

Town of Thompson's Station  
Municipal Planning Commission  
Meeting Agenda  
October 25, 2018

**Meeting Called To Order**

**Pledge Of Allegiance**

**Minutes-**

**Consideration Of The Minutes Of The September 25, 2018 Meeting**

Documents:

[09252018 MINUTES\\_.PDF](#)

**Public Comments-**

**New Business:**

**1. Preliminary Plat For The Subdivision Of 91 Lots For Littlebury Located Along The East Side Of Pantall Road (PP 2018-006)**

Documents:

[ITEM 1 LITTLEBURY STAFF REPORT.PDF](#)  
[ITEM 1 LITTLEBURY PLAT PACKET.PDF](#)  
[ITEM 1 LITTLEBURY REVISED TRAFFIC STUDY DATED SEPT 2018.PDF](#)  
[ITEM 1 BARGE TRAFFIC STUDY REVIEW.PDF](#)  
[ITEM 1 BAUGH ROAD EXHIBIT.PDF](#)

**2. Preliminary Plat For The Subdivision Of 27 Lots For Phase 2A Of The "Town Center" In The Tollgate Village Community (PP 2018-008)**

Documents:

[ITEM 2 TV 2A PRELIM PLAT STAFF REPORT.PDF](#)  
[ITEM 2 TV 2A PRELIMINARY PLAT.PDF](#)  
[ITEMS 2 AND 3 TOLLGATE VILLAGE TRAFFIC STUDY.PDF](#)  
[TIS RESPONSE - TOLLGATE VILLAGE OCTOBER 2018.PDF](#)

**3. Site Plan For The Development Of Phase 2A (Townhomes, Condominiums, Live Work And Mixed Use) Within The Tollgate Village Community (SP 2018-007)**

Documents:

[ITEM 3 TV 2A STAFF REPORT.PDF](#)  
[ITEM 3 SITE PLAN PACKET.PDF](#)  
[ITEM 3 SEWER TAP ANALYSIS.PDF](#)

**4. Site Plan Amendment To The Specific Plan For Graystone Quarry To Add A Ticket Booth, Restrooms, Concession Buildings And A Storage Building Located At 4520 Graystone Quarry Lane (SP 2018-005)**

Documents:

ITEM 4 GRAYSTONE STAFF REPORT.PDF  
ITEM 4 SITE PLAN PACKET.PDF  
ITEM 4 SITE PLAN PACKET 2.PDF

**5. Final Plat For The Dedication Of An Extension To Branford Place To Provide Access To An Existing Lot (FP 2018-019)**

Documents:

ITEM 5 TV BRANFORD STAFF REPORT.PDF  
ITEM 5 BRANFORD PLAT.PDF

**6. Request To Waive The Requirement For A 20-Foot Easement As Required In Section 3.10.1 Of Article 3 – Subdivision Regulations Within The Land Development Ordinance (FP 2018-018)**

Documents:

ITEM 6 STAFF MEMO FP DEVIATION REQUEST.PDF  
ITEM 6 WES JUSTIFICATION LETTER.PDF  
ITEM 6 FC 1158-1159 FINAL PLAT.PDF

**Adjourn**

*This meeting will be held at 7:00 p.m. at the Thompson's Station Community Center  
1555 Thompson's Station Rd West*



**Minutes of the Meeting**  
**of the Municipal Planning Commission**  
**of the Town of Thompson 's Station, Tennessee**  
**September 25, 2018**

**Call to Order:**

The meeting of the Municipal Planning Commission of the Town of Thompson's Station was called to order at 7:00 p.m. on the 28<sup>nd</sup> day of August 2018 at the Thompson's Station Community Center with the required quorum. Members and staff in attendance were: Chairman Jack Elder; Vice Chairman Mike Roberts; Commissioner Shaun Alexander; Alderman Ben Dilks; Commissioner Trent Harris; Commissioner Tara Rumpler; Commissioner Bob Whitmer; Town Planner Wendy Deats, Town Clerk Jennifer Jones and Town Attorney Todd Moore.

**Pledge of Allegiance.**

**Minutes:**

The minutes of the August 28, 2018 meeting were previously submitted.

**Commissioner Whitmer made a motion to approve of the August 28, 2018 meeting minutes. The motion was seconded and carried unanimously.**

**Public Comment:**

**Aaron Holliday – Grove Park Construction** – Supportive of the garage provision amendment and would like consideration to add D1 to the LDO Amendment.

**George Dean – Representative of Crescent Homes** – Supportive of garage LDO amendment and would like to see it considered for approval.

**Kevin Sturgill – Lennar Homes** - Supportive of garage LDO amendment and would like to see it considered for approval.

**Planner Report:**

Mrs. Deats informed the Commission that the October 23<sup>rd</sup> Planning Commission meeting has been rescheduled to October 25<sup>th</sup>, 2018.

Avenue Downs has sent in a withdrawal request in order for the Town to complete the wastewater study.

**Unfinished Business:**

- 1. Final Plat for the creation of 70 single-family lots and five (5) open space lots within section 17 of Tollgate Village (FP 2018-013).**

Mrs. Deats reviewed her report and Based on the project's consistency with the preliminary plat for section 17 and with the incorporation of the recommended contingencies, the plat will comply with the Land Development Ordinance, therefore, Staff recommends the Planning Commission approve the final plat with the following contingencies:

Page 2

1. Prior to the recordation of the final plat, a plat identifying all remaining open space shall be approved by the Town.
2. Prior to recordation of the final plat, all sewer improvements shall be completed and shall pass any necessary testing. These improvements shall include a driveway from Wareham Drive to the pump station in addition to a water spigot at the pump station.
3. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$380,000 for roadways, drainage and erosion control with automatic renewal.
4. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$280,000 for sewer with automatic renewal.
5. All tree replacements shall be installed in accordance with the approved replacement plan for phase 17.
6. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$84,000 for the landscaping (tree replacement).
7. As built drawings shall be required for the drainage and sewer system with a letter from the Design Engineer that they are constructed per the approved drawings and functioning as intended.

**After discussion, Commissioner Harris made a motion to approve Item 1, Final Plat for the creation of 70 single-family lots and five (5) open space lots within section 17 of Tollgate Village with Staff recommended contingencies. The motion was seconded and carried by all.**

**New Business:**

2. **Preliminary Plat for the subdivision of 69 lots for the development of Avenue Downs.**

*Item 2 was withdrawn by the applicant.*

3. **Final Plat for the creation of three (3) single-family lots within section 18A of Tollgate Village (FP 2018-016)**

Mrs. Deats reviewed her report and Staff recommends the Planning Commission approve the final plat with the following contingencies:

1. Prior to the recordation of the final plat, the plats with all remaining open space shall be recorded.
2. Prior to the recordation of the final plat, the development agreement for phase 18 shall be approved and executed between the Town and the developer.
3. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$16,500 for sewer with automatic renewal.
4. As built drawings shall be required for the drainage and sewer system with a letter from the Design Engineer that they are constructed per the approved drawings and functioning as intended.

**After discussion, Commissioner Roberts made a motion to approve Item 3, Final Plat for the creation of three (3) single-family lots within section 18A of Tollgate Village with Staff recommended contingencies. The motion was seconded and carried by all.**

**4. LDO Amendment to reduce the garage as required in Section 4.10 Use Residential Property Standards (LDO Amend 2018-006)**

Mrs. Deats reviewed her report and Staff recommends that the Planning Commission consider recommending the amendment as proposed to the Board of Mayor and Aldermen.

**After discussion, Commissioner Roberts made a motion to deny the LDO Amendment to reduce the garage as required in Section 4.10 Use Residential Property Standards. The motion was seconded and carried by all.**

There being no further business, Commissioner Alexander made a motion to adjourn. The motion was seconded, and the meeting was adjourned at 7:59 p.m.

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Jack Elder, Chairman

Attest:

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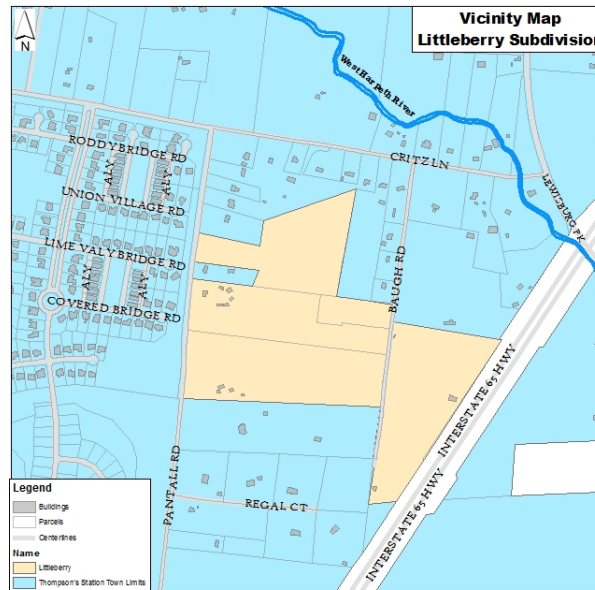
Shaun Alexander, Secretary

**Thompson's Station Planning Commission  
Staff Report – Item 1 (PP 2018-006)  
October 25, 2018**

**Littleberry Preliminary Plat for the creation of 91 single family lots and 13 open space lots on 91.17 acres along the east side of Pantall Road along with the removal of 14 trees. The applicant is also requesting the Town vacate Baugh Road as is currently identified.**

**PROJECT DESCRIPTION**

Great Tennessee Land Company submitted a request for a preliminary plat to subdivide 91.17 acres include 91 single family lots and 13 open space lots located along the east side of Pantall Road along with the removal of 14 trees that have a diameter of 18 inches or greater. The applicant is also requesting that Baugh Road through the project site be vacated and a new connection be approved.



**BACKGROUND**

The developer, Great Tennessee Land Company submitted a concept plan for review in November 2017. The project originally included the development of 87 single family homes on 87.1 acres along the east side of Pantall Road. Staff noted during the planner report that the project was substantially consistent with the D1 zoning district, however, some details were not shown on the concept plan and are reviewed during the preliminary plat phase for compliance with the LDO. Staff also expressed concerns that a traffic study had not been submitted and a connection to Baugh Road should be considered during the evaluation of access to the site to provide another future access to the residences.

The developer has acquired additional acreage and has modified the concept plan to 91 single-family lots on 91.17 acres. The developer has also considered the location of Baugh Road and is proposing a future connection to Baugh Road and requesting the town vacate the current Baugh Road.

**ANALYSIS**

*Land Use/Density*

The proposed residential subdivision is located within the D1 – Low Intensity zoning district which single family at a density of one unit per acre. The overall project area is 91.17 acres thereby

permitting up to 91 single family lots. The proposed neighborhood is located along a collector, Pantall Road and has freeway adjacency in proximity to other single family residences.

#### *Lot Width and Setbacks*

The single family lots will vary in size from .27 acres to over an acre with widths greater than 85 feet. The proposed setbacks are 25 feet for the front yard setback, 10 feet for the side yards and 30 feet for the rear yard setback. The zone permits 25 feet for the front yard, an aggregate of 20 feet with a minimum of five feet for the side yard and 30 feet for the rear yard. Secondary frontages shall maintain a minimum of 20 feet. Driveway lengths are required to be a minimum of 20 feet with a width of 12 feet from the right of way to the setback (25 feet).

#### *Roadways*

The standard for local roadways is 50 feet. The project will consist of two entrances from Pantall Road, Cherry Jack and Littlebury Park and a network of local roads to serve each lot within the neighborhood. Both Cherry Jack and Littlebury Park have a median proposed within the right-of-way, however all roadways will have a 50 feet right-of-way with a five-foot-wide landscape strip and a five-foot-wide sidewalk. Street lights are not shown on the plat; however, Staff recommends a contingency that street lights shall be installed within the landscape strip between the sidewalk and the roadway. The maximum block length permitted within the D1 zoning district is 1200 feet. The maximum block length within the neighborhood is 1100 feet.

Currently Baugh Road is a private driveway that runs through the east side of the proposed project in proximity to Interstate 65. The applicant is requesting that this portion of Baugh Road be vacated, and a new connection be approved (see attached exhibit). To vacate a right-of-way, the Board of Mayor and Aldermen would need to review the request, however, Staff recommends that the Planning Commission evaluate the street network through the proposed development and make a recommendation for the vacation of the existing road as shown on the county maps. The future connection to Baugh Road would be located between two open space lots 96 and 97.

#### *Slope and Critical Lots*

No development on areas greater than 25% is permitted or proposed on the plat. However, several lots contain slopes between 15 and 25% and are critical lots due to these slopes. A grading plan will be reviewed with the construction plans for the overall phase. Prior to the issuance of building permits, all critical lots require engineered site plans and site-specific grading plans to address any issues.

#### *Open Space*

Residential subdivisions require a minimum of 45% open space which is required to be platted as permanent open space. Land that is undevelopable, such as but not limited to, areas of 25% of greater slope, waterways or sinkholes shall be placed within the open space. The developer proposed 46.01 acres or 50% of the site. The proposed open space is not entirely contiguous however is determined based on the location of the resources throughout the site. The open space is planned around the natural and historic resources on the site and includes a cemetery, areas of undevelopable slope, the water resources, and some wooded areas.

#### *Amenities*

The proposed subdivision consisting of 91 lots is required to have one amenity to serve the residents. The developer proposes a trail network through the open space connecting to the sidewalks to meet the code. In addition, another (second) amenity area is proposed within open

space lot 98. No plans for the second amenity are submitted at this time, however, is available for future use.

#### *Landscaping/Tree Removal*

The subdivision, located within the D1 zoning district abuts other D1 zoning and is required to have a type 2 buffer adjacent to surrounding properties. The applicant proposes a type 2 buffer along the property lines within the public utility and drainage easement.

The development of this project includes the removal of 14 trees for a total of 589.5 inches. The Land Development Ordinance requires the replacement of trees 18 inches or greater to be replaced at a ratio of one and a half inches for every inch removed. Therefore, 884.25 inches of trees are required to be replaced on the site. The landscape plan includes the planting of 1225 inches of trees on site, which will be planted as street trees and front yard trees for each lot.

#### *Construction Route*

Access to the subdivision will consist of two new roadways (entrances from Pantall Road), Cherry Jack and Littlebury Park, which will serve the internal network of local roads. The first phase will result in the construction of Cherry Jack which will serve as the construction access/route into/through the subdivision. Once phase 1 is complete and roads are final topped, Littlebury Park will become the construction access and route for the duration of the project.

#### *Natural Resources*

The overall site contains several water features and are within the jurisdiction of the Tennessee Department of Environment and Conservation (TDEC). Two roadways, Cherry Jack and Littlebury Park Drive are shown crossing water features (stream) on the site. Therefore, prior to any construction activities, permits shall be required through TDEC. A cemetery is also located on site and shall be preserved with a 20-foot access easement and located within the open space. A geotechnical report was submitted, and recommendations will be incorporated into project approval.

#### *Traffic Study*

A traffic study was submitted, reviewed by the Town's traffic engineer and a revised study was submitted as a result of the comments. Barge Design Solutions has reviewed the revised study. They find that the revised study addresses the comments and offers mitigation that is expected to mitigate the impacts of the proposed development. Therefore, Staff recommends that the report be accepted, and the traffic mitigation/recommendations are included in the contingencies.

Barge Design Solutions also recommends that the right-of-way dedication be confirmed on the plat. The plat does not clearly state the dedication of the right-of-way; therefore, Staff recommends the incorporation of a contingency for the dedication of the roadway along the project frontage.

### **RECOMMENDATION**

Based on the project's compliance with the Town's Land Development Ordinance, Staff recommends that the Planning Commission approve the plat with the following contingencies:

1. Prior to the approval of construction plans, the developer shall enter into a development agreement for the project.
2. Prior to the approval of a final plat, roadway dedication along the entire project frontage on Pantall Road shall be incorporated into the plat for recordation of the public right-of-way.
3. Prior to the approval of construction plans, the developer shall obtain any necessary permits through the Tennessee Department of Environment and Conservation.

4. Prior to the approval of construction plans, the developer shall obtain BOMA approval for a wastewater management plan.
5. Prior to the approval of construction plans, all applicable codes and regulations shall be addressed to the satisfaction of the Town Engineer. Any corrections or issues with the drawings related to regulations may be subject to further Planning Commission review.
6. Prior to the approval of construction drawings, a drainage study shall be submitted to verify that storm water is managed adequately on site.
7. All landscape buffers and replacement trees shall be installed and maintained in a healthy manner.
8. Any signage proposed for the subdivision shall comply requirements set forth within the Land Development Ordinance and shall be located within the open space and maintained by the homeowner's association.
9. Street lights shall be incorporated in accordance with the Land Development Ordinance and shall be documented on the construction drawings.
10. All construction traffic into these phases shall be required to use Cherry Jack during phase 1. Upon completion of phase 1 and the final topping of the roadways within the phase, Littlebury Park shall be used for all construction traffic. No construction traffic is permitted on Baugh Road or Regal Court.
11. All recommendations within the geotechnical report shall be adhered to during construction activities. Any new information or features not identified shall be subject to the review by a geotechnical engineer.
12. All recommendations within the traffic study shall be completed.
13. Any change of use or expansion of the project site shall conform to the requirements set forth within the Land Development Ordinance and shall be approved prior to the implementation of any changes to the project.

Staff recommends that the Planning Commission recommend that the Board of Mayor and Aldermen approve vacating a portion of Baugh Road through Tax Map 145, Parcel 039.00 (as noted on the Williamson County tax records) be approved with the following contingency:

1. A connection to Baugh Road shall be constructed as shown on the preliminary plat and shall be used as fire access only until such time that improvements to Baugh Road will be made for public access.

ATTACHMENT

Preliminary Plat packet

Revised Traffic Study (dated September 2018)

Barge Design Traffic Memo

Baugh Road exhibit

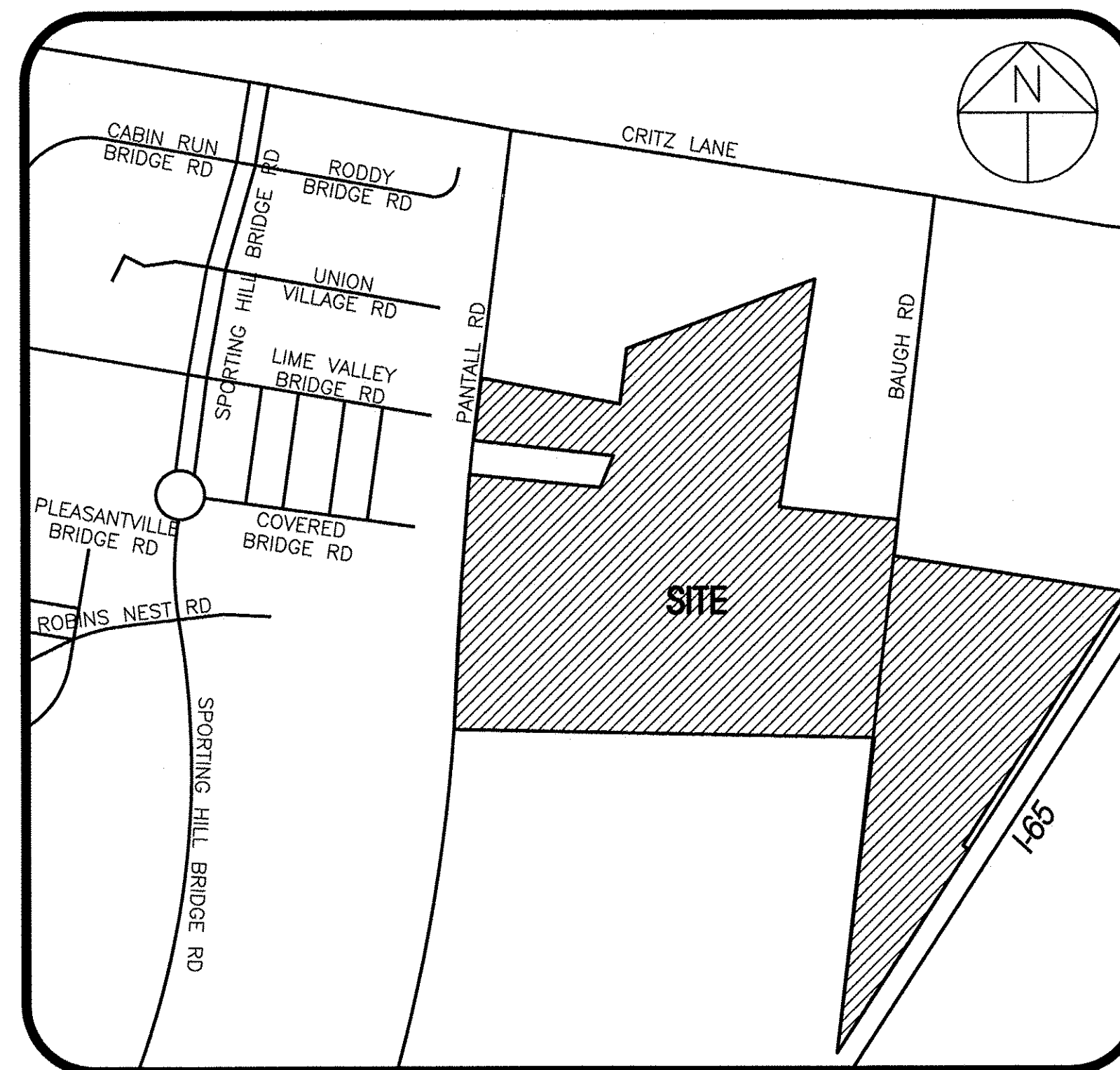
# Littlebury Subdivision

## Preliminary Plat

### Thompson's Station, Tennessee

#### Drawing Index

Sheet No.	Title
C0.0	Cover Sheet
C0.1	Master Site Plan
C1.0 - C1.7	Preliminary Plats



Site Location Map  
Not To Scale

Watershed: West Harpeth River

#### Owner:

- Kim Davis  
2625 Baugh Ln.  
Thompson station, TN 37179  
DB 6178  
PG 490
- Lisa Horvath  
2632 Pantall Rd.  
Thompson Station, TN 37179  
DB 1488  
PG 898
- W.T. Williams  
2638 Pantall Rd.  
Thompson Station, TN 37179  
DB 1000  
PG 757
- Robert White  
6430 Arno Rd.  
College Grove, TN 37046  
DB 4461  
PG 864
- Don Cameron  
2634 Baugh Ln.  
Thompson Station, TN 37179  
DB 3881  
PG 473
- William Marlin  
319 Lakeway Ter.  
Springhill, TN 37174  
DB 119  
PG 170
- Ellen Bogle  
6430 Arno Rd.  
College Grove, TN 37046  
DB 364  
PG 372

#### Developer:

Great Tennessee Land Co.  
c/o: Mr. Daniel Woods  
7123 Cross Roads, Suite E  
Brentwood, TN 37027

#### Floodplain Note:

No Portion of this site lies within a 100 Year Flood Hazard Area per F.E.M.A. Map No. 47187C0365F, dated Sept. 29, 2006.

#### Land Data:

91 Buildable Lots on 35.41 Ac.±  
13 Open Space Lots on 45.75 Ac.± (50%)  
Total Land Area: 91.17 Ac.±  
Zoned: D1

#### Lot Setbacks:

Front: 25'  
Side: 10'  
Rear: 30'

#### Deed Reference:

The property shown hereon as follows, in Williamson County.

Tax Map	Parcel	Deed	Page
145	34.00	4461	864
145	34.05	364	372
145	37.00	1000	757
145	37.01	1488	898
145	37.07	6178	490
145	38.00	119	170
145	39.00	3881	473

#### S.T.E.P. System Data:

Wastewater Lots: 10.60± Acres  
Design Flow = 30,000 GPD  
Required Land Application Area + Reserve Area = 5.17 Ac.  
Provided Land Application Area + Reserve Area = 6.37 Ac.

Approved by the City of Thompson Station Planning Commission, with such conditions as are indicated in the minutes of the Commission on 11.

#### Purpose Statement:

Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

#### Contacts:

**Middle Tennessee Electric Member. Corp.:**  
2156 Edward Curd Lane  
Franklin, TN 37067  
Phone: (615) 794-3561  
Contact: Jacob Cain

**Engineer/Surveyor:**  
Site Engineering Consultants, Inc.  
850 Middle Tennessee Blvd.  
Murfreesboro, TN 37129  
Phone: (615) 890-7901  
Contact: Jamie Reed

**Engineering:**  
Clifton and King, LLC  
1525 Thompson Rd. W.  
Thompson Station, TN 37179  
Phone: (615) 591-9885  
Contact: Steve Clifton

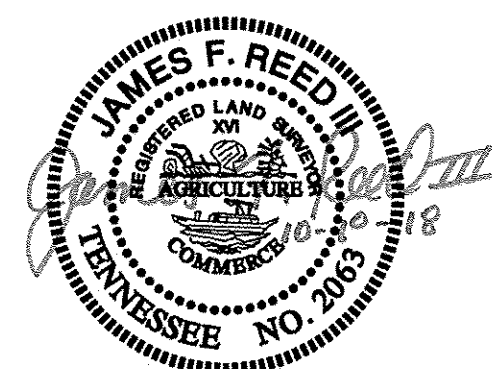
**H.B. & T.S.**  
505 Downs Blvd.  
Franklin, TN 37064  
Phone: (615) 794-7796

**SEC, Inc.** SITE ENGINEERING CONSULTANTS  
ENGINEERING • SURVEYING • LAND PLANNING  
LANDSCAPE ARCHITECTURE

850 MIDDLE TENNESSEE BOULEVARD MURFREESBORO, TENNESSEE 37129  
PHONE: (615) 890-7901 E-MAIL: JREED@SEC-CIVIL.COM FAX: (615) 895-2567

NO PORTION OF THIS DRAWING MAY BE REPRODUCED WITHOUT THE EXPRESSED WRITTEN CONSENT OF S.E.C. INC.

By: James F. Reed III Date: Oct. 10, 2018  
James F. Reed III, P.E., R.L.S. TN. Reg. #02063



Sheet C0.0  
Littlebury  
S.E.C. Project #17224  
Date: 5-1-18  
Revised: 8-30-18 Comments  
9-26-18 Update Lot Layout









**NOTE:**  
See Construction Plans  
for Offsite Roadway  
Improvements.

**\* CRITICAL LOTS**

Description	Area
Lots	35.41± Ac.
Row Dedication	9.80± Ac.
Length of Roads	7,441 L.F.
Min Lot Area	10,000 s.f.
Min Open Space Required	36.47 Ac. (40%)
Open Space Provided	45.93± Ac. (50%)
Wastewater Lots	0.17± Ac.
Total Land Area	91.17± Ac.

BLOCK LENGTHS				
Street Name	Intersection	Intersection	Length	
1 Littlebury Park Dr.	Pantall Rd.	Giddens Ct.	525.34'	
2 Giddens Ct.	Littlebury Park Dr.	C.D.S.	524.06'	
3 Littlebury Park Dr.	Giddens Ct.	Cherry Jack Ln.	605.44'	
4 Littlebury Park Dr.	Cherry Jack Ln.	Sarah Bee Ln.	904.75'	
5 Sarah Bee Ln.	Littlebury Park Dr.	C.D.S.	296.14'	
6 Sarah Bee Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	286.91'	
7 Sarah Bee Ln.	Jeremiah Cherry Tr.	Giddens Ct.	1155.28'	
8 Cherry Jack Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	141.45'	
9 Cherry Jack Ln.	Jeremiah Cherry Tr.	Sarah Bee Ln.	472.49'	
10 Cherry Jack Ln.	Sarah Bee Ln.	Pantall Rd.	1331.92'	

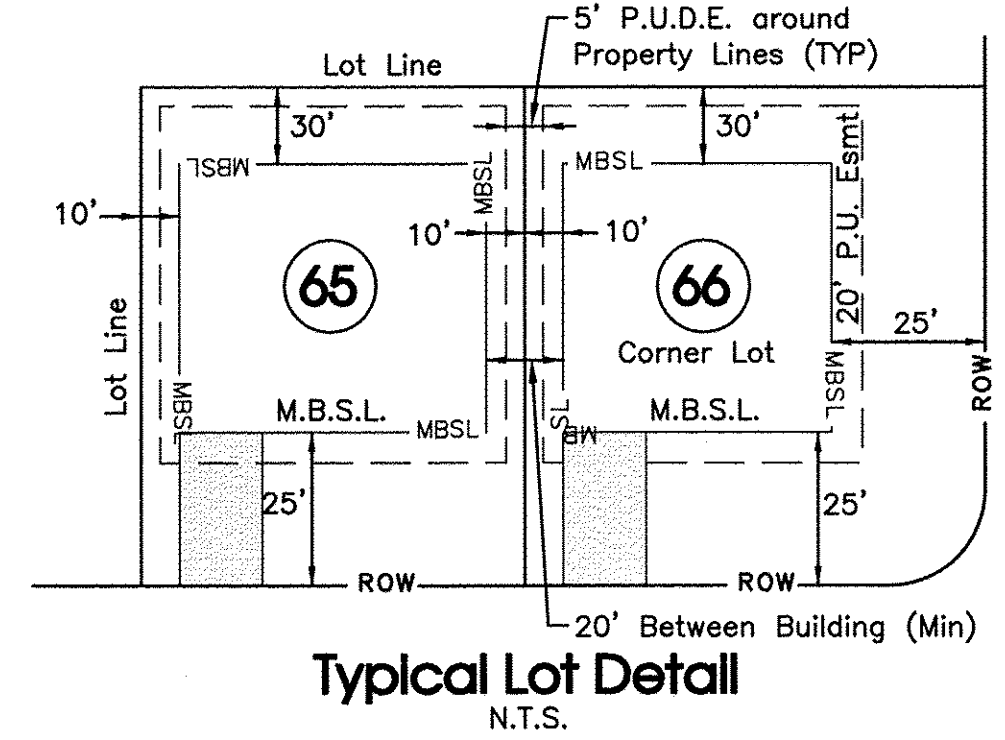
GIDDENS COURT					
PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
2+71.60	500.00'	375.89'	43°04'27.54"	11°27'32.96"	367.10'

LITTLEBURY PARK DRIVE					
PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
2+08.10	1000.00'	90.81'	05°12'10.80"	05°43'46.48"	90.78'
6+62.65	1500.00'	478.24'	18°16'03.28"	03°49'10.99"	476.22'
13+47.72	1000.00'	360.36'	20°38'49.51"	05°43'46.48"	358.41'
17+60.58	800.00'	134.59'	09°38'22.38"	07°09'43.10"	134.43'

Lot #	Lot Area (s.f.)	Lot #	Lot Area (s.f.)
1	19024	54	17272
2	19587	55	18978
3	18704	56	19258
4	16786	57	17816
5	15831	58	16690
6	14927	59	14250
7	12389	60	18818
8	14736	61	23726
9	17595	62	21215
10	18903	63	16578
11	20705	64	16960
12	20878	65	19899
13	20303	66	16383
14	17577	67	21141
15	16166	68	14289
16	15276	69	14289
17	13851	70	13458
18	12900	71	13532
19	13137	72	12942
20	16335	73	14976
21	15308	74	13103
22	47549	75	14349
23	41006	76	19501
24	21326	77	18366
25	15923	78	11821
26	15547	79	12518
27	13500	80	17028
28	15000	81	15993
29	15000	82	18271
30	16314	83	16423
31	16194	84	15954
32	16194	85	18777
33	16194	86	19029
34	23209	87	12684
35	19963	88	11700
36	17557	89	11647
37	17512	90	11508
38	17499	91	13646
39	17500	92 (OS)	9262
40	15982	93 (OS)	564799
41	15212	94 (OS)	37513
42	12657	95 (OS)	86979
43	13441	96 (OS)	678850
44	14256	97 (OS)	12697
45	15248	98 (OS)	43389
46	16527	99 (OS)	389440
47	16178	100 (OS)	101571
48	16309	101 (OS)	64873
49	13219	102 (OS)	5232
50	13750	*103 (OS)	8471
51	13658	104 (OS)	6783
52	12361	105 (WW)	7198
53	15876		

CURVE DELTA ANGLE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH	
C1	710.50'	243.01'	274.39'	N 02°06'10"E	274.09'
C2	246.50'	4129.88'	200.41'	N 02°43'30"E	200.39'



Typical Lot Detail  
N.T.S.

**Note:**  
All Open Space is to be maintained by the Home Owners Association Third Party.

The proposed electric and water information shown hereon is not an actual design to be used for construction, and is for reference and illustrative purposes only. The contractor shall refer to the actual final design for each proper discipline (electrical, civil, mechanical, etc.) with the Tennessee professional engineer's seal, for precise design information.

**Purpose Statement:**  
Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

Legend:			
□	EXIST. CONCRETE MONUMENT	⊕	BENCHMARK
●	IRON PIN SET (I.P.S.)	⊕	HANDICAP RAMP SYMBOL
○	IRON PIN FOUND (I.P.F.)	V.A.	VAN ACCESSIBLE HANDICAP DESIGNATION
+	EXIST. SIGN POST	⊕	HC SIGN
○	EXIST. SEWER CLEANOUT	+	PROPOSED SIGN POST
⊕	EXIST. MANHOLE (SEWER & PHONE)	•	CONCRETE BOLLARD
⊕	EXIST. CATCH BASIN (STORM SEWER)	⊕	WHEEL STOP
⊕	EXIST. WATER/GAS VALVE	⊕	CONCRETE SIDEWALK
⊕	EXIST. TELEPHONE RISER	⊕	EXTRUDED CURB
⊕	EXIST. GAS RISER	⊕	CURB & GUTTER
⊕	ELECTRICAL ENCLOSURE	➔	TRAFFIC ARROW
⊕	EXIST. WATER METER	➔	TURN LANE ARROWS
⊕	EXIST. UTILITY POLE	⊕	REVISION NUMBER
⊕	EXIST. FIRE HYDRANT	#1	DRAINAGE STRUCTURE DESIGNATION
⊕	POST INDICATOR VALVE	A	DRAINAGE PIPE DESIGNATION
⊕	BLOW OFF VALVE	⊕	RIP RAP
⊕	REDUCER	➔	RUNOFF FLOW ARROW
⊕	REMOTE FIRE DEPT. CONNECTION	⊕	INLET FILTER PROTECTION
⊕	CONCRETE THRUST BLOCK	63.25 x	PROPOSED SPOT ELEVATION
⊕	DOUBLE DETECTOR CHECK VALVE	(63.25) x	EXIST. SPOT ELEVATION
⊕	FIRE DEPT. CONNECTION	➔	SEWER/STORM FLOW DIRECTION
⊕	FIRE HYDRANT	⊕	CATCH BASIN
⊕	GATE VALVE & BOX	⊕	CURB INLET
⊕	WATER METER	⊕	AREA DRAIN
⊕	GAS METER	⊕	HEADWALL
⊕	GREASE TRAP	⊕	WINGED HEADWALL
⊕	EXTERIOR CLEANOUT ECO	⊕	CONCRETE SWALE
⊕	MANHOLE	⊕	TYPE- X- HEADWALL

EXISTING PHONE	PH
EXISTING ELECTRIC	OH
PROPERTY LINE	---
EASEMENTS	---
RIGHT OF WAY	50' ROW
EROSION CONTROL SILT FENCE	SF SF
EROSION EEL	E E E
EXISTING TREELINE	---
EXISTING FENCELINE	X X X
MINIMUM BUILDING SETBACK LINE	MBSL
PHASE BOUNDARY	-----
EXISTING GAS LINE	GAS
PROPOSED GAS LINE	GAS
EXISTING STORM	STM
PROPOSED STORM	STM
EXISTING CONTOUR LINES	601
PROPOSED CONTOUR LINES	601
EXISTING SANITARY SEWER	SS SS
PROPOSED SANITARY SEWER	SS SS
EXISTING WATER	W W
PROPOSED WATER	W W

811  
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SCALE: 1"=50'

**SEC, Inc.**  
SITE ENGINEERING CONSULTANTS  
ENGINEERING • SURVEYING • LAND PLANNING  
LANDSCAPE ARCHITECTURE  
850 MIDDLE TENNESSEE BOULEVARD  
MURFREESBORO, TENNESSEE 37129  
PHONE: (615) 890-7901 E-MAIL: JREED@SEC-CIVIL.COM FAX: (615) 895-2887  
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**MASS F. REED III**  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF TENNESSEE

**Littlebury Subdivision**  
Thompson Station, Tennessee

**Preliminary Plat**

REVISIONS: 8-30-18 Comments  
9-26-18 Update Lot Layout  
DRAWN: MLG  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleburyPrelim  
SCALE: 1"=50'  
JOB NO. 17224  
SHEET: C1.0





Description	Area
Lots	35,412 Ac.
Row Dedication	9,802 Ac.
Length of Roads	7,441 L.F.
Min Lot Area	10,000 s.f.
Min Open Space Required	36.47 Ac. (40%)
Open Space Provided	45,932 Ac. (50%)
Wastewater Lots	0.172 Ac.
Total Land Area	91.171 Ac.

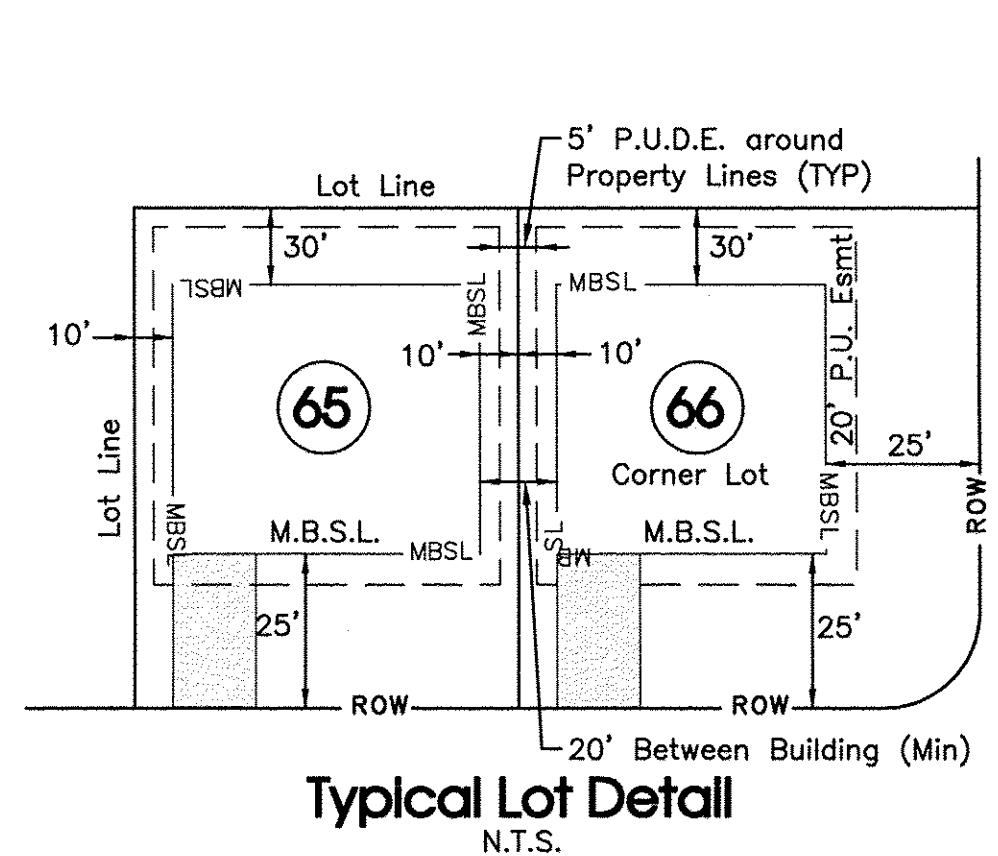
Lot #	Lot Area (s.f.)	Lot #	Lot Area (s.f.)
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3	18704	56	19258
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49	13219	102 (OS)	5232
50	13750	*103 (OS)	8471
51	13658	104 (OS)	6783
52	12361	105 (WW)	7198
53	15876		

**Legend:**

EXIST. CONCRETE MONUMENT	BENCHMARK
IRON PIN SET (I.P.S.)	HANDICAP RAMP SYMBOL
IRON PIN FOUND (I.P.F.)	VAN ACCESSIBLE HANDICAP DESIGNATION
EXIST. SIGN POST	HC SIGN
EXIST. SEWER CLEANOUT	PROPOSED SIGN POST
EXIST. MANHOLE (SEWER & PHONE)	CONCRETE BOLLARD
EXIST. CATCH BASIN (STORM SEWER)	WHEEL STOP
EXIST. WATER/GAS VALVE	CONCRETE SIDEWALK
EXIST. TELEPHONE RISER	EXTRUDED CURB
EXIST. GAS RISER	CURB & GUTTER
ELECTRICAL ENCLOSURE	TRAFFIC ARROW
EXIST. WATER METER	TURN LANE ARROWS
EXIST. UTILITY POLE	REVISION NUMBER
EXIST. FIRE HYDRANT	#1 DRAINAGE STRUCTURE DESIGNATION
POST INDICATOR VALVE	DRAINAGE PIPE DESIGNATION
BLOW OFF VALVE	RIP RAP
REDUCER	RUNOFF FLOW ARROW
REMOTE FIRE DEPT. CONNECTION	INLET FILTER PROTECTION
CONCRETE THRUST BLOCK	PROPOSED SPOT ELEVATION
DOUBLE DETECTOR CHECK VALVE	EXIST. SPOT ELEVATION
FIRE DEPT. CONNECTION	SEWER/STORM FLOW DIRECTION
FIRE HYDRANT	CATCH BASIN
GATE VALVE & BOX	CURB INLET
WATER METER	AREA DRAIN
GAS METER	HEADWALL
GREASE TRAP	WINGED HEADWALL
EXTERIOR CLEANOUT ECO	CONCRETE SWALE
MANHOLE	TYPE - X - HEADWALL

EXISTING PHONE	PH
EXISTING ELECTRIC	OH
PROPERTY LINE	
EASEMENTS	
RIGHT OF WAY	50' ROW
EROSION CONTROL SILT FENCE	SF SF
EROSION EEL	E E E
EXISTING TREELINE	
EXISTING FENCELINE	X X
MINIMUM BUILDING SETBACK LINE	MBSL
PHASE BOUNDARY	
EXISTING GAS LINE	GAS
PROPOSED GAS LINE	GAS
EXISTING STORM	STM
PROPOSED STORM	STM
EXISTING CONTOUR LINES	601
PROPOSED CONTOUR LINES	601
EXISTING SANITARY SEWER	SS SS
PROPOSED SANITARY SEWER	SS SS
EXISTING WATER	W W
PROPOSED WATER	W W

**\* CRITICAL LOTS**



**CHERRY JACK LANE**

PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
5+05.04	770.75'	511.86'	38°03'02.84"	07°26'01.57"	502.51'
9+31.74	570.26'	349.82'	35°08'50.94"	10°02'50.06"	344.36'
13+93.67	500.00'	214.83'	24°37'05.50"	11°27'32.96"	213.19'
16+63.76	500.00'	76.36'	08°45'00.90"	11°27'32.96"	76.29'

**JEREMIAH CHERRY TRAIL**

PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
2+74.26	1973.79'	449.29'	13°02'31.99"	02°54'10.19"	448.32'
6+61.32	986.49'	323.85'	18°48'33.59"	05°48'29.03"	322.40'

**LITTLEBURY PARK DRIVE**

PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
2+08.10	1000.00'	90.81'	05°12'10.80"	05°43'46.48"	90.78'
6+62.65	1500.00'	478.24'	18°16'03.28"	03°49'10.99"	476.22'
13+47.72	1000.00'	360.36'	20°38'49.51"	05°43'46.48"	358.41'
17+60.58	800.00'	134.59'	09°38'22.38"	07°09'43.10"	134.43'

**BLOCK LENGTHS**

Street Name	Intersection	Intersection	Length
1 Littlebury Park Dr.	Pantall Rd.	Giddens Ct.	525.34'
2 Giddens Ct.	Littlebury Park Dr.	C.D.S.	524.06'
3 Littlebury Park Dr.	Giddens Ct.	Cherry Jack Ln.	605.44'
4 Littlebury Park Dr.	Cherry Jack Ln.	Sarah Bee Ln.	904.75'
5 Sarah Bee Ln.	Littlebury Park Dr.	C.D.S.	296.14'
6 Sarah Bee Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	286.91'
7 Sarah Bee Ln.	Jeremiah Cherry Tr.	Giddens Ct.	1155.28'
8 Cherry Jack Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	141.45'
9 Cherry Jack Ln.	Jeremiah Cherry Tr.	Sarah Bee Ln.	472.49'
10 Cherry Jack Ln.	Sarah Bee Ln.	Pantall Rd.	1331.92'

**Purpose Statement:**  
Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

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**Note:**  
All Open Space is to be maintained by the Home Owners Association Third Party.

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SCALE: 1" = 50'

**SEC, Inc.**  
SITE ENGINEERING CONSULTANTS  
ENGINEERING • SURVEYING • LAND PLANNING  
LANDSCAPE ARCHITECTURE  
860 MIDDLE TENNESSEE BOULEVARD, SUITE 200, THOMPSON STATION, TENNESSEE 37172  
PHONE: (615) 800-7000 FAX: (615) 804-5500  
WWW.SEC-CUSTOMERS.COM  
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**STATE OF TENNESSEE**  
REGISTERED PROFESSIONAL ENGINEER  
No. 10000  
EXPIRES 12/31/2024

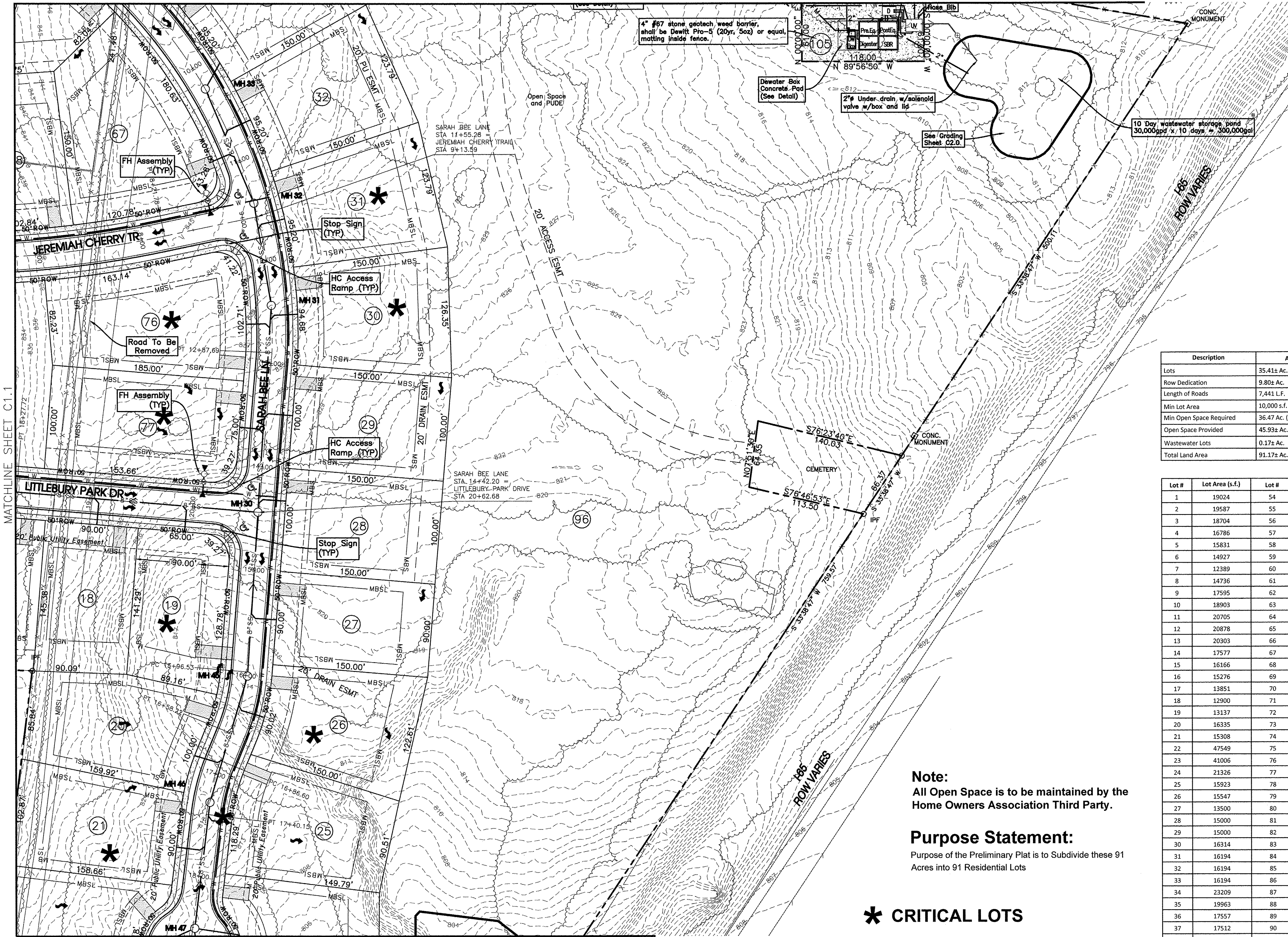
**Littlebury Subdivision**  
Thompson Station, Tennessee

**Preliminary Plat**

REVISIONS: 8-30-18 Comments  
9-26-18 Update Lot Layout  
DRAWN: MLC  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224\Littlebury\ Prelim  
SCALE: 1" = 50'  
JOB NO. 17224  
SHEET: C1.1

Plot Style: S.E.C. Standard Monocott Plot Date: 10/10/2018 7:47 AM User: CADTECH4





MATCHLINE SHEET C1.1

MATCHLINE SHEET C1.3

Description	Area
Lots	35.41± Ac.
Row Dedication	9.80± Ac.
Length of Roads	7,441 L.F.
Min Lot Area	10,000 s.f.
Min Open Space Required	36.47 Ac. (40%)
Open Space Provided	45.93± Ac. (50%)
Wastewater Lots	0.17± Ac.
Total Land Area	91.17± Ac.

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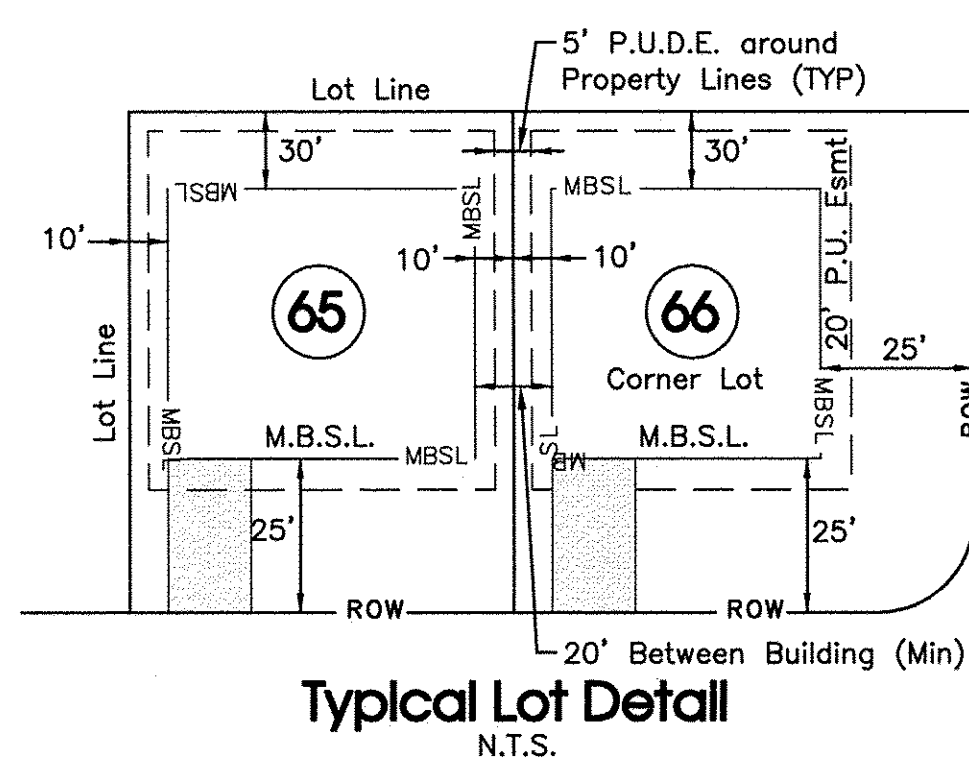
PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
10+21.15	471.16'	690.93'	84°01'16.64"	12°09'38.02"	630.67'
16+37.43	200.00'	231.80'	66°24'24.15"	28°38'52.40"	219.04'

**Note:**  
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**Purpose Statement:**  
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**\* CRITICAL LOTS**

The proposed electric and water information shown hereon is not an actual design to be used for construction, and is for reference and illustrative purposes only. The contractor shall refer to the actual final design for each proper discipline (electrical, civil, mechanical, etc.) with the Tennessee professional engineer's seal, for precise design information.



BLOCK LENGTHS				
Street Name	Intersection	Intersection	Length	
1	Littlebury Park Dr.	Pantall Rd.	Giddens Ct.	525.34'
2	Giddens Ct.	Littlebury Park Dr.	C.D.S.	524.06'
3	Littlebury Park Dr.	Giddens Ct.	Cherry Jack Ln.	605.44'
4	Littlebury Park Dr.	Cherry Jack Ln.	Sarah Bee Ln.	904.75'
5	Sarah Bee Ln.	Littlebury Park Dr.	C.D.S.	296.14'
6	Sarah Bee Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	286.91'
7	Sarah Bee Ln.	Jeremiah Cherry Tr.	Giddens Ct.	1155.28'
8	Cherry Jack Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	141.45'
9	Cherry Jack Ln.	Jeremiah Cherry Tr.	Sarah Bee Ln.	472.49'
10	Cherry Jack Ln.	Sarah Bee Ln.	Pantall Rd.	1331.92'

**Legend:**

□	EXIST. CONCRETE MONUMENT	○	BENCHMARK
●	IRON PIN SET (I.P.S.)	♿	HANDICAP RAMP SYMBOL
○	IRON PIN FOUND (I.P.F.)	V.A.	VAN ACCESSIBLE HANDICAP DESIGNATION
+	EXIST. SIGN POST	○	HC SIGN
○	EXIST. SEWER CLEANOUT	→	PROPOSED SIGN POST
○	EXIST. MANHOLE (SEWER & PHONE)	●	CONCRETE BOLLARD
⊞	EXIST. CATCH BASIN (STORM SEWER)	—	WHEEL STOP
⊞	EXIST. WATER/GAS VALVE	—	CONCRETE SIDEWALK
⊞	EXIST. TELEPHONE RISER	—	EXTRUDED CURB
⊞	EXIST. GAS RISER	—	CURB & GUTTER
⊞	ELECTRICAL ENCLOSURE	→	TRAFFIC ARROW
⊞	EXIST. WATER METER	↔	TURN LANE ARROWS
○	EXIST. UTILITY POLE	△	REVISION NUMBER
○	EXIST. FIRE HYDRANT	#1	DRAINAGE STRUCTURE DESIGNATION
○	POST INDICATOR VALVE	⊞	DRAINAGE PIPE DESIGNATION
⊞	BLOW OFF VALVE	⊞	RIP RAP
⊞	REDUCER	→	RUNOFF FLOW ARROW
⊞	REMOTE FIRE DEPT. CONNECTION	⊞	INLET FILTER PROTECTION
⊞	CONCRETE THRUST BLOCK	63.25	PROPOSED SPOT ELEVATION
⊞	DOUBLE DETECTOR CHECK VALVE	(63.25)	EXIST. SPOT ELEVATION
⊞	FIRE DEPT. CONNECTION	>	SEWER/STORM FLOW DIRECTION
⊞	FIRE HYDRANT	⊞	CATCH BASIN
⊞	GATE VALVE & BOX	⊞	CURB INLET
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⊞	GAS METER	—	HEADWALL
⊞	GREASE TRAP	⊞	WINGED HEADWALL
○	EXTERIOR CLEANOUT	⊞	CONCRETE SWALE
○	MANHOLE	⊞	TYPE- X- HEADWALL

EXISTING PHONE	PH
EXISTING ELECTRIC	OH
PROPERTY LINE	---
EASEMENTS	---
RIGHT OF WAY	50' ROW
EROSION CONTROL SILT FENCE	SF SF
EROSION EEL	E E E
EXISTING TREELINE	~ ~ ~
EXISTING FENCELINE	X X
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PROPOSED SANITARY SEWER	SS SS
EXISTING WATER	W W
PROPOSED WATER	W W

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SCALE: 1" = 50'

50' 0 50' 100'

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850 MIDDLE TENNESSEE BOULEVARD  
MURFREESBORO, TENNESSEE 37129  
PHONE: (615) 867-7800 FAX: (615) 867-8267  
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**JAMES F. REED III**  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF TENNESSEE  
NO. 0000000000

**Littlebury Subdivision**  
Thompson Station, Tennessee

**Preliminary Plat**

REVISIONS: 8-30-18 Comments  
9-26-18 Update Lot Layout  
DRAWN: MLG  
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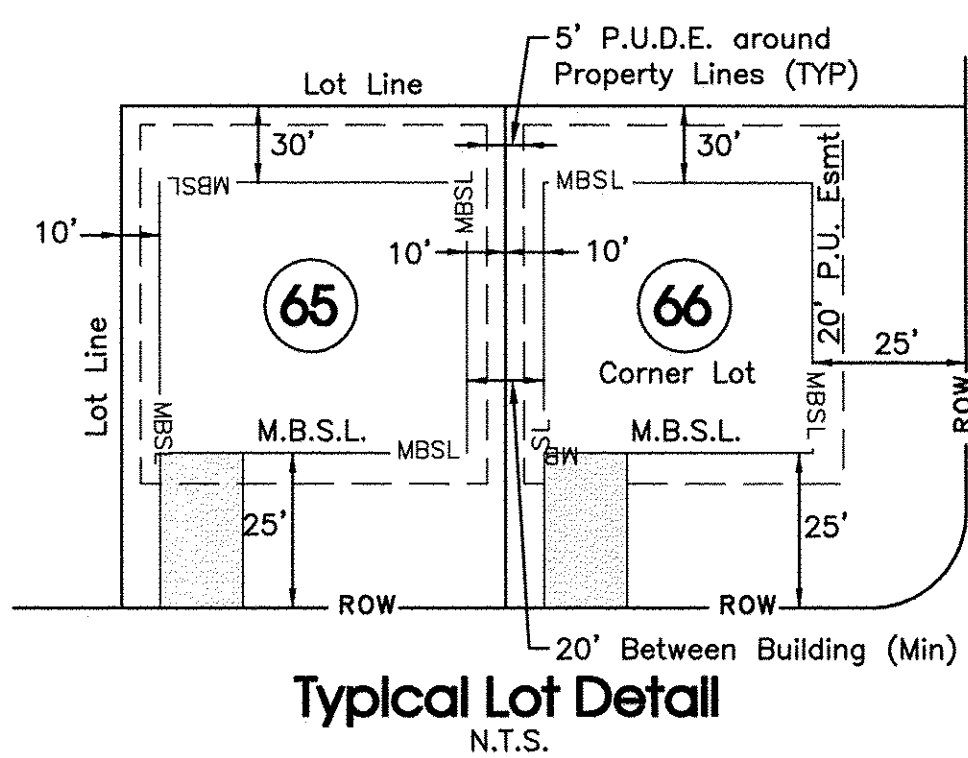
**C1.2**



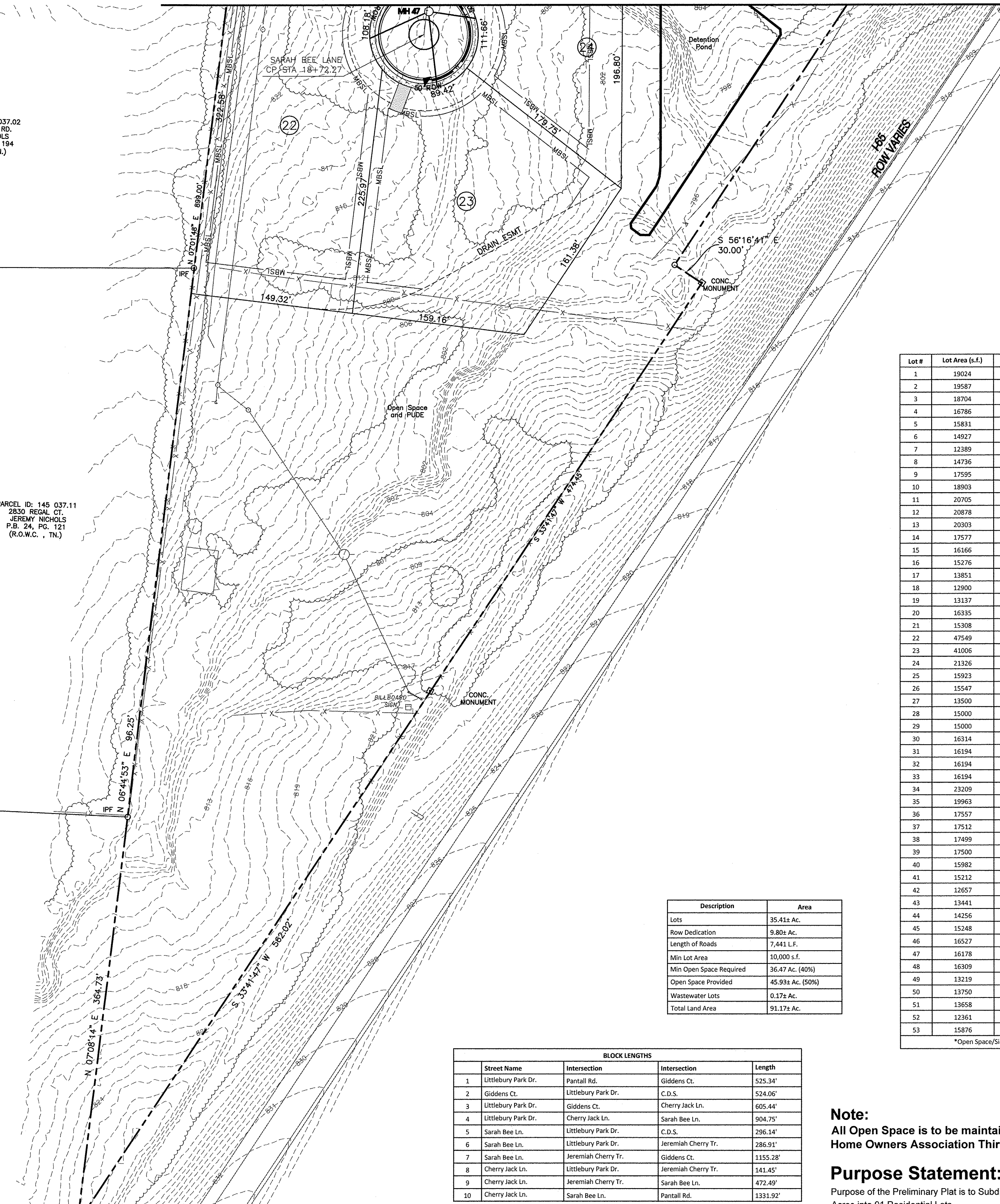
PARCEL ID: 145 037.02  
2648 PANTALL RD.  
HARRY NICHOLS  
D.B. 1426, PG. 194  
(R.O.W.C., TN.)

PARCEL ID: 145 037.11  
2830 REGAL CT.  
JEREMY NICHOLS  
P.B. 24, PG. 121  
(R.O.W.C., TN.)

PARCEL ID: 145 037.13  
2835 REGAL CT.  
WILLIAM H JONES  
P.B. 24, PG. 121 (LOT 5)  
(R.O.W.C., TN.)



Plot Style: S.E.C. Standard Monocb Plot Date: 10/10/2018 7:47 AM User: CADTECH4



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\*Open Space/Sidewalk Blockout

**Legend:**

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IRON PIN SET (I.P.S.)	HANDICAP RAMP SYMBOL
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EXIST. CATCH BASIN (STORM SEWER)	WHEEL STOP
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EXIST. TELEPHONE RISER	EXTRUDED CURB
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ELECTRICAL ENCLOSURE	TRAFFIC ARROW
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EXIST. FIRE HYDRANT	#1 DRAINAGE STRUCTURE DESIGNATION
POST INDICATOR VALVE	A DRAINAGE PIPE DESIGNATION
BLOW OFF VALVE	RIP RAP
REDUCER	RUNOFF FLOW ARROW
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CONCRETE THRUST BLOCK	63.25 x PROPOSED SPOT ELEVATION
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GREASE TRAP	WINGED HEADWALL
EXTERIOR CLEANOUT ECO	CONCRETE SWALE
MANHOLE	TYPE- X- HEADWALL

EXISTING PHONE: PH \_\_\_\_\_

EXISTING ELECTRIC: OH \_\_\_\_\_

PROPERTY LINE: \_\_\_\_\_

EASEMENTS: \_\_\_\_\_

RIGHT OF WAY: 50' ROW \_\_\_\_\_

EROSION CONTROL SILT FENCE: SF \_\_\_\_\_ SF \_\_\_\_\_

EROSION EEL: E \_\_\_\_\_ E \_\_\_\_\_ E \_\_\_\_\_

EXISTING TREELINE: \_\_\_\_\_

EXISTING FENCELINE: X \_\_\_\_\_ X \_\_\_\_\_

MINIMUM BUILDING SETBACK LINE: MBSL \_\_\_\_\_

PHASE BOUNDARY: \_\_\_\_\_

EXISTING GAS LINE: GAS \_\_\_\_\_

PROPOSED GAS LINE: GAS \_\_\_\_\_

EXISTING STORM: STM \_\_\_\_\_

PROPOSED STORM: STM \_\_\_\_\_

EXISTING CONTOUR LINES: \_\_\_\_\_ 601 \_\_\_\_\_

PROPOSED CONTOUR LINES: \_\_\_\_\_ 601 \_\_\_\_\_

EXISTING SANITARY SEWER: SS \_\_\_\_\_ SS \_\_\_\_\_

PROPOSED SANITARY SEWER: SS \_\_\_\_\_ SS \_\_\_\_\_

EXISTING WATER: W \_\_\_\_\_ W \_\_\_\_\_

PROPOSED WATER: W \_\_\_\_\_ W \_\_\_\_\_

**SEC, Inc.**  
ENGINEERING • SURVEYING • LAND PLANNING  
LANDSCAPE ARCHITECTURE  
850 MIDDLE TENNESSEE BOULEVARD  
MURFREESBORO, TENNESSEE 37129  
PHONE: (615) 890-7901 E-MAIL: JREED@SEC-CIVIL.COM FAX: (615) 890-2587  
NO PORTION OF THIS DRAWING MAY BE REPRODUCED WITHOUT THE EXPRESSED WRITTEN CONSENT OF S.E.C. INC.

**STATE OF TENNESSEE**  
JAMES F. REED  
REGISTERED PROFESSIONAL SURVEYOR  
No. 10000  
EXPIRES 12/31/2024

**Littlebury Subdivision**  
Thompson Station, Tennessee

**Preliminary Plat**

REVISION: 8-30-18 Comments  
9-26-18 Update Lot Layout

DRAWN: MLG  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleburyPrelim  
SCALE: 1"=50'  
JOB NO. 17224  
SHEET: C1.3

**Note:**  
All Open Space is to be maintained by the Home Owners Association Third Party.

**Purpose Statement:**  
Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

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

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





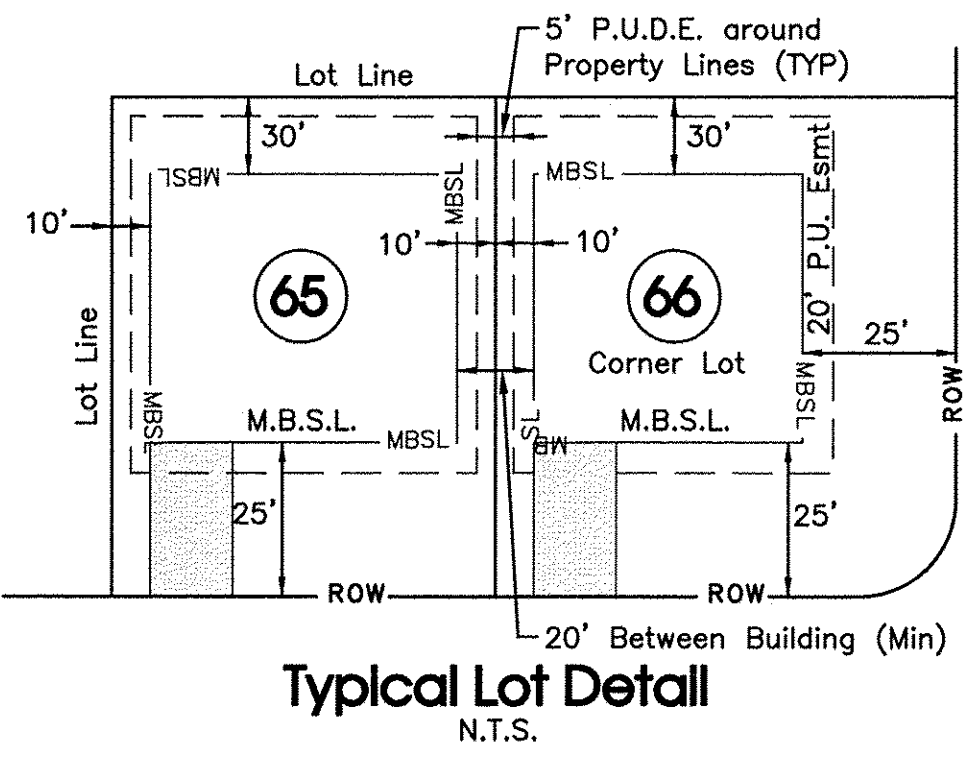
**NOTE:**  
See Construction Plans for Offsite Roadway Improvements.

Lot #	Lot Area (s.f.)	Lot #	Lot Area (s.f.)
1	19024	54	17272
2	19587	55	18978
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4	16786	57	17816
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6	14927	59	14250
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52	12361	105 (WW)	7198
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Description	Area
Lots	35.41± Ac.
Row Dedication	9.80± Ac.
Length of Roads	7,441 L.F.
Min Lot Area	10,000 s.f.
Min Open Space Required	36.47 Ac. (40%)
Open Space Provided	45.93± Ac. (50%)
Wastewater Lots	0.17± Ac.
Total Land Area	91.17± Ac.

PI Station	Radius	Arc Length	Delta Angle	Degree of Curve	Chord Length
5+05.04	770.75'	511.86'	38°03'02.84"	07°26'01.57"	502.51'
9+31.74	570.26'	349.82'	35°08'50.94"	10°02'50.06"	344.36'
13+93.67	500.00'	214.83'	24°37'05.50"	11°27'32.96"	213.19'
16+63.76	500.00'	76.36'	08°45'00.90"	11°27'32.96"	76.29'

Street Name	Intersection	Intersection	Length
1	Littlebury Park Dr.	Pantall Rd.	Giddens Ct. 525.34'
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4	Littlebury Park Dr.	Cherry Jack Ln.	Sarah Bee Ln. 904.75'
5	Sarah Bee Ln.	Littlebury Park Dr.	C.D.S. 296.14'
6	Sarah Bee Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr. 286.91'
7	Sarah Bee Ln.	Jeremiah Cherry Tr.	Giddens Ct. 1155.28'
8	Cherry Jack Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr. 141.45'
9	Cherry Jack Ln.	Jeremiah Cherry Tr.	Sarah Bee Ln. 472.49'
10	Cherry Jack Ln.	Sarah Bee Ln.	Pantall Rd. 1331.92'



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**Purpose Statement:**  
Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

Legend:	
EXIST. CONCRETE MONUMENT	BENCHMARK
IRON PIN SET (I.P.S.)	HANDICAP RAMP SYMBOL
IRON PIN FOUND (I.P.F.)	V.A. VAN ACCESSIBLE HANDICAP DESIGNATION
EXIST. SIGN POST	HC SIGN
EXIST. SEWER CLEANOUT	PROPOSED SIGN POST
EXIST. MANHOLE (SEWER & PHONE)	CONCRETE BOLLARD
EXIST. CATCH BASIN (STORM SEWER)	WHEEL STOP
EXIST. WATER/GAS VALVE	CONCRETE SIDEWALK
EXIST. TELEPHONE RISER	EXTRUDED CURB
EXIST. GAS RISER	CURB & GUTTER
ELECTRICAL ENCLOSURE	TRAFFIC ARROW
EXIST. WATER METER	TURN LANE ARROWS
EXIST. UTILITY POLE	REVISION NUMBER
EXIST. FIRE HYDRANT	#1 DRAINAGE STRUCTURE DESIGNATION
POST INDICATOR VALVE	DRAINAGE PIPE DESIGNATION
BLOW OFF VALVE	RIP RAP
REDUCER	RUNOFF FLOW ARROW
REMOTE FIRE DEPT. CONNECTION	INLET FILTER PROTECTION
CONCRETE THRUST BLOCK	PROPOSED SPOT ELEVATION
DOUBLE DETECTOR CHECK VALVE	EXIST. SPOT ELEVATION
FIRE DEPT. CONNECTION	SEWER/STORM FLOW DIRECTION
FIRE HYDRANT	CATCH BASIN
GATE VALVE & BOX	CURB INLET
WATER METER	AREA DRAIN
GAS METER	HEADWALL
GREASE TRAP	WINGED HEADWALL
EXTERIOR CLEANOUT ECO	CONCRETE SWALE
MANHOLE	TYPE-X HEADWALL

EXISTING PHONE	PH
EXISTING ELECTRIC	OH
PROPERTY LINE	---
EASEMENTS	---
RIGHT OF WAY	50' ROW
EROSION CONTROL SILT FENCE	SF SF
EROSION EEL	E E E
EXISTING TREELINE	---
EXISTING FENCELINE	X X
MINIMUM BUILDING SETBACK LINE	MBSL
PHASE BOUNDARY	---
EXISTING GAS LINE	GAS
PROPOSED GAS LINE	GAS
EXISTING STORM	STM
PROPOSED STORM	STM
EXISTING CONTOUR LINES	-60-
PROPOSED CONTOUR LINES	601
EXISTING SANITARY SEWER	SS SS
PROPOSED SANITARY SEWER	SS SS
EXISTING WATER	W W
PROPOSED WATER	W W

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SCALE: 1" = 50'

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The site as shown on these construction drawings is intended to achieve specific accessibility, design, safety and objectives. It is the sole responsibility of the owner/developer to ensure that the construction of the site shown on these construction drawings is in accordance with the applicable laws, codes and regulations. The contractor shall be responsible for the construction of the site in accordance with the construction plans.

**Littlebury Subdivision**  
Thompson Station, Tennessee

**Preliminary Plat**  
DRAWN: MLG  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleberryPrelim  
SCALE: 1" = 50'  
JOB NO. 17224  
SHEET: C1.4



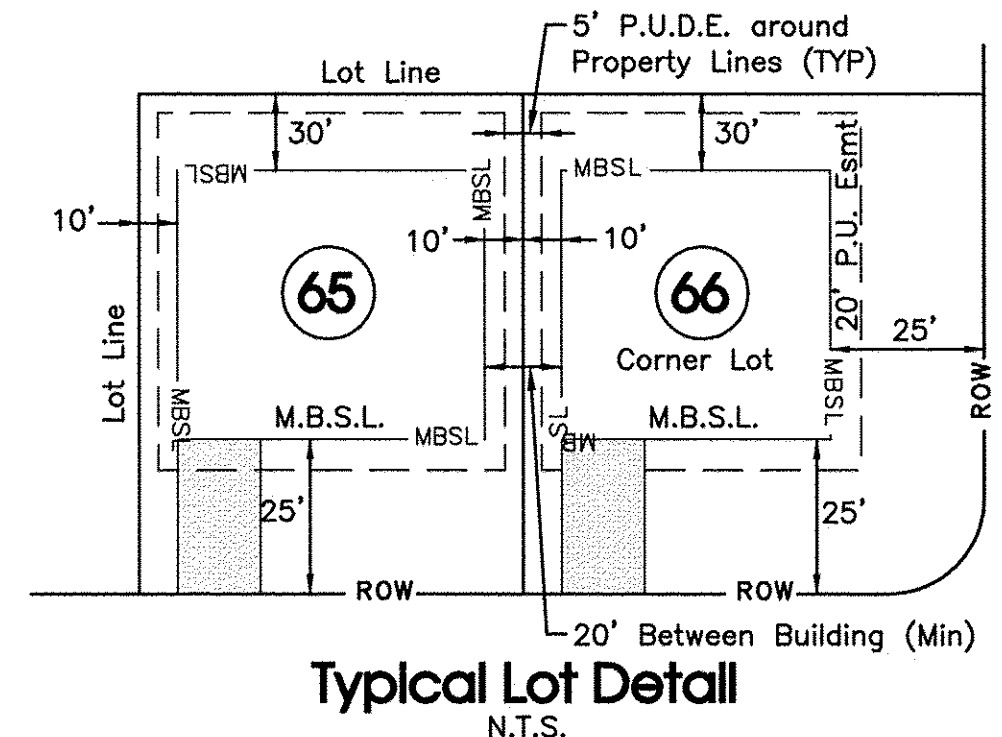


CHERRY JACK LANE					
PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
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SARAH BEE LANE					
PI Station	Radius Length	Arc Length	Delta Angle	Degree of Curve	Chord Length
10+21.15	471.16'	690.93'	84°01'16.64"	12°09'38.02"	630.67'
16+37.43	200.00'	231.80'	66°24'24.15"	28°38'52.40"	219.04'

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**\* CRITICAL LOTS**

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**Purpose Statement:**

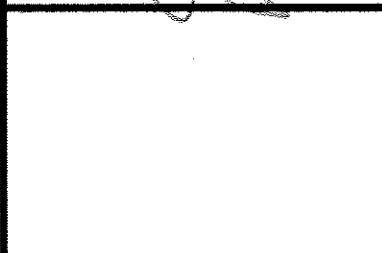
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○	EXIST. FIRE HYDRANT	#1 DRAINAGE STRUCTURE DESIGNATION
○	POST INDICATOR VALVE	DRAINAGE PIPE DESIGNATION
□	BLOW OFF VALVE	RIP RAP
□	REDUCER	RUNOFF FLOW ARROW
□	REMOTE FIRE DEPT. CONNECTION	INLET FILTER PROTECTION
□	CONCRETE THRUST BLOCK	63.25' PROPOSED SPOT ELEVATION
□	DOUBLE DETECTOR CHECK VALVE	(63.25') EXIST. SPOT ELEVATION
□	FIRE DEPT. CONNECTION	SEWER/STORM FLOW DIRECTION
□	FIRE HYDRANT	CATCH BASIN
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○	EXTERIOR CLEANOUT ECO	CONCRETE SWALE
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OH	EXISTING ELECTRIC	OH
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---	EASEMENTS	---
---	RIGHT OF WAY	50' ROW
SF SF	EROSION CONTROL SILT FENCE	SF SF
E E E	EROSION EEL	E E E
X X	EXISTING FENCELINE	X X
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**Littlebury Subdivision**  
Thompson Station, Tennessee

REVISION: 8-30-18 Comments  
DRAWN: MLG  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleburyPrelim  
SCALE: 1"=50'  
JOB NO. 17224  
SHEET: C1.5

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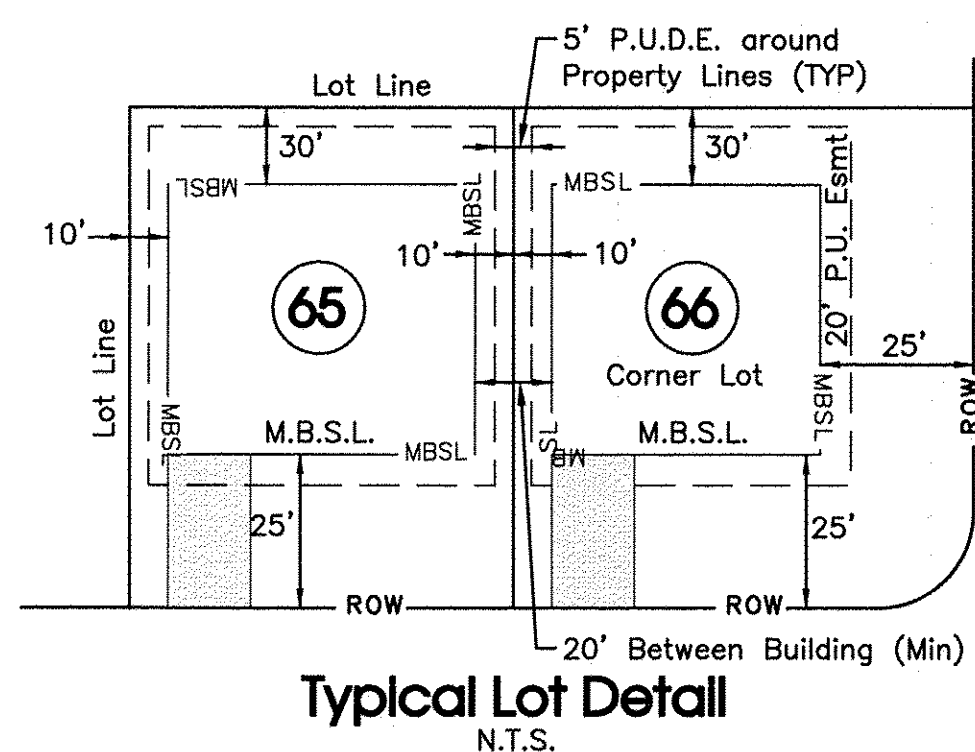


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MURFREESBORO, TENNESSEE 37129  
PHONE: (615) 890-7901 E-MAIL: JREDE@SEC-CIVIL.COM FAX: (615) 895-2687

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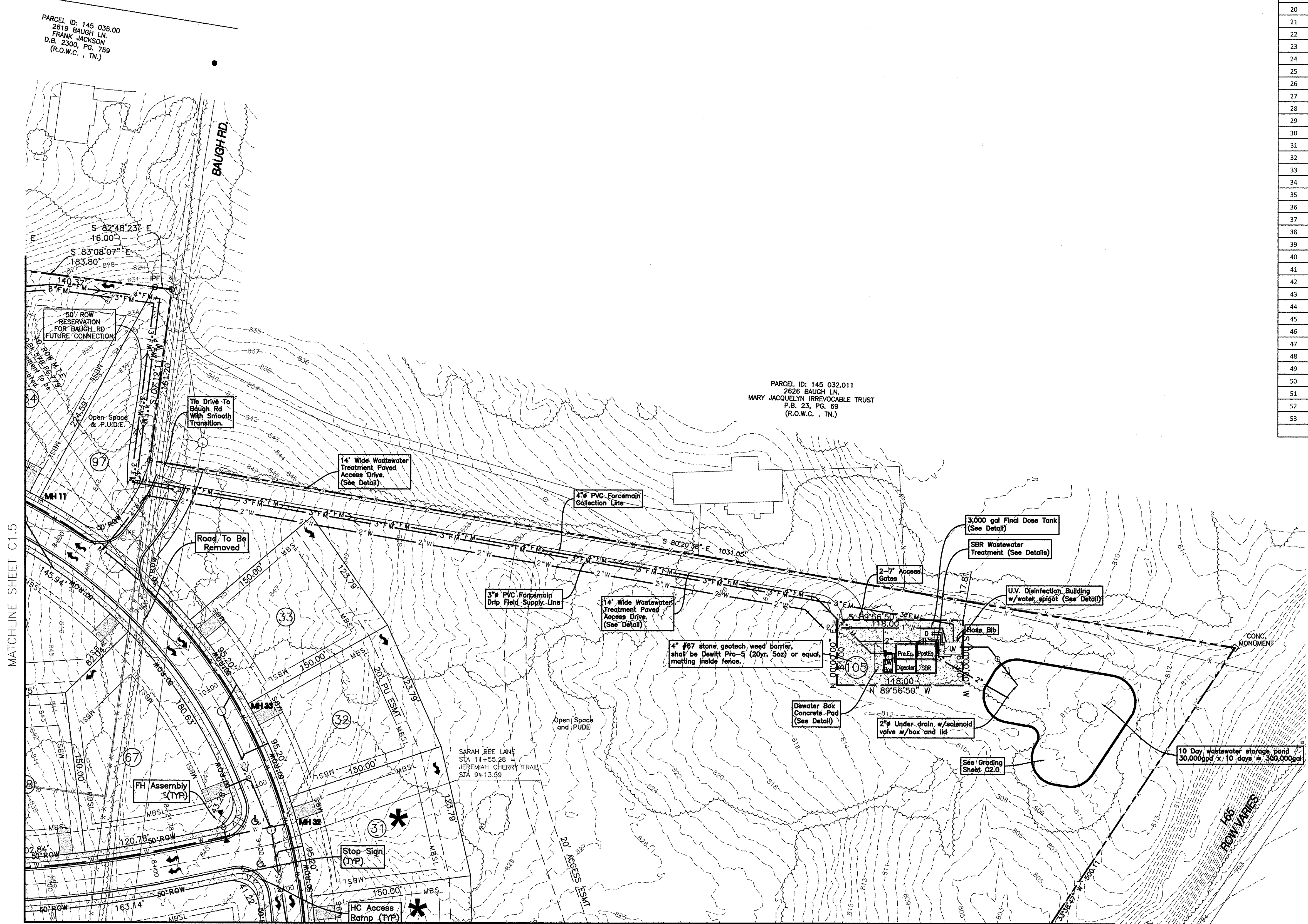
**Littlebury Subdivision**

Thompson Station, Tennessee

**Preliminary Plat**

REVISION: 8-30-18 Comments  
9-26-18 Update Lot Layout

DRAWN: MLG  
DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleberryPrelim  
SCALE: 1" = 50'  
JOB NO. 17224  
SHEET: C1.6



PARCEL ID: 145 035.00  
2619 BAUGH LN.  
FRANK JACKSON  
D.B. 2301, PG. 759  
(R.O.W.C., TN.)

PARCEL ID: 145 032.011  
2626 BAUGH LN.  
MARY JACQUELYN IRREVOCABLE TRUST  
P.B. 23, PG. 69  
(R.O.W.C., TN.)

Plot Style: S.E.C. Standard Mono.ctb Plot Date: 10/10/2018 7:48 AM User: CADTECH4

MATCHLINE SHEET C1.5

MATCHLINE SHEET C1.2





PARCEL ID: 145 035.00  
2612 PANTALL RD.  
WILLIAM H MARLIN  
P.B. 20, PG. 7  
(R.O.W.C., TN.)

REMAINING LANDS OF  
PARCEL ID: 145 035.00  
2620 PANTALL LN.  
ELLEN BOGLE  
D.B. 364, PG. 372  
(R.O.W.C., TN.)

9 Zones @ 4150LF  
per Bioline drip emitter  
piping zone to be split  
by 2" Solenoid Valves.

Description	Area
Lots	35.41± Ac.
Row Dedication	9.80± Ac.
Length of Roads	7,441 L.F.
Min Lot Area	10,000 s.f.
Min Open Space Required	36.47 Ac. (40%)
Open Space Provided	45.93± Ac. (50%)
Wastewater Lots	0.17± Ac.
Total Land Area	91.17± Ac.

Lot #	Lot Area (s.f.)	Lot #	Lot Area (s.f.)
1	19024	54	17272
2	19587	55	18978
3	18704	56	19258
4	16786	57	17816
5	15831	58	16690
6	14927	59	14250
7	12389	60	18818
8	14736	61	23726
9	17595	62	21215
10	18903	63	16578
11	20705	64	16960
12	20878	65	19899
13	20303	66	16383
14	17577	67	21141
15	16166	68	14289
16	15276	69	14289
17	13851	70	13458
18	12900	71	13532
19	13137	72	12942
20	16335	73	14976
21	15308	74	13103
22	47549	75	14349
23	41006	76	19501
24	21326	77	18366
25	15923	78	11821
26	15547	79	12518
27	13500	80	17028
28	15000	81	15993
29	15000	82	18271
30	16314	83	16423
31	16194	84	15954
32	16194	85	18777
33	16194	86	19029
34	23209	87	12684
35	19963	88	11700
36	17557	89	11647
37	17512	90	11508
38	17499	91	13646
39	17500	92 (OS)	9262
40	15982	93 (OS)	564799
41	15212	94 (OS)	37513
42	12657	95 (OS)	86979
43	13441	96 (OS)	678850
44	14256	97 (OS)	12697
45	15248	98 (OS)	49389
46	16527	99 (OS)	389440
47	16178	100 (OS)	101571
48	16309	101 (OS)	64873
49	13219	102 (OS)	5232
50	13750	**103 (OS)	8471
51	13658	104 (OS)	6783
52	12361	105 (WW)	7198
53	15876		

**Legend:**

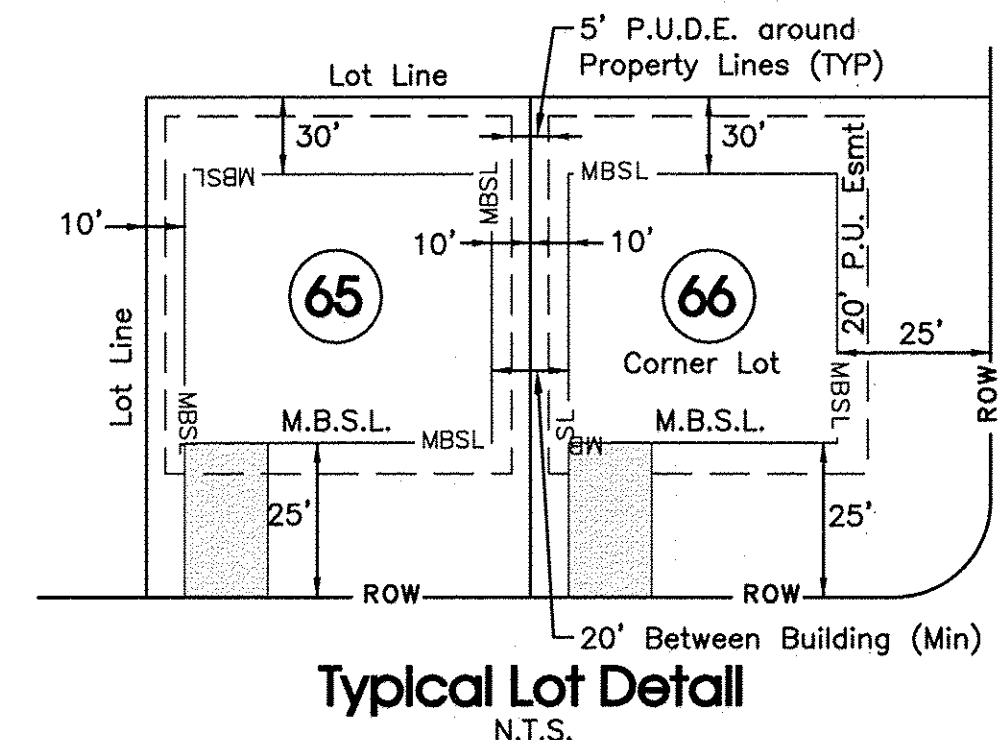
EXIST. CONCRETE MONUMENT	BENCHMARK
IRON PIN SET (I.P.S.)	HANDICAP RAMP SYMBOL
IRON PIN FOUND (I.P.F.)	V.A. VAN ACCESSIBLE HANDICAP DESIGNATION
EXIST. SIGN POST	HC SIGN
EXIST. SEWER CLEANOUT	PROPOSED SIGN POST
EXIST. MANHOLE (SEWER & PHONE)	CONCRETE BOLLARD
EXIST. CATCH BASIN (STORM SEWER)	WHEEL STOP
EXIST. WATER/GAS VALVE	CONCRETE SIDEWALK
EXIST. TELEPHONE RISER	EXTRUDED CURB
EXIST. GAS RISER	CURB & GUTTER
ELECTRICAL ENCLOSURE	TRAFFIC ARROW
EXIST. WATER METER	TURN LANE ARROWS
EXIST. UTILITY POLE	REVISION NUMBER
EXIST. FIRE HYDRANT	#1 DRAINAGE STRUCTURE DESIGNATION
POST INDICATOR VALVE	A DRAINAGE PIPE DESIGNATION
BLOW OFF VALVE	RIP RAP
REDUCER	RUNOFF FLOW ARROW
REMOTE FIRE DEPT. CONNECTION	INLET FILTER PROTECTION
CONCRETE THRUST BLOCK	63.25 PROPOSED SPOT ELEVATION
DOUBLE DETECTOR CHECK VALVE	(63.25) EXIST. SPOT ELEVATION
FIRE DEPT. CONNECTION	> SEWER/STORM FLOW DIRECTION
FIRE HYDRANT	CATCH BASIN
GATE VALVE & BOX	CURB INLET
WATER METER	AREA DRAIN
GAS METER	HEADWALL
GREASE TRAP	WINGED HEADWALL
EXTERIOR CLEANOUT ECO	CONCRETE SWALE
MANHOLE	TYPE- X- HEADWALL

EXISTING PHONE	PH
EXISTING ELECTRIC	OH
PROPERTY LINE	
EASEMENTS	
RIGHT OF WAY	50' ROW
EROSION CONTROL SILT FENCE	SF SF
EROSION EEL	E E E
EXISTING TREELINE	
EXISTING FENCELINE	X X
MINIMUM BUILDING SETBACK LINE	MBSL
PHASE BOUNDARY	-----
EXISTING GAS LINE	GAS
PROPOSED GAS LINE	GAS
EXISTING STORM	STM
PROPOSED STORM	STM
EXISTING CONTOUR LINES	601
PROPOSED CONTOUR LINES	601
EXISTING SANITARY SEWER	SS SS
PROPOSED SANITARY SEWER	SS SS
EXISTING WATER	W W
PROPOSED WATER	W W

**BLOCK LENGTHS**

Street Name	Intersection	Intersection	Length
1 Littlebury Park Dr.	Pantall Rd.	Giddens Ct.	525.34'
2 Giddens Ct.	Littlebury Park Dr.	C.D.S.	524.06'
3 Littlebury Park Dr.	Giddens Ct.	Cherry Jack Ln.	605.44'
4 Littlebury Park Dr.	Cherry Jack Ln.	Sarah Bee Ln.	904.75'
5 Sarah Bee Ln.	Littlebury Park Dr.	C.D.S.	296.14'
6 Sarah Bee Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	286.91'
7 Sarah Bee Ln.	Jeremiah Cherry Tr.	Giddens Ct.	1155.28'
8 Cherry Jack Ln.	Littlebury Park Dr.	Jeremiah Cherry Tr.	141.45'
9 Cherry Jack Ln.	Jeremiah Cherry Tr.	Sarah Bee Ln.	472.49'
10 Cherry Jack Ln.	Sarah Bee Ln.	Pantall Rd.	1331.92'

The proposed electric and water information shown hereon is not an actual design to be used for construction, and is for reference and illustrative purposes only. The contractor shall refer to the actual final design for each proper discipline (electrical, civil, mechanical, etc.) with the Tennessee professional engineer's seal, for precise design information.



**Note:**  
All Open Space is to be maintained by the Home Owners Association Third Party.

**Purpose Statement:**  
Purpose of the Preliminary Plat is to Subdivide these 91 Acres into 91 Residential Lots

**811**  
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Scale: 1" = 50'

Scale: 1" = 50'

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**MALES F. REED**  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF TENNESSEE  
No. 12345

**Littlebury Subdivision**  
Thompson Station, Tennessee

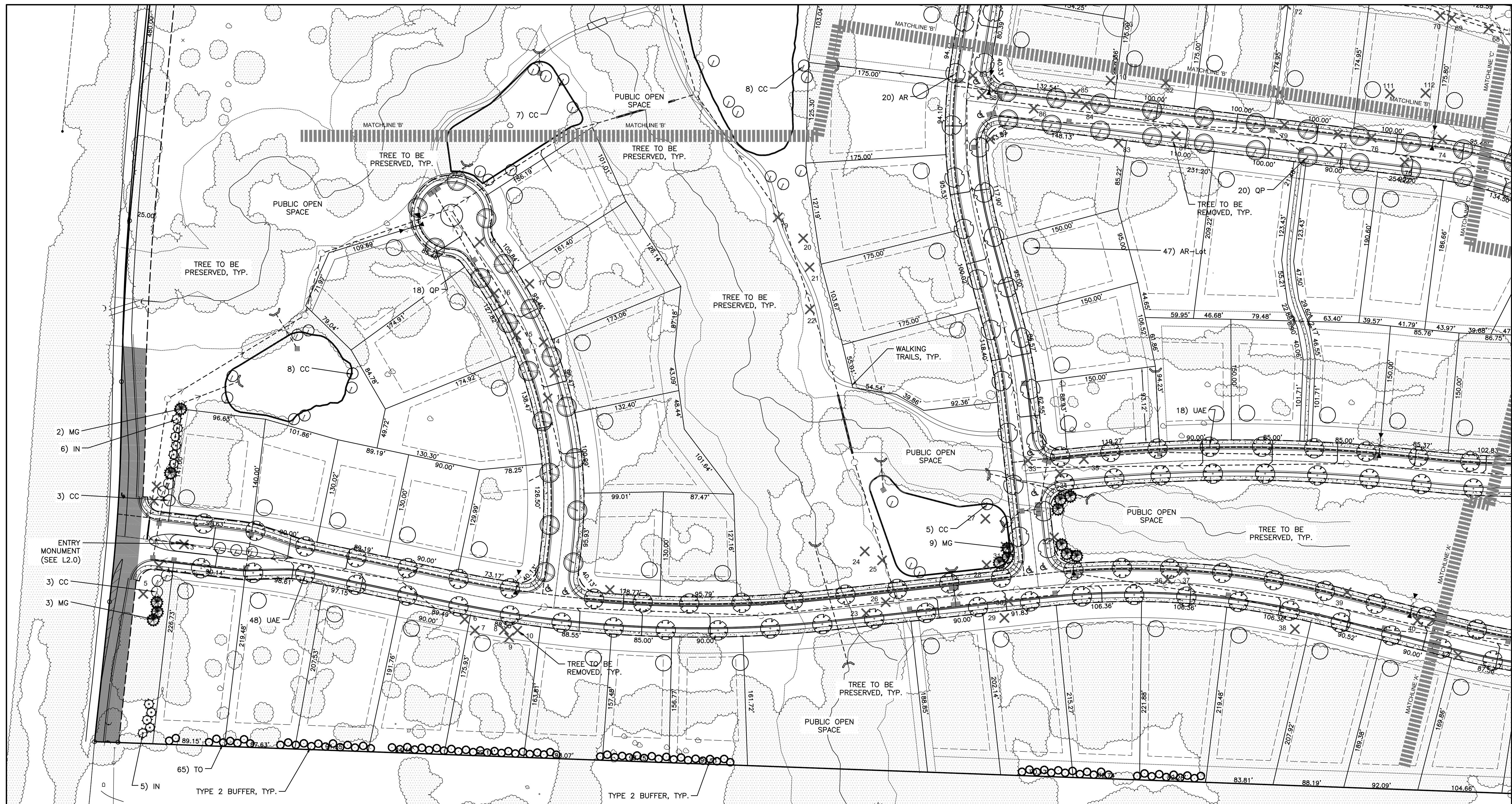
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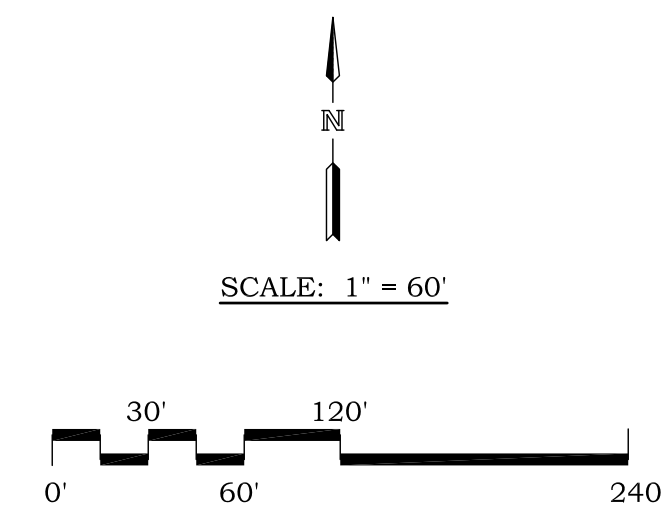






**LANDSCAPE PLAN**

\*SEE TREE REMOVAL CHART AND PLANT LIST ON L2.0



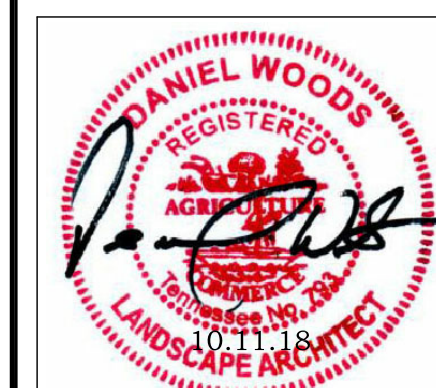
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LANDSCAPE PLANS

**LITTLEBURY**

THOMPSON'S STATION, TENNESSEE

Prepared For:  
Great TN Land Company



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REVISIONS:

REV 09.07.18

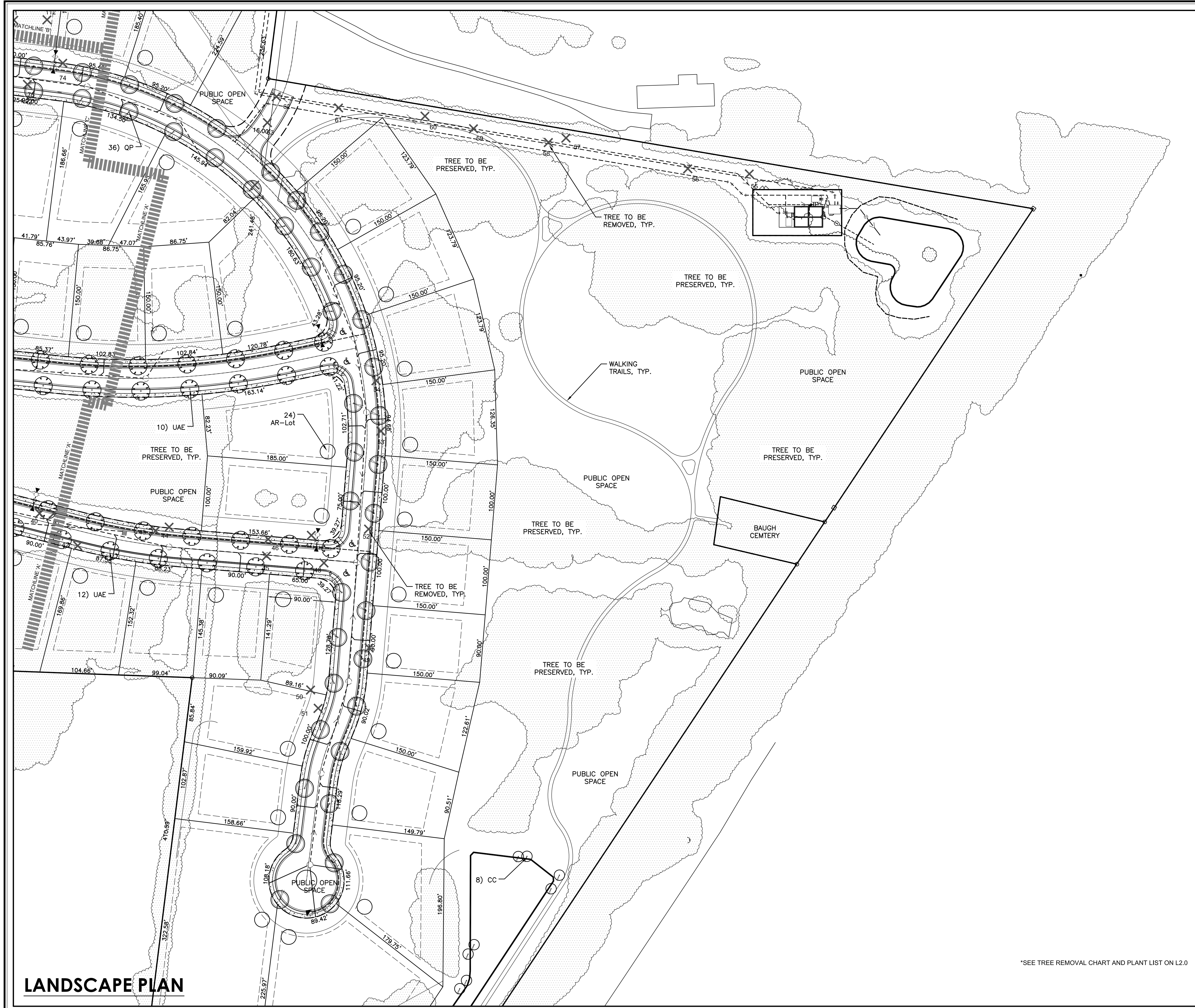
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REV 10.11.18

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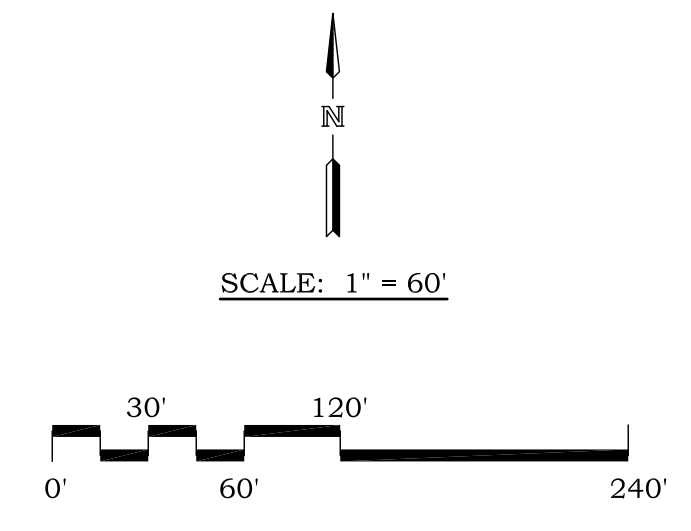
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**LANDSCAPE PLAN**

\*SEE TREE REMOVAL CHART AND PLANT LIST ON L2.0

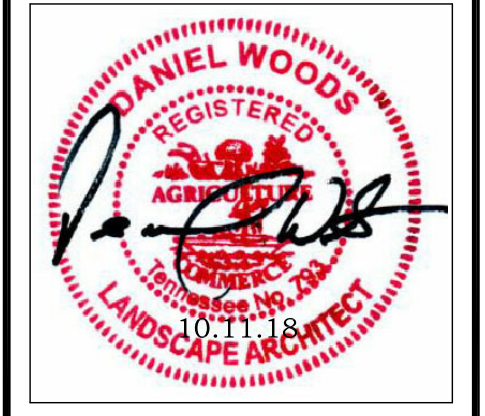


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LANDSCAPE PLANS  
**LITTLEBURY**

THOMPSON'S STATION, TENNESSEE

Prepared For:  
 Great TN Land Company



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REV 10.02.18
REV 10.11.18

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**L2.2**







**F i s c h b a c h**  
**Transportation Group, LLC**  
**Traffic Engineering and Planning**

## **Traffic Impact Study**

**Littlebury**  
**Pantall Road**  
**Thompson's Station, TN**

Prepared January 2018  
(Revised September 2018)  
For Great Tennessee Land Company

**FTG, LLC**  
**P.O. Box 682736**  
**Franklin, TN 37068**  
**(615) 771-8022 phone**  
**Gillian@FTGtraffic.com**

# Traffic Impact Study

## Littlebury Pantall Road

Thompson's Station, Tennessee

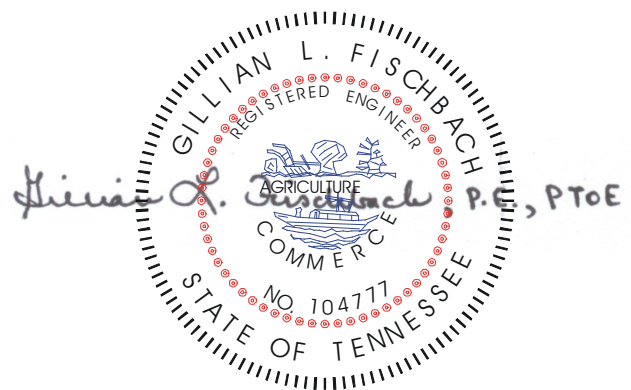
Prepared January 2018  
(Revised September 2019)

**PREPARED FOR:**

Great Tennessee Land Company  
7123 Crossroads Blvd, Suite E  
Brentwood, TN 37027

**PREPARED BY:**

Ms. Gillian L. Fischbach, P.E., PTOE  
Fischbach Transportation Group (FTG, LLC)  
P.O. Box 682736  
Franklin, TN 37068  
Phone: (615) 771-8022  
FTG Project Number: 10886



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## **1. INTRODUCTION**

This traffic study has been prepared in order to identify the traffic impacts of a residential project that is proposed to be constructed on the east side of Pantall Road, south of Critz Lane, in Thompson's Station, Tennessee.

For the purposes of this study, existing and background traffic volumes were established, and capacity analyses were conducted for these conditions. Trip generation calculations were performed, and the trips which are expected to be generated by the proposed project were distributed to the roadway system. The site-generated trips were added to the background traffic volumes, and the intersections which provide access to the site were then evaluated to determine the traffic impacts of the proposed project. Access needs for the project were evaluated, and the necessary roadway and/or traffic control improvements were identified. This report presents the results of these analyses and the subsequent recommendations.

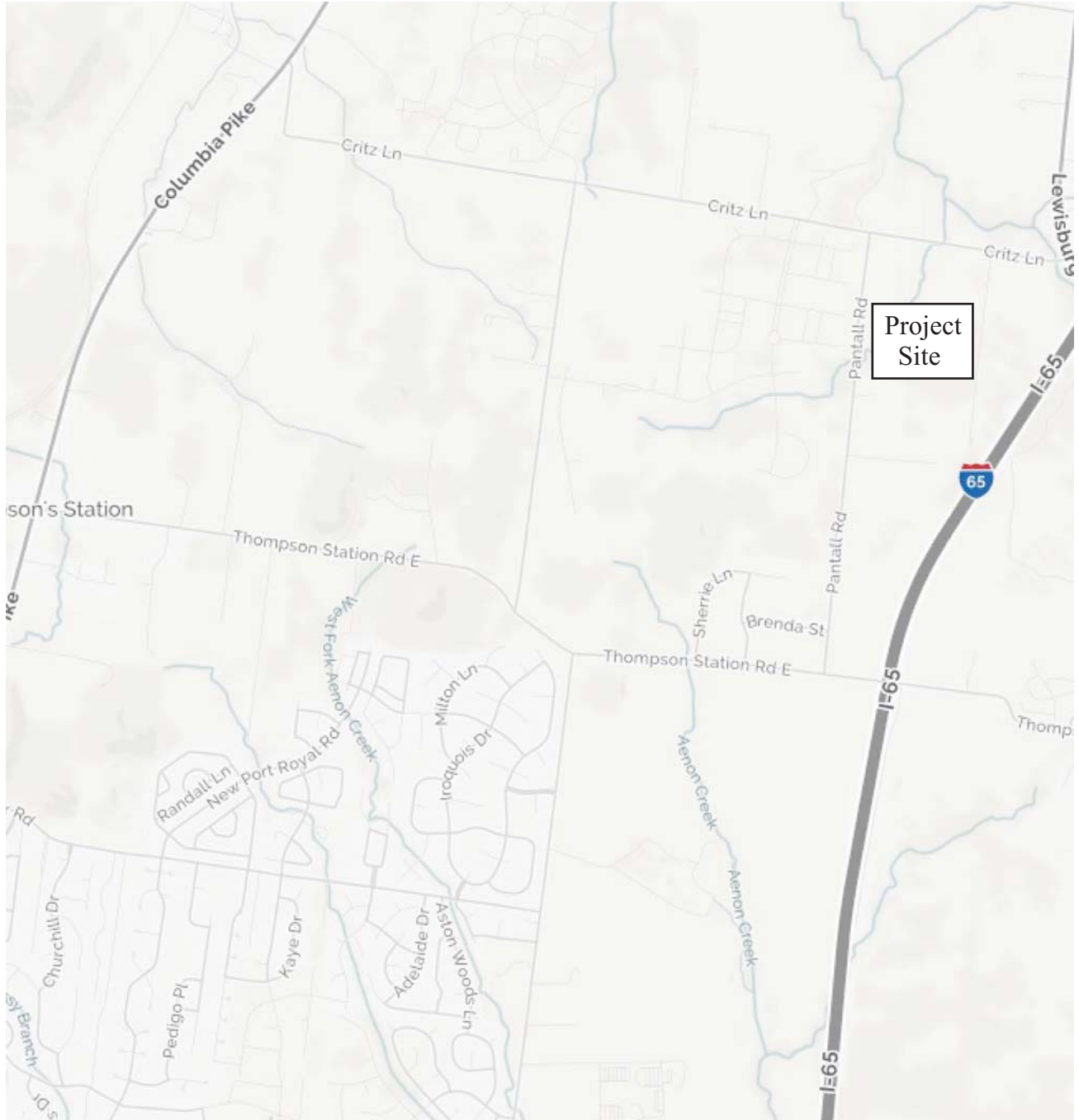
## **2. PROJECT DESCRIPTION**

The location of the proposed project is shown in [Figure 1](#). As shown, the project site is located on the east side of Pantall Road, south of Critz Lane, in Thompson's Station, Tennessee.

The current site plan for the proposed project is shown in [Figure 2](#). Currently, the project site is undeveloped, and the developer of the proposed project plans to construct 92 single-family homes. Access to these homes will be provided at two locations on Pantall Road.

In large part, economic and market considerations will dictate the pace and timing with which the proposed project is actually completed. For the purposes of this study, it was assumed that the entire proposed project will be completed by Year 2020.

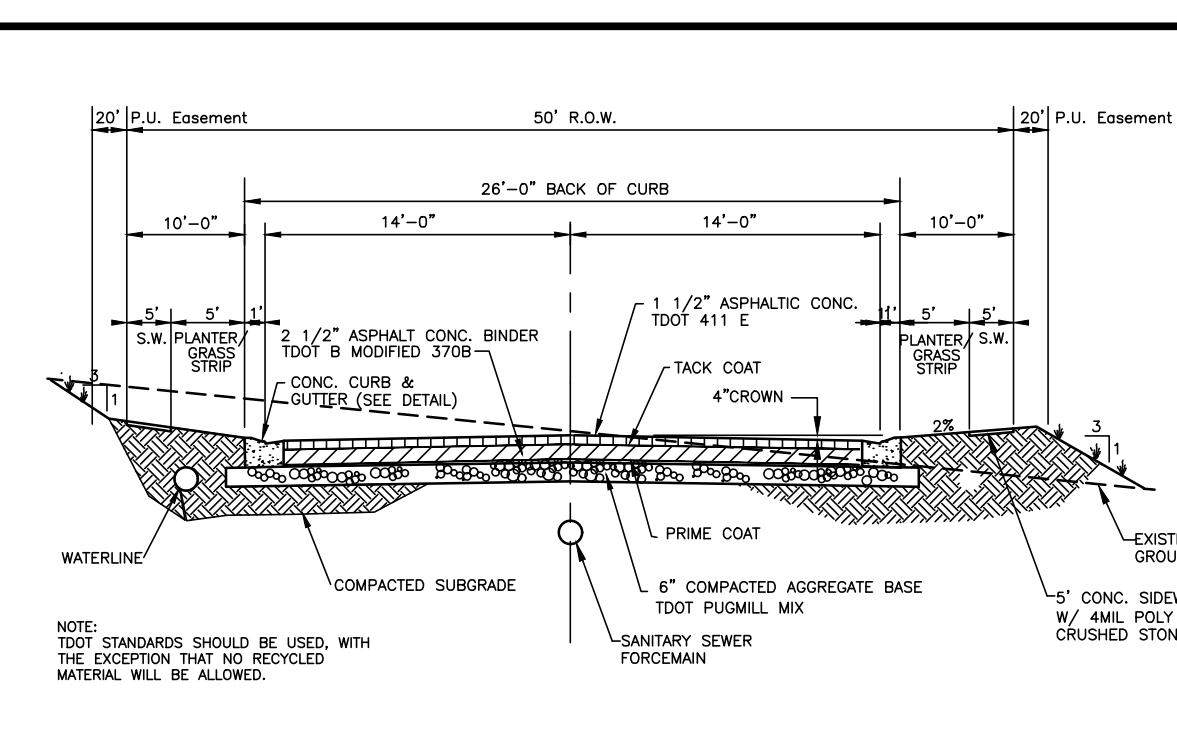
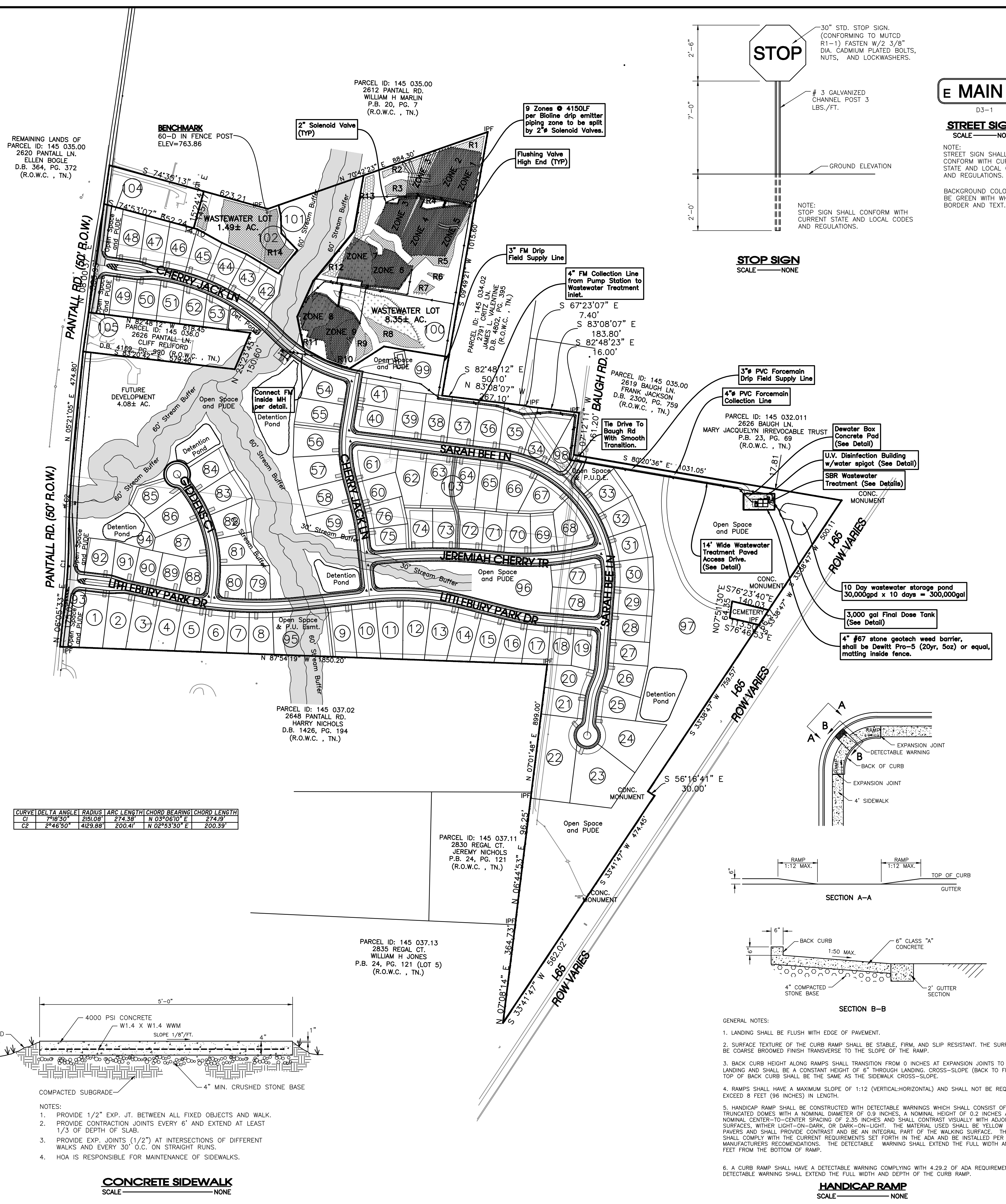
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Traffic Engineering and Planning



No Scale

Figure 1.  
Location of the Proposed Project Site

Plot SW#: S.E.C. Standard Memo.ctb Plot Date: 9/26/2018 1:00 PM User: CADTECH4



The proposed electric and water information shown hereon is not an actual design to be used for construction, and is for reference and illustrative purposes only. The contractor shall refer to the actual final design for each proper discipline (electrical, civil, mechanical, etc.) with the Tennessee professional engineer's seal, for precise design information.

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50	13750	103 (OS)	5232
51	13658	104 (OS)	8471
52	12361	105 (OS)	6783
53	10005		

**Legend:**

□	EXIST. CONCRETE MONUMENT	⊕	BENCHMARK
●	IRON PIN SET (I.P.S.)	♿	HANDICAP RAMP SYMBOL
○	IRON PIN FOUND (I.P.F.)	V.A.	VAN ACCESSIBLE HANDICAP DESIGNATION
—	EXIST. SIGN POST	—	HC SIGN
—	EXIST. SEWER CLEANOUT	—	PROPOSED SIGN POST
⊙	EXIST. MANHOLE (SEWER & PHONE)	●	CONCRETE BOLLARD
⊞	EXIST. WATER/GAS VALVE	—	WHEEL STOP
⊞	EXIST. TELEPHONE RISER	—	CONCRETE SIDEWALK
⊞	EXIST. GAS RISER	—	EXTRUDED CURB
⊞	EXIST. ELECTRICAL ENCLOSURE	—	CURB & GUTTER
⊞	EXIST. WATER METER	→	TRAFFIC ARROW
⊞	EXIST. UTILITY POLE	↔	TURN LANE ARROWS
⊞	EXIST. FIRE HYDRANT	⚠	REVISION NUMBER
⊞	POST INDICATOR VALVE	⚠	DRAINAGE STRUCTURE DESIGNATION
⊞	BLOW OFF VALVE	⚠	DRAINAGE PIPE DESIGNATION
⊞	REDUCER	⚠	RIP RAP
⊞	REMOTE FIRE DEPT. CONNECTION	⚠	RUNOFF FLOW ARROW
⊞	CONCRETE THRUST BLOCK	⚠	INLET FILTER PROTECTION
⊞	DOUBLE DETECTOR CHECK VALVE	⚠	PROPOSED SPOT ELEVATION
⊞	FIRE DEPT. CONNECTION	⚠	EXIST. SPOT ELEVATION
⊞	FIRE HYDRANT	⚠	SEWER/STORM FLOW DIRECTION
⊞	GATE VALVE & BOX	⚠	CATCH BASIN
⊞	WATER METER	⚠	CURB INLET
⊞	GAS METER	⚠	AREA DRAIN
⊞	GREASE TRAP	⚠	HEADWALL
⊞	EXTERIOR CLEANOUT ECO	⚠	WINGED HEADWALL
⊞	MANHOLE	⚠	CONCRETE SWALE
⊞		⚠	TYPE- X- HEADWALL

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200' 0 200' 400'  
SCALE: 1" = 200'

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**Littleberry Subdivision**  
Thompson Station, Tennessee

**Master Plan**

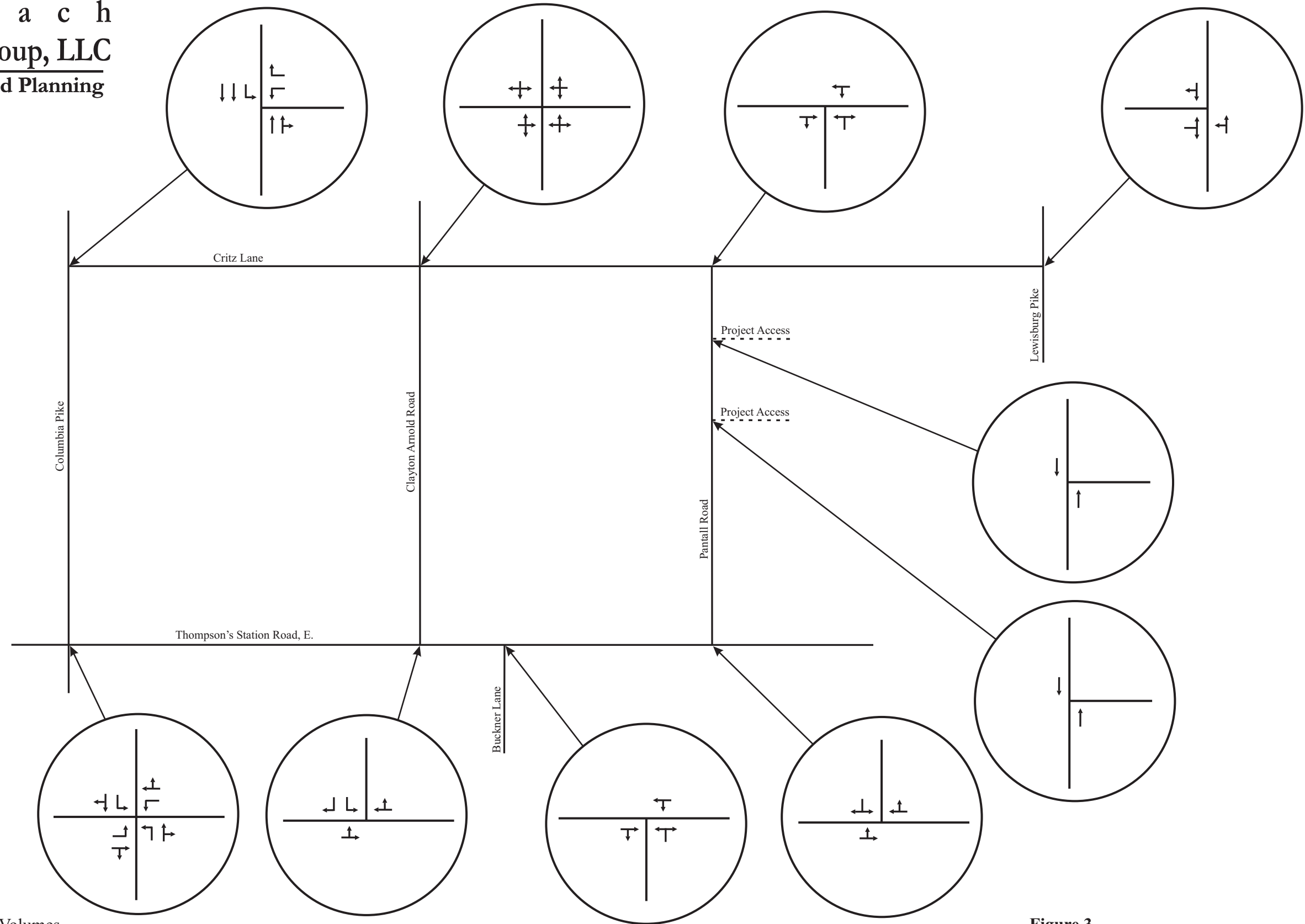
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DATE: 6-11-18  
CHECKED: JFR  
FILE NAME: 17224LittleberryPrelim  
SCALE: 1"=200'  
JOB NO. 17224  
SHEET: C0.1

### **3. EXISTING CONDITIONS**

#### **3.1 REGIONAL AND LOCAL ACCESS**

Pantall Road provides regional and local access to the project site. This facility is a two-lane collector roadway that provides a north-south connection between Critz Lane and Thompson's Station, E. According to the data compiled by the Tennessee Department of Transportation (TDOT) within their E-TRIMS database, Pantall Road includes a right-of-way that is currently 52 feet wide. Based on field measurements, this segment of Pantall Road is approximately 20 feet wide and includes one travel lane in each direction. Currently, a 40 mph speed limit is posted on Pantall Road in the vicinity of the project site. The existing laneage at the intersections within the study area is shown in [Figure 3](#).





**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 3.**  
**Existing Laneage within the Study Area**

### 3.2 EXISTING TRAFFIC VOLUMES

In order to provide data for the traffic impact analysis, peak hour traffic volumes were identified for the following intersections:

- Columbia Pike and Critz Lane
- Critz Lane and Clayton Arnold Road / Paddock Park Drive
- Critz Lane and Pantall Road
- Lewisburg Pike and Critz Lane
- Thompson's Station Road, E. and Pantall Road
- Thompson's Station Road, E. and Buckner Lane
- Thompson's Station Road, E. and Clayton Arnold Road
- Columbia Pike and Thompson's Station Road

Specifically, peak hour traffic counts were collected from 6:00-9:00 AM and 4:00-7:00 PM on typical weekdays and 2:00-7:00 PM on typical Saturdays in September 2018. The traffic count worksheets are included in [Appendix A](#), and the existing peak hour traffic volumes are shown in [Figures 4A and 4B](#).

Using the existing peak hour traffic volumes shown in [Figures 4A and 4B](#), capacity analyses were conducted for the intersection studied. Specifically, in order to identify current peak hour levels of operation within the study area, the capacity calculations were performed according to the methods outlined in the [Highway Capacity Manual 2010](#) (HCM2010). These analyses result in the determination of a Level of Service (LOS), which is a measure of evaluation is used to describe how well an intersection or roadway operates. LOS A represents free flow traffic operations, and LOS F suggests that the traffic demand exceeds the available capacity. In an urbanized area, LOS D is typically considered to be the minimum acceptable LOS. [Table 1](#) presents the descriptions of LOS for signalized intersections, and [Table 2](#) presents the descriptions of LOS for unsignalized intersections.

The results of the capacity analyses for the existing peak hour traffic volumes are shown in [Tables 3A and 3B](#), and [Appendix B](#) includes the capacity analyses worksheets. The capacity analyses indicate the following:

#### **Columbia Pike and Critz Lane**

Under current signalized conditions, the intersection of Columbia Pike and Critz Lane operates at LOS C during the AM peak hour and LOS B during the weekday PM peak hour. Also, additional analyses were conducted in order to identify how well this intersection would operate if a second westbound right turn lane were provided. The additional analyses indicate that a second westbound right turn lane would improve the overall LOS and reduce the westbound vehicle delays and queues during the weekday AM peak hour.

This intersection operates acceptably during the Saturday peak hour.



### **Critz Lane and Clayton Arnold Road / Paddock Park Drive**

With existing two-way stop conditions and existing laneage at this intersection, most of the critical turning movements operate at LOS C or better during both peak hours. However, the northbound turning movements operate at LOS F during the weekday AM peak hour, during the peak hour of operations for the elementary and middle school located on the east side of Clayton Arnold Road, south of Critz Lane.

All of the critical turning movements at this intersection operate acceptably during the Saturday peak hour.

### **Critz Lane and Pantall Road**

With existing stop conditions on Pantall Road and existing laneage at this intersection, all of the critical turning movements operate at LOS B or better during both weekday peak hours.

All of the critical turning movements at this intersection operate acceptably during the Saturday peak hour.

### **Lewisburg Pike and Critz Lane**

Under existing unsignalized conditions, and with the existing laneage at this intersection, the eastbound left and right turns operate at LOS F during both weekday peak hours, with significant vehicle delays and queues.

All of the critical turning movements at this intersection operate acceptably during the Saturday peak hour.

### **Thompson's Station Road, E. and Pantall Road**

With existing stop conditions on Pantall Road and existing laneage at this intersection, all of the critical turning movements operate at LOS B or better during both weekday peak hours.

All of the critical turning movements at this intersection operate acceptably during the Saturday peak hour.

### **Thompson's Station Road, E. and Buckner Lane**

With existing signalized conditions and existing laneage at this intersection, the westbound and/or northbound turning movements operate poorly during both weekday peak hours. Specifically, these conditions occur because no dedicated turn lanes are provided on either Thompson's Station Road, E. or Buckner Lane at this location.

This intersection operates acceptably during the Saturday peak hour.

### **Thompson's Station Road, E. and Clayton Arnold Road**

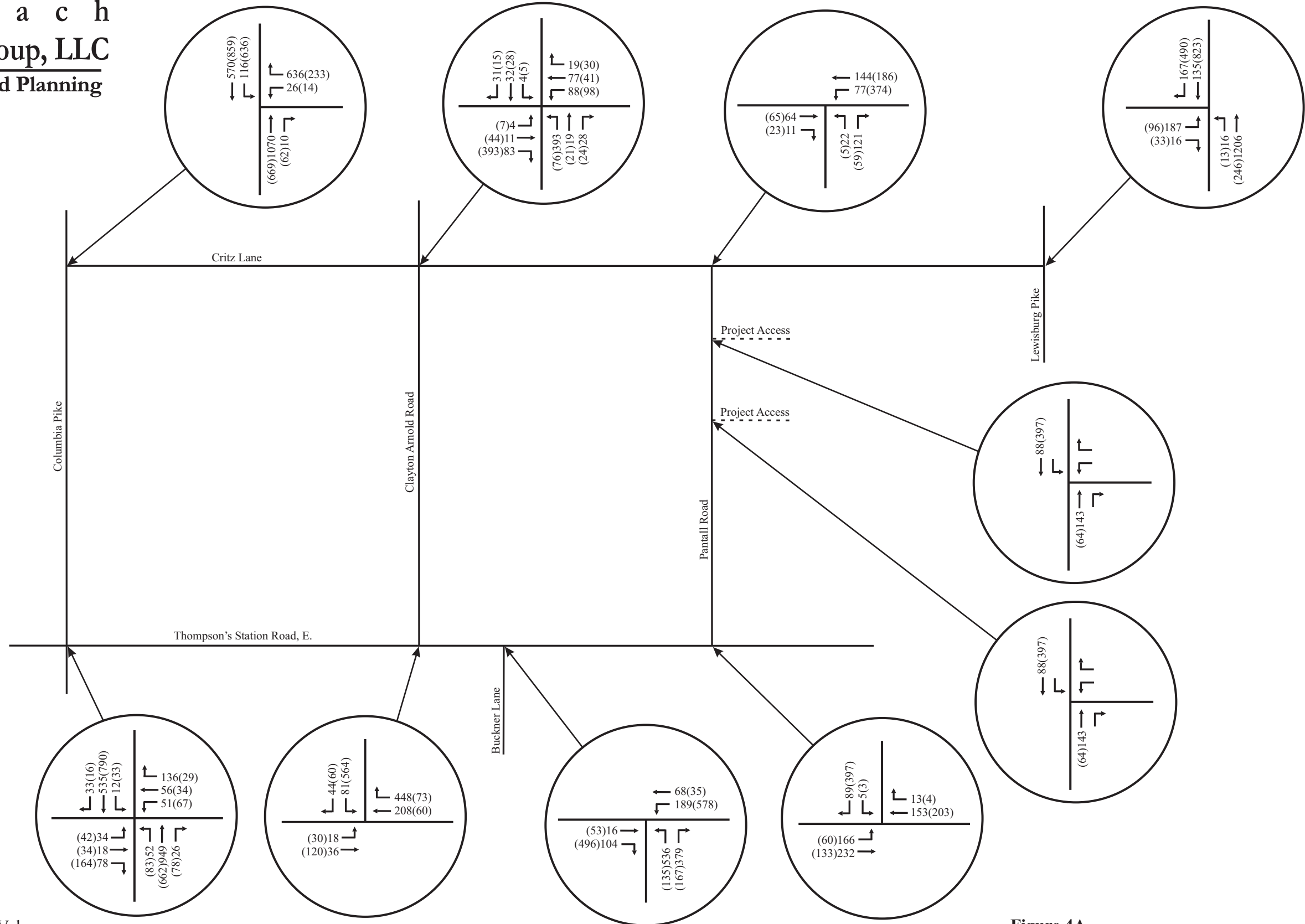
With existing stop conditions on Clayton Arnold Road and existing laneage at this intersection, most of the critical turning movements operate at LOS B or better during both weekday peak hours. However, the southbound left turns operate poorly during the PM peak hour.

All of the critical turning movements at this intersection operate acceptably during the Saturday peak hour.

**Columbia Pike and Thompson's Station Road**

With existing signalized conditions and existing laneage at this intersection, the intersection of Columbia Pike and Thompson's Station Road currently operates at LOS C during both weekday peak hours.

This intersection operates acceptably during the Saturday peak hour.

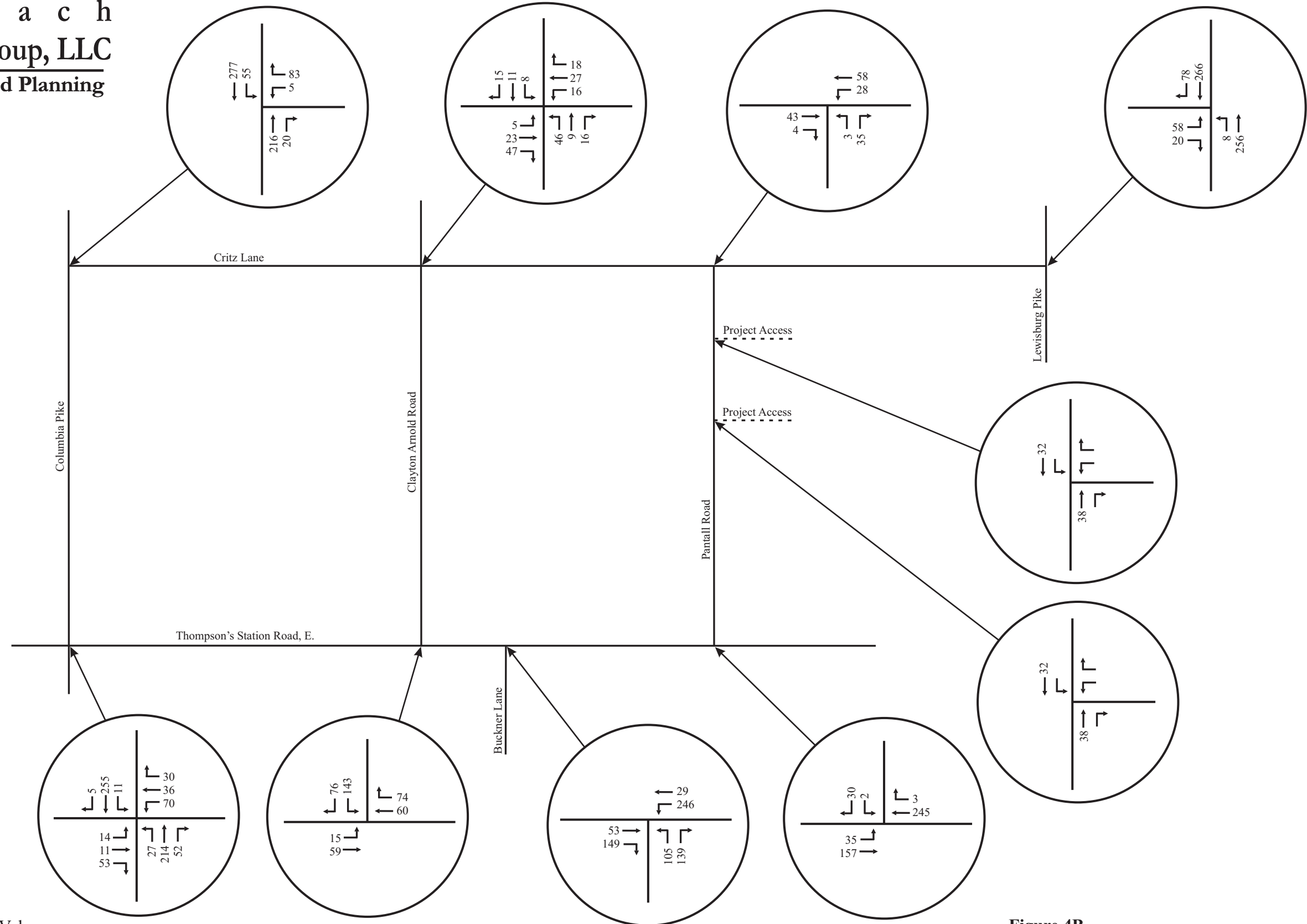


**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 4A.**  
**Existing Weekday Peak Hour Traffic Volumes**

**F i s c h b a c h**  
**Transportation Group, LLC**  
**Traffic Engineering and Planning**



**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 4B.**  
**Existing Saturday Peak Hour Traffic Volumes**

**TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS**

<b>Level of Service</b>	<b>Description</b>	<b>Average Control Delay per Vehicle (sec)</b>
A	Operations with very low control delay. Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	$\leq 10$
B	Operations with stable flows. This generally occurs with good progression, short cycle lengths, or both. More vehicles stop than for LOS A, causing higher levels of average delay.	$> 10$ and $\leq 20$
C	Operations with stable flow. Occurs with fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	$> 20$ and $\leq 35$
D	Approaching unstable flow. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop.	$> 35$ and $\leq 55$
E	Unstable flow. In many cases, this is considered to be the limit for acceptable delay. These high delays generally indicate poor progression, long cycle lengths, and high v/c ratios.	$> 55$ and $\leq 80$
F	Unacceptable delay. This condition often occurs with oversaturation or with high v/c ratios. Poor progression and long cycle lengths may also cause such delay levels.	$> 80$

Source: Highway Capacity Manual 2010 (HCM2010)

**TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS**

<b>Level of Service</b>	<b>Description</b>	<b>Average Control Delay (sec/veh)</b>
A	Minimal delay	$\leq 10$
B	Brief delay	$> 10$ and $\leq 15$
C	Average delay	$> 15$ and $\leq 25$
D	Significant delay	$> 25$ and $\leq 35$
E	Long delay	$> 35$ and $\leq 50$
F	Extreme delay	$> 50$

Source: Highway Capacity Manual 2010 (HCM 2010)

**TABLE 3A. EXISTING WEEKDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE	LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS B	1 veh (18 sec/veh)	LOS D	1 veh (40 sec/veh)
	Westbound Right Turns	LOS D	24 veh (47 sec/veh)	LOS C	8 veh (28 sec/veh)
	Northbound Thrus	LOS D	19 veh (39 sec/veh)	LOS B	8 veh (14 sec/veh)
	Northbound Right Turns	LOS D	19 veh (39 sec/veh)	LOS B	8 veh (14 sec/veh)
	Southbound Left Turns	LOS C	3 veh (23 sec/veh)	LOS B	12 veh (17 sec/veh)
	Southbound Thrus	LOS B	7 veh (15 sec/veh)	LOS A	2 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS C (34 sec/veh)</b>		<b>LOS B (12 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (20 sec/veh)	LOS D	1 veh (40 sec/veh)
	Westbound Right Turns	LOS C	9 veh (32 sec/veh)	LOS C	4 veh (26 sec/veh)
	Northbound Thrus	LOS B	11 veh (19 sec/veh)	LOS B	8 veh (14 sec/veh)
	Northbound Right Turns	LOS B	11 veh (19 sec/veh)	LOS B	8 veh (14 sec/veh)
	Southbound Left Turns	LOS B	1 veh (13 sec/veh)	LOS B	12 veh (17 sec/veh)
	Southbound Thrus	LOS A	2 veh (6 sec/veh)	LOS A	2 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (19 sec/veh)</b>		<b>LOS B (12 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (7 sec/veh)	LOS A	0 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (9 sec/veh)
	Northbound Turning Movements	LOS F	15 veh (81 sec/veh)	LOS C	1 veh (18 sec/veh)
	Southbound Turning Movements	LOS B	1 veh (12 sec/veh)	LOS C	1 veh (16 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (8 sec/veh)
	Northbound Left and Right Turns	LOS B	1 veh (10 sec/veh)	LOS B	1 veh (11 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with existing conditions)	Eastbound Left and Right Turns	LOS F	16 veh (392 sec/veh)	LOS F	5 veh (65 sec/veh)
	Northbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)	LOS B	1 veh (12 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (8 sec/veh)
	Southbound Left and Right Turns	LOS B	1 veh (11 sec/veh)	LOS B	3 veh (14 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS C	4 veh (29 sec/veh)	LOS B	13 veh (11 sec/veh)
	Westbound Left Turns / Thrus	LOS E	13 veh (60 sec/veh)	LOS F	53 veh (141 sec/veh)
	Northbound Left and Right Turns	LOS C	28 veh (33 sec/veh)	LOS E	18 veh (64 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS D (38 sec/veh)</b>		<b>LOS E (76 sec/veh)</b>	
<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (9 sec/veh)	LOS A	1 veh (8 sec/veh)
	Southbound Left Turns	LOS B	1 veh (14 sec/veh)	LOS E	11 veh (38 sec/veh)
	Southbound Right Turns	LOS B	1 veh (12 sec/veh)	LOS A	1 veh (9 sec/veh)



<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS D	2 veh (44 sec/veh)	LOS D	2 veh (42 sec/veh)
	Eastbound Thrus / Right Turns	LOS D	5 veh (49 sec/veh)	LOS D	10 veh (54 sec/veh)
	Westbound Left Turns	LOS D	3 veh (43 sec/veh)	LOS D	3 veh (43 sec/veh)
	Westbound Thrus / Right Turns	LOS D	10 veh (54 sec/veh)	LOS D	3 veh (45 sec/veh)
	Northbound Left Turns	LOS B	1 veh (11 sec/veh)	LOS B	2 veh (18 sec/veh)
	Northbound Thrus / Right Turns	LOS C	34 veh (31 sec/veh)	LOS C	22 veh (22 sec/veh)
	Southbound Left Turns	LOS C	1 veh (22 sec/veh)	LOS B	1 veh (15 sec/veh)
	Southbound Thrus / Right Turns	LOS B	15 veh (17 sec/veh)	LOS C	26 veh (26 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS C (30 sec/veh)</b>		<b>LOS C (28 sec/veh)</b>	

**TABLE 3B. EXISTING SATURDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AFTERNOON PEAK	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (21 sec/veh)
	Westbound Right Turns	LOS B	1 veh (19 sec/veh)
	Northbound Thrus	LOS A	1 veh (7 sec/veh)
	Northbound Right Turns	LOS A	1 veh (7 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (21 sec/veh)
	Westbound Right Turns	LOS B	1 veh (19 sec/veh)
	Northbound Thrus	LOS A	1 veh (7 sec/veh)
	Northbound Right Turns	LOS A	1 veh (7 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	0 veh (7 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (10 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (9 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (7 sec/veh)
	Northbound Left and Right Turns	LOS A	1 veh (9 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with existing conditions)	Eastbound Left and Right Turns	LOS B	1 veh (13 sec/veh)
	Northbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)
	Southbound Left and Right Turns	LOS B	1 veh (10 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS A	3 veh (6 sec/veh)
	Westbound Left Turns / Thrus	LOS A	6 veh (9 sec/veh)
	Northbound Left and Right Turns	LOS E	15 veh (66 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS C (27 sec/veh)</b>	
<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)
	Southbound Left Turns	LOS B	1 veh (11 sec/veh)
	Southbound Right Turns	LOS A	1 veh (9 sec/veh)

<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS C	1 veh (24 sec/veh)
	Eastbound Thrus / Right Turns	LOS C	2 veh (27 sec/veh)
	Westbound Left Turns	LOS C	2 veh (22 sec/veh)
	Westbound Thrus / Right Turns	LOS C	2 veh (23 sec/veh)
	Northbound Left Turns	LOS A	1 veh (10 sec/veh)
	Northbound Thrus / Right Turns	LOS B	4 veh (13 sec/veh)
	Southbound Left Turns	LOS B	1 veh (11 sec/veh)
	Southbound Thrus / Right Turns	LOS B	4 veh (14 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (16 sec/veh)</b>	

#### 4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES

In order to account for the traffic growth which will occur within the study area because of typical growth, consideration was given to background traffic volumes for the intersections within the study area. Specifically, in order to account for typical growth within the study area, consideration was given to the weekday peak hour traffic volumes that were identified in the Comprehensive Update that was prepared by RPM Transportation Consultants, LLC in September 2015 on behalf of the Town of Thompson's Station. Specifically, [Figure 5A](#) identifies the weekday peak hour traffic volumes expected to be generated by the following projects that are planned for construction within the study area:

- The Club at Pleasant Creek
- Bridgemore Village
- Roderick Place
- Canterbury
- Tollgate Farms
- Newport North
- Whistle Stop
- Mars Petcare
- Downtown Thompson's Station
- Former Walmart site
- Commercial Development site adjacent to Lewisburg Pike and Interstate 840

These traffic volumes were established by subtracting the background peak hour traffic volumes identified in the September 2015 Comprehensive Update from the total projected peak hour traffic volumes in the same document. The traffic volumes in [Figures 5A](#) were added together in order to establish the background traffic volumes shown in [Figure 5B](#).

It is important to note that the September 2015 Comprehensive Update did not include peak hour traffic data for a typical weekend. Therefore, background traffic volumes for a typical Saturday were estimated by increasing the existing Saturday peak hour traffic volumes by 20%, as shown in [Figure 5C](#).

Using the background peak hour traffic volumes shown in [Figures 5B and 5C](#), capacity analyses were conducted for the intersections studied. For the purposes of these analyses, it was assumed that all existing laneage and traffic control will be maintained, unless otherwise described below.

The results of the capacity analyses for the total projected peak hour traffic volumes are shown in [Tables 4A and 4B](#), and [Appendix B](#) includes the capacity analyses worksheets. The capacity analyses indicate the following:

### **Columbia Pike and Critz Lane**

The signalized intersection of Columbia Pike and Critz Lane is expected to operate at LOS F during both weekday peak hours. Also, additional analyses were conducted in order to identify how well this intersection would operate if a second westbound right turn lane were provided. The additional analyses indicate that a second westbound right turn lane would improve the overall LOS and reduce the westbound vehicle delays and queues during the weekday AM peak hour.

This intersection is expected to operate acceptably during the Saturday peak hour.

### **Critz Lane and Clayton Arnold Road / Paddock Park Drive**

With existing two-way stop conditions and existing laneage at this intersection, most of the critical turning movements will operate at LOS D or better during both weekday peak hours. However, the northbound turning movements will operate at LOS F, with significant vehicle delays and queues, during the weekday AM peak hour. Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if it were reconstructed as a single-lane roundabout, as recommended in the 2015 Comprehensive Update prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station. The additional analyses indicate that each approach would operate at LOS A during each weekday peak hour under these conditions.

All of the critical turning movements at this intersection are expected to operate acceptably during the Saturday peak hour with either existing conditions or with a single-lane roundabout.

### **Critz Lane and Pantall Road**

With existing stop conditions on Pantall Road and existing laneage at this intersection, most of the critical turning movements will operate at LOS B or better during both weekday peak hours. However, the northbound turning movements will operate at LOS F, with significant vehicle delays and queues, during the weekday PM peak hour. Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if it were reconstructed as a single-lane roundabout, as recommended in the 2015 Comprehensive Update prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station. The additional analyses indicate that each approach would operate at LOS B or better during each weekday peak hour under these conditions.

All of the critical turning movements at this intersection are expected to operate acceptably during the Saturday peak hour with either existing conditions or with a single-lane roundabout.

### **Lewisburg Pike and Critz Lane**

The Town of Thompson's Station and the Tennessee Department of Transportation (TDOT) have approved the construction of dedicated turn lanes and a traffic signal at this location. Specifically, a northbound left turn lane, a southbound right turn lane, and separate eastbound

left and right turn lanes will be provided. Under these conditions, the signalized intersection of Lewisburg Pike and Critz Lane will operate at LOS E during the weekday AM peak hour and LOS B during the weekday PM peak hour. Specifically, the eastbound left turns and northbound throughs will experience significant vehicle delays and queues during the AM weekday peak hour. However, no additional improvements to this intersection can be provided without also widening Lewisburg Pike to a four- or five-lane corridor.

This intersection is expected to operate acceptably during the Saturday peak hour.

#### **Thompson's Station Road, E. and Pantall Road**

With existing stop conditions on Pantall Road and existing laneage at this intersection, the southbound left and right turns will operate at LOS F during both weekday peak hours, and the vehicle delays and queues are expected to be particularly significant during the weekday PM peak hour. Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if an eastbound left turn lane and a traffic signal were provided at this intersection, as recommended in the 2015 Comprehensive Update prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station. The results of these additional analyses indicate that, under with these improvements, the intersection of Thompson's Station Road, E. and Pantall Road would operate at LOS B during the weekday AM peak hour and LOS D during the weekday PM peak hour. Further analyses were conducted in order to identify how well this intersection would operate if it were reconstructed as a single-lane roundabout. The additional analyses indicate that each approach would operate at LOS C or better during each weekday peak hour under these conditions.

All of the critical turning movements at this intersection are expected to operate acceptably during the Saturday peak hour with existing conditions, a traffic signal, or a single-lane roundabout.

#### **Thompson's Station Road, E. and Buckner Lane**

With existing signalized conditions and existing laneage at this intersection, the westbound and/or northbound turning movements are expected to operate poorly during both weekday peak hours. Specifically, these conditions will occur because no dedicated turn lanes are provided on either Thompson's Station Road, E. or Buckner Lane at this location.

This intersection is expected to operate acceptably during the Saturday peak hour.

#### **Thompson's Station Road, E. and Clayton Arnold Road**

With existing stop conditions on Clayton Arnold Road and existing laneage at this intersection, most of the critical turning movements will operate at LOS C or better during both weekday peak hours. However, the southbound left turns will operate poorly during the PM peak hour.

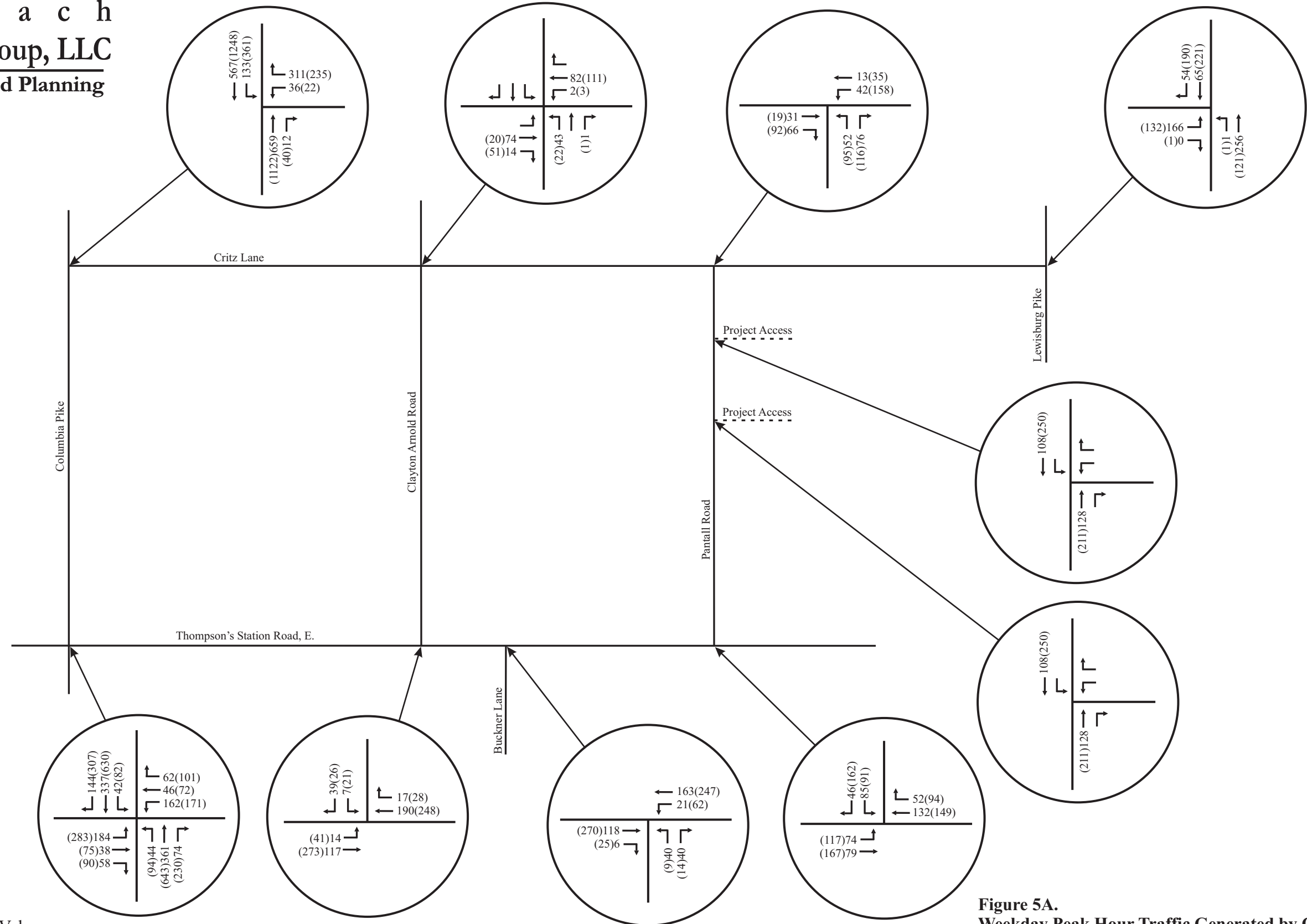
All of the critical turning movements at this intersection are expected to operate acceptably during the Saturday peak hour.

### **Columbia Pike and Thompson's Station Road**

With existing signalized conditions and existing laneage at this intersection, the intersection of Columbia Pike and Thompson's Station Road is expected to operate at LOS F during both weekday peak hours, with significant vehicle delays and queues for multiple turning movements during both peak hours. Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if an additional northbound through lane and southbound through lane were provided. The additional analyses indicate that the intersection of Columbia Pike and Thompson's Station Road would operate at LOS D during the weekday AM peak hour and LOS F during the weekday PM peak hour under these conditions.

This intersection is expected to operate acceptably during the Saturday peak hour.

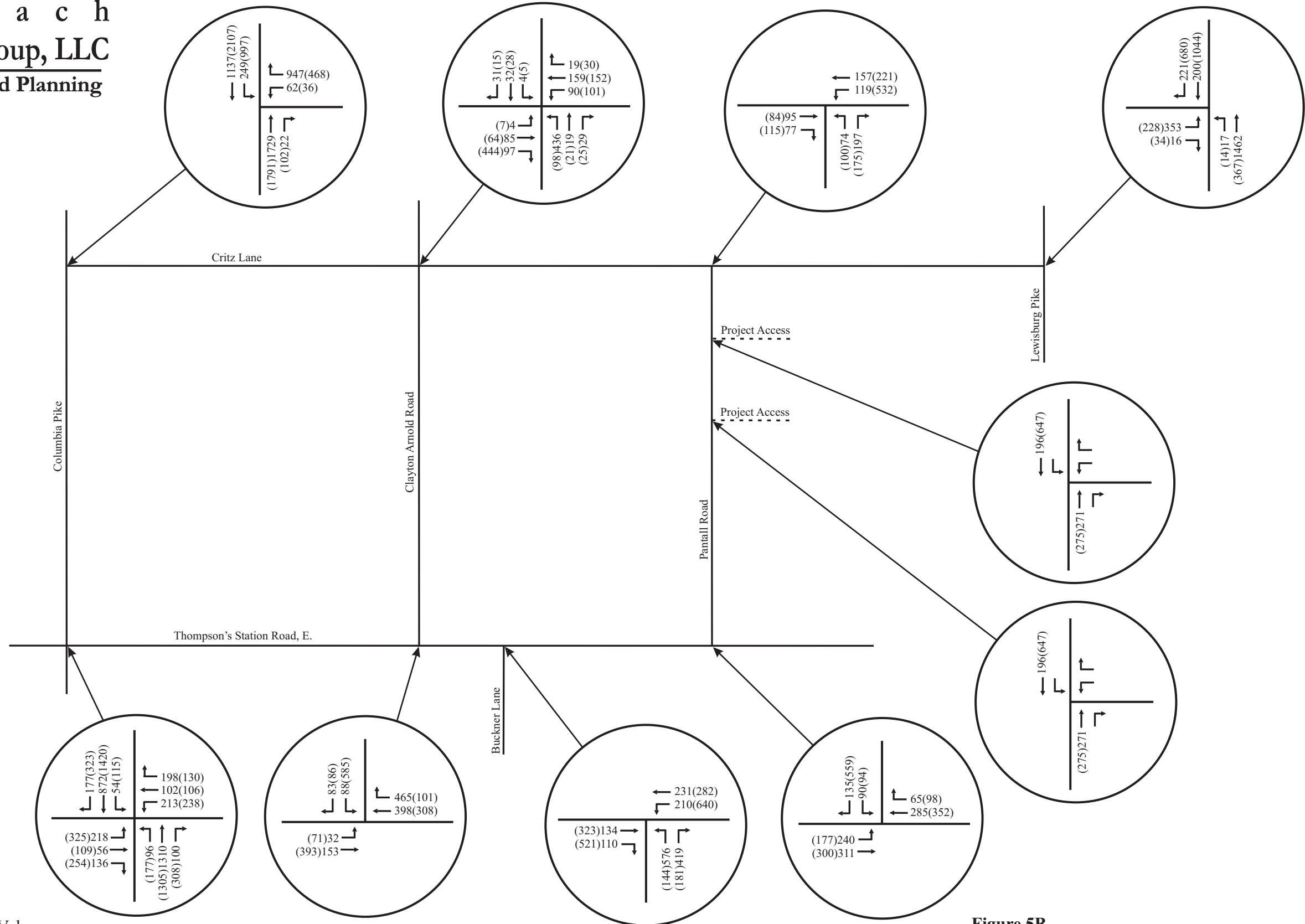




**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

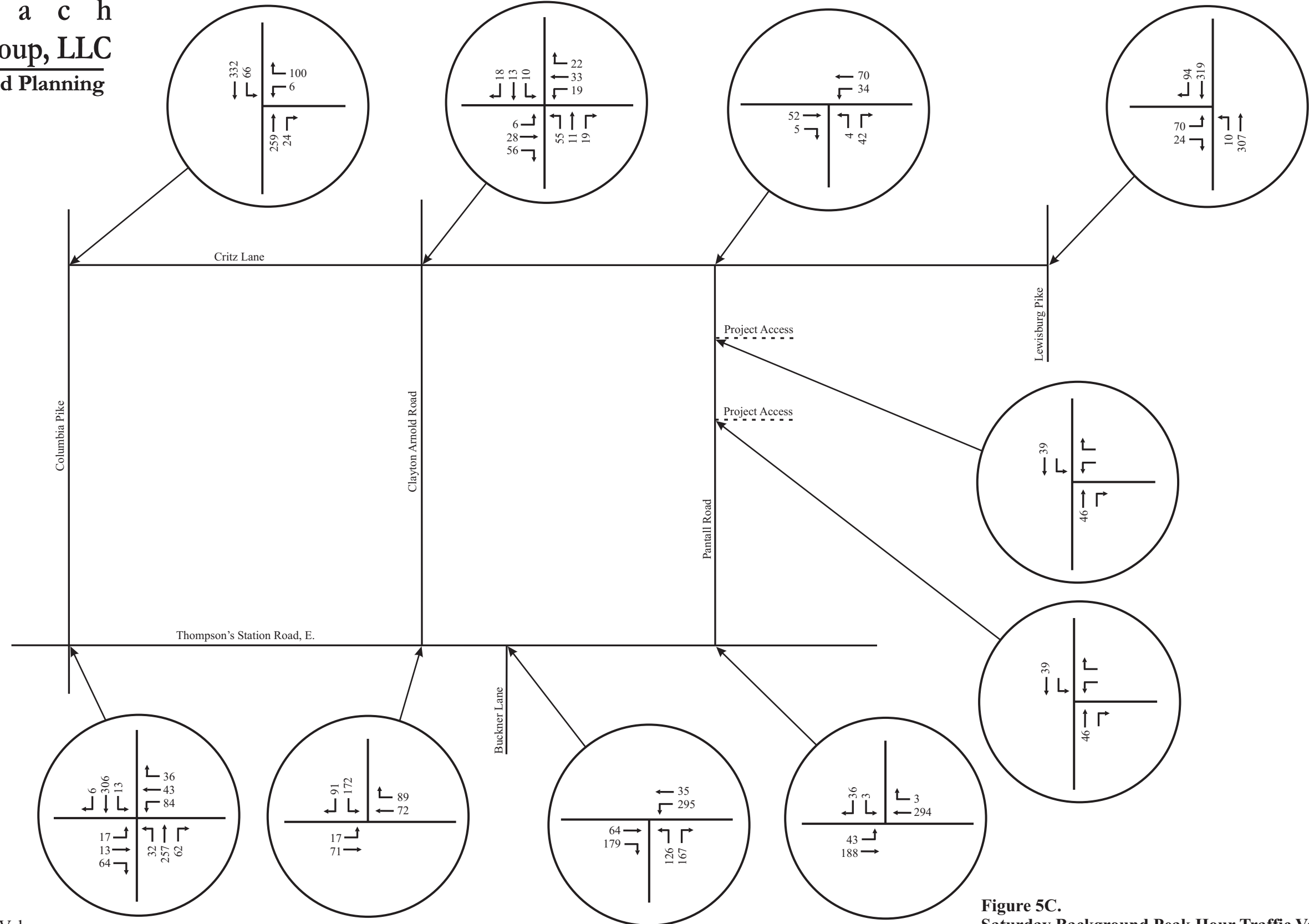
**Figure 5A.**  
**Weekday Peak Hour Traffic Generated by Other**  
**Projects (Based on the 2015 Comprehensive Update)**



**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 5B.**  
**Weekday Background Peak Hour Traffic Volumes**



**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 5C.**  
**Saturday Background Peak Hour Traffic Volumes**  
**(Existing Traffic Increased by 20%)**

**TABLE 4A. BACKGROUND WEEKDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE	LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with planned traffic signal and laneage)	Westbound Left Turns	LOS C	2 veh (26 sec/veh)	LOS C	1 veh (35 sec/veh)
	Westbound Right Turns	LOS F	95 veh (325 sec/veh)	LOS F	24 veh (94 sec/veh)
	Northbound Thrus	LOS F	50 veh (116 sec/veh)	LOS D	32 veh (44 sec/veh)
	Northbound Right Turns	LOS F	51 veh (117 sec/veh)	LOS D	33 veh (48 sec/veh)
	Southbound Left Turns	LOS C	10 veh (28 sec/veh)	LOS F	135 veh (921 sec/veh)
	Southbound Thrus	LOS B	10 veh (11 sec/veh)	LOS B	16 veh (11 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS F (129 sec/veh)</b>		<b>LOS F (195 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with planned traffic signal and laneage, plus second westbound right turn lane)	Westbound Left Turns	LOS D	3 veh (36 sec/veh)	LOS C	1 veh (33 sec/veh)
	Westbound Right Turns	LOS F	31 veh (131 sec/veh)	LOS B	6 veh (20 sec/veh)
	Northbound Thrus	LOS D	31 veh (40 sec/veh)	LOS F	63 veh (159 sec/veh)
	Northbound Right Turns	LOS D	31 veh (40 sec/veh)	LOS F	65 veh (169 sec/veh)
	Southbound Left Turns	LOS D	11 veh (35 sec/veh)	LOS F	114 veh (456 sec/veh)
	Southbound Thrus	LOS A	8 veh (7 sec/veh)	LOS B	18 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS D (51 sec/veh)</b>		<b>LOS F (146 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (8 sec/veh)	LOS A	0 veh (8 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (9 sec/veh)
	Northbound Turning Movements	LOS F	33 veh (306 sec/veh)	LOS D	3 veh (29 sec/veh)
	Southbound Turning Movements	LOS B	1 veh (14 sec/veh)	LOS C	1 veh (20 sec/veh)
<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS A	3 veh (8 sec/veh)
	Westbound Turning Movements	LOS A	2 veh (9 sec/veh)	LOS A	1 veh (5 sec/veh)
	Northbound Turning Movements	LOS A	2 veh (8 sec/veh)	LOS A	1 veh (4 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (7 sec/veh)	LOS A	1 veh (4 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)	LOS A	2 veh (9 sec/veh)
	Northbound Left and Right Turns	LOS B	2 veh (15 sec/veh)	LOS F	20 veh (370 sec/veh)
<b>Critz Lane and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (4 sec/veh)	LOS A	1 veh (8 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS B	5 veh (12 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS A	1 veh (5 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with planned traffic signal and laneage)	Eastbound Left Turns	LOS F	32 veh (178 sec/veh)	LOS E	14 veh (64 sec/veh)
	Eastbound Right Turns	LOS D	1 veh (47 sec/veh)	LOS D	2 veh (47 sec/veh)
	Northbound Left Turns	LOS A	1 veh (6 sec/veh)	LOS B	1 veh (19 sec/veh)
	Northbound Thrus	LOS F	83 veh (74 sec/veh)	LOS A	7 veh (7 sec/veh)

	Southbound Thrus	LOS A	5 veh (9 sec/veh)	LOS C	36 veh (24 sec/veh)
	Southbound Right Turns	LOS A	2 veh (2 sec/veh)	LOS A	7 veh (4 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS E (77 sec/veh)</b>		<b>LOS B (20 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (9 sec/veh)	LOS A	1 veh (9 sec/veh)
	Southbound Left and Right Turns	LOS F	14 veh (176 sec/veh)	LOS F	48 veh (363 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with eastbound left turn lane and traffic signal)	Eastbound Left Turns	LOS B	3 veh (10 sec/veh)	LOS C	7 veh (30 sec/veh)
	Eastbound Thrus	LOS A	3 veh (7 sec/veh)	LOS C	11 veh (24 sec/veh)
	Westbound Thrus / Right Turns	LOS B	8 veh (19 sec/veh)	LOS D	22 veh (50 sec/veh)
	Southbound Left and Right Turns	LOS C	7 veh (26 sec/veh)	LOS D	31 veh (46 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (15 sec/veh)</b>		<b>LOS D (41 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	3 veh (8 sec/veh)	LOS A	2 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	2 veh (7 sec/veh)	LOS A	2 veh (7 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (6 sec/veh)	LOS C	6 veh (15 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS C	9 veh (28 sec/veh)	LOS B	14 veh (13 sec/veh)
	Westbound Left Turns / Thrus	LOS F	40 veh (205 sec/veh)	LOS F	148 veh (777 sec/veh)
	Northbound Left and Right Turns	LOS F	63 veh (119 sec/veh)	LOS F	24 veh (161 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS F (129 sec/veh)</b>		<b>LOS F (373 sec/veh)</b>	

<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS B	1 veh (10 sec/veh)	LOS A	1 veh (8 sec/veh)
	Southbound Left Turns	LOS C	2 veh (24 sec/veh)	LOS F	51 veh (674 sec/veh)
	Southbound Right Turns	LOS C	1 veh (15 sec/veh)	LOS B	1 veh (11 sec/veh)
<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS F	13 veh (182 sec/veh)	LOS F	25 veh (278 sec/veh)
	Eastbound Thrus / Right Turns	LOS F	22 veh (280 sec/veh)	LOS F	50 veh (562 sec/veh)
	Westbound Left Turns	LOS F	17 veh (246 sec/veh)	LOS F	25 veh (419 sec/veh)
	Westbound Thrus / Right Turns	LOS F	46 veh (810 sec/veh)	LOS F	36 veh (754 sec/veh)
	Northbound Left Turns	LOS C	4 veh (34 sec/veh)	LOS E	11 veh (57 sec/veh)
	Northbound Thrus / Right Turns	LOS F	105 veh (139 sec/veh)	LOS F	154 veh (239 sec/veh)
	Southbound Left Turns	LOS D	2 veh (37 sec/veh)	LOS D	8 veh (47 sec/veh)
	Southbound Thrus / Right Turns	LOS D	45 veh (39 sec/veh)	LOS F	196 veh (335 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS F (178.0 sec/veh)</b>		<b>LOS F (324.0 sec/veh)</b>	
<b>Columbia Pike and Thompson's Station Road</b> (with additional northbound through lane and southbound through lane)	Eastbound Left Turns	LOS F	12 veh (137 sec/veh)	LOS F	14 veh (122 sec/veh)
	Eastbound Thrus / Right Turns	LOS D	9 veh (47 sec/veh)	LOS F	45 veh (507 sec/veh)
	Westbound Left Turns	LOS C	8 veh (32 sec/veh)	LOS F	12 veh (133 sec/veh)
	Westbound Thrus / Right Turns	LOS E	14 veh (56 sec/veh)	LOS F	31 veh (570 sec/veh)
	Northbound Left Turns	LOS B	2 veh (18 sec/veh)	LOS C	4 veh (24 sec/veh)

	Northbound Thrus	LOS D	26 veh (42 sec/veh)	LOS D	26 veh (38 sec/veh)
	Northbound Right Turns	LOS D	26 veh (43 sec/veh)	LOS D	28 veh (44 sec/veh)
	Southbound Left Turns	LOS C	1 veh (23 sec/veh)	LOS C	2 veh (22 sec/veh)
	Southbound Thrus	LOS C	17 veh (29 sec/veh)	LOS F	35 veh (61 sec/veh)
	Southbound Right Turns	LOS C	16 veh (29 sec/veh)	LOS F	39 veh (77 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS D (44 sec/veh)</b>		<b>LOS F (121.0 sec/veh)</b>	



**TABLE 4B. BACKGROUND SATURDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AFTERNOON PEAK	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (21 sec/veh)
	Westbound Right Turns	LOS B	2 veh (19 sec/veh)
	Northbound Thrus	LOS A	1 veh (8 sec/veh)
	Northbound Right Turns	LOS A	1 veh (8 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (21 sec/veh)
	Westbound Right Turns	LOS B	1 veh (18 sec/veh)
	Northbound Thrus	LOS A	1 veh (8 sec/veh)
	Northbound Right Turns	LOS A	1 veh (8 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	0 veh (7 sec/veh)
	Northbound Turning Movements	LOS B	1 veh (10 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (10 sec/veh)
<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (3 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (7 sec/veh)
	Northbound Left and Right Turns	LOS A	1 veh (9 sec/veh)
<b>Critz Lane and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (3 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with planned traffic signal and laneage)	Eastbound Left Turns	LOS C	2 veh (34 sec/veh)
	Eastbound Right Turns	LOS C	1 veh (27 sec/veh)
	Northbound Left Turns	LOS A	1 veh (4 sec/veh)
	Northbound Thrus	LOS A	2 veh (3 sec/veh)

	Southbound Thrus	LOS A	4 veh (8 sec/veh)
	Southbound Right Turns	LOS A	1 veh (4 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (8 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)
	Southbound Left and Right Turns	LOS B	1 veh (11 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with eastbound left turn lane and traffic signal)	Eastbound Left Turns	LOS A	1 veh (3 sec/veh)
	Eastbound Thrus	LOS A	1 veh (2 sec/veh)
	Westbound Thrus / Right Turns	LOS A	3 veh (6 sec/veh)
	Southbound Left and Right Turns	LOS C	1 veh (35 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (6 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (4 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (5 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (4 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS A	2 veh (7 sec/veh)
	Westbound Left Turns / Thrus	LOS B	5 veh (13 sec/veh)
	Northbound Left and Right Turns	LOS C	5 veh (20 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (14 sec/veh)</b>	

<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)
	Southbound Left Turns	LOS B	1 veh (11 sec/veh)
	Southbound Right Turns	LOS A	1 veh (9 sec/veh)
<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS C	1 veh (28 sec/veh)
	Eastbound Thrus / Right Turns	LOS C	2 veh (32 sec/veh)
	Westbound Left Turns	LOS C	2 veh (27 sec/veh)
	Westbound Thrus / Right Turns	LOS C	2 veh (28 sec/veh)
	Northbound Left Turns	LOS A	1 veh (9 sec/veh)
	Northbound Thrus / Right Turns	LOS B	6 veh (13 sec/veh)
	Southbound Left Turns	LOS A	1 veh (10 sec/veh)
	Southbound Thrus / Right Turns	LOS B	6 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (17 sec/veh)</b>	
<b>Columbia Pike and Thompson's Station Road</b> (with additional northbound through lane and southbound through lane)	Eastbound Left Turns	LOS C	1 veh (24 sec/veh)
	Eastbound Thrus / Right Turns	LOS C	2 veh (27 sec/veh)
	Westbound Left Turns	LOS C	2 veh (22 sec/veh)
	Westbound Thrus / Right Turns	LOS C	2 veh (23 sec/veh)
	Northbound Left Turns	LOS B	1 veh (10 sec/veh)

	Northbound Thrus	LOS B	3 veh (12 sec/veh)
	Northbound Right Turns	LOS B	2 veh (12 sec/veh)
	Southbound Left Turns	LOS B	1 veh (11 sec/veh)
	Southbound Thrus	LOS B	3 veh (13 sec/veh)
	Southbound Right Turns	LOS B	3 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (16 sec/veh)</b>	

## 5. IMPACTS OF PROPOSED DEVELOPMENT

### 5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Tenth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2017. [Tables 5A and 5B](#) present the daily and peak hour trip generations for proposed project, and these calculations are included in [Appendix C](#).

**TABLE 5A. WEEKDAY TRIP GENERATION FOR THE PROPOSED PROJECT**

LAND USE	SIZE	GENERATED TRAFFIC				
		DAILY	AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Single-Family Residential (LUC 210)	92 homes	962	18	53	59	35

**TABLE 5B. SATURDAY TRIP GENERATION FOR THE PROPOSED PROJECT**

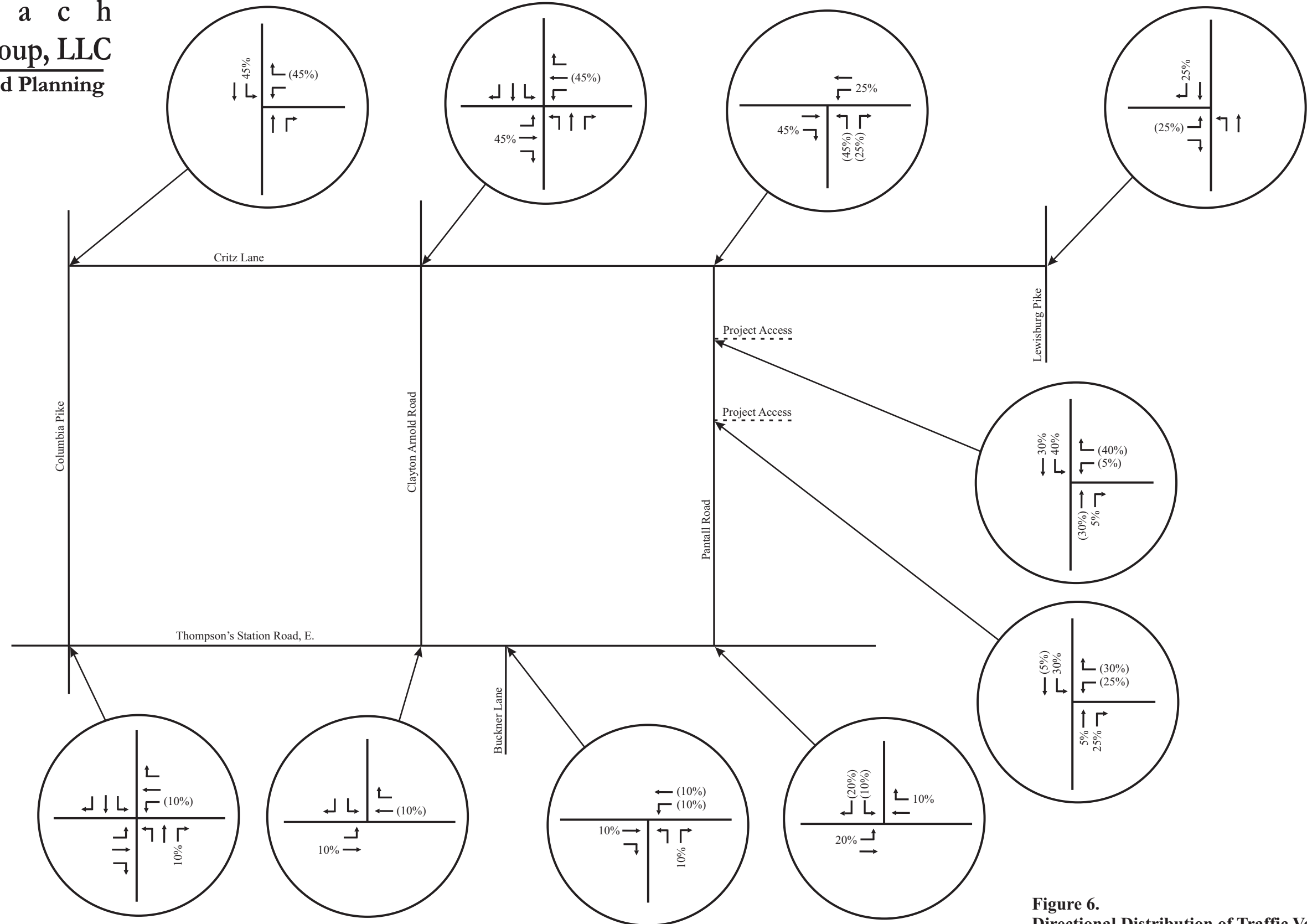
LAND USE	SIZE	GENERATED TRAFFIC	
		SATURDAY PEAK HOUR	
		ENTER	EXIT
Single-Family Residential	92 homes	51	44

## 5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

For the purposes of this study, it was estimated that the trips generated by the proposed development will access the project site according to the directional distribution shown in [Figure 6](#). The development of this distribution was based on the following factors:

- existing land use characteristics,
- the directions of approach of the existing traffic,
- the access proposed for the project, and
- the locations of population centers in the area.

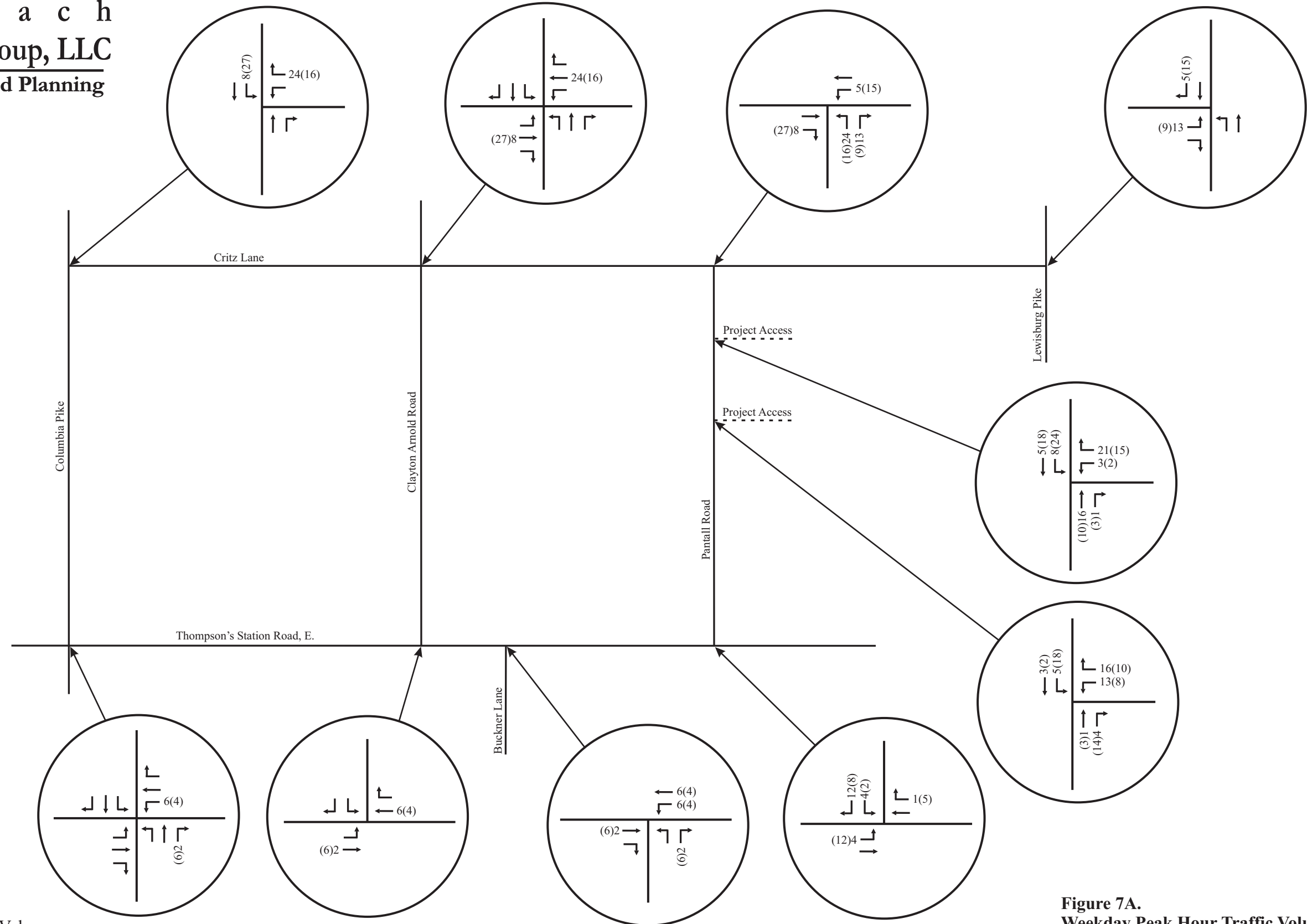
The peak hour trip generation and directional distribution were used to add the site-generated trips to the roadway system. [Figures 7A and 7B](#) include the peak hour traffic volumes that are expected to be generated by the proposed project.



**No Scale**  
 XX - Entering Volumes  
 (XX) - Exiting Volumes

**Figure 6.**  
**Directional Distribution of Traffic Volumes**  
**Generated by the Proposed Project**

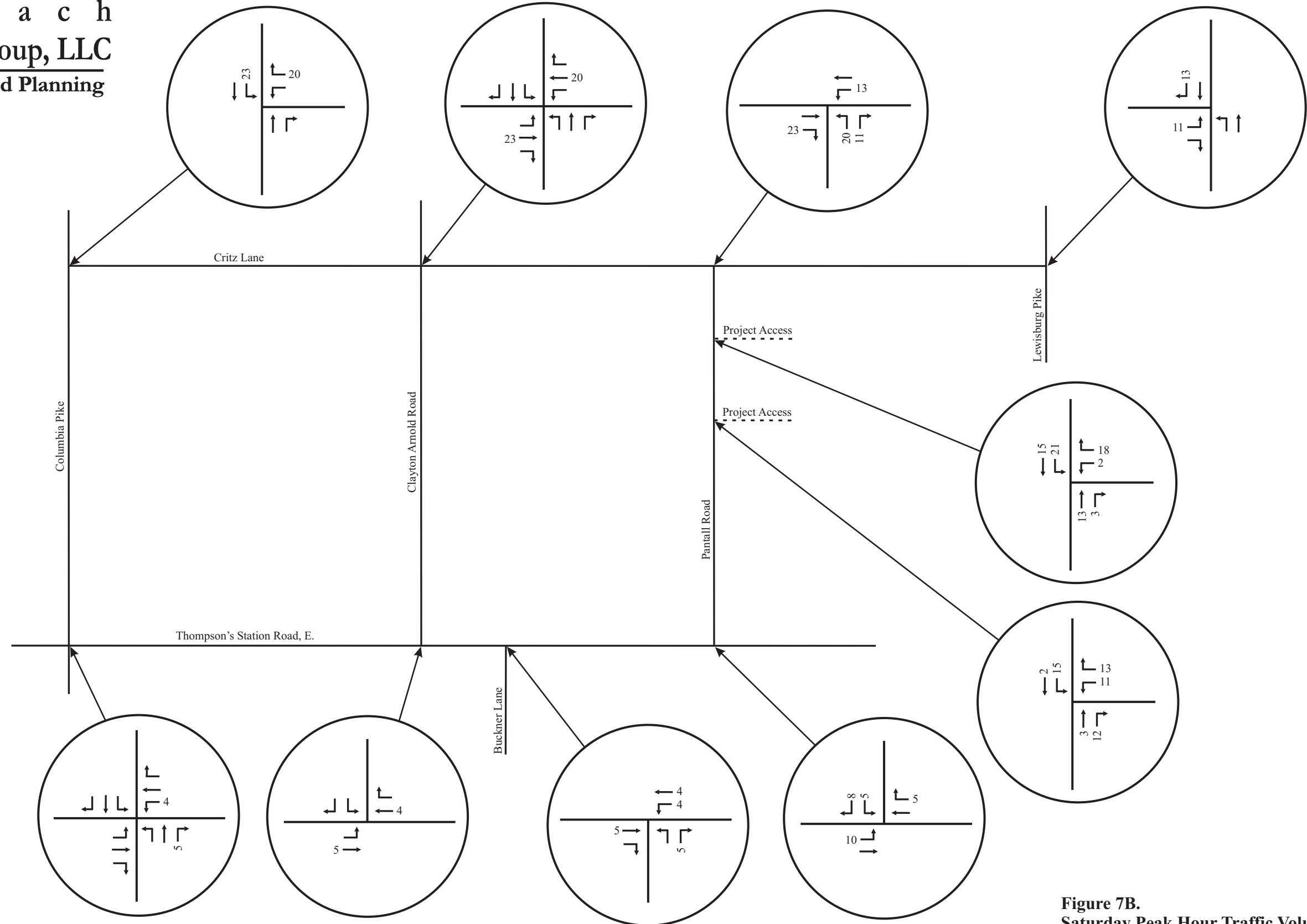




**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 7A.**  
**Weekday Peak Hour Traffic Volumes**  
**Generated by the Proposed Project**



**No Scale**  
 XX - Entering Volumes  
 (XX) - Exiting Volumes

**Figure 7B.**  
**Saturday Peak Hour Traffic Volumes**  
**Generated by the Proposed Project**

### 5.3 CAPACITY ANALYSES

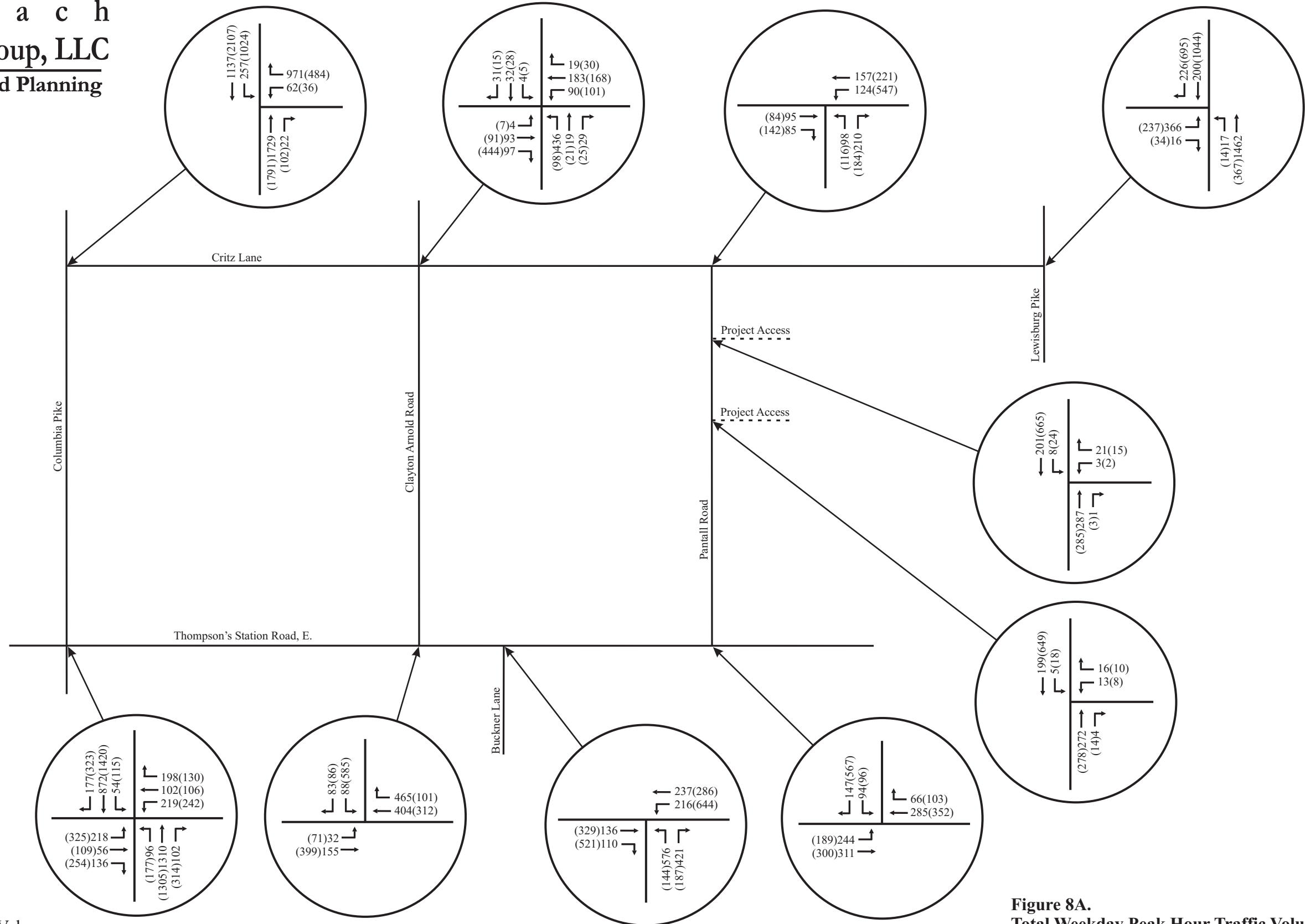
In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the proposed development were added to the background peak hour traffic volumes within the study area. The resulting peak hour volumes are shown in [Figures 8A and 8B](#).

Using the total projected peak hour traffic volumes, capacity analyses were conducted in order to determine the impact of the proposed project on the roadway system. For the purposes of these analyses, it was assumed that all existing laneage and traffic control will be maintained, unless otherwise described below. Also, it was assumed that each of the project accesses will be constructed to include one entering lane and one exiting lane.

The results of the capacity analyses for the total projected peak hour traffic volumes are shown in [Tables 6A and 6B](#), and [Appendix B](#) includes the capacity analyses worksheets. The capacity analyses indicate that the total projected conditions are consistent with the background conditions. Also, at the intersections of Pantall Road and the project accesses, all of the critical turning movements will operate at LOS C or better during the weekday and Saturday peak hours.

Using the total projected peak hour traffic volumes, analyses were conducted to determine whether or not a dedicated southbound left turn lane and/or northbound right turn lane is warranted for construction on Pantall Road at one or both of the project accesses. These analyses were based on the method outlined in *NCHRP Report 457: Engineering Study Guide for Evaluating Intersection Improvements*, and the relevant charts are included in [Appendix D](#). The analyses indicate that the total projected traffic volumes shown in [Figure 8](#) do warrant a southbound left turn lane on Pantall Road at each of the project accesses.

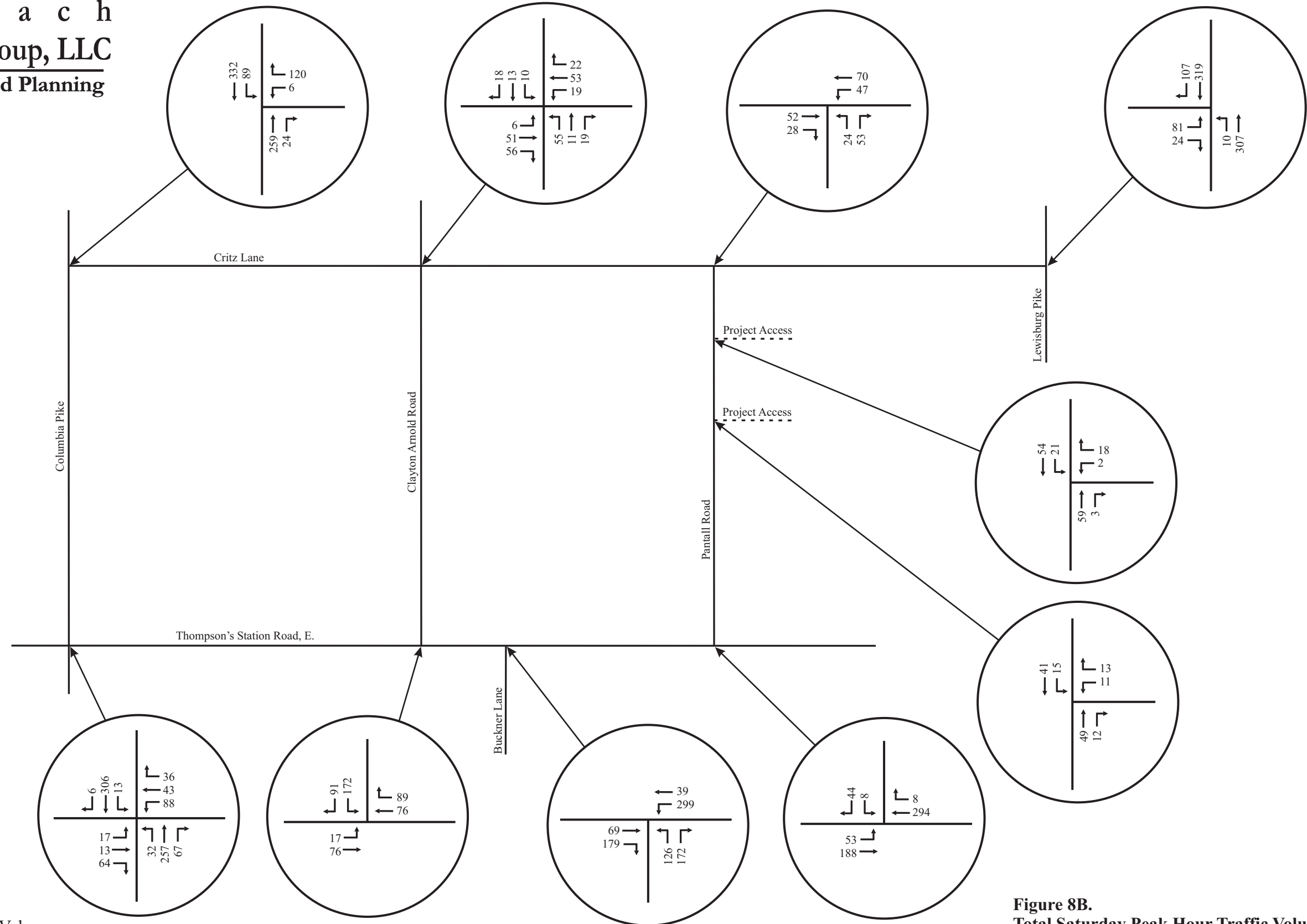
**F i s c h b a c h**  
**Transportation Group, LLC**  
**Traffic Engineering and Planning**



**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 8A.**  
**Total Weekday Peak Hour Traffic Volumes**  
**with the Completion of the Proposed Project**



**No Scale**

XX - AM Peak Hour Volumes  
 (XX) - PM Peak Hour Volumes

**Figure 8B.**  
**Total Saturday Peak Hour Traffic Volumes**  
**with the Completion of the Proposed Project**

**TABLE 6A. TOTAL WEEKDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE	LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with planned traffic signal and laneage)	Westbound Left Turns	LOS C	2 veh (26 sec/veh)	LOS C	1 veh (35 sec/veh)
	Westbound Right Turns	LOS F	99 veh (334 sec/veh)	LOS F	27 veh (106 sec/veh)
	Northbound Thrus	LOS F	52 veh (121 sec/veh)	LOS D	32 veh (44 sec/veh)
	Northbound Right Turns	LOS F	52 veh (123 sec/veh)	LOS D	33 veh (48 sec/veh)
	Southbound Left Turns	LOS C	10 veh (28 sec/veh)	LOS F	140 veh (957 sec/veh)
	Southbound Thrus	LOS B	10 veh (11 sec/veh)	LOS B	16 veh (11 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS F (134 sec/veh)</b>		<b>LOS F (206 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with planned traffic signal and laneage, plus second westbound right turn lane)	Westbound Left Turns	LOS D	3 veh (36 sec/veh)	LOS C	1 veh (33 sec/veh)
	Westbound Right Turns	LOS F	33 veh (135 sec/veh)	LOS B	6 veh (20 sec/veh)
	Northbound Thrus	LOS D	32 veh (41 sec/veh)	LOS F	63 veh (159 sec/veh)
	Northbound Right Turns	LOS D	32 veh (42 sec/veh)	LOS F	65 veh (169 sec/veh)
	Southbound Left Turns	LOS D	11 veh (35 sec/veh)	LOS F	121 veh (496 sec/veh)
	Southbound Thrus	LOS A	8 veh (7 sec/veh)	LOS B	18 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS D (54 sec/veh)</b>		<b>LOS F (154 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (8 sec/veh)	LOS A	0 veh (8 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (9 sec/veh)
	Northbound Turning Movements	LOS F	35 veh (353 sec/veh)	LOS D	3 veh (33 sec/veh)
	Southbound Turning Movements	LOS B	1 veh (14 sec/veh)	LOS C	1 veh (21 sec/veh)
<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS A	3 veh (8 sec/veh)
	Westbound Turning Movements	LOS A	2 veh (10 sec/veh)	LOS A	1 veh (6 sec/veh)
	Northbound Turning Movements	LOS A	3 veh (8 sec/veh)	LOS A	1 veh (4 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (8 sec/veh)	LOS A	1 veh (4 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)	LOS A	2 veh (10 sec/veh)
	Northbound Left and Right Turns	LOS C	3 veh (17 sec/veh)	LOS F	26 veh (573 sec/veh)
<b>Critz Lane and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS A	1 veh (9 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (5 sec/veh)	LOS B	6 veh (13 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (6 sec/veh)	LOS A	1 veh (5 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with planned traffic signal and laneage)	Eastbound Left Turns	LOS F	35 veh (195 sec/veh)	LOS E	14 veh (66 sec/veh)
	Eastbound Right Turns	LOS D	1 veh (47 sec/veh)	LOS D	2 veh (47 sec/veh)
	Northbound Left Turns	LOS A	1 veh (6 sec/veh)	LOS B	1 veh (19 sec/veh)
	Northbound Thrus	LOS F	83 veh (74 sec/veh)	LOS A	7 veh (7 sec/veh)

	Southbound Thrus	LOS A	5 veh (9 sec/veh)	LOS C	36 veh (24 sec/veh)
	Southbound Right Turns	LOS A	2 veh (2 sec/veh)	LOS A	8 veh (4 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS E (80 sec/veh)</b>		<b>LOS C (20 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (9 sec/veh)	LOS A	1 veh (9 sec/veh)
	Southbound Left and Right Turns	LOS F	16 veh (210 sec/veh)	LOS F	40 veh (298 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with eastbound left turn lane and traffic signal)	Eastbound Left Turns	LOS B	3 veh (11 sec/veh)	LOS C	7 veh (31 sec/veh)
	Eastbound Thrus	LOS A	4 veh (7 sec/veh)	LOS C	11 veh (25 sec/veh)
	Westbound Thrus / Right Turns	LOS C	9 veh (21 sec/veh)	LOS E	23 veh (55 sec/veh)
	Southbound Left and Right Turns	LOS C	7 veh (26 sec/veh)	LOS D	31 veh (46 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (16 sec/veh)</b>		<b>LOS D (43 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	3 veh (8 sec/veh)	LOS A	2 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	2 veh (7 sec/veh)	LOS A	2 veh (7 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (6 sec/veh)	LOS C	6 veh (15 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS C	9 veh (28 sec/veh)	LOS B	14 veh (13 sec/veh)
	Westbound Left Turns / Thrus	LOS F	43 veh (227 sec/veh)	LOS F	151 veh (803 sec/veh)
	Northbound Left and Right Turns	LOS F	63 veh (121 sec/veh)	LOS F	25 veh (171 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS F (136 sec/veh)</b>		<b>LOS F (386 sec/veh)</b>	



<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS B	1 veh (10 sec/veh)	LOS A	1 veh (8 sec/veh)
	Southbound Left Turns	LOS C	2 veh (25 sec/veh)	LOS F	51 veh (691 sec/veh)
	Southbound Right Turns	LOS C	1 veh (15 sec/veh)	LOS B	1 veh (11 sec/veh)
<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS F	13 veh (182 sec/veh)	LOS F	25 veh (278 sec/veh)
	Eastbound Thrus / Right Turns	LOS F	22 veh (280 sec/veh)	LOS F	50 veh (562 sec/veh)
	Westbound Left Turns	LOS F	18 veh (261 sec/veh)	LOS F	26 veh (431 sec/veh)
	Westbound Thrus / Right Turns	LOS F	46 veh (810 sec/veh)	LOS F	36 veh (754 sec/veh)
	Northbound Left Turns	LOS C	4 veh (34 sec/veh)	LOS E	11 veh (57 sec/veh)
	Northbound Thrus / Right Turns	LOS F	105 veh (139 sec/veh)	LOS F	155 veh (241 sec/veh)
	Southbound Left Turns	LOS D	2 veh (37 sec/veh)	LOS D	8 veh (47 sec/veh)
	Southbound Thrus / Right Turns	LOS D	45 veh (39 sec/veh)	LOS F	196 veh (335 sec/veh)
	<b>OVERALL INTERSECTION</b>		<b>LOS F (180.0 sec/veh)</b>		<b>LOS F (325.0 sec/veh)</b>
<b>Columbia Pike and Thompson's Station Road</b> (with additional northbound through lane and southbound through lane)	Eastbound Left Turns	LOS F	12 veh (137 sec/veh)	LOS F	14 veh (122 sec/veh)
	Eastbound Thrus / Right Turns	LOS D	9 veh (48 sec/veh)	LOS F	45 veh (507 sec/veh)
	Westbound Left Turns	LOS C	8 veh (32 sec/veh)	LOS F	12 veh (139 sec/veh)
	Westbound Thrus / Right Turns	LOS E	14 veh (56 sec/veh)	LOS F	31 veh (570 sec/veh)
	Northbound Left Turns	LOS B	2 veh (18 sec/veh)	LOS C	4 veh (24 sec/veh)

	Northbound Thrus	LOS D	26 veh (42 sec/veh)	LOS D	27 veh (39 sec/veh)
	Northbound Right Turns	LOS D	26 veh (43 sec/veh)	LOS D	28 veh (45 sec/veh)
	Southbound Left Turns	LOS C	1 veh (23 sec/veh)	LOS C	2 veh (22 sec/veh)
	Southbound Thrus	LOS C	17 veh (29 sec/veh)	LOS F	35 veh (61 sec/veh)
	Southbound Right Turns	LOS C	16 veh (29 sec/veh)	LOS F	39 veh (77 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS D (44 sec/veh)</b>		<b>LOS F (121.0 sec/veh)</b>	
<b>Pantall Road and Northern Project Access</b>	Westbound Left and Right Turns	LOS B	1 veh (11 sec/veh)	LOS B	1 veh (12 sec/veh)
	Southbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)	LOS A	1 veh (8 sec/veh)
<b>Pantall Road and Southern Project Access</b>	Westbound Left and Right Turns	LOS B	1 veh (11 sec/veh)	LOS C	1 veh (15 sec/veh)
	Southbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)	LOS A	0 veh (8 sec/veh)

**TABLE 6B. TOTAL SATURDAY PEAK HOUR LEVELS OF SERVICE**

INTERSECTION	TURNING MOVEMENT	AFTERNOON PEAK	
		LEVEL OF SERVICE	95 <sup>th</sup> %-ILE QUEUE
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (20 sec/veh)
	Westbound Right Turns	LOS B	2 veh (18 sec/veh)
	Northbound Thrus	LOS A	1 veh (9 sec/veh)
	Northbound Right Turns	LOS A	1 veh (9 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (8 sec/veh)</b>	
<b>Columbia Pike and Critz Lane</b> (with existing conditions)	Westbound Left Turns	LOS C	1 veh (20 sec/veh)
	Westbound Right Turns	LOS B	1 veh (17 sec/veh)
	Northbound Thrus	LOS A	1 veh (9 sec/veh)
	Northbound Right Turns	LOS A	1 veh (9 sec/veh)
	Southbound Left Turns	LOS A	1 veh (5 sec/veh)
	Southbound Thrus	LOS A	1 veh (3 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	

<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with existing conditions)	Eastbound Turning Movements	LOS A	0 veh (7 sec/veh)
	Westbound Turning Movements	LOS A	0 veh (8 sec/veh)
	Northbound Turning Movements	LOS B	1 veh (11 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (10 sec/veh)
<b>Critz Lane and Clayton Arnold Road / Paddock Park Drive</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (4 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (4 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (3 sec/veh)
<b>Critz Lane and Pantall Road</b> (with existing conditions)	Westbound Left Turns / Thrus	LOS A	1 veh (7 sec/veh)
	Northbound Left and Right Turns	LOS A	1 veh (9 sec/veh)
<b>Critz Lane and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (3 sec/veh)
	Northbound Turning Movements	LOS A	1 veh (3 sec/veh)
<b>Lewisburg Pike and Critz Lane</b> (with planned traffic signal and laneage)	Eastbound Left Turns	LOS C	3 veh (35 sec/veh)
	Eastbound Right Turns	LOS C	1 veh (27 sec/veh)
	Northbound Left Turns	LOS A	1 veh (4 sec/veh)
	Northbound Thrus	LOS A	2 veh (3 sec/veh)

	Southbound Thrus	LOS A	4 veh (8 sec/veh)
	Southbound Right Turns	LOS A	1 veh (4 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (9 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	1 veh (8 sec/veh)
	Southbound Left and Right Turns	LOS B	1 veh (11 sec/veh)
<b>Thompson's Station Road, E. and Pantall Road</b> (with eastbound left turn lane and traffic signal)	Eastbound Left Turns	LOS A	1 veh (3 sec/veh)
	Eastbound Thrus	LOS A	1 veh (2 sec/veh)
	Westbound Thrus / Right Turns	LOS A	3 veh (6 sec/veh)
	Southbound Left and Right Turns	LOS C	2 veh (35 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS A (7 sec/veh)</b>	
<b>Thompson's Station Road, E. and Pantall Road</b> (with single-lane roundabout)	Eastbound Turning Movements	LOS A	1 veh (4 sec/veh)
	Westbound Turning Movements	LOS A	1 veh (5 sec/veh)
	Southbound Turning Movements	LOS A	1 veh (4 sec/veh)
<b>Thompson's Station Road, E. and Buckner Lane</b> (with existing conditions)	Eastbound Thrus / Right Turns	LOS A	2 veh (7 sec/veh)
	Westbound Left Turns / Thrus	LOS B	5 veh (13 sec/veh)
	Northbound Left and Right Turns	LOS C	6 veh (20 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (14 sec/veh)</b>	

<b>Thompson's Station Road, E. and Clayton Arnold Road</b> (with existing conditions)	Eastbound Left Turns / Thrus	LOS A	0 veh (8 sec/veh)
	Southbound Left Turns	LOS B	1 veh (12 sec/veh)
	Southbound Right Turns	LOS A	1 veh (9 sec/veh)
<b>Columbia Pike and Thompson's Station Road</b> (with existing conditions)	Eastbound Left Turns	LOS C	1 veh (28 sec/veh)
	Eastbound Thrus / Right Turns	LOS C	2 veh (32 sec/veh)
	Westbound Left Turns	LOS C	2 veh (27 sec/veh)
	Westbound Thrus / Right Turns	LOS C	2 veh (28 sec/veh)
	Northbound Left Turns	LOS A	1 veh (9 sec/veh)
	Northbound Thrus / Right Turns	LOS B	6 veh (13 sec/veh)
	Southbound Left Turns	LOS A	1 veh (10 sec/veh)
	Southbound Thrus / Right Turns	LOS B	6 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (17 sec/veh)</b>	
<b>Columbia Pike and Thompson's Station Road</b> (with additional northbound through lane and southbound through lane)	Eastbound Left Turns	LOS C	1 veh (24 sec/veh)
	Eastbound Thrus / Right Turns	LOS C	2 veh (27 sec/veh)
	Westbound Left Turns	LOS C	2 veh (22 sec/veh)
	Westbound Thrus / Right Turns	LOS C	2 veh (23 sec/veh)
	Northbound Left Turns	LOS B	1 veh (10 sec/veh)

	Northbound Thrus	LOS B	3 veh (12 sec/veh)
	Northbound Right Turns	LOS B	3 veh (12 sec/veh)
	Southbound Left Turns	LOS B	1 veh (11 sec/veh)
	Southbound Thrus	LOS B	3 veh (13 sec/veh)
	Southbound Right Turns	LOS B	3 veh (13 sec/veh)
	<b>OVERALL INTERSECTION</b>	<b>LOS B (16 sec/veh)</b>	
<b>Pantall Road and Northern Project Access</b>	Westbound Left and Right Turns	LOS A	1 veh (9 sec/veh)
	Southbound Left Turns / Thrus	LOS A	0 veh (7 sec/veh)
<b>Pantall Road and Southern Project Access</b>	Westbound Left and Right Turns	LOS A	1 veh (9 sec/veh)
	Southbound Left Turns / Thrus	LOS A	0 veh (7 sec/veh)

## 6. CRASH DATA ON THE ROADWAYS WITHIN THE STUDY AREA

For the purposes of this study, consideration was given to recent crash data on the roadways and intersections within the study area. Specifically, data was collected from the Tennessee Department of Transportation (TDOT) database, known as E-TRIMS (Tennessee Roadway Information Management System). The database was queried for incidents on Clayton Arnold Road, Critz Lane, Pantall Road, and Thompson's Station, E. from August 1, 2015 through August 31, 2018. The query results are included in [Appendix E](#) and summarized in [Table 7](#). As shown, the plurality of the crashes on these roadways do not include a collision with another vehicle, and only 15% of the crashes include the more serious angle or head-on collisions. Also, 77.5% of the crashes within the study area included only property damage. These results indicate that the existing topography within the study area, including significant vertical curvature, contribute to the crashes on these roadways.

**TABLE 7. SUMMARY OF RECENT CRASH DATA WITHIN THE STUDY AREA**

Roadway	From	To	TYPE OF COLLISION					SEVERITY		
			None	Side swipe	Rear- End	Angle	Head- On	Property Damages	Injuries	Fatalities
Clayton Arnold Road	Critz Lane	Thompson's Station Road	7	2	5	1	0	15	0	0
Critz Lane	Columbia Pike	Lewisburg Pike	9	1	8	2	0	15	4	1
Pantall Road	Critz Lane	Thompson's Station Road	4	1	1	0	0	4	2	0
Thompson's Station, E.	Columbia Pike	Lewisburg Pike	15	4	11	8	1	28	11	0
<b>TOTAL</b>			<b>35</b>	<b>8</b>	<b>25</b>	<b>11</b>	<b>1</b>	<b>62</b>	<b>17</b>	<b>1</b>



## 7. CONCLUSIONS AND RECOMMENDATIONS

The analyses presented in this study indicate the following information about the intersections within the study area:

### **Columbia Pike and Critz Lane**

Based on analyses conducted for the purposes of this study, it is likely that this intersection will also warrant a second westbound right turn lane in the future, whether or not the proposed project is constructed. It is important to note that the proposed residential project will have a negligible impact on the peak hour traffic operations at this intersection.

### **Critz Lane and Clayton Arnold Road / Paddock Park Drive**

The September 2015 Comprehensive Update that was prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station included the recommendation that a single-lane roundabout be provided at this intersection. Subsequently, the Town of Thompson's Station has retained Barge, Waggoner, Sumner & Cannon, Inc. (BWSC) to design improvements to Critz Lane, including providing a roundabout at the intersection with Clayton Arnold Road / Paddock Park Drive. Based on analyses conducted for the purposes of this study, each approach to the intersection would operate at LOS A during each peak hour under these conditions. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

### **Critz Lane and Pantall Road**

The September 2015 Comprehensive Update that was prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station included the recommendation that a single-lane roundabout be provided at this intersection. Subsequently, the Town of Thompson's Station has retained Barge, Waggoner, Sumner & Cannon, Inc. (BWSC) to design improvements to Critz Lane, including providing a roundabout at the intersection with Pantall Road. Based on analyses conducted for the purposes of this study, each approach to the intersection would operate at LOS B or better during each peak hour under these conditions. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

### **Lewisburg Pike and Critz Lane**

The Town of Thompson's Station and the Tennessee Department of Transportation (TDOT) have approved the construction of dedicated turn lanes and a traffic signal at this location. Even with these improvements, the eastbound left turns and northbound throughs will experience significant vehicle delays and queues during the AM peak hour. However, no additional improvements to this intersection can be provided without also widening Lewisburg Pike to a four- or five-lane corridor. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

### **Thompson's Station Road, E. and Pantall Road**

With existing stop conditions on Pantall Road and existing laneage at this intersection, the southbound left and right turns will operate at LOS F during both weekday peak hours, and the vehicle delays and queues are expected to be particularly significant during the PM peak hour.

Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if an eastbound left turn lane and a traffic signal were provided at this intersection, as recommended in the 2015 Comprehensive Update prepared by RPM Transportation Consultants, LLC on behalf of the Town of Thompson's Station. The results of these additional analyses indicate that, under with these improvements, the intersection of Thompson's Station Road, E. and Pantall Road would operate at LOS B during the AM peak hour and LOS D during the PM peak hour. Further analyses were conducted in order to identify how well this intersection would operate if it were reconstructed as a single-lane roundabout. The additional analyses indicate that each approach would operate at LOS C or better during each peak hour under these conditions. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

#### **Thompson's Station Road, E. and Buckner Lane**

Based on analyses conducted for the purposes of this study, the westbound and/or northbound turning movements are expected to operate poorly during both weekday peak hours. Specifically, these conditions will occur because no dedicated turn lanes are provided on either Thompson's Station Road, E. or Buckner Lane at this location. It is important to note that the proposed residential project will have a negligible impact on the peak hour traffic operations at this intersection.

#### **Thompson's Station Road, E. and Clayton Arnold Road**

With existing stop conditions on Clayton Arnold Road and existing laneage at this intersection, the southbound left turns are expected to operate at LOS F during the weekday PM peak hour. Because of the topography of this intersection, the Town of Thompson's Station has determined that a roundabout is not an appropriate treatment for this intersection. Therefore, it is possible that a traffic signal will be warranted at this intersection in the future. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

#### **Columbia Pike and Thompson's Station Road**

With existing signalized conditions and existing laneage at this intersection, the intersection of Columbia Pike and Thompson's Station Road is expected to operate at LOS F during both peak hours, with significant vehicle delays and queues for multiple turning movements during both peak hours. Based on these results, additional analyses were conducted in order to identify how well this intersection would operate if an additional northbound through lane and southbound through lane were provided. The additional analyses indicate that the intersection of Columbia Pike and Thompson's Station Road would operate at LOS D during the AM peak hour and LOS F during the PM peak hour under these conditions. It is important to note that the proposed residential project will have a relatively minor impact on the peak hour traffic operations at this intersection.

#### **Pantall Road and Northern Project Access**

As planned, this project access should be constructed to include one eastbound entering lane and one westbound exiting lane, striped as a shared left and right turn lane at the intersection with Pantall Road. Also, a southbound left turn lane should be constructed on Pantall Road at the northern project access. This turn lane should include at least 100 feet of storage and should be

designed and constructed according to AASHTO standards. Also, this turn lane should be constructed when the project access is constructed.

### **Pantall Road and Southern Project Access**

As planned, this project access should be constructed to include one eastbound entering lane and one westbound exiting lane, striped as a shared left and right turn lane at the intersection with Pantall Road. Also, a southbound left turn lane should be constructed on Pantall Road at the southern project access. This turn lane should include at least 100 feet of storage and should be designed and constructed according to AASHTO standards. Also, this turn lane should be constructed when the project access is constructed.

### **Critz Lane Corridor**

The Town of Thompson's Station has retained Barge, Waggoner, Sumner & Cannon, Inc. (BWSC) to design improvements to Critz Lane from east of Columbia Pike to Pantall Road, including:

- widening Critz Lane to include two 11-foot travel lanes and 4-foot shoulders,
- correcting existing vertical geometry deficiencies along the corridor,
- providing roundabouts at the intersections with Clayton Arnold Road and Pantall Road,
- providing turn lanes at other side streets, and
- providing a multi-use path along the corridor.

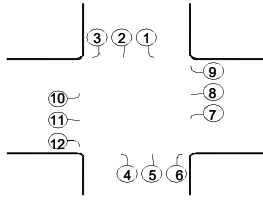
No additional improvements will be necessary in conjunction with the proposed residential project.

### **Potential Connectivity with Baugh Road**

The eastern boundary of the proposed project site is contiguous to Baugh Road. However, Baugh Road is currently one-lane wide and has the design characteristics of a private driveway rather than a public roadway. Also, the intersection of Critz Lane and Baugh Road is not included in the planned improvements to Critz Lane. Finally, the analyses conducted for the purposes of this study indicate that the intersections of Pantall Road and the project accesses will operate acceptably with the full build-out of the 87 single-family homes proposed. Therefore, no connection to Baugh Road is recommended in conjunction with the proposed project. However, it would be appropriate to allow for a future connection to Baugh Road in the event that Baugh Road is reconstructed and additional development occurs east of the project site in the future.

**APPENDIX A  
EXISTING TRAFFIC COUNTS**

INTERSECTION TRAFFIC VOLUME COUNTS



LOCATION: Columbia Pike and Critz Lane  
 DATE: 11-Sep-18 Tue  
 RECORDER: Burns  
 NOTES: signalized

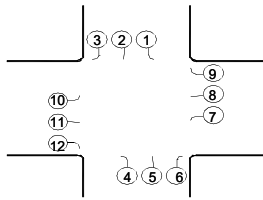
LOCATION	S/B Columbia Pike			N/B Columbia Pike			W/B Critz Lane			E/B		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15	7	33			274	4	1		42			
6:15-6:30	2	62			262	1	5		72			
6:30-6:45	12	79			305	4	5		127			
6:45-7:00	14	97			306	2	7		178			
7:00-7:15	22	132			282		7		144			
7:15-7:30	23	124			248	1	8		142			
7:30-7:45	20	157			292	1	6		173			
7:45-8:00	33	159			249	5	8		171			
8:00-8:15	40	130			281	3	4		150			
8:15-8:30	29	120			248	3	11		95			
8:30-8:45	11	101			229	8	10		97			
8:45-9:00	13	131			217	10	13		74			
4:00-4:15	80	208			139	12	2		51			
4:15-4:30	88	252			160	6	3		34			
4:30-4:45	110	221			169	13	6		39			
4:45-5:00	173	226			150	13	4		40			
5:00-5:15	175	186			192	14	7		59			
5:15-5:30	148	223			173	14			65			
5:30-5:45	140	224			154	21	3		69			
5:45-6:00	93	188			133	7	6		51			
6:00-6:15	72	211			162	9	2		34			
6:15-6:30	86	231			145	12	2		27			
6:30-6:45	53	199			148	20	4		35			
6:45-7:00	43	141			88	9	4		19			
<b>TOTAL</b>	<b>1,487</b>	<b>3,835</b>			<b>5,006</b>	<b>192</b>	<b>128</b>		<b>1,988</b>			
<b>AM PK HR</b>	<b>116</b>	<b>570</b>			<b>1,070</b>	<b>10</b>	<b>26</b>		<b>636</b>			
<b>PM PK HR</b>	<b>636</b>	<b>859</b>			<b>669</b>	<b>62</b>	<b>14</b>		<b>233</b>			

1,901 361  
 2,127 404  
 2,269 532  
 2,386 604  
 2,407 587  
 2,428 546  
 2,388 649  
 2,195 625  
 2,028 608  
 506  
 456  
 458  
 2,199 492  
 2,340 543  
 2,420 558  
 2,473 606  
 2,345 633  
 2,202 623  
 2,082 611  
 1,930 478  
 1,756 490  
 503  
 459  
 304

7:15-8:15  
 4:45-5:45

<b>AM PK PHF</b>	0.73	0.90			0.92	0.50	0.81		0.92				0.94
<b>PM PK PHF</b>	0.91	0.95			0.87	0.74	0.50		0.84				0.98

INTERSECTION TRAFFIC VOLUME COUNTS



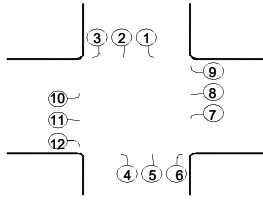
LOCATION: Critz Lane and Clayton Arnold Road / Paddock Park Drive  
 DATE: 11-Sep-18 Tue  
 RECORDER: Burns  
 NOTES: unsignalized

LOCATION	S/B Paddock Park Drive			N/B Clayton Arnold Road			W/B Critz Lane			E/B Critz Lane		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15	2	1	2	23				4	2	1		4
6:15-6:30	3	4	3	51	4	1	2	6	2	1	2	1
6:30-6:45	1	2	9	97	1	1	3	15	6	3	2	9
6:45-7:00		6	10	105	1	2	10	20	4		3	11
7:00-7:15		10	7	99	1	1	28	17	5	1	3	25
7:15-7:30	3	13	5	93	8	16	35	21	5	1	1	28
7:30-7:45	1	3	9	96	9	9	15	19	5	2	4	19
7:45-8:00		1	3	69	4	3	13	14	3	1	3	13
8:00-8:15	1	4	2	43	4	6	6	8	2	1	6	14
8:15-8:30	2	8	9	37	2	3	10	8	3	5	2	17
8:30-8:45		18	7	53	13	14	20	12	5	2	1	24
8:45-9:00	1	7	2	50	8	4	7	8	2	2	2	10
4:00-4:15		4	6	42	10	15	13	7	5	9	7	56
4:15-4:30	2	4	3	23	4	4	17	9	5	3	8	51
4:30-4:45	1	8	2	18	3	6	12	8	10	2	13	100
4:45-5:00	2	7	3	18	7	3	29	9	6	1	14	113
5:00-5:15	1	7	6	23	6	7	32	8	8	4	11	89
5:15-5:30	1	6	4	17	5	8	25	16	6		6	91
5:30-5:45	1	6	3	19	2	2	29	11	4	3	7	84
5:45-6:00	3	6	2	13		4	28	8	13	4	7	64
6:00-6:15	2	4	2	19	5	6	12	11	11	7	9	30
6:15-6:30	2	5	5	21	4	4	8	7	8	6	8	29
6:30-6:45	3	5	6	17	4	3	5	7	8	7	1	26
6:45-7:00				3		1	11	4	4	2	5	26
<b>TOTAL</b>	<b>32</b>	<b>139</b>	<b>110</b>	<b>1,049</b>	<b>105</b>	<b>123</b>	<b>370</b>	<b>257</b>	<b>132</b>	<b>68</b>	<b>125</b>	<b>934</b>
<b>AM PK HR</b>	<b>4</b>	<b>32</b>	<b>31</b>	<b>393</b>	<b>19</b>	<b>28</b>	<b>88</b>	<b>77</b>	<b>19</b>	<b>4</b>	<b>11</b>	<b>83</b>
<b>PM PK HR</b>	<b>5</b>	<b>28</b>	<b>15</b>	<b>76</b>	<b>21</b>	<b>24</b>	<b>98</b>	<b>41</b>	<b>30</b>	<b>7</b>	<b>44</b>	<b>393</b>
<b>AM PK PHF</b>	<b>0.33</b>	<b>0.62</b>	<b>0.78</b>	<b>0.94</b>	<b>0.53</b>	<b>0.44</b>	<b>0.63</b>	<b>0.92</b>	<b>0.95</b>	<b>0.50</b>	<b>0.69</b>	<b>0.74</b>
<b>PM PK PHF</b>	<b>0.63</b>	<b>0.88</b>	<b>0.63</b>	<b>0.83</b>	<b>0.75</b>	<b>0.75</b>	<b>0.77</b>	<b>0.64</b>	<b>0.75</b>	<b>0.44</b>	<b>0.79</b>	<b>0.87</b>

440 39  
 598 80  
 747 149  
 789 172  
 744 197  
 644 229  
 521 191  
 499 127  
 475 97  
 106  
 169  
 103  
 702 174  
 730 133  
 782 183  
 770 212  
 710 202  
 626 185  
 548 171  
 469 152  
 373 118  
 107  
 92  
 56  
 6:45-7:45  
 4:30-5:30

0.86  
 0.92

INTERSECTION TRAFFIC VOLUME COUNTS



LOCATION: Critz Lane and Pantall Road  
 DATE: 12-Sep-18 Wed  
 RECORDER: Burns  
 NOTES: unsignalized

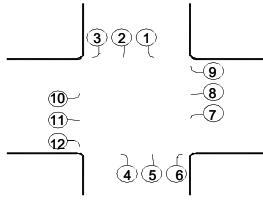
LOCATION TIME	S/B			N/B Pantall Road			W/B Critz Lane			E/B Critz Lane		
	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15						54	3	3			15	1
6:15-6:30				2		44	12	2			15	1
6:30-6:45				3		39	13	12			7	
6:45-7:00				7		28	18	29			13	
7:00-7:15				3		23	22	45			10	5
7:15-7:30				8		27	23	45			20	3
7:30-7:45				4		43	14	25			21	3
7:45-8:00				1		28	11	18			8	
8:00-8:15				2		32	8	19			15	
8:15-8:30				3		36	12	24			14	1
8:30-8:45				4		35	11	18			21	2
8:45-9:00						28	11	17			14	1
4:00-4:15				1		14	92	21			23	7
4:15-4:30				4		10	101	38			21	2
4:30-4:45				2		13	111	34			13	4
4:45-5:00				6		7	95	34			16	1
5:00-5:15				2		15	90	36			16	2
5:15-5:30				1		15	91	47			24	10
5:30-5:45						18	90	58			14	8
5:45-6:00				2		11	103	45			11	3
6:00-6:15				2		17	91	31			16	
6:15-6:30				1		9	93	31			25	1
6:30-6:45						14	85	31			9	1
6:45-7:00				1		9	68	29			15	
<b>TOTAL</b>				59		569	1,268	692			376	56
<b>AM PK HR</b>				22		121	77	144			64	11
<b>PM PK HR</b>				5		59	374	186			65	23

321 76  
 353 76  
 403 74  
 439 95  
 410 108  
 378 126  
 342 110  
 323 66  
 328 76  
 90  
 91  
 71  
 670 158  
 673 176  
 685 177  
 696 159  
 712 161  
 708 188  
 680 188  
 632 175  
 579 157  
 160  
 140  
 122

6:45-7:45  
 5:00-6:00

<b>AM PK PHF</b>				0.69		0.70	0.84	0.80			0.76	0.55	0.87
<b>PM PK PHF</b>				0.63		0.82	0.91	0.80			0.68	0.58	0.95

INTERSECTION TRAFFIC VOLUME COUNTS



LOCATION: Lewisburg Pike and Critz Lane  
 DATE: 13-Sep-18 Thu  
 RECORDER: Burns  
 NOTES: unsignalized

LOCATION	S/B Lewisburg Pike			N/B Lewisburg Pike			W/B			E/B Critz Lane		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15		8	6	1	148					77		
6:15-6:30		21	18		258					62		
6:30-6:45		22	31	5	300					48		1
6:45-7:00		33	42	3	342					39		2
7:00-7:15		34	46	2	283					51		2
7:15-7:30		32	45	8	291					46		3
7:30-7:45		36	34	3	290					51		9
7:45-8:00		46	36	4	240					51		7
8:00-8:15		38	28	7	160					46		
8:15-8:30		36	34	5	164					44		
8:30-8:45		28	38	7	147					53		4
8:45-9:00		41	36	2	119					48		1
4:00-4:15		189	131	7	64					16		4
4:15-4:30		201	125	4	56					26		7
4:30-4:45		201	132	3	59					22		9
4:45-5:00		216	122	3	59					23		8
5:00-5:15		195	124	5	60					24		7
5:15-5:30		211	112	2	68					27		9
5:30-5:45		212	107	4	62					28		5
5:45-6:00		181	135	1	57					24		5
6:00-6:15		120	112		42					27		6
6:15-6:30		139	110	2	45					24		5
6:30-6:45		87	94	3	46					22		5
6:45-7:00		101	76	2	45					26		4
<b>TOTAL</b>		<b>2,428</b>	<b>1,774</b>	<b>83</b>	<b>3,405</b>					<b>905</b>		<b>103</b>
<b>AM PK HR</b>		<b>135</b>	<b>167</b>	<b>16</b>	<b>1,206</b>					<b>187</b>		<b>16</b>
<b>PM PK HR</b>		<b>823</b>	<b>490</b>	<b>13</b>	<b>246</b>					<b>96</b>		<b>33</b>
<b>AM PK PHF</b>		<b>0.94</b>	<b>0.91</b>	<b>0.50</b>	<b>0.88</b>					<b>0.92</b>		<b>0.44</b>
<b>PM PK PHF</b>		<b>0.95</b>	<b>0.93</b>	<b>0.65</b>	<b>0.90</b>					<b>0.89</b>		<b>0.92</b>

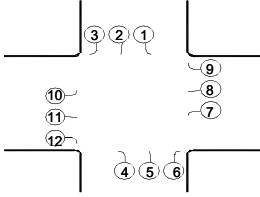
1,467 240  
 1,645 359  
 1,711 407  
 1,727 461  
 1,650 418  
 1,511 425  
 1,369 423  
 1,223 384  
 1,086 279  
 283  
 277  
 247  
 1,687 411  
 1,691 419  
 1,701 426  
 1,693 431  
 1,665 415  
 1,557 429  
 1,453 418  
 1,292 403  
 1,143 307  
 325  
 257  
 254

6:45-7:45  
 4:30-5:30

0.94  
 0.99



INTERSECTION TRAFFIC VOLUME COUNTS



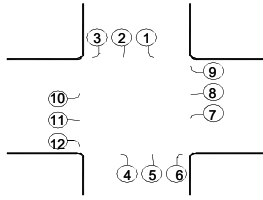
LOCATION: Thompson's Station Road and Pantall Road  
 DATE: 20-Sep-18 Thu  
 RECORDER: Burns  
 NOTES: unsignalized

LOCATION	S/B Pantall Road			N/B			W/B Thompson's Station Rd			E/B Thompson's Station Rd		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15	1		7					8		65	52	
6:15-6:30			8					6	2	35	69	
6:30-6:45	1		14					11	2	47	39	
6:45-7:00			19					22	1	30	44	
7:00-7:15	3		28					42	4	43	48	
7:15-7:30			34					65	7	34	61	
7:30-7:45	1		17					29	2	51	60	
7:45-8:00	1		10					17		38	63	
8:00-8:15	1		10					22		34	48	
8:15-8:30	3		21					23		48	58	
8:30-8:45	1		8					36		39	61	
8:45-9:00			11					34		25	31	
4:00-4:15	5		103					46	1	12	31	
4:15-4:30	2		105					55		11	24	
4:30-4:45	1		102					47	2	14	31	
4:45-5:00	1		58					46	1	12	35	
5:00-5:15	2		88					50		11	54	
5:15-5:30	4		88					39	1	10	41	
5:30-5:45			92					66	1	18	38	
5:45-6:00	2		99					53	2	15	25	
6:00-6:15			104					44	1	10	31	
6:15-6:30	1		102					40		17	39	
6:30-6:45	5		104					46	1	10	30	
6:45-7:00			55					33		18	46	
TOTAL	35		1,287					880	28	647	1,059	
AM PK HR	5		89					153	13	166	232	
PM PK HR	3		397					203	4	60	133	

483 133  
 518 120  
 599 114  
 645 116  
 658 168  
 605 201  
 557 160  
 542 129  
 514 115  
 153  
 145  
 101  
 745 198  
 752 197  
 738 197  
 756 153  
 799 205  
 784 183  
 800 215  
 781 196  
 737 190  
 199  
 196  
 152  
 7:00-8:00  
 5:30-6:30

AM PK PHF	0.42		0.65					0.59	0.46	0.81	0.92		0.82
PM PK PHF	0.38		0.95					0.77	0.50	0.83	0.85		0.93

INTERSECTION TRAFFIC VOLUME COUNTS



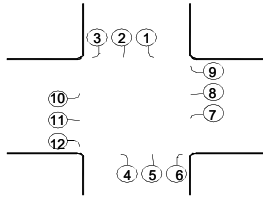
LOCATION: Thompson's Station Road and Buckner Lane  
 DATE: 19-Sep-18 Wed  
 RECORDER: Burns  
 NOTES: signalized

LOCATION TIME	S/B			N/B Buckner Lane			W/B Thompson's Station Rd			E/B Thompson's Station Rd		
	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15				51		103	7	1				5
6:15-6:30				82		115	12	4				4
6:30-6:45				143		80	15	8				14
6:45-7:00				161		72	32	11			2	14
7:00-7:15				140		85	41	11			1	30
7:15-7:30				145		89	63	19			4	39
7:30-7:45				117		104	43	20			9	24
7:45-8:00				134		101	42	18			2	11
8:00-8:15				89		97	14	18			5	16
8:15-8:30				95		74	36	6			8	19
8:30-8:45				99		92	34	11			4	39
8:45-9:00				63		52	36	14			8	35
4:00-4:15				20		35	134	8			26	99
4:15-4:30				22		46	126	8			17	88
4:30-4:45				30		42	142	8			14	121
4:45-5:00				40		43	146	10			15	130
5:00-5:15				29		41	134	7			17	147
5:15-5:30				36		41	156	10			7	98
5:30-5:45				22		36	137	4			17	125
5:45-6:00				26		35	139	10			18	116
6:00-6:15				34		39	139	10			8	67
6:15-6:30				38		37	108	8			15	61
6:30-6:45				23		30	124	15			5	53
6:45-7:00				23		29	94	7			7	38
<b>TOTAL</b>				<b>1,662</b>		<b>1,518</b>	<b>1,954</b>	<b>246</b>			<b>209</b>	<b>1,393</b>
<b>AM PK HR</b>				<b>536</b>		<b>379</b>	<b>189</b>	<b>68</b>			<b>16</b>	<b>104</b>
<b>PM PK HR</b>				<b>135</b>		<b>167</b>	<b>578</b>	<b>35</b>			<b>53</b>	<b>496</b>

936 167  
 1,077 217  
 1,219 260  
 1,276 292  
 1,292 308  
 1,223 359  
 1,102 317  
 1,064 308  
 964 239  
 238  
 279  
 208  
 1,370 322  
 1,423 307  
 1,464 357  
 1,448 384  
 1,408 375  
 1,330 348  
 1,249 341  
 1,158 344  
 1,012 297  
 267  
 250  
 198  
 7:00-8:00  
 4:30-5:30

<b>AM PK PHF</b>				0.92		0.91	0.75	0.85			0.44	0.67	0.90
<b>PM PK PHF</b>				0.84		0.97	0.93	0.88			0.78	0.84	0.95

INTERSECTION TRAFFIC VOLUME COUNTS



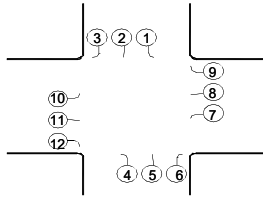
LOCATION: Thompson's Station Road and Clayton Arnold Road  
 DATE: 18-Sep-18 Tue  
 RECORDER: Burns  
 NOTES: unsignalized

LOCATION	S/B Clayton Arnold Road			N/B			W/B Thompson's Station Rd			E/B Thompson's Station Rd		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15	4		2					22	33	3	1	
6:15-6:30	3		1					31	62			
6:30-6:45	6		3					52	87	2	7	
6:45-7:00	6		4					58	121	5	5	
7:00-7:15	18		8					46	122	3	14	
7:15-7:30	25		16					41	129	9	10	
7:30-7:45	32		16					63	76	1	7	
7:45-8:00	13		4					47	77	5	8	
8:00-8:15	10		6					33	57	6	12	
8:15-8:30	8		10					48	62	5	7	
8:30-8:45	41		26					39	66	13	9	
8:45-9:00	37		25					44	20	4	16	
4:00-4:15	99		24					17	22	8	32	
4:15-4:30	66		9					20	30	10	29	
4:30-4:45	97		9					19	17	8	21	
4:45-5:00	121		13					17	14	8	34	
5:00-5:15	134		17					15	19	7	30	
5:15-5:30	149		17					17	16	6	29	
5:30-5:45	160		13					11	24	9	27	
5:45-6:00	121		20					16	21	10	19	
6:00-6:15	65		12					21	20	9	20	
6:15-6:30	53		12					14	26	6	26	
6:30-6:45	37		16					15	12	8	19	
6:45-7:00	32		6					5	11	7	33	
TOTAL	1,337		289					711	1,144	152	415	
AM PK HR	81		44					208	448	18	36	
PM PK HR	564		60					60	73	30	120	

518 65  
 664 97  
 797 157  
 835 199  
 790 211  
 703 230  
 613 195  
 612 154  
 604 124  
 140  
 194  
 146  
 744 202  
 764 164  
 834 171  
 907 207  
 907 222  
 832 234  
 735 244  
 598 207  
 485 147  
 137  
 107  
 94  
 6:45-7:45  
 4:45-5:45

AM PK PHF	0.63		0.69					0.83	0.87	0.50	0.64		0.91
PM PK PHF	0.88		0.88					0.88	0.76	0.83	0.88		0.93

INTERSECTION TRAFFIC VOLUME COUNTS



LOCATION: Columbia Pike and Thompson's Station Road  
 DATE: 18-Sep-18 Tue  
 RECORDER: Burns  
 NOTES: signalized

LOCATION	S/B Columbia Pike			N/B Columbia Pike			W/B Thompson's Station Rd			E/B Thompson's Station Rd		
TIME	1	2	3	4	5	6	7	8	9	10	11	12
6:00-6:15	1	38		5	275	4	4		13	8	3	1
6:15-6:30	6	61	1	12	263	4	4	4	34	10		5
6:30-6:45	2	66		10	271	5	3	5	43	12	3	9
6:45-7:00	1	104	4	6	273	3	4	7	48	8	5	9
7:00-7:15	10	119	3	22	227	7	10	13	36	9	4	24
7:15-7:30	4	123	4	18	241	9	12	15	35	7	3	11
7:30-7:45	2	145	8	12	251	6	15	10	36	8	3	24
7:45-8:00	2	135	9	8	228	4	10	15	38	4	8	19
8:00-8:15	4	132	12	14	229	7	14	16	27	15	4	24
8:15-8:30	4	114	9	20	222	13	12	11	30	12	6	25
8:30-8:45	4	99	3	25	231	12	21	11	23	8	6	16
8:45-9:00	4	110	7	38	178	7	27	16	18	7	8	26
4:00-4:15	8	192	11	13	132	17	19	13	6	15	16	32
4:15-4:30	4	205	5	16	148	18	15	8	6	10	19	27
4:30-4:45	3	199	5	21	146	24	20	8	14	11	9	28
4:45-5:00	6	204	5	15	162	26	17	7	7	13	7	50
5:00-5:15	3	213	3	21	169	18	20	11	7	13	8	36
5:15-5:30	16	179	3	23	171	12	17	12	10	7	12	32
5:30-5:45	8	194	5	24	160	22	13	4	5	9	7	46
5:45-6:00	7	213	9	14	121	20	19	8	10	10	8	17
6:00-6:15	10	216	5	14	177	18	15	8	7	9	9	25
6:15-6:30	15	200	3	19	151	19	20	5	13	6	3	31
6:30-6:45	12	223	3	11	115	14	5	4	7	7	8	21
6:45-7:00	10	156	3	10	102	10	14	5	6	4	5	8
<b>TOTAL</b>	<b>146</b>	<b>3,640</b>	<b>120</b>	<b>391</b>	<b>4,643</b>	<b>299</b>	<b>330</b>	<b>216</b>	<b>479</b>	<b>222</b>	<b>164</b>	<b>546</b>
<b>AM PK HR</b>	<b>12</b>	<b>535</b>	<b>33</b>	<b>52</b>	<b>949</b>	<b>26</b>	<b>51</b>	<b>56</b>	<b>136</b>	<b>34</b>	<b>18</b>	<b>78</b>
<b>PM PK HR</b>	<b>33</b>	<b>790</b>	<b>16</b>	<b>83</b>	<b>662</b>	<b>78</b>	<b>67</b>	<b>34</b>	<b>29</b>	<b>42</b>	<b>34</b>	<b>164</b>
<b>AM PK PHF</b>	<b>0.75</b>	<b>0.92</b>	<b>0.69</b>	<b>0.72</b>	<b>0.95</b>	<b>0.72</b>	<b>0.85</b>	<b>0.88</b>	<b>0.89</b>	<b>0.57</b>	<b>0.56</b>	<b>0.81</b>
<b>PM PK PHF</b>	<b>0.52</b>	<b>0.93</b>	<b>0.80</b>	<b>0.86</b>	<b>0.97</b>	<b>0.75</b>	<b>0.84</b>	<b>0.71</b>	<b>0.73</b>	<b>0.81</b>	<b>0.71</b>	<b>0.82</b>

1,657 352  
 1,789 404  
 1,867 429  
 1,958 472  
 1,966 484  
 1,980 482  
 1,976 520  
 1,915 480  
 1,881 498  
 478  
 459  
 446  
 1,962 474  
 2,010 481  
 2,023 488  
 2,032 519  
 1,969 522  
 1,960 494  
 1,951 497  
 1,884 456  
 1,761 513  
 485  
 430  
 333  
 7:15-8:15  
 4:45-5:45

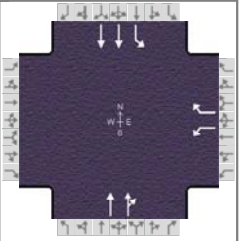
0.95  
 0.97

**APPENDIX B  
CAPACITY ANALYSES**

**EXISTING WEEKDAY CONDITIONS**

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.94		
Intersection	Columbia Pk and Critz L...			Analysis Year	2018 (Existing)		
Project Description	10886			Analysis Period	1 > 7:00		
				File Name	1_exam.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				26		636		1070	10	116	570	

Signal Information				Phase Diagram									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		5.7	32.3	34.0	0.0	0.0	0.0				
		Yellow		4.0	4.0	4.0	0.0	0.0	0.0				
		Red		2.0	2.0	2.0	0.0	0.0	0.0				

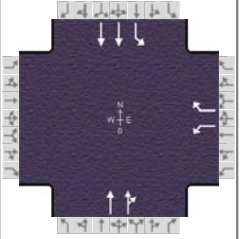
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				40.0		38.3	11.7	50.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				36.0			5.7	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.2	0.0
Phase Call Probability				1.00			0.95	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12		1	6	
Adjusted Flow Rate ( v ), veh/h				28		677	575	574		123	606	
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610	1900	1894		1810	1809	
Queue Service Time ( g <sub>s</sub> ), s				0.9		34.0	32.6	25.1		3.7	9.3	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.9		34.0	32.6	25.1		3.7	9.3	
Green Ratio ( g/C )				0.38		0.44	0.36	0.36		0.44	0.49	
Capacity ( c ), veh/h				684		711	681	679		195	1769	
Volume-to-Capacity Ratio ( X )				0.040		0.952	0.845	0.845		0.632	0.343	
Back of Queue ( Q ), ft/ln ( 95 th percentile)				15.8		596.9	472.5	471.4		67.1	164.3	
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.6		23.9	18.9	18.9		2.7	6.6	
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.16		3.73	0.94	0.94		0.42	0.33	
Uniform Delay ( d <sub>1</sub> ), s/veh				17.7		24.2	26.6	26.6		21.4	14.1	
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		22.4	12.2	12.3		1.3	0.5	
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh				17.7		46.7	38.8	38.8		22.7	14.7	
Level of Service ( LOS )				B		D	D	D		C	B	
Approach Delay, s/veh / LOS	0.0			45.5		D	38.8	D		16.0	B	
Intersection Delay, s/veh / LOS				34.2						C		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.91	B	0.70	A
Bicycle LOS Score / LOS				F	1.44	A	1.09	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.98
Urban Street	Columbia Pike	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...	File Name	1_expm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				14		233			669	62	636	859

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	18.9	47.1	6.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				12.0		53.1	24.9	78.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				8.0			17.5	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	1.4	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

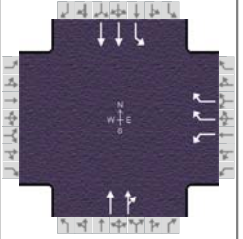
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12		1	6	
Adjusted Flow Rate ( v ), veh/h				14		238	378	368		649	877	
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610	1900	1843		1810	1809	
Queue Service Time ( g <sub>s</sub> ), s				0.7		6.0	18.1	10.7		15.5	5.8	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.7		6.0	18.1	10.7		15.5	5.8	
Green Ratio ( g/C )				0.07		0.28	0.52	0.52		0.76	0.80	
Capacity ( c ), veh/h				121		446	993	964		694	2894	
Volume-to-Capacity Ratio ( X )				0.118		0.533	0.381	0.381		0.935	0.303	
Back of Queue ( Q ), ft/ln ( 95 th percentile)				13.3		190.8	198.7	194.6		295.3	53.6	
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.5		7.6	7.9	7.8		11.8	2.1	
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.13		1.19	0.40	0.39		1.85	0.11	
Uniform Delay ( d <sub>1</sub> ), s/veh				39.5		27.6	12.8	12.8		14.6	2.4	
Incremental Delay ( d <sub>2</sub> ), s/veh				0.2		0.6	1.1	1.1		2.8	0.3	
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh				39.7		28.2	13.9	13.9		17.4	2.6	
Level of Service ( LOS )				D		C	B	B		B	A	
Approach Delay, s/veh / LOS	0.0			28.9		C	13.9	B		8.9	A	
Intersection Delay, s/veh / LOS				12.4				B				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.89	B	0.62	A
Bicycle LOS Score / LOS				F	1.10	A	1.75	B



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.94		
Intersection	Columbia Pk and Critz L...			Analysis Year	2018 (Existing)		
Project Description	10886			Analysis Period	1 > 7:00		
File Name	1_exam_imp.xus						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				26		636		1070	10	116	570	

Signal Information				Signal Timing (s)									
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	5.2	25.8	11.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

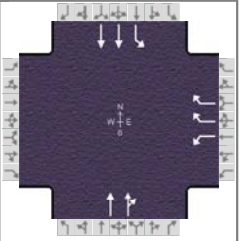
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				17.0		31.8	11.2	43.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				13.0			4.0	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.2	0.0
Phase Call Probability				1.00			0.87	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12	1	6		
Adjusted Flow Rate ( v ), veh/h				28		677	575	574	123	606		
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425	1900	1894	1810	1809		
Queue Service Time ( g <sub>s</sub> ), s				0.8		11.0	21.7	14.9	2.0	4.6		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.8		11.0	21.7	14.9	2.0	4.6		
Green Ratio ( g/C )				0.18		0.27	0.43	0.43	0.55	0.62		
Capacity ( c ), veh/h				332		771	816	813	311	2231		
Volume-to-Capacity Ratio ( X )				0.083		0.877	0.705	0.705	0.396	0.272		
Back of Queue ( Q ), ft/ln ( 95 th percentile)				13.4		222.4	265.1	264.6	27.1	57.6		
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.5		8.9	10.6	10.6	1.1	2.3		
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.13		1.39	0.53	0.53	0.17	0.12		
Uniform Delay ( d <sub>1</sub> ), s/veh				20.3		20.9	14.0	14.0	12.4	5.3		
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		10.8	5.1	5.1	0.3	0.3		
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0	0.0	0.0		
Control Delay ( d ), s/veh				20.4		31.8	19.1	19.1	12.7	5.6		
Level of Service ( LOS )				C		C	B	B	B	A		
Approach Delay, s/veh / LOS	0.0			31.3		C	19.1	B	6.8	A		
Intersection Delay, s/veh / LOS				19.0				B				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	2.08	B	0.66	A
Bicycle LOS Score / LOS				F	1.44	A	1.09	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.98
Urban Street	Columbia Pike		Analysis Year	2018 (Existing)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...		File Name	1_expm_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				14		233		669	62	636	859	

Signal Information				Phase Diagram								
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
Green	18.9	47.1	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				12.0		53.1	24.9	78.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				7.9			17.5	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	1.4	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

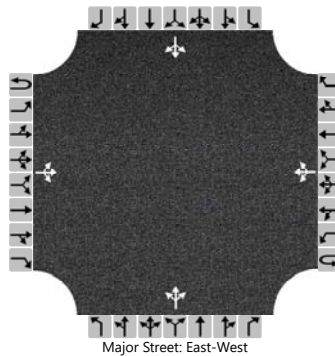
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				14		238		378	368	649		877
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425		1900	1843	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				0.7		5.9		18.1	10.7	15.5		5.8
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.7		5.9		18.1	10.7	15.5		5.8
Green Ratio ( g/C )				0.07		0.28		0.52	0.52	0.76		0.80
Capacity ( c ), veh/h				121		790		993	964	694		2894
Volume-to-Capacity Ratio ( X )				0.118		0.301		0.381	0.381	0.935		0.303
Back of Queue ( Q ), ft/ln ( 95 th percentile)				13.3		87.6		198.7	194.6	295.3		53.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.5		3.5		7.9	7.8	11.8		2.1
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.13		0.55		0.40	0.39	1.85		0.11
Uniform Delay ( d <sub>1</sub> ), s/veh				39.5		25.7		12.8	12.8	14.6		2.4
Incremental Delay ( d <sub>2</sub> ), s/veh				0.2		0.1		1.1	1.1	2.8		0.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				39.7		25.7		13.9	13.9	17.4		2.6
Level of Service ( LOS )				D		C		B	B	B		A
Approach Delay, s/veh / LOS	0.0			26.5			13.9			8.9		
Intersection Delay, s/veh / LOS				12.2						B		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	2.08	B	0.62	A
Bicycle LOS Score / LOS				F	1.10	A	1.75	B

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.86		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	11	83		88	77	19		393	19	28		4	32	31
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

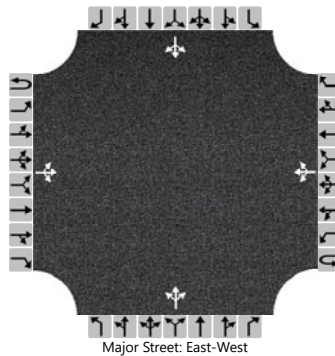
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				102					512					78
Capacity, c (veh/h)		1491				1494					491					630
v/c Ratio		0.00				0.07					1.04					0.12
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.2					15.2					0.4
Control Delay (s/veh)		7.4				7.6					81.3					11.5
Level of Service (LOS)		A				A					F					B
Approach Delay (s/veh)	0.3				3.9				81.3				11.5			
Approach LOS	A				A				F				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		7	44	393		98	41	30		76	21	24		5	28	15
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

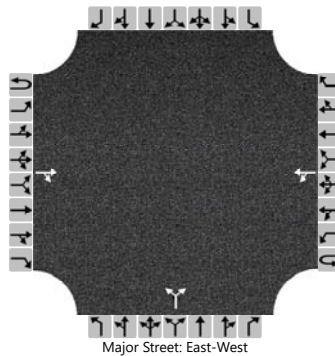
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8				107					132					52	
Capacity, c (veh/h)		1534				1098					410					394	
v/c Ratio		0.00				0.10					0.32					0.13	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.3					1.4					0.5	
Control Delay (s/veh)		7.4				8.6					17.9					15.5	
Level of Service (LOS)		A				A					C					C	
Approach Delay (s/veh)		0.2				5.4				17.9				15.5			
Approach LOS										C				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			64	11		77	144			22		121				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

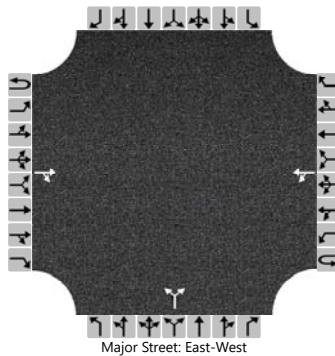
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						89						164				
Capacity, c (veh/h)						1523						880				
v/c Ratio						0.06						0.19				
95% Queue Length, Q <sub>95</sub> (veh)						0.2						0.7				
Control Delay (s/veh)						7.5						10.0				
Level of Service (LOS)						A						B				
Approach Delay (s/veh)					2.9				10.0							
Approach LOS									B							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			65	23		374	186			5		59				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

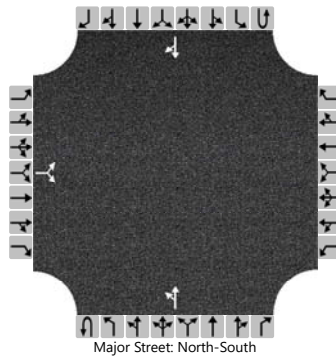
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						394						67				
Capacity, c (veh/h)						1515						725				
v/c Ratio						0.26						0.09				
95% Queue Length, Q <sub>95</sub> (veh)						1.0						0.3				
Control Delay (s/veh)						8.2						10.5				
Level of Service (LOS)						A						B				
Approach Delay (s/veh)					6.3				10.5							
Approach LOS									B							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Lewisburg and Critz		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Lewisburg Pike		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.94		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		187		16						16	1206				135	167
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

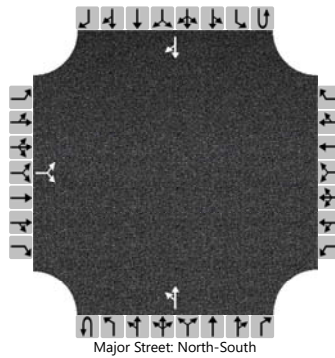
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			216							17						
Capacity, c (veh/h)			129							1250						
v/c Ratio			1.67							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			15.9							0.0						
Control Delay (s/veh)			392.2							7.9						
Level of Service (LOS)			F							A						
Approach Delay (s/veh)	392.2								0.5							
Approach LOS	F															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Lewisburg and Critz		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Lewisburg Pike		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		96		33						13	246				823	490
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

## Delay, Queue Length, and Level of Service

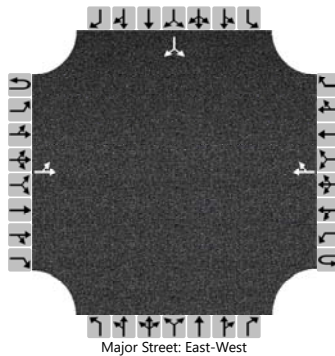
Flow Rate, v (veh/h)			130							13						
Capacity, c (veh/h)			180							527						
v/c Ratio			0.72							0.02						
95% Queue Length, Q <sub>95</sub> (veh)			4.5							0.1						
Control Delay (s/veh)			64.6							12.0						
Level of Service (LOS)			F							B						
Approach Delay (s/veh)	64.6								0.9							
Approach LOS	F															



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.82		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		166	232				153	13						5		89
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

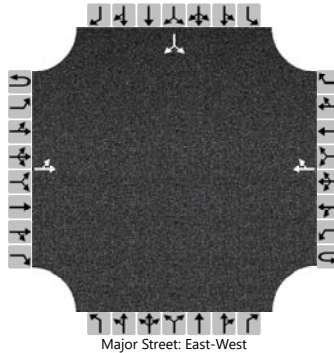
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		202														115
Capacity, c (veh/h)		1381														762
v/c Ratio		0.15														0.15
95% Queue Length, Q <sub>95</sub> (veh)		0.5														0.5
Control Delay (s/veh)		8.1														10.6
Level of Service (LOS)		A														B
Approach Delay (s/veh)		4.2												10.6		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		60	133				203	4						3		397
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

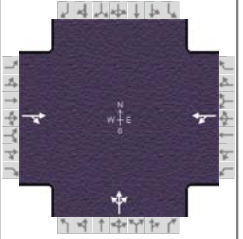
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		65														430	
Capacity, c (veh/h)		1358														820	
v/c Ratio		0.05														0.52	
95% Queue Length, Q <sub>95</sub> (veh)		0.1														3.1	
Control Delay (s/veh)		7.8														14.1	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		2.7												14.1			
Approach LOS														B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.90
Urban Street	Thompson's Station Road	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_exam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h		16	104	189	68		536	0	379			

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	23.0	55.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

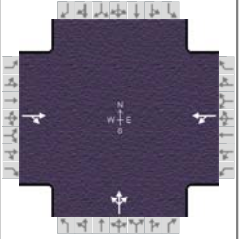
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		29.0		29.0		61.0		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		6.0		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.2		
Queue Clearance Time ( $g_s$ ), s						52.5		
Green Extension Time ( $g_e$ ), s		0.0		0.0		2.5		
Phase Call Probability						1.00		
Max Out Probability						0.08		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		133			286			1017				
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1644			1038			1721				
Queue Service Time ( $g_s$ ), s		5.9			17.1			50.5				
Cycle Queue Clearance Time ( $g_c$ ), s		5.9			23.0			50.5				
Green Ratio ( $g/C$ )		0.26			0.26			0.61				
Capacity ( $c$ ), veh/h		420			335			1052				
Volume-to-Capacity Ratio ( $X$ )		0.318			0.853			0.966				
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		110.2			323.4			698				
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		4.4			12.9			27.9				
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( $d_1$ ), s/veh		27.1			37.1			16.6				
Incremental Delay ( $d_2$ ), s/veh		2.0			23.2			15.9				
Initial Queue Delay ( $d_3$ ), s/veh		0.0			0.0			0.0				
Control Delay ( $d$ ), s/veh		29.1			60.3			32.5				
Level of Service (LOS)		C			E			C				
Approach Delay, s/veh / LOS	29.1	C		60.3	E		32.5	C		0.0		
Intersection Delay, s/veh / LOS	37.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.41	A	1.41	A	1.73	B	1.73	B
Bicycle LOS Score / LOS	0.71	A	0.96	A	2.17	B		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_expm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		53	496	578	35		135	0	167			

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	107.7	30.3	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		113.7		113.7		36.3		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						29.7		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.7		
Phase Call Probability						1.00		
Max Out Probability						0.00		

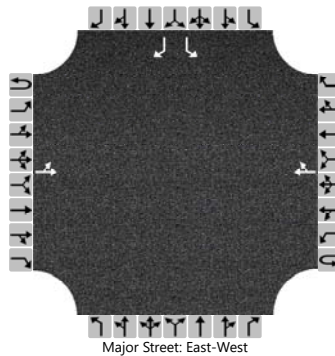
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		578			645			318				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1634			688			1694				
Queue Service Time ( g <sub>s</sub> ), s		23.1			84.5			27.7				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		23.1			107.7			27.7				
Green Ratio ( g/C )		0.72			0.72			0.20				
Capacity ( c ), veh/h		1173			541			342				
Volume-to-Capacity Ratio ( X )		0.493			1.194			0.929				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		316.8			1333			446.9				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		12.7			53.3			17.9				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		9.2			36.4			58.8				
Incremental Delay ( d <sub>2</sub> ), s/veh		1.5			104.2			4.8				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		10.7			140.6			63.6				
Level of Service ( LOS )		B			F			E				
Approach Delay, s/veh / LOS	10.7	B		140.6	F		63.6	E		0.0		
Intersection Delay, s/veh / LOS	76.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.35	A	1.35	A	1.75	B	1.75	B
Bicycle LOS Score / LOS	1.44	A	1.55	B	1.01	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Clayton Arnold Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.91		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		18	36				208	448						81		44
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

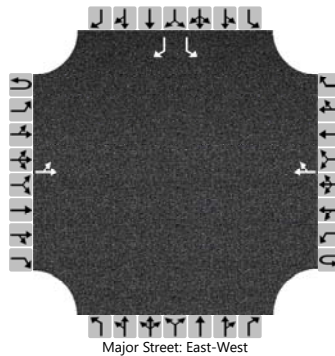
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		20												89		48
Capacity, c (veh/h)		890												486		594
v/c Ratio		0.02												0.18		0.08
95% Queue Length, Q <sub>95</sub> (veh)		0.1												0.7		0.3
Control Delay (s/veh)		9.1												14.1		11.6
Level of Service (LOS)		A												B		B
Approach Delay (s/veh)		3.2												13.2		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		30	120				60	73						564		60
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized													No			
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

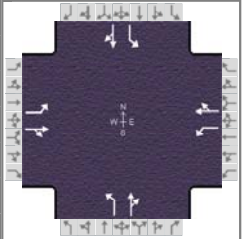
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32												606		65
Capacity, c (veh/h)		1452												681		956
v/c Ratio		0.02												0.89		0.07
95% Queue Length, Q <sub>95</sub> (veh)		0.1												11.1		0.2
Control Delay (s/veh)		7.5												37.8		9.0
Level of Service (LOS)		A												E		A
Approach Delay (s/veh)	1.7												35.0			
Approach LOS													E			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.95
Urban Street	Columbia Pike	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_exam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	34	18	78	51	56	136	52	949	26	12	535	33

Signal Information				Signal Phases									
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	2.1	3.0	70.1	4.2	0.8	15.9			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.2	21.9	11.0	22.7	11.0	79.1	8.1	76.1
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	4.0	8.8	5.0	16.1	3.4		2.3	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.6	0.1	0.6	0.1	0.0	0.0	0.0
Phase Call Probability	0.70	1.00	0.83	1.00	0.84		0.34	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

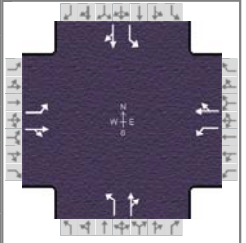
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	36	101		54	202		55	1026		13	598	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1658		1810	1685		1810	1891		1810	1880	
Queue Service Time ( g <sub>s</sub> ), s	2.0	6.8		3.0	14.1		1.4	55.7		0.3	23.3	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	2.0	6.8		3.0	14.1		1.4	55.7		0.3	23.3	
Green Ratio ( g/C )	0.17	0.13		0.17	0.14		0.63	0.61		0.60	0.58	
Capacity ( c ), veh/h	129	219		235	234		461	1152		163	1099	
Volume-to-Capacity Ratio ( X )	0.278	0.461		0.229	0.863		0.119	0.891		0.078	0.544	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	41.1	126.6		61.3	254.3		23.8	849.3		7.2	379.9	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.6	5.1		2.5	10.2		1.0	34.0		0.3	15.2	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.46	0.90		0.61	1.59		0.15	1.70		0.04	0.76	
Uniform Delay ( d <sub>1</sub> ), s/veh	43.5	48.1		42.4	50.5		11.1	20.1		22.4	15.2	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.4	0.6		0.2	3.7		0.0	10.5		0.1	1.9	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	43.9	48.7		42.6	54.2		11.1	30.6		22.4	17.1	
Level of Service ( LOS )	D	D		D	D		B	C		C	B	
Approach Delay, s/veh / LOS	47.4		D	51.8		D	29.6		C	17.3		B
Intersection Delay, s/veh / LOS	29.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.95	B	1.95	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.71	A	0.91	A	2.27	B	1.49	A



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.97
Urban Street	Columbia Pike		Analysis Year	2018 (Existing)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...		File Name	8_expm.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	42	34	164	67	34	29	83	662	78	33	790	16

Signal Information				Signal Phases								
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	4.1	1.6	67.9	4.6	0.8	17.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.6	23.0	11.4	23.9	11.7	75.5	10.1	73.9
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	4.4	16.5	5.9	5.9	4.3		2.9	
Green Extension Time ( g <sub>e</sub> ), s	0.1	0.5	0.0	0.6	0.2	0.0	0.0	0.0
Phase Call Probability	0.76	1.00	0.90	1.00	0.94		0.68	
Max Out Probability	0.00	0.00	1.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	43	204		69	65		86	763		34	831	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1653		1810	1755		1810	1865		1810	1893	
Queue Service Time ( g <sub>s</sub> ), s	2.4	14.5		3.9	3.9		2.3	35.0		0.9	40.7	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	2.4	14.5		3.9	3.9		2.3	35.0		0.9	40.7	
Green Ratio ( g/C )	0.18	0.14		0.19	0.15		0.61	0.58		0.60	0.57	
Capacity ( c ), veh/h	264	235		167	261		297	1080		315	1071	
Volume-to-Capacity Ratio ( X )	0.164	0.870		0.414	0.249		0.288	0.706		0.108	0.776	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	48.6	256.7		78.6	77.2		40.1	542.3		16.1	637.1	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.9	10.3		3.1	3.1		1.6	21.7		0.6	25.5	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.54	1.83		0.79	0.48		0.25	1.08		0.10	1.27	
Uniform Delay ( d <sub>1</sub> ), s/veh	41.4	50.4		42.2	45.1		17.4	18.0		15.3	20.2	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1	3.8		0.6	0.2		0.2	3.9		0.1	5.5	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	41.5	54.2		42.8	45.3		17.6	21.9		15.3	25.7	
Level of Service ( LOS )	D	D		D	D		B	C		B	C	
Approach Delay, s/veh / LOS	52.0		D	44.0		D	21.5		C	25.2		C
Intersection Delay, s/veh / LOS	28.1						C					

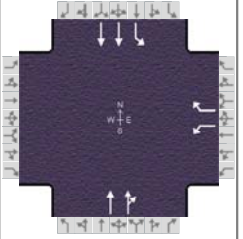
Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	1.95	B	1.95	B	1.89	B	1.89
Bicycle LOS Score / LOS	0.90	A	0.71	A	1.89	B	1.91	B



**EXISTING SATURDAY CONDITIONS**

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.98
Urban Street	Columbia Pike	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...	File Name	1_expm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				5		83		216	20	55	277	

Signal Information				Signal Timing (s)									
Cycle, s	50.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	3.2	24.5	4.3	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

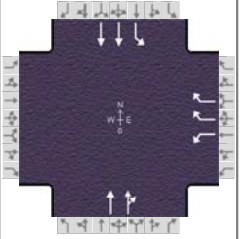
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				10.3		30.5	9.2	39.7
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				4.4			2.6	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.1	0.0
Phase Call Probability				0.71			0.54	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				5		85		121	120	56		283
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610		1900	1843	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				0.1		2.4		2.8	1.8	0.6		1.4
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.1		2.4		2.8	1.8	0.6		1.4
Green Ratio ( g/C )				0.09		0.15		0.49	0.49	0.59		0.67
Capacity ( c ), veh/h				155		242		930	902	763		2440
Volume-to-Capacity Ratio ( X )				0.033		0.349		0.130	0.133	0.074		0.116
Back of Queue ( Q ), ft/ln ( 95 th percentile)				2.3		35.8		26.5	26.3	6.6		11.2
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.1		1.4		1.1	1.1	0.3		0.4
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.02		0.22		0.05	0.05	0.04		0.02
Uniform Delay ( d <sub>1</sub> ), s/veh				21.0		19.0		7.0	7.0	4.5		2.9
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		0.3		0.3	0.3	0.0		0.1
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				21.0		19.4		7.2	7.3	4.5		3.0
Level of Service ( LOS )				C		B		A	A	A		A
Approach Delay, s/veh / LOS	0.0			19.5			7.3			3.2		
Intersection Delay, s/veh / LOS				6.9						A		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	1.87	B	0.64	A
Bicycle LOS Score / LOS				F	0.69	A	0.77	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			Time Period	PM Peak Hour		
Intersection	Columbia Pk and Critz L...			PHF	0.98		
Project Description	10886			Analysis Year	2018 (Existing)		
				Analysis Period	1 > 7:00		
				File Name	1_expm_imp.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				5		83		216	20	55	277	

Signal Information													
Cycle, s	50.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.2	24.5	4.3	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				10.3		30.5	9.2	39.7
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				3.3			2.6	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.0	0.0
Phase Call Probability				0.71			0.54	
Max Out Probability				1.00			0.00	

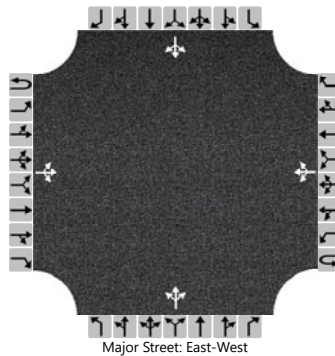
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12	1	6		
Adjusted Flow Rate ( v ), veh/h				5		85	121	120	56	283		
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425	1900	1843	1810	1809		
Queue Service Time ( g <sub>s</sub> ), s				0.1		1.3	2.3	1.8	0.6	1.4		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.1		1.3	2.3	1.8	0.6	1.4		
Green Ratio ( g/C )				0.09		0.15	0.49	0.49	0.59	0.67		
Capacity ( c ), veh/h				155		429	930	902	774	2440		
Volume-to-Capacity Ratio ( X )				0.033		0.197	0.130	0.133	0.073	0.116		
Back of Queue ( Q ), ft/ln ( 95 th percentile)				2.3		17.2	26.5	26.3	6.6	11.2		
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.1		0.7	1.1	1.1	0.3	0.4		
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.02		0.11	0.05	0.05	0.04	0.02		
Uniform Delay ( d <sub>1</sub> ), s/veh				21.0		18.6	7.0	7.0	4.4	2.9		
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		0.1	0.3	0.3	0.0	0.1		
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0	0.0	0.0		
Control Delay ( d ), s/veh				21.0		18.7	7.2	7.3	4.5	3.0		
Level of Service ( LOS )				C		B	A	A	A	A		
Approach Delay, s/veh / LOS	0.0			18.8		B	7.3	A	3.2		A	
Intersection Delay, s/veh / LOS				6.8					A			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	2.06	B	0.64	A
Bicycle LOS Score / LOS				F	0.69	A	0.77	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	23	47		16	27	18		46	9	16		8	11	15
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

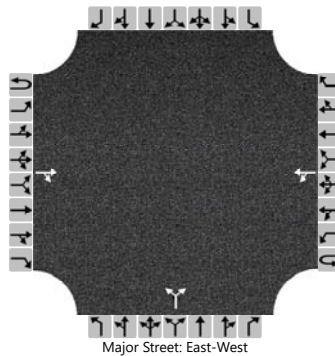
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				17					77					37	
Capacity, c (veh/h)		1571				1536					825					855	
v/c Ratio		0.00				0.01					0.09					0.04	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.3					0.1	
Control Delay (s/veh)		7.3				7.4					9.8					9.4	
Level of Service (LOS)		A				A					A					A	
Approach Delay (s/veh)		0.5				2.0				9.8				9.4			
Approach LOS										A				A			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			43	4		28	58			3		35				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

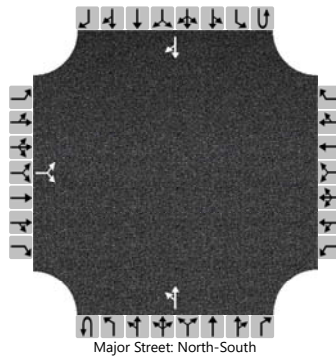
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						29						40				
Capacity, c (veh/h)						1570						1006				
v/c Ratio						0.02						0.04				
95% Queue Length, Q <sub>95</sub> (veh)						0.1						0.1				
Control Delay (s/veh)						7.3						8.7				
Level of Service (LOS)						A						A				
Approach Delay (s/veh)					2.5				8.7							
Approach LOS									A							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Lewisburg and Critz		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2018			North/South Street	Lewisburg Pike		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		58		20						8	256				266	78
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

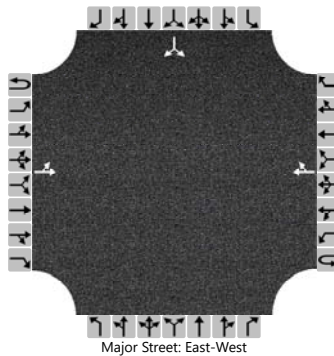
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			79							8						
Capacity, c (veh/h)			522							1223						
v/c Ratio			0.15							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.5							0.0						
Control Delay (s/veh)			13.1							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.1								0.3							
Approach LOS	B															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		35	157				245	3						2		30
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

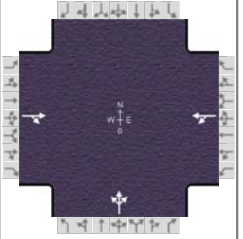
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38														34
Capacity, c (veh/h)		1309														754
v/c Ratio		0.03														0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.1														0.1
Control Delay (s/veh)		7.8														10.0
Level of Service (LOS)		A														B
Approach Delay (s/veh)		1.6												10.0		
Approach LOS														B		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2018 (Existing)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_expm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		53	149	246	29		105	0	139			

Signal Information													
Cycle, s	150.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		113.1	24.9	0.0	0.0	0.0	0.0				
		Yellow		4.0	4.0	0.0	0.0	0.0	0.0				
		Red		2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		119.1		119.1		30.9		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						24.4		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.5		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		213			289			257				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1677			1182			1690				
Queue Service Time ( g <sub>s</sub> ), s		5.4			12.5			22.4				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		5.4			17.8			22.4				
Green Ratio ( g/C )		0.75			0.75			0.17				
Capacity ( c ), veh/h		1264			936			281				
Volume-to-Capacity Ratio ( X )		0.168			0.309			0.914				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		80.6			151.9			376.2				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		3.2			6.1			15.0				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		5.2			7.6			61.5				
Incremental Delay ( d <sub>2</sub> ), s/veh		0.3			0.9			4.9				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		5.5			8.5			66.4				
Level of Service ( LOS )		A			A			E				
Approach Delay, s/veh / LOS	5.5	A		8.5	A		66.4	E		0.0		
Intersection Delay, s/veh / LOS	27.2						C					

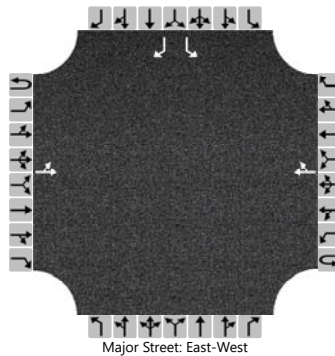
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.34	A	1.34	A	1.75	B	1.75	B
Bicycle LOS Score / LOS	0.84	A	0.97	A	0.91	A		



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2018			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Existing)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		15	59				60	74						143		76
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

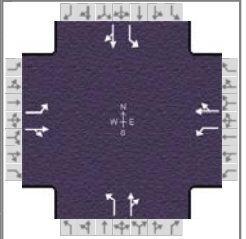
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		16												154		82
Capacity, c (veh/h)		1451												784		956
v/c Ratio		0.01												0.20		0.09
95% Queue Length, Q <sub>95</sub> (veh)		0.0												0.7		0.3
Control Delay (s/veh)		7.5												10.7		9.1
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		1.6												10.2		
Approach LOS														B		

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.97
Urban Street	Columbia Pike		Analysis Year	2018 (Existing)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...		File Name	8_expm.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	14	11	53	70	36	30	27	214	52	11	255	5

Signal Information				Signal Phases									
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	1.0	1.2	24.1	1.3	2.9	5.5			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.3	11.5	10.2	14.4	8.2	31.3	7.0	30.1
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	2.4	4.3	4.1	4.1	2.5		2.2	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability	0.21	0.92	0.70	0.97	0.37		0.17	
Max Out Probability	0.00	0.07	1.00	0.00	0.00		0.00	

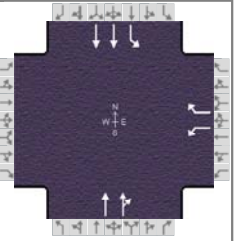
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	14	66		72	68		28	274		11	268	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1654		1810	1756		1810	1835		1810	1893	
Queue Service Time ( g <sub>s</sub> ), s	0.4	2.3		2.1	2.1		0.5	6.1		0.2	5.9	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	0.4	2.3		2.1	2.1		0.5	6.1		0.2	5.9	
Green Ratio ( g/C )	0.11	0.09		0.16	0.14		0.44	0.42		0.42	0.40	
Capacity ( c ), veh/h	256	151		320	246		529	773		472	760	
Volume-to-Capacity Ratio ( X )	0.056	0.436		0.226	0.276		0.053	0.355		0.024	0.353	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	7.7	38.7		37.2	36.4		8	107.3		3.4	108.7	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.3	1.5		1.5	1.5		0.3	4.3		0.1	4.3	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.09	0.28		0.37	0.23		0.05	0.21		0.02	0.22	
Uniform Delay ( d <sub>1</sub> ), s/veh	23.8	25.8		22.0	23.1		9.9	11.8		10.6	12.5	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.0	0.7		0.1	0.2		0.0	1.3		0.0	1.3	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	23.8	26.5		22.1	23.3		9.9	13.1		10.6	13.8	
Level of Service ( LOS )	C	C		C	C		A	B		B	B	
Approach Delay, s/veh / LOS	26.0		C	22.7		C	12.8		B	13.7		B
Intersection Delay, s/veh / LOS	16.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.92	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.62	A	0.72	A	0.99	A	0.95	A

## **BACKGROUND WEEKDAY CONDITIONS**

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.94		
Intersection	Columbia Pk and Critz L...			Analysis Year	2020 (Back)		
Project Description	10886			Analysis Period	1 > 7:00		
				File Name	1_bgam.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				62		947		1729	22	249	1137	

Signal Information				Signal Timing (s)									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	11.3	37.7	23.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

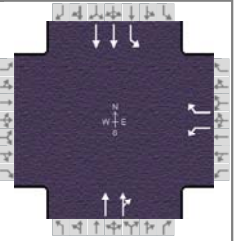
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				29.0		43.7	17.3	61.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				25.0			10.8	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.4	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				66		1007		932	931	265		1210
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610		1900	1891	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				2.5		23.0		64.7	37.7	8.8		17.6
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				2.5		23.0		64.7	37.7	8.8		17.6
Green Ratio ( g/C )				0.26		0.38		0.42	0.42	0.57		0.61
Capacity ( c ), veh/h				462		613		797	793	306		2211
Volume-to-Capacity Ratio ( X )				0.143		1.644		1.169	1.174	0.865		0.547
Back of Queue ( Q ), ft/ln ( 95 th percentile)				48		2384.4		1259.7	1270.3	241.3		260.3
Back of Queue ( Q ), veh/ln ( 95 th percentile)				1.9		95.4		50.4	50.8	9.7		10.4
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.48		14.90		2.52	2.54	1.51		0.52
Uniform Delay ( d <sub>1</sub> ), s/veh				25.9		27.9		26.1	26.1	25.2		10.2
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		297.0		89.5	91.3	2.9		1.0
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				25.9		324.9		115.6	117.4	28.1		11.2
Level of Service ( LOS)				C		F		F	F	C		B
Approach Delay, s/veh / LOS	0.0			306.5		F	116.5		F	14.2		B
Intersection Delay, s/veh / LOS				128.6						F		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.91	B	0.68	A
Bicycle LOS Score / LOS				F	2.02	B	1.70	B

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			Time Period	PM Peak Hour		
Intersection	Columbia Pk and Critz L...			PHF	0.98		
Project Description	10886			Analysis Year	2020 (Back)		
				Analysis Period	1 > 7:00		
				File Name	1_bgpm.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				36		468		1791	102	997	2107	

Signal Information				Signal Phases									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	13.0	47.0	12.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

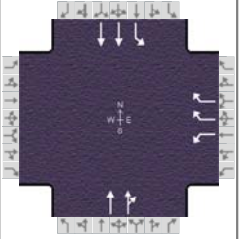
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				18.0		53.0	19.0	72.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				14.0			15.0	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			1.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				37		478		966	966	1017		2150
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610		1900	1864	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				1.6		12.0		45.3	46.2	13.0		35.2
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				1.6		12.0		45.3	46.2	13.0		35.2
Green Ratio ( g/C )				0.13		0.28		0.52	0.52	0.69		0.73
Capacity ( c ), veh/h				241		447		992	973	343		2653
Volume-to-Capacity Ratio ( X )				0.152		1.068		0.974	0.992	2.963		0.810
Back of Queue ( Q ), ft/ln ( 95 th percentile)				31.6		610.2		790.4	829.1	3375.8		393.5
Back of Queue ( Q ), veh/ln ( 95 th percentile)				1.3		24.4		31.6	33.2	135.0		15.7
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.32		3.81		1.58	1.66	21.10		0.79
Uniform Delay ( d <sub>1</sub> ), s/veh				34.5		32.5		20.9	21.3	30.3		7.9
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		61.8		22.9	27.0	891.0		2.8
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				34.6		94.3		43.8	48.3	921.2		10.7
Level of Service ( LOS )				C		F		D	D	F		B
Approach Delay, s/veh / LOS	0.0			90.0		F	46.0		D	303.2		F
Intersection Delay, s/veh / LOS				195.2						F		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.89	B	0.65	A
Bicycle LOS Score / LOS				F	2.08	B	3.10	C

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	AM Peak Hour		PHF	0.94
Urban Street	Columbia Pike		Analysis Year	2020 (Back)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...		File Name	1_bgam_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				62		947		1729	22	249	1137	

Signal Information				Signal Timing (s)									
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	12.8	52.2	17.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

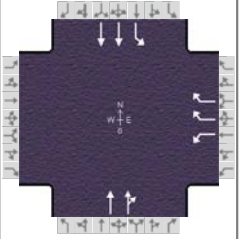
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				23.0		58.2	18.8	77.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				19.0			12.3	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.5	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				66		1007		932	931	265		1210
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425		1900	1891	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				3.1		17.0		86.9	46.3	10.3		14.6
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				3.1		17.0		86.9	46.3	10.3		14.6
Green Ratio ( g/C )				0.17		0.30		0.52	0.52	0.67		0.71
Capacity ( c ), veh/h				308		849		992	988	303		2568
Volume-to-Capacity Ratio ( X )				0.214		1.187		0.939	0.943	0.873		0.471
Back of Queue ( Q ), ft/ln ( 95 th percentile)				61.9		781.2		781.1	786.1	266.1		206.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)				2.5		31.2		31.2	31.4	10.6		8.3
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.62		4.88		1.56	1.57	1.66		0.41
Uniform Delay ( d <sub>1</sub> ), s/veh				35.7		35.1		22.4	22.5	32.2		6.3
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		95.8		17.2	17.8	3.1		0.6
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				35.9		131.0		39.6	40.2	35.3		6.9
Level of Service ( LOS )				D		F		D	D	D		A
Approach Delay, s/veh / LOS	0.0			125.1		F	39.9		D	12.0		B
Intersection Delay, s/veh / LOS				51.3						D		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	2.09	B	0.66	A
Bicycle LOS Score / LOS				F	2.02	B	1.70	B

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.98
Urban Street	Columbia Pike		Analysis Year	2020 (Back)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...		File Name	1_bgpm_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				36		468		1791	102	997	2107	

Signal Information														
Cycle, s	90.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	22.2	36.0	13.8	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
				Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				19.8		42.0	28.2	70.2
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				12.9			24.1	
Green Extension Time ( g <sub>e</sub> ), s				0.9		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.11			1.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				37		478		966	966	1017		2150
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425		1900	1864	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				1.6		10.9		56.9	36.0	22.1		37.8
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				1.6		10.9		56.9	36.0	22.1		37.8
Green Ratio ( g/C )				0.15		0.40		0.40	0.40	0.67		0.71
Capacity ( c ), veh/h				278		1139		761	746	525		2580
Volume-to-Capacity Ratio ( X )				0.132		0.419		1.270	1.294	1.937		0.833
Back of Queue ( Q ), ft/ln ( 95 th percentile)				30.7		154.2		1564.9	1624.3	2845.8		442.3
Back of Queue ( Q ), veh/ln ( 95 th percentile)				1.2		6.2		62.6	65.0	113.8		17.7
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.31		0.96		3.13	3.25	17.79		0.88
Uniform Delay ( d <sub>1</sub> ), s/veh				32.9		19.5		27.0	27.0	27.7		9.1
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		0.1		131.8	142.1	428.7		3.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				33.0		19.6		158.8	169.1	456.4		12.5
Level of Service ( LOS)				C		B		F	F	F		B
Approach Delay, s/veh / LOS	0.0			20.5		C		163.9	F	155.1		F
Intersection Delay, s/veh / LOS				145.8				F				

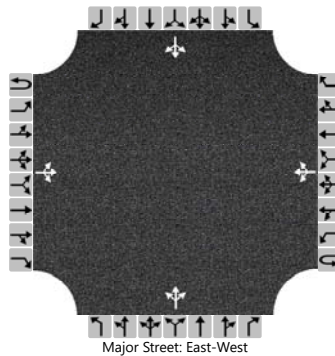
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	2.10	B	0.65	A
Bicycle LOS Score / LOS				F	2.08	B	3.10	C



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.86		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	85	97		90	159	19		436	19	29		4	32	31
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

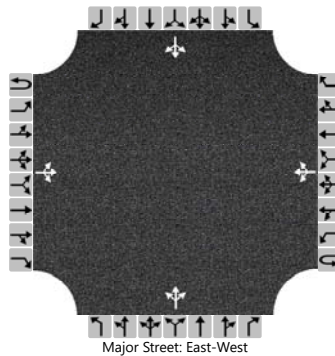
Flow Rate, v (veh/h)		5				105					563				78		
Capacity, c (veh/h)		1376				1371					354				497		
v/c Ratio		0.00				0.08					1.59				0.16		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.2					32.6				0.6		
Control Delay (s/veh)		7.6				7.8					305.6				13.6		
Level of Service (LOS)		A				A					F				B		
Approach Delay (s/veh)		0.2				3.1				305.6				13.6			
Approach LOS										F				B			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		7	64	444		101	152	30		98	21	25		5	28	15
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8				110					157					52	
Capacity, c (veh/h)		1387				1028					301					297	
v/c Ratio		0.01				0.11					0.52					0.18	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.4					2.8					0.6	
Control Delay (s/veh)		7.6				8.9					29.2					19.7	
Level of Service (LOS)		A				A					D					C	
Approach Delay (s/veh)		0.2				3.9				29.2				19.7			
Approach LOS										D				C			

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	AM Peak Hour				Peak Hour Factor	0.86			
Project Description	10886 (Back)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	4	85	97	0	90	159	19	0	436	19	29	0	4	32	31
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate ( $v_{pc}$ ), pc/h	0	5	99	113	0	105	185	22	0	507	22	34	0	5	37	36
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow ( $v_e$ ), pc/h		217.00			312.00			563.00			78.00	
Entry Volume veh/h		217.00			312.00			563.00			78.00	
Circulating Flow ( $v_c$ ), pc/h	147			534			109			797		
Exiting Flow ( $v_{ex}$ ), pc/h	138			728			49			255		
Capacity ( $C_{pc}$ ), pc/h		1187.85			800.44			1234.79			612.11	
Capacity (c), veh/h		1187.85			800.44			1234.79			612.11	
v/c Ratio (x)		0.18			0.39			0.46			0.13	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.6			9.3			7.6			7.4	
Lane LOS		A			A			A			A	
95% Queue, veh		0.7			1.9			2.4			0.4	
Approach Delay, s/veh	4.6			9.3			7.6			7.4		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	7.5						A					

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Back)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	7	64	444	0	101	152	30	0	98	21	25	0	5	28	15
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	8	70	483	0	110	165	33	0	107	23	27	0	5	30	16
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		561.00			308.00			157.00			51.00	
Entry Volume veh/h		561.00			308.00			157.00			51.00	
Circulating Flow (v <sub>c</sub> ), pc/h	145			138			83			382		
Exiting Flow (v <sub>ex</sub> ), pc/h	102			288			64			623		
Capacity (c <sub>PCE</sub> ), pc/h		1190.27			1198.80			1267.98			934.68	
Capacity (c), veh/h		1190.27			1198.80			1267.98			934.68	
v/c Ratio (x)		0.47			0.26			0.12			0.05	

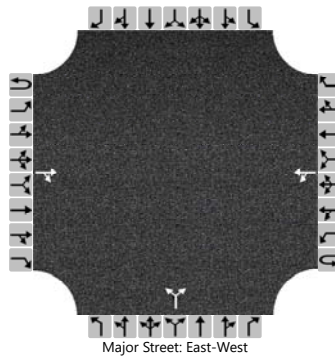
## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.0			5.3			3.9			4.3	
Lane LOS		A			A			A			A	
95% Queue, veh		2.6			1.0			0.4			0.2	
Approach Delay, s/veh	8.0			5.3			3.9			4.3		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	6.5						A					

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			95	77		119	157			74		197				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

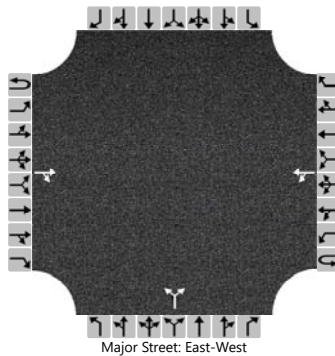
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						137						311				
Capacity, c (veh/h)						1387						679				
v/c Ratio						0.10						0.46				
95% Queue Length, Q <sub>95</sub> (veh)						0.3						2.4				
Control Delay (s/veh)						7.9						14.7				
Level of Service (LOS)						A						B				
Approach Delay (s/veh)					3.9				14.7							
Approach LOS									B							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			84	115		532	221			100		175				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						560						289				
Capacity, c (veh/h)						1373						174				
v/c Ratio						0.41						1.66				
95% Queue Length, Q <sub>95</sub> (veh)						2.0						19.9				
Control Delay (s/veh)						9.4						369.9				
Level of Service (LOS)						A						F				
Approach Delay (s/veh)					7.9				369.9							
Approach LOS									F							

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency or Co.	FTG			E/W Street Name	Critz Lane		
Date Performed	Sept 2018			N/S Street Name	Pantall Lane		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.88		
Project Description	10886 (Back)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		95	77	0	119	157		0	74		197				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		108	88	0	135	178		0	84		224				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		196.00			313.00			308.00				
Entry Volume veh/h		196.00			313.00			308.00				
Circulating Flow (v <sub>c</sub> ), pc/h		135			84			108			397	
Exiting Flow (v <sub>ex</sub> ), pc/h		332			262			0			223	
Capacity (c <sub>PCE</sub> ), pc/h		1202.48			1266.68			1236.05				
Capacity (c), veh/h		1202.48			1266.68			1236.05				
v/c Ratio (x)		0.16			0.25			0.25				

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.4			5.0			5.1				
Lane LOS		A			A			A				
95% Queue, veh		0.6			1.0			1.0				
Approach Delay, s/veh	4.4			5.0			5.1					
Approach LOS	A			A			A					
Intersection Delay, s/veh   LOS	4.9						A					

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Pantall			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Pantall Lane			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Back)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		84	115	0	532	221		0	100		175				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		91	125	0	578	240		0	109		190				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

## Flow Computations, Capacity and v/c Ratios

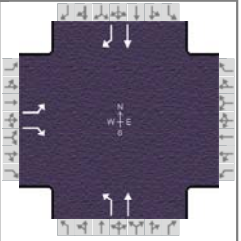
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		216.00			818.00			299.00				
Entry Volume veh/h		216.00			818.00			299.00				
Circulating Flow (v <sub>c</sub> ), pc/h	578			109			91			927		
Exiting Flow (v <sub>ex</sub> ), pc/h	281			349			0			703		
Capacity (c <sub>PCE</sub> ), pc/h		765.31			1234.79			1257.67				
Capacity (c), veh/h		765.31			1234.79			1257.67				
v/c Ratio (x)		0.28			0.66			0.24				

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.0			11.7			4.9				
Lane LOS		A			B			A				
95% Queue, veh		1.2			5.3			0.9				
Approach Delay, s/veh	8.0			11.7			4.9					
Approach LOS	A			B			A					
Intersection Delay, s/veh   LOS	9.6						A					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Lewisburg and Critz Lane	File Name	4_bgam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	353		16				17	1462			200	221

Signal Information													
Cycle, s	150.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	6.0	102.0	26.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	0.0	2.0	2.0	0.0	0.0	0.0			

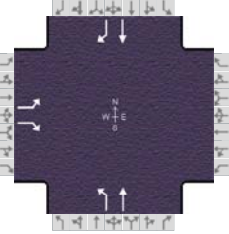
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		32.0			10.0	118.0		108.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.1			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		28.0			2.4			
Green Extension Time ( g <sub>e</sub> ), s		0.0			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			0.36			

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate ( v ), veh/h	376		17				18	1555			213	235
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900			1900	1610
Queue Service Time ( g <sub>s</sub> ), s	26.0		1.3				0.4	112.0			6.1	3.8
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	26.0		1.3				0.4	112.0			6.1	3.8
Green Ratio ( g/C )	0.17		0.21				0.73	0.75			0.68	0.85
Capacity ( c ), veh/h	314		344				880	1419			1292	1374
Volume-to-Capacity Ratio ( X )	1.197		0.050				0.021	1.096			0.165	0.171
Back of Queue ( Q ), ft/ln ( 95 th percentile)	808.6		23.1				6.5	2077			114.5	41.7
Back of Queue ( Q ), veh/ln ( 95 th percentile)	32.3		0.9				0.3	83.1			4.6	1.7
Queue Storage Ratio ( RQ ) ( 95 th percentile)	8.98		0.16				0.04	4.15			0.23	0.08
Uniform Delay ( d <sub>1</sub> ), s/veh	62.0		46.9				5.6	19.0			8.6	1.9
Incremental Delay ( d <sub>2</sub> ), s/veh	115.5		0.0				0.0	54.8			0.3	0.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay ( d ), s/veh	177.5		46.9				5.6	73.8			8.9	2.2
Level of Service ( LOS )	F		D				A	F			A	A
Approach Delay, s/veh / LOS	171.9		F	0.0			73.0	E		5.4		A
Intersection Delay, s/veh / LOS	76.5						E					

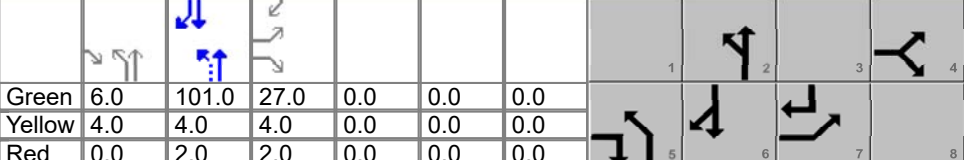
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.97	B	1.97	B	0.66	A	1.88	B
Bicycle LOS Score / LOS		F			3.08	C	1.23	A



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	FTG			Duration, h	0.25	
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other	
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.99	
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00	
Intersection	Lewisburg and Critz Lane	File Name	4_bgpm.xus			
Project Description	10886					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	228		34				14	367			1044	680

Signal Information														
Cycle, s	150.0	Reference Phase	2	Green	6.0	101.0	27.0	0.0	0.0	0.0				
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Red	0.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		33.0			10.0	117.0		107.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.2			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		19.9			2.3			
Green Extension Time ( g <sub>e</sub> ), s		0.3			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		0.03			0.28			

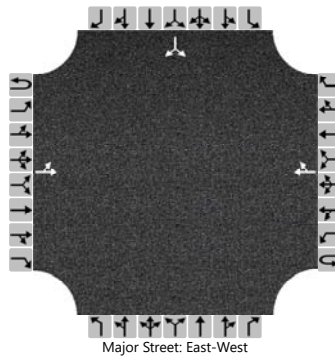
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate ( v ), veh/h	230		34				14	371			1055	687
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900			1900	1610
Queue Service Time ( g <sub>s</sub> ), s	17.9		2.5				0.3	9.5			61.1	16.4
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	17.9		2.5				0.3	9.5			61.1	16.4
Green Ratio ( g/C )	0.18		0.22				0.73	0.74			0.67	0.85
Capacity ( c ), veh/h	326		354				265	1406			1279	1374
Volume-to-Capacity Ratio ( X )	0.707		0.097				0.053	0.264			0.824	0.500
Back of Queue ( Q ), ft/ln ( 95 th percentile)	339.3		46.6				9.5	167.9			889.4	183.8
Back of Queue ( Q ), veh/ln ( 95 th percentile)	13.6		1.9				0.4	6.7			35.6	7.4
Queue Storage Ratio ( RQ ) ( 95 th percentile)	3.77		0.33				0.06	0.34			1.78	0.37
Uniform Delay ( d <sub>1</sub> ), s/veh	57.8		46.6				19.3	6.3			18.0	2.8
Incremental Delay ( d <sub>2</sub> ), s/veh	5.9		0.0				0.0	0.5			6.1	1.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay ( d ), s/veh	63.7		46.7				19.3	6.8			24.1	4.1
Level of Service ( LOS )	E		D				B	A			C	A
Approach Delay, s/veh / LOS	61.5		E	0.0			7.2	A		16.2		B
Intersection Delay, s/veh / LOS	19.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.97	B	1.97	B	0.66	A	1.88	B
Bicycle LOS Score / LOS		F			1.12	A	3.36	C

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.82		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		240	311				285	65						90		135
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

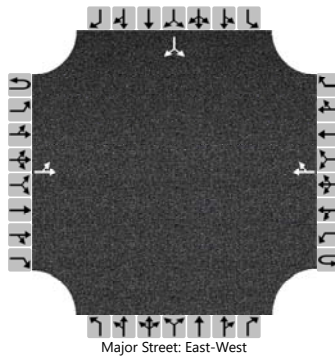
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		293													274	
Capacity, c (veh/h)		1143													225	
v/c Ratio		0.26													1.22	
95% Queue Length, Q <sub>95</sub> (veh)		1.0													13.7	
Control Delay (s/veh)		9.2													176.2	
Level of Service (LOS)		A													F	
Approach Delay (s/veh)	5.7												176.2			
Approach LOS													F			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		177	300				352	98						94		559
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

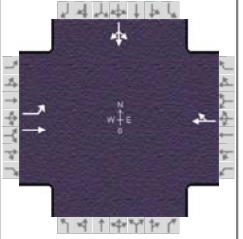
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		190														702
Capacity, c (veh/h)		1089														461
v/c Ratio		0.17														1.52
95% Queue Length, Q <sub>95</sub> (veh)		0.6														37.3
Control Delay (s/veh)		9.0														269.8
Level of Service (LOS)		A														F
Approach Delay (s/veh)		4.5												269.8		
Approach LOS														F		

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	AM Peak Hour	PHF	0.82
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_bgam_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	240	311			285	65				90	0	135

Signal Information				Signal Phases										
Cycle, s	60.0	Reference Phase	2											
Offset, s	0	Reference Point	End	Green	7.7	22.6	11.7	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	13.7	42.3		28.6				17.7
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( MAH ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( g <sub>s</sub> ), s	7.3							11.4
Green Extension Time ( g <sub>e</sub> ), s	0.4	0.0		0.0				0.4
Phase Call Probability	0.99							0.99
Max Out Probability	0.00							0.01

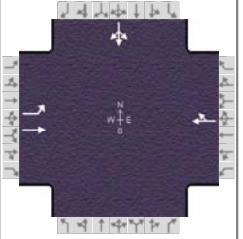
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( v ), veh/h	293	379			427						274	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1900			1839						1684	
Queue Service Time ( g <sub>s</sub> ), s	5.3	5.9			11.3						9.4	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	5.3	5.9			11.3						9.4	
Green Ratio ( g/C )	0.54	0.61			0.38						0.19	
Capacity ( c ), veh/h	537	1150			693						328	
Volume-to-Capacity Ratio ( X )	0.546	0.330			0.616						0.837	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	73.1	85			210.7						161.3	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	2.9	3.4			8.4						6.5	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.00	0.00			0.00						0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh	9.7	5.8			15.2						23.3	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.3	0.8			4.1						2.2	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0						0.0	
Control Delay ( d ), s/veh	10.0	6.6			19.2						25.5	
Level of Service ( LOS )	B	A			B						C	
Approach Delay, s/veh / LOS	8.1	A		19.2	B		0.0			25.5	C	
Intersection Delay, s/veh / LOS	15.0						B					

Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	1.34	A	1.67	B	1.71	B	1.94
Bicycle LOS Score / LOS	1.60	B	1.19	A			0.94	A



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	PM Peak Hour	PHF	0.93
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_bgpm_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	177	300			352	98				94	0	559

Signal Information				Signal Timing (s)										
Cycle, s	130.0	Reference Phase	2	Green	11.0	43.0	58.0	0.0	0.0	0.0	1	2	3	4
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	17.0	66.0		49.0				64.0
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( MAH ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( g <sub>s</sub> ), s	10.7							56.1
Green Extension Time ( g <sub>e</sub> ), s	0.3	0.0		0.0				1.9
Phase Call Probability	1.00							1.00
Max Out Probability	0.00							0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( v ), veh/h	190	323			484						702	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1900			1828						1636	
Queue Service Time ( g <sub>s</sub> ), s	8.7	14.3			31.3						54.1	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	8.7	14.3			31.3						54.1	
Green Ratio ( g/C )	0.43	0.46			0.33						0.45	
Capacity ( c ), veh/h	292	877			604						730	
Volume-to-Capacity Ratio ( X )	0.652	0.368			0.801						0.962	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	169.9	271.7			553.9						773.3	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	6.8	10.9			22.2						30.9	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.00	0.00			0.00						0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh	28.9	22.7			39.6						34.9	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.9	1.2			10.7						11.3	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0						0.0	
Control Delay ( d ), s/veh	29.8	23.9			50.3						46.2	
Level of Service ( LOS)	C	C			D						D	
Approach Delay, s/veh / LOS	26.1	C		50.3	D		0.0			46.2	D	
Intersection Delay, s/veh / LOS	41.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.40	A	1.71	B	1.74	B	1.97	B
Bicycle LOS Score / LOS	1.33	A	1.29	A			1.65	B

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's Sta and Pantall		
Agency or Co.	FTG			E/W Street Name	Thompson's Station Road		
Date Performed	Sept 2018			N/S Street Name	Pantall Road		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.89		
Project Description	10886 (Back)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR				LR							
Volume (V), veh/h	0	240	311		0		285	65					0	90		135
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	270	349		0		320	73					0	101		152
Right-Turn Bypass	None				None				None							
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		619.00			393.00						253.00	
Entry Volume veh/h		619.00			393.00						253.00	
Circulating Flow (v <sub>c</sub> ), pc/h	101			270			720			320		
Exiting Flow (v <sub>ex</sub> ), pc/h	450			472			343			0		
Capacity (c <sub>PCE</sub> ), pc/h		1244.91			1047.79						995.70	
Capacity (c), veh/h		1244.91			1047.79						995.70	
v/c Ratio (x)		0.50			0.38						0.25	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.2			7.4						6.1	
Lane LOS		A			A						A	
95% Queue, veh		2.9			1.8						1.0	
Approach Delay, s/veh	8.2			7.4						6.1		
Approach LOS	A			A						A		
Intersection Delay, s/veh   LOS	7.5						A					

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's Sta and Pantall		
Agency or Co.	FTG			E/W Street Name	Thompson's Station Road		
Date Performed	Sept 2018			N/S Street Name	Pantall Road		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Project Description	10886 (Back)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR								LR			
Volume (V), veh/h	0	177	300		0		352	98					0	94		559
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	179	303		0		356	99					0	95		565
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

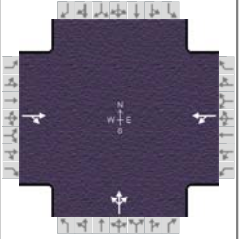
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		482.00			455.00						660.00	
Entry Volume veh/h		482.00			455.00						660.00	
Circulating Flow (v <sub>c</sub> ), pc/h	95			179			577			356		
Exiting Flow (v <sub>ex</sub> ), pc/h	398			921			278			0		
Capacity (c <sub>PCE</sub> ), pc/h		1252.55			1149.70						959.80	
Capacity (c), veh/h		1252.55			1149.70						959.80	
v/c Ratio (x)		0.38			0.40						0.69	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.6			7.1						15.0	
Lane LOS		A			A						C	
95% Queue, veh		1.8			1.9						5.7	
Approach Delay, s/veh	6.6			7.1						15.0		
Approach LOS	A			A						C		
Intersection Delay, s/veh   LOS	10.2						B					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.90
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_bgam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		134	110	210	231		576	0	419			

Signal Information												
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	34.0	54.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		40.0		40.0		60.0		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						56.0		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.0		
Phase Call Probability						1.00		
Max Out Probability						1.00		

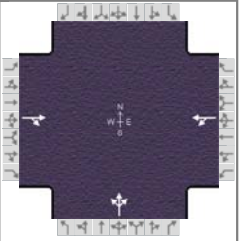
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		271			490			1106				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1757			930			1720				
Queue Service Time ( g <sub>s</sub> ), s		12.0			22.0			54.0				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		12.0			34.0			54.0				
Green Ratio ( g/C )		0.34			0.34			0.54				
Capacity ( c ), veh/h		598			369			929				
Volume-to-Capacity Ratio ( X )		0.454			1.327			1.190				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		223.8			1003.9			1561.4				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		9.0			40.2			62.5				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		25.8			40.5			23.0				
Incremental Delay ( d <sub>2</sub> ), s/veh		2.5			164.8			96.4				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		28.2			205.3			119.4				
Level of Service ( LOS)		C			F			F				
Approach Delay, s/veh / LOS	28.2	C		205.3	F		119.4	F		0.0		
Intersection Delay, s/veh / LOS	128.7						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.40	A	1.40	A	1.73	B	1.73	B
Bicycle LOS Score / LOS	0.93	A	1.30	A	2.31	B		



# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_bgpm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h		323	521	640	282		144	0	181			

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	63.0	15.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		69.0		69.0		21.0		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		6.0		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.2		
Queue Clearance Time ( $g_s$ ), s						17.0		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.0		
Phase Call Probability						1.00		
Max Out Probability						1.00		

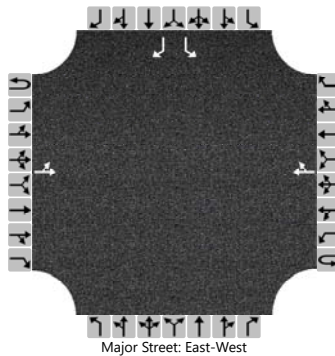
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		888			971			342				
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1710			428			1693				
Queue Service Time ( $g_s$ ), s		29.2			33.8			15.0				
Cycle Queue Clearance Time ( $g_c$ ), s		29.2			63.0			15.0				
Green Ratio ( $g/C$ )		0.70			0.70			0.17				
Capacity ( $c$ ), veh/h		1197			367			282				
Volume-to-Capacity Ratio ( $X$ )		0.742			2.641			1.213				
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		350.1			3695			603				
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		14.0			147.8			24.1				
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( $d_1$ ), s/veh		8.4			31.2			37.5				
Incremental Delay ( $d_2$ ), s/veh		4.2			746.2			123.8				
Initial Queue Delay ( $d_3$ ), s/veh		0.0			0.0			0.0				
Control Delay ( $d$ ), s/veh		12.6			777.4			161.3				
Level of Service (LOS)		B			F			F				
Approach Delay, s/veh / LOS	12.6	B		777.4	F		161.3	F		0.0		
Intersection Delay, s/veh / LOS	373.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.34	A	1.34	A	1.73	B	1.73	B
Bicycle LOS Score / LOS	1.95	B	2.09	B	1.05	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.91		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		32	153				398	465						88		83
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

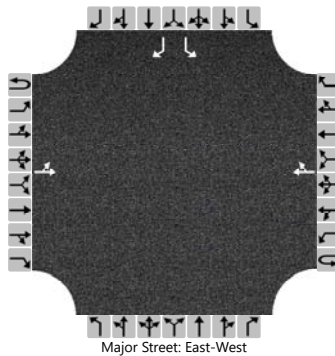
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		35												97		91
Capacity, c (veh/h)		732												283		447
v/c Ratio		0.05												0.34		0.20
95% Queue Length, Q <sub>95</sub> (veh)		0.2												1.5		0.8
Control Delay (s/veh)		10.2												24.2		15.1
Level of Service (LOS)		B												C		C
Approach Delay (s/veh)		2.2												19.8		
Approach LOS														C		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		71	393				308	101						585		86
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

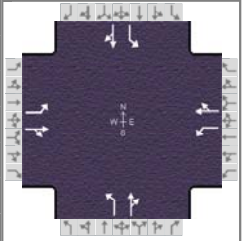
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		76												629		92
Capacity, c (veh/h)		1131												262		667
v/c Ratio		0.07												2.41		0.14
95% Queue Length, Q <sub>95</sub> (veh)		0.2												50.6		0.5
Control Delay (s/veh)		8.4												673.9		11.3
Level of Service (LOS)		A												F		B
Approach Delay (s/veh)		1.9												589.0		
Approach LOS														F		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.95
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_bgam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	218	56	136	213	102	198	96	1310	100	54	872	177

Signal Information				Signal Timing (s)																		
Cycle, s	140.0	Reference Phase	2	Green	5.3	0.5	89.1	9.0	2.0	10.0	Yellow	4.0	0.0	4.0	4.0	4.0	Red	2.0	0.0	2.0	2.0	2.0
Offset, s	0	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On																			
Force Mode	Fixed	Simult. Gap N/S	On																			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.0	18.0	15.0	16.0	11.9	95.7	11.3	95.1
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	13.0	14.0	11.0	12.0	4.7		3.5	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.98		0.89	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.00	

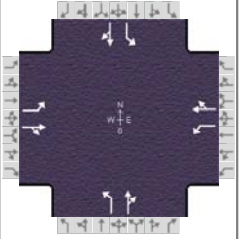
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	229	202		224	316		101	1484		57	1104	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1685		1810	1698		1810	1876		1810	1844	
Queue Service Time ( g <sub>s</sub> ), s	11.0	12.0		9.0	10.0		2.7	89.7		1.5	75.9	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	11.0	12.0		9.0	10.0		2.7	89.7		1.5	75.9	
Green Ratio ( g/C )	0.15	0.09		0.14	0.07		0.68	0.64		0.67	0.64	
Capacity ( c ), veh/h	194	144		168	121		176	1201		121	1174	
Volume-to-Capacity Ratio ( X )	1.185	1.399		1.337	2.603		0.574	1.235		0.471	0.941	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	335.4	553.9		418.4	1157		100.9	2613.8		57	1127.9	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	13.4	22.2		16.7	46.3		4.0	104.6		2.3	45.1	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	3.73	3.96		4.18	7.23		0.63	5.23		0.36	2.26	
Uniform Delay ( d <sub>1</sub> ), s/veh	58.6	64.0		59.9	65.0		32.9	25.2		36.0	23.0	
Incremental Delay ( d <sub>2</sub> ), s/veh	123.5	216.0		186.1	744.8		1.1	113.3		1.1	15.4	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	182.1	280.0		246.1	809.8		34.0	138.5		37.1	38.5	
Level of Service ( LOS )	F	F		F	F		C	F		D	D	
Approach Delay, s/veh / LOS	227.9	F		575.7	F		131.8	F		38.4	D	
Intersection Delay, s/veh / LOS	178.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.96	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	1.20	A	1.38	A	3.10	C	2.40	B



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_bgpm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	325	109	254	238	106	130	177	1305	308	115	1420	323

Signal Information				Signal Phases								
Cycle, s	140.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	7.2	4.9	81.9	7.0	1.0	8.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	4.0	4.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	2.0	2.0		

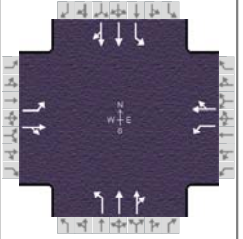
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	20.0	21.0	13.0	14.0	18.1	92.8	13.2	87.9
Change Period, ( $Y+R_c$ ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s	16.0	17.0	9.0	10.0	11.9		7.1	
Green Extension Time ( $g_e$ ), s	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		0.99	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( $v$ ), veh/h	335	374		245	243		182	1663		119	1797	
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1687		1810	1729		1810	1837		1810	1839	
Queue Service Time ( $g_s$ ), s	14.0	15.0		7.0	8.0		9.9	86.8		5.1	81.9	
Cycle Queue Clearance Time ( $g_c$ ), s	14.0	15.0		7.0	8.0		9.9	86.8		5.1	81.9	
Green Ratio ( $g/C$ )	0.17	0.11		0.11	0.06		0.68	0.62		0.64	0.58	
Capacity ( $c$ ), veh/h	232	181		142	99		208	1139		144	1075	
Volume-to-Capacity Ratio ( $X$ )	1.442	2.070		1.729	2.463		0.877	1.460		0.821	1.671	
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	623.4	1242.5		626.6	892.8		278.4	3848.9		193.3	4899.1	
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	24.9	49.7		25.1	35.7		11.1	154.0		7.7	196.0	
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	6.93	8.87		6.27	5.58		1.74	7.70		1.21	9.80	
Uniform Delay ( $d_1$ ), s/veh	56.8	62.5		62.7	66.0		48.8	26.6		42.2	29.1	
Incremental Delay ( $d_2$ ), s/veh	221.5	499.9		355.8	687.7		8.5	211.9		4.4	306.1	
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( $d$ ), s/veh	278.3	562.4		418.5	753.7		57.4	238.5		46.6	335.2	
Level of Service ( LOS )	F	F		F	F		E	F		D	F	
Approach Delay, s/veh / LOS	428.2	F		585.4	F		220.5	F		317.3	F	
Intersection Delay, s/veh / LOS	323.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.96	B	1.89	B	1.90	B
Bicycle LOS Score / LOS	1.66	B	1.29	A	3.53	D	3.65	D

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.95
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_bgam_imp.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	218	56	136	213	102	198	96	1310	100	54	872	177

Signal Information				Signal Phases									
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	4.8	0.9	42.6	7.0	5.2	15.5			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0			

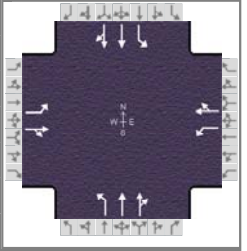
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	13.0	21.5	18.2	26.7	11.6	49.5	10.8	48.6
Change Period, ( $Y+R_c$ ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s	9.0	13.5	12.1	20.1	5.1		3.7	
Green Extension Time ( $g_e$ ), s	0.0	0.7	0.2	0.6	0.2	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.94		0.79	
Max Out Probability	1.00	0.19	0.46	0.41	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( $v$ ), veh/h	229	202		224	316		101	749	735	57	569	536
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1685		1810	1698		1810	1900	1852	1810	1900	1788
Queue Service Time ( $g_s$ ), s	7.0	11.5		10.1	18.1		3.1	36.7	37.2	1.7	24.5	24.5
Cycle Queue Clearance Time ( $g_c$ ), s	7.0	11.5		10.1	18.1		3.1	36.7	37.2	1.7	24.5	24.5
Green Ratio ( $g/C$ )	0.23	0.16		0.29	0.21		0.48	0.44	0.44	0.47	0.43	0.43
Capacity ( $c$ ), veh/h	205	262		341	352		268	827	806	174	810	763
Volume-to-Capacity Ratio ( $X$ )	1.118	0.773		0.658	0.898		0.377	0.906	0.912	0.327	0.702	0.702
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	298.8	220.4		196.2	348.7		55	655.7	653.8	31.1	427.8	409.1
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	12.0	8.8		7.8	13.9		2.2	26.2	26.2	1.2	17.1	16.4
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	3.32	1.57		1.96	2.18		0.34	1.31	1.31	0.19	0.86	0.82
Uniform Delay ( $d_1$ ), s/veh	38.2	40.5		29.8	38.6		17.9	26.3	26.4	22.8	23.5	23.5
Incremental Delay ( $d_2$ ), s/veh	98.2	6.0		1.7	17.3		0.3	15.3	16.4	0.4	5.0	5.4
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( $d$ ), s/veh	136.5	46.6		31.5	55.9		18.2	41.7	42.8	23.2	28.5	28.8
Level of Service ( LOS )	F	D		C	E		B	D	D	C	C	C
Approach Delay, s/veh / LOS	94.4		F	45.8		D	40.7		D	28.4		C
Intersection Delay, s/veh / LOS	43.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	1.20	A	1.38	A	1.80	B	1.45	A

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other		
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97		
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00		
Intersection	Columbia Pk and Thom...	File Name	8_bgpm_imp.xus				
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	325	109	254	238	106	130	177	1305	308	115	1420	323

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.7	1.4	41.9	7.0	4.0	6.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
				Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.0	16.0	13.0	12.0	13.1	49.3	11.7	47.9
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	13.0	12.0	9.0	8.0	6.9		5.0	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.99		0.95	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.01	

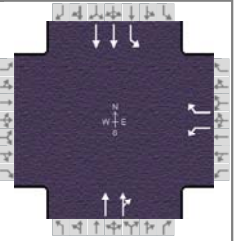
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	335	374		245	243		182	846	817	119	907	890
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1687		1810	1729		1810	1900	1776	1810	1900	1780
Queue Service Time ( g <sub>s</sub> ), s	11.0	10.0		7.0	6.0		4.9	37.4	39.8	3.0	41.9	41.9
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	11.0	10.0		7.0	6.0		4.9	37.4	39.8	3.0	41.9	41.9
Green Ratio ( g/C )	0.19	0.11		0.14	0.07		0.54	0.48	0.48	0.53	0.47	0.47
Capacity ( c ), veh/h	301	188		221	115		223	914	855	199	885	829
Volume-to-Capacity Ratio ( X )	1.113	1.996		1.112	2.111		0.820	0.925	0.956	0.594	1.025	1.074
Back of Queue ( Q ), ft/ln ( 95 th percentile)	337.1	1126.7		295.7	785.2		89.8	658.5	686.3	51.8	875.6	969.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)	13.5	45.1		11.8	31.4		3.6	26.3	27.5	2.1	35.0	38.8
Queue Storage Ratio ( RQ ) ( 95 th percentile)	3.75	8.05		2.96	4.91		0.56	1.32	1.37	0.32	1.75	1.94
Uniform Delay ( d <sub>1</sub> ), s/veh	36.6	40.0		38.9	42.0		21.4	21.8	22.4	20.4	24.0	24.0
Incremental Delay ( d <sub>2</sub> ), s/veh	85.6	466.6		93.7	528.1		2.9	16.3	21.8	1.1	36.8	52.9
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh	122.1	506.6		132.7	570.1		24.2	38.2	44.3	21.5	60.8	77.0
Level of Service ( LOS )	F	F		F	F		C	D	D	C	F	F
Approach Delay, s/veh / LOS	325.0		F	350.4		F	39.5		D	65.9		E
Intersection Delay, s/veh / LOS	121.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	1.66	B	1.29	A	2.01	B	2.07	B

## **BACKGROUND SATURDAY CONDITIONS**

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			Time Period	PM Peak Hour		
Intersection	Columbia Pk and Critz L...			PHF	0.98		
Project Description	10886			Analysis Year	2020 (Back)		
				Analysis Period	1 > 7:00		
				File Name	1_bgpm.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h				6		100		259	24	66	332	

Signal Information				Signal Timing (s)									
Cycle, s	50.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.6	23.7	4.7	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				10.7		29.7	9.6	39.3
Change Period, ( $Y+R_c$ ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s				4.8			2.8	
Green Extension Time ( $g_e$ ), s				0.0		0.0	0.1	0.0
Phase Call Probability				0.78			0.61	
Max Out Probability				1.00			0.00	

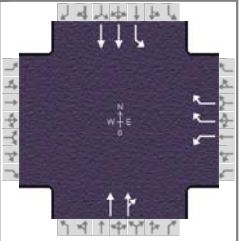
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( $v$ ), veh/h				6		102		146	143	67		339
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln				1810		1610		1900	1843	1810		1809
Queue Service Time ( $g_s$ ), s				0.2		2.8		3.4	2.2	0.8		1.7
Cycle Queue Clearance Time ( $g_c$ ), s				0.2		2.8		3.4	2.2	0.8		1.7
Green Ratio ( $g/C$ )				0.09		0.17		0.47	0.47	0.59		0.67
Capacity ( $c$ ), veh/h				169		268		900	873	725		2412
Volume-to-Capacity Ratio ( $X$ )				0.036		0.381		0.162	0.164	0.093		0.140
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)				2.7		42.4		34.2	33.8	8.4		14.5
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)				0.1		1.7		1.4	1.4	0.3		0.6
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)				0.03		0.27		0.07	0.07	0.05		0.03
Uniform Delay ( $d_1$ ), s/veh				20.6		18.6		7.5	7.5	4.7		3.1
Incremental Delay ( $d_2$ ), s/veh				0.0		0.3		0.4	0.4	0.0		0.1
Initial Queue Delay ( $d_3$ ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( $d$ ), s/veh				20.7		18.9		7.9	7.9	4.8		3.2
Level of Service (LOS)				C		B		A	A	A		A
Approach Delay, s/veh / LOS	0.0			19.0		B	7.9	A		3.4		A
Intersection Delay, s/veh / LOS				7.1				A				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	1.88	B	0.64	A
Bicycle LOS Score / LOS				F	0.73	A	0.82	A



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.98
Urban Street	Columbia Pike		Analysis Year	2020 (Back)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...		File Name	1_bgpm_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				6		100		259	24	66	332	

Signal Information				Signal Timing (s)									
Cycle, s	50.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.6	23.7	4.7	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				10.7		29.7	9.6	39.3
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				3.5			2.8	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.0	0.0
Phase Call Probability				0.78			0.61	
Max Out Probability				1.00			0.00	

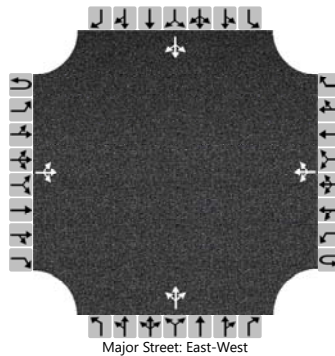
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12	1	6		
Adjusted Flow Rate ( v ), veh/h				6		102	146	143	67	339		
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425	1900	1843	1810	1809		
Queue Service Time ( g <sub>s</sub> ), s				0.2		1.5	2.8	2.2	0.8	1.7		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.2		1.5	2.8	2.2	0.8	1.7		
Green Ratio ( g/C )				0.09		0.17	0.47	0.47	0.59	0.67		
Capacity ( c ), veh/h				169		474	900	873	738	2412		
Volume-to-Capacity Ratio ( X )				0.036		0.215	0.162	0.164	0.091	0.140		
Back of Queue ( Q ), ft/ln ( 95 th percentile)				2.7		20.3	34.2	33.8	8.3	14.5		
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.1		0.8	1.4	1.4	0.3	0.6		
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.03		0.13	0.07	0.07	0.05	0.03		
Uniform Delay ( d <sub>1</sub> ), s/veh				20.6		18.0	7.5	7.5	4.7	3.1		
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		0.1	0.4	0.4	0.0	0.1		
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0	0.0	0.0		
Control Delay ( d ), s/veh				20.7		18.1	7.9	7.9	4.7	3.2		
Level of Service ( LOS )				C		B	A	A	A	A		
Approach Delay, s/veh / LOS	0.0			18.3			7.9			3.4		
Intersection Delay, s/veh / LOS				7.0						A		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	2.07	B	0.64	A
Bicycle LOS Score / LOS				F	0.73	A	0.82	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		6	28	56		19	33	22		55	11	19		10	13	18
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		7				21					92					45	
Capacity, c (veh/h)		1557				1516					788					826	
v/c Ratio		0.00				0.01					0.12					0.05	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.4					0.2	
Control Delay (s/veh)		7.3				7.4					10.2					9.6	
Level of Service (LOS)		A				A					B					A	
Approach Delay (s/veh)		0.5				2.0				10.2				9.6			
Approach LOS										B				A			

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Back)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	6	28	56	0	19	33	22	0	55	11	19	0	10	13	18
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate (v <sub>pc</sub> ), pc/h	0	7	30	61	0	21	36	24	0	60	12	21	0	11	14	20
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		98.00			81.00			93.00			45.00	
Entry Volume veh/h		98.00			81.00			93.00			45.00	
Circulating Flow (v <sub>c</sub> ), pc/h	46			79			48			117		
Exiting Flow (v <sub>ex</sub> ), pc/h	62			116			43			96		
Capacity (c <sub>pc</sub> ), pc/h		1316.74			1273.16			1314.06			1224.76	
Capacity (c), veh/h		1316.74			1273.16			1314.06			1224.76	
v/c Ratio (x)		0.07			0.06			0.07			0.04	

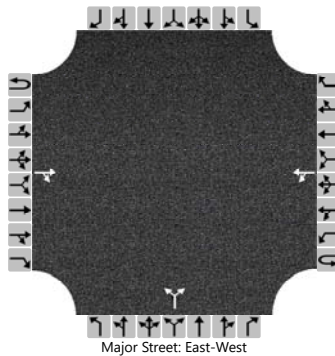
## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.3			3.3			3.3			3.2	
Lane LOS		A			A			A			A	
95% Queue, veh		0.2			0.2			0.2			0.1	
Approach Delay, s/veh	3.3			3.3			3.3			3.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	3.3						A					

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			52	5		34	70			4		42				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)					36						48					
Capacity, c (veh/h)					1556						987					
v/c Ratio					0.02						0.05					
95% Queue Length, Q <sub>95</sub> (veh)					0.1						0.2					
Control Delay (s/veh)					7.4						8.8					
Level of Service (LOS)					A						A					
Approach Delay (s/veh)					2.5				8.8							
Approach LOS									A							

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency or Co.	FTG			E/W Street Name	Critz Lane		
Date Performed	Sept 2018			N/S Street Name	Pantall Lane		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Project Description	10886 (Back)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		52	5	0	34	70		0	4		42				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		57	5	0	37	76		0	4		46				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		62.00			113.00			50.00				
Entry Volume veh/h		62.00			113.00			50.00				
Circulating Flow (v <sub>c</sub> ), pc/h	37			4			57			117		
Exiting Flow (v <sub>ex</sub> ), pc/h	103			80			0			42		
Capacity (c <sub>PCE</sub> ), pc/h		1328.89			1374.38			1302.05				
Capacity (c), veh/h		1328.89			1374.38			1302.05				
v/c Ratio (x)		0.05			0.08			0.04				

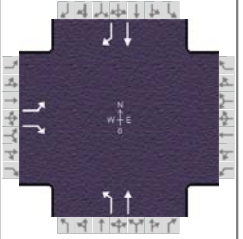
## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.1			3.3			3.1				
Lane LOS		A			A			A				
95% Queue, veh		0.1			0.3			0.1				
Approach Delay, s/veh	3.1			3.3			3.1					
Approach LOS	A			A			A					
Intersection Delay, s/veh   LOS	3.2						A					



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.99
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Lewisburg and Critz Lane	File Name	4_bgpm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	70		24				10	307			319	94

Signal Information													
Cycle, s	80.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	7.0	49.0	8.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	0.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		14.0			11.0	66.0		55.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.2			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		4.9			2.1			
Green Extension Time ( g <sub>e</sub> ), s		0.0			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			0.01			

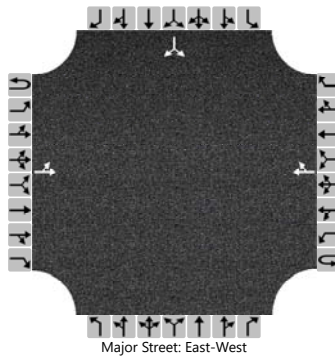
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7		14				5	2		6		16
Adjusted Flow Rate ( v ), veh/h	71		24				10	310		322		95
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900		1900		1610
Queue Service Time ( g <sub>s</sub> ), s	2.9		1.0				0.1	3.9		6.3		1.4
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	2.9		1.0				0.1	3.9		6.3		1.4
Green Ratio ( g/C )	0.10		0.19				0.72	0.75		0.61		0.71
Capacity ( c ), veh/h	181		302				821	1425		1164		1147
Volume-to-Capacity Ratio ( X )	0.391		0.080				0.012	0.218		0.277		0.083
Back of Queue ( Q ), ft/ln ( 95 th percentile)	57		16.7				1.4	47		104.5		16.9
Back of Queue ( Q ), veh/ln ( 95 th percentile)	2.3		0.7				0.1	1.9		4.2		0.7
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.63		0.12				0.01	0.09		0.21		0.03
Uniform Delay ( d <sub>1</sub> ), s/veh	33.7		26.8				3.5	3.0		7.2		3.5
Incremental Delay ( d <sub>2</sub> ), s/veh	0.5		0.0				0.0	0.4		0.6		0.1
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0		0.0		0.0
Control Delay ( d ), s/veh	34.2		26.9				3.5	3.3		7.8		3.7
Level of Service ( LOS )	C		C				A	A		A		A
Approach Delay, s/veh / LOS	32.3		C	0.0			3.3	A		6.9		A
Intersection Delay, s/veh / LOS	8.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.95	B	1.95	B	0.64	A	1.87	B
Bicycle LOS Score / LOS		F			1.02	A	1.18	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		43	188				294	3						3		36
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

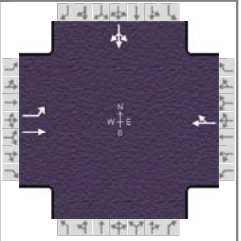
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		46													42	
Capacity, c (veh/h)		1252													693	
v/c Ratio		0.04													0.06	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.2	
Control Delay (s/veh)		8.0													10.5	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)	1.8												10.5			
Approach LOS													B			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	PM Peak Hour	PHF	0.93
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_bgpm_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	43	188			294	3				3	0	36

Signal Information													
Cycle, s	70.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		3.6	45.1	3.3	0.0	0.0	0.0				
		Yellow		4.0	4.0	4.0	0.0	0.0	0.0				
		Red		2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	9.6	60.7		51.1				9.3
Change Period, ( $Y+R_c$ ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( $MAH$ ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( $g_s$ ), s	2.5							3.8
Green Extension Time ( $g_e$ ), s	0.0	0.0		0.0				0.0
Phase Call Probability	0.59							0.56
Max Out Probability	0.00							0.24

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	46	202			319					42		
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1900			1897					1624		
Queue Service Time ( $g_s$ ), s	0.5	1.8			5.0					1.8		
Cycle Queue Clearance Time ( $g_c$ ), s	0.5	1.8			5.0					1.8		
Green Ratio ( $g/C$ )	0.72	0.78			0.64					0.05		
Capacity ( $c$ ), veh/h	811	1483			1222					78		
Volume-to-Capacity Ratio ( $X$ )	0.057	0.136			0.261					0.540		
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	4.9	15.4			73.8					31.9		
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	0.2	0.6			3.0					1.3		
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00	0.00			0.00					0.00		
Uniform Delay ( $d_1$ ), s/veh	3.1	1.9			5.3					32.6		
Incremental Delay ( $d_2$ ), s/veh	0.0	0.2			0.5					2.2		
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0					0.0		
Control Delay ( $d$ ), s/veh	3.1	2.1			5.8					34.7		
Level of Service (LOS)	A	A			A					C		
Approach Delay, s/veh / LOS	2.3		A	5.8		A	0.0			34.7		C
Intersection Delay, s/veh / LOS	6.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.30	A	1.63	B	1.72	B	1.95	B
Bicycle LOS Score / LOS	0.90	A	1.01	A			0.56	A

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's Sta and Pantall		
Agency or Co.	FTG			E/W Street Name	Thompson's Station Road		
Date Performed	Sept 2018			N/S Street Name	Pantall Road		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Project Description	10886 (Back)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR				LR							
Volume (V), veh/h	0	43	188		0		294	3					0	3		36
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	43	190		0		297	3					0	3		36
Right-Turn Bypass	None				None				None							
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

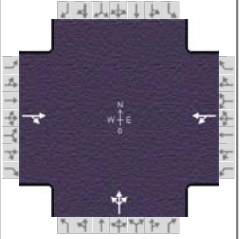
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		233.00			300.00						39.00	
Entry Volume veh/h		233.00			300.00						39.00	
Circulating Flow (v <sub>c</sub> ), pc/h	3			43			236			297		
Exiting Flow (v <sub>ex</sub> ), pc/h	193			333			46			0		
Capacity (c <sub>PCE</sub> ), pc/h		1375.78			1320.78						1019.33	
Capacity (c), veh/h		1375.78			1320.78						1019.33	
v/c Ratio (x)		0.17			0.23						0.04	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.0			4.7						3.9	
Lane LOS		A			A						A	
95% Queue, veh		0.6			0.9						0.1	
Approach Delay, s/veh	4.0			4.7						3.9		
Approach LOS	A			A						A		
Intersection Delay, s/veh   LOS	4.3						A					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2020 (Back)	Analysis Period	1> 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_bgpm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		64	179	295	35		126	0	167			

Signal Information												
Cycle, s	50.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	26.9	11.1	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		32.9		32.9		17.1		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						10.7		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.6		
Phase Call Probability						0.99		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		256			347			308				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1678			1024			1690				
Queue Service Time ( g <sub>s</sub> ), s		4.2			10.7			8.7				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		4.2			14.8			8.7				
Green Ratio ( g/C )		0.54			0.54			0.22				
Capacity ( c ), veh/h		902			687			376				
Volume-to-Capacity Ratio ( X )		0.284			0.505			0.821				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		51.1			114.3			134.9				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		2.0			4.6			5.4				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		6.3			10.1			18.5				
Incremental Delay ( d <sub>2</sub> ), s/veh		0.8			2.6			1.7				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		7.1			12.8			20.2				
Level of Service ( LOS )		A			B			C				
Approach Delay, s/veh / LOS	7.1	A		12.8	B		20.2	C		0.0		
Intersection Delay, s/veh / LOS	13.7						B					

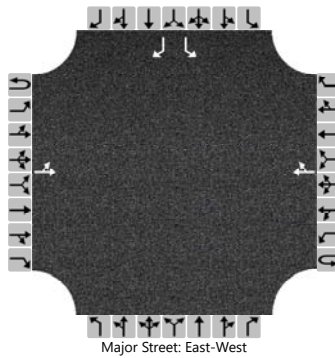
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.35	A	1.35	A	1.71	B	1.71	B
Bicycle LOS Score / LOS	0.91	A	1.06	A	1.00	A		



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Back)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		17	71				72	89						172		91
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

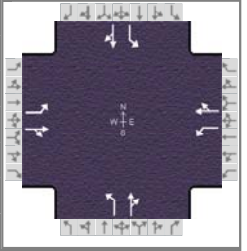
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18												185		98
Capacity, c (veh/h)		1416												744		931
v/c Ratio		0.01												0.25		0.11
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.0		0.4
Control Delay (s/veh)		7.6												11.4		9.3
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		1.5												10.7		
Approach LOS														B		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_bgpm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	17	13	64	84	43	36	32	257	62	13	306	6

Signal Information				Phase Diagram											
Cycle, s	70.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
		Green		1.4	1.5	32.5	1.7	3.2	5.8						
		Yellow		4.0	0.0	4.0	4.0	0.0	4.0						
		Red		2.0	0.0	2.0	2.0	0.0	2.0						

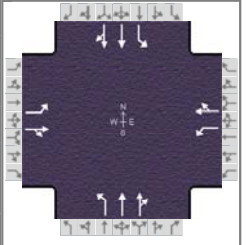
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.7	11.8	10.9	15.0	8.8	39.9	7.4	38.5
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	2.6	5.2	5.0	5.0	2.6		2.3	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability	0.29	0.97	0.81	0.99	0.47		0.23	
Max Out Probability	0.06	1.00	1.00	0.04	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	18	79		87	81		33	329		13	322	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1653		1810	1756		1810	1836		1810	1893	
Queue Service Time ( g <sub>s</sub> ), s	0.6	3.2		3.0	3.0		0.6	7.9		0.3	7.7	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	0.6	3.2		3.0	3.0		0.6	7.9		0.3	7.7	
Green Ratio ( g/C )	0.11	0.08		0.15	0.13		0.50	0.48		0.48	0.46	
Capacity ( c ), veh/h	224	137		278	225		557	890		505	878	
Volume-to-Capacity Ratio ( X )	0.078	0.578		0.311	0.362		0.059	0.370		0.027	0.366	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	11.4	57.6		55.4	54.3		9.9	137.7		4.2	140.8	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.5	2.3		2.2	2.2		0.4	5.5		0.2	5.6	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.13	0.41		0.55	0.34		0.06	0.28		0.03	0.28	
Uniform Delay ( d <sub>1</sub> ), s/veh	28.2	30.9		26.5	27.9		9.2	11.3		9.9	12.1	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1	1.4		0.2	0.4		0.0	1.2		0.0	1.2	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	28.2	32.3		26.7	28.3		9.2	12.5		9.9	13.3	
Level of Service ( LOS )	C	C		C	C		A	B		A	B	
Approach Delay, s/veh / LOS	31.6		C	27.5		C	12.2		B	13.2		B
Intersection Delay, s/veh / LOS	17.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.65	A	0.76	A	1.08	A	1.04	A

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other		
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97		
Urban Street	Columbia Pike	Analysis Year	2020 (Back)	Analysis Period	1 > 7:00		
Intersection	Columbia Pk and Thom...	File Name	8_bgpm_imp.xus				
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	17	13	64	84	43	36	32	257	62	13	306	6

Signal Information				Signal Phases											
Cycle, s	60.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	1.2	1.3	23.2	1.5	3.1	5.7	1	2	3	4	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0	5	6	7	8	
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0					

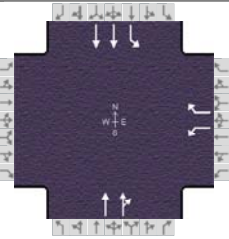
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.5	11.7	10.6	14.8	8.5	30.5	7.2	29.2
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	2.5	4.7	4.5	4.5	2.6		2.3	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability	0.25	0.95	0.76	0.98	0.42		0.20	
Max Out Probability	0.01	0.22	1.00	0.01	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	18	79		87	81		33	168	161	13	161	161
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1653		1810	1756		1810	1900	1773	1810	1900	1887
Queue Service Time ( g <sub>s</sub> ), s	0.5	2.7		2.5	2.5		0.6	3.4	3.5	0.3	3.4	3.4
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	0.5	2.7		2.5	2.5		0.6	3.4	3.5	0.3	3.4	3.4
Green Ratio ( g/C )	0.12	0.09		0.17	0.15		0.43	0.41	0.41	0.41	0.39	0.39
Capacity ( c ), veh/h	261	157		324	256		550	777	725	494	734	729
Volume-to-Capacity Ratio ( X )	0.067	0.506		0.267	0.318		0.060	0.216	0.222	0.027	0.219	0.220
Back of Queue ( Q ), ft/ln ( 95 th percentile)	9.3	46.8		44.4	43.6		9.8	61.9	60.2	4.1	62.7	62.5
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.4	1.9		1.8	1.7		0.4	2.5	2.4	0.2	2.5	2.5
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.10	0.33		0.44	0.27		0.06	0.12	0.12	0.03	0.13	0.13
Uniform Delay ( d <sub>1</sub> ), s/veh	23.5	25.8		21.7	22.9		10.1	11.5	11.5	10.8	12.3	12.3
Incremental Delay ( d <sub>2</sub> ), s/veh	0.0	0.9		0.2	0.3		0.0	0.6	0.7	0.0	0.7	0.7
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh	23.5	26.8		21.9	23.2		10.1	12.1	12.2	10.8	13.0	13.0
Level of Service ( LOS )	C	C		C	C		B	B	B	B	B	B
Approach Delay, s/veh / LOS	26.2	C		22.5	C		12.0	B		12.9	B	
Intersection Delay, s/veh / LOS	15.6						B					

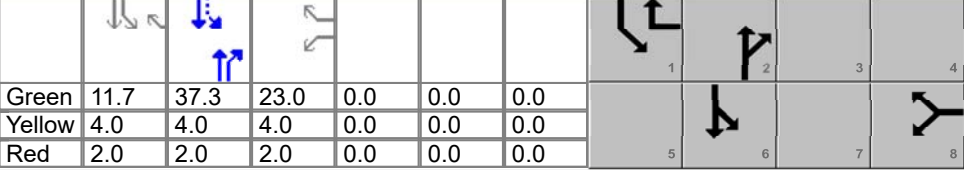
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.28	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.65	A	0.76	A	0.79	A	0.76	A

**TOTAL PROJECTED WEEKDAY CONDITIONS**

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.94		
Intersection	Columbia Pk and Critz L...			Analysis Year	2020 (Total)		
Project Description	10886			File Name	1_fuam.xus		
							

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h				62		971		1729	22	257	1137	

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		11.7	37.3	23.0	0.0	0.0	0.0				
		Yellow		4.0	4.0	4.0	0.0	0.0	0.0				
		Red		2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				29.0		43.3	17.7	61.0
Change Period, ( $Y+R_c$ ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s				25.0			11.3	
Green Extension Time ( $g_e$ ), s				0.0		0.0	0.4	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

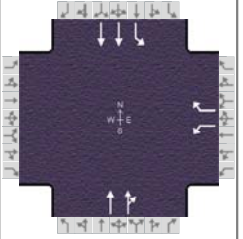
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( $v$ ), veh/h				66		1033		932	931	273		1210
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln				1810		1610		1900	1891	1810		1809
Queue Service Time ( $g_s$ ), s				2.5		23.0		64.7	37.3	9.3		17.6
Cycle Queue Clearance Time ( $g_c$ ), s				2.5		23.0		64.7	37.3	9.3		17.6
Green Ratio ( $g/C$ )				0.26		0.39		0.41	0.41	0.57		0.61
Capacity ( $c$ ), veh/h				462		620		788	784	315		2211
Volume-to-Capacity Ratio ( $X$ )				0.143		1.665		1.183	1.187	0.868		0.547
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)				48		2475.4		1294.3	1305	247.2		260.3
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)				1.9		99.0		51.8	52.2	9.9		10.4
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)				0.48		15.47		2.59	2.61	1.54		0.52
Uniform Delay ( $d_1$ ), s/veh				25.9		27.7		26.3	26.3	25.3		10.2
Incremental Delay ( $d_2$ ), s/veh				0.1		306.2		95.0	96.9	2.9		1.0
Initial Queue Delay ( $d_3$ ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( $d$ ), s/veh				25.9		333.9		121.3	123.2	28.2		11.2
Level of Service ( LOS )				C		F		F	F	C		B
Approach Delay, s/veh / LOS	0.0			315.4		F	122.3		F	14.3		B
Intersection Delay, s/veh / LOS				134.0						F		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.91	B	0.68	A
Bicycle LOS Score / LOS				F	2.02	B	1.71	B



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.98		
Intersection	Columbia Pk and Critz L...			Analysis Year	2020 (Total)		
Project Description	10886			File Name	1_fupm.xus		
Analysis Period	1 > 7:00						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				36		484		1791	102	1024	2107	

Signal Information				Signal Timing (s)									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	13.0	47.0	12.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

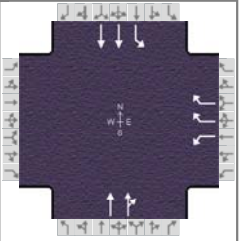
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				18.0		53.0	19.0	72.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				14.0			15.0	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			1.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12	1	6		
Adjusted Flow Rate ( v ), veh/h				37		494	966	966	1045	2150		
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1610	1900	1864	1810	1809		
Queue Service Time ( g <sub>s</sub> ), s				1.6		12.0	45.3	46.2	13.0	35.2		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				1.6		12.0	45.3	46.2	13.0	35.2		
Green Ratio ( g/C )				0.13		0.28	0.52	0.52	0.69	0.73		
Capacity ( c ), veh/h				241		447	992	973	343	2653		
Volume-to-Capacity Ratio ( X )				0.152		1.104	0.974	0.992	3.043	0.810		
Back of Queue ( Q ), ft/ln ( 95 th percentile)				31.6		666.9	790.4	829.1	3501.5	393.5		
Back of Queue ( Q ), veh/ln ( 95 th percentile)				1.3		26.7	31.6	33.2	140.1	15.7		
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.32		4.17	1.58	1.66	21.88	0.79		
Uniform Delay ( d <sub>1</sub> ), s/veh				34.5		32.5	20.9	21.3	30.3	7.9		
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		73.9	22.9	27.0	927.0	2.8		
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0	0.0	0.0		
Control Delay ( d ), s/veh				34.6		106.4	43.8	48.3	957.2	10.7		
Level of Service ( LOS )				C		F	D	D	F	B		
Approach Delay, s/veh / LOS	0.0			101.5		F	46.0	D	320.3	F		
Intersection Delay, s/veh / LOS				206.1					F			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	1.89	B	0.65	A
Bicycle LOS Score / LOS				F	2.08	B	3.12	C

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.94		
Intersection	Columbia Pk and Critz L...			Analysis Year	2020 (Total)		
Project Description	10886			Analysis Period	1> 7:00		
	File Name			1_fuam_imp.xus			



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				62		971		1729	22	257	1137	

Signal Information				Signal Phases									
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		13.3	51.7	17.0	0.0	0.0	0.0				
		Yellow		4.0	4.0	4.0	0.0	0.0	0.0				
		Red		2.0	2.0	2.0	0.0	0.0	0.0				

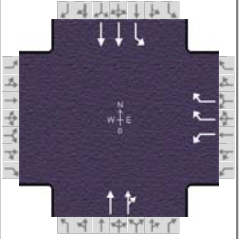
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				23.0		57.7	19.3	77.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				19.0			12.8	
Green Extension Time ( g <sub>e</sub> ), s				0.0		0.0	0.5	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12		1	6	
Adjusted Flow Rate ( v ), veh/h				66		1033	932	931		273	1210	
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425	1900	1891		1810	1809	
Queue Service Time ( g <sub>s</sub> ), s				3.1		17.0	86.9	46.8		10.8	14.6	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				3.1		17.0	86.9	46.8		10.8	14.6	
Green Ratio ( g/C )				0.17		0.30	0.52	0.52		0.67	0.71	
Capacity ( c ), veh/h				308		862	983	979		312	2568	
Volume-to-Capacity Ratio ( X )				0.214		1.198	0.948	0.951		0.876	0.471	
Back of Queue ( Q ), ft/ln ( 95 th percentile)				61.9		811.8	798.3	803.6		272.7	206.6	
Back of Queue ( Q ), veh/ln ( 95 th percentile)				2.5		32.5	31.9	32.1		10.9	8.3	
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.62		5.07	1.60	1.61		1.70	0.41	
Uniform Delay ( d <sub>1</sub> ), s/veh				35.7		34.9	22.9	22.9		32.2	6.3	
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		100.2	18.6	19.2		3.1	0.6	
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh				35.9		135.1	41.4	42.1		35.3	6.9	
Level of Service ( LOS )				D		F	D	D		D	A	
Approach Delay, s/veh / LOS	0.0			129.1		F	41.8	D		12.2	B	
Intersection Delay, s/veh / LOS				53.5				D				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	2.09	B	0.66	A
Bicycle LOS Score / LOS				F	2.02	B	1.71	B

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG			Analysis Date	12/21/2014		
Jurisdiction	Thompson's Station, TN			Area Type	Other		
Urban Street	Columbia Pike			PHF	0.98		
Intersection	Columbia Pk and Critz L...			Analysis Year	2020 (Total)		
Project Description	10886			Analysis Period	1 > 7:00		
	File Name			1_fupm_imp.xus			



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				36		484		1791	102	1024	2107	

Signal Information															
Cycle, s	90.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On	Green	21.7	36.0	14.3	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0					
				Red	2.0	2.0	2.0	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				20.3		42.0	27.7	69.7
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				13.3			23.7	
Green Extension Time ( g <sub>e</sub> ), s				0.9		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.15			1.00	

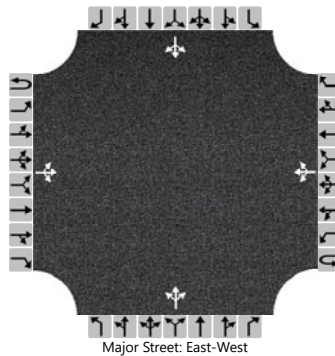
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( v ), veh/h				37		494		966	966	1045		2150
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425		1900	1864	1810		1809
Queue Service Time ( g <sub>s</sub> ), s				1.6		11.3		56.9	36.0	21.7		38.5
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				1.6		11.3		56.9	36.0	21.7		38.5
Green Ratio ( g/C )				0.16		0.40		0.40	0.40	0.66		0.71
Capacity ( c ), veh/h				287		1139		761	746	516		2561
Volume-to-Capacity Ratio ( X )				0.128		0.434		1.270	1.294	2.024		0.839
Back of Queue ( Q ), ft/ln ( 95 th percentile)				30.5		160.4		1565.1	1624.6	3020		453
Back of Queue ( Q ), veh/ln ( 95 th percentile)				1.2		6.4		62.6	65.0	120.8		18.1
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.31		1.00		3.13	3.25	18.87		0.91
Uniform Delay ( d <sub>1</sub> ), s/veh				32.5		19.6		27.0	27.0	27.8		9.5
Incremental Delay ( d <sub>2</sub> ), s/veh				0.1		0.1		131.8	142.2	467.7		3.5
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( d ), s/veh				32.6		19.7		158.8	169.2	495.5		13.0
Level of Service ( LOS)				C		B		F	F	F		B
Approach Delay, s/veh / LOS	0.0			20.6		C	164.0		F	170.8		F
Intersection Delay, s/veh / LOS				154.4						F		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.15	B	2.32	B	2.10	B	0.65	A
Bicycle LOS Score / LOS				F	2.08	B	3.12	C

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.86		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	93	97		90	183	19		436	19	29		4	32	31
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

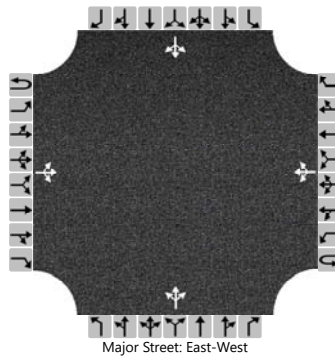
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				105					563					78	
Capacity, c (veh/h)		1344				1360					332					474	
v/c Ratio		0.00				0.08					1.69					0.16	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.2					34.9					0.6	
Control Delay (s/veh)		7.7				7.9					352.6					14.1	
Level of Service (LOS)		A				A					F					B	
Approach Delay (s/veh)		0.2				2.9				352.6				14.1			
Approach LOS										F				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		7	91	444		101	168	30		98	21	25		5	28	15
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8				110					157					52	
Capacity, c (veh/h)		1367				1003					278					279	
v/c Ratio		0.01				0.11					0.56					0.19	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.4					3.2					0.7	
Control Delay (s/veh)		7.6				9.0					33.3					20.9	
Level of Service (LOS)		A				A					D					C	
Approach Delay (s/veh)		0.2				3.8				33.3				20.9			
Approach LOS										D				C			



# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	AM Peak Hour				Peak Hour Factor	0.86			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	4	93	97	0	90	183	19	0	436	19	29	0	4	32	31
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate (v <sub>pc</sub> ), pc/h	0	5	108	113	0	105	213	22	0	507	22	34	0	5	37	36
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		226.00			340.00			563.00			78.00	
Entry Volume veh/h		226.00			340.00			563.00			78.00	
Circulating Flow (v <sub>c</sub> ), pc/h	147			534			118			825		
Exiting Flow (v <sub>ex</sub> ), pc/h	147			756			49			255		
Capacity (c <sub>pc</sub> ), pc/h		1187.85			800.44			1223.51			594.87	
Capacity (c), veh/h		1187.85			800.44			1223.51			594.87	
v/c Ratio (x)		0.19			0.42			0.46			0.13	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.7			9.9			7.7			7.6	
Lane LOS		A			A			A			A	
95% Queue, veh		0.7			2.1			2.5			0.4	
Approach Delay, s/veh	4.7			9.9			7.7			7.6		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	7.8						A					

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	7	91	444	0	101	168	30	0	98	21	25	0	5	28	15
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	8	99	483	0	110	183	33	0	107	23	27	0	5	30	16
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763		
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087		

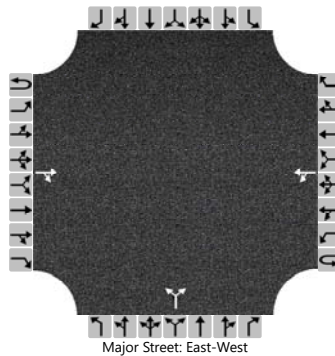
Flow Computations, Capacity and v/c Ratios													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Entry Flow (v <sub>e</sub> ), pc/h		590.00			326.00			157.00			51.00		
Entry Volume veh/h		590.00			326.00			157.00			51.00		
Circulating Flow (v <sub>c</sub> ), pc/h	145			138			112			400			
Exiting Flow (v <sub>ex</sub> ), pc/h	131			306			64			623			
Capacity (c <sub>PCE</sub> ), pc/h		1190.27			1198.80			1231.02			917.67		
Capacity (c), veh/h		1190.27			1198.80			1231.02			917.67		
v/c Ratio (x)		0.50			0.27			0.13			0.06		

Delay and Level of Service													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Lane Control Delay (d), s/veh		8.4			5.5			4.0			4.4		
Lane LOS		A			A			A			A		
95% Queue, veh		2.8			1.1			0.4			0.2		
Approach Delay, s/veh	8.4			5.5			4.0			4.4			
Approach LOS	A			A			A			A			
Intersection Delay, s/veh   LOS	6.8						A						

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			95	85		124	157			98		210				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

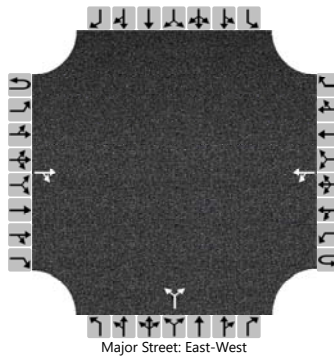
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						143						354				
Capacity, c (veh/h)						1376						642				
v/c Ratio						0.10						0.55				
95% Queue Length, Q <sub>95</sub> (veh)						0.3						3.4				
Control Delay (s/veh)						7.9						17.3				
Level of Service (LOS)						A						C				
Approach Delay (s/veh)					4.0				17.3							
Approach LOS									C							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			84	142		547	221			116		184				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						576						316				
Capacity, c (veh/h)						1341						149				
v/c Ratio						0.43						2.11				
95% Queue Length, Q <sub>95</sub> (veh)						2.2						25.5				
Control Delay (s/veh)						9.7						572.8				
Level of Service (LOS)						A						F				
Approach Delay (s/veh)					8.3				572.8							
Approach LOS									F							

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency or Co.	FTG			E/W Street Name	Critz Lane		
Date Performed	Sept 2018			N/S Street Name	Pantall Lane		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.88		
Project Description	10886 (Total)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		95	85	0	124	157		0	98		210				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		108	97	0	141	178		0	111		239				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		205.00			319.00			350.00				
Entry Volume veh/h		205.00			319.00			350.00				
Circulating Flow (v <sub>c</sub> ), pc/h		141			111			108			430	
Exiting Flow (v <sub>ex</sub> ), pc/h		347			289			0			238	
Capacity (c <sub>PCE</sub> ), pc/h		1195.14			1232.28			1236.05				
Capacity (c), veh/h		1195.14			1232.28			1236.05				
v/c Ratio (x)		0.17			0.26			0.28				

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.5			5.2			5.5				
Lane LOS		A			A			A				
95% Queue, veh		0.6			1.0			1.2				
Approach Delay, s/veh		4.5			5.2			5.5				
Approach LOS		A			A			A				
Intersection Delay, s/veh   LOS	5.2						A					



# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Pantall			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Pantall Lane			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		84	142	0	547	221		0	116		184				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		91	154	0	595	240		0	126		200				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

## Flow Computations, Capacity and v/c Ratios

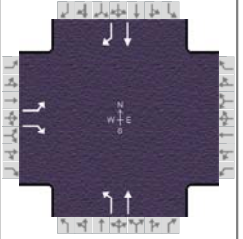
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		245.00			835.00			326.00				
Entry Volume veh/h		245.00			835.00			326.00				
Circulating Flow (v <sub>c</sub> ), pc/h	595			126			91			961		
Exiting Flow (v <sub>ex</sub> ), pc/h	291			366			0			749		
Capacity (c <sub>PCE</sub> ), pc/h		752.16			1213.57			1257.67				
Capacity (c), veh/h		752.16			1213.57			1257.67				
v/c Ratio (x)		0.33			0.69			0.26				

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.7			12.7			5.2				
Lane LOS		A			B			A				
95% Queue, veh		1.4			5.9			1.0				
Approach Delay, s/veh	8.7			12.7			5.2					
Approach LOS	A			B			A					
Intersection Delay, s/veh   LOS	10.2						B					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Lewisburg and Critz Lane	File Name	4_fuam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	366		16				17	1462			200	226

Signal Information													
Cycle, s	150.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	6.0	102.0	26.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	0.0	2.0	2.0	0.0	0.0	0.0			

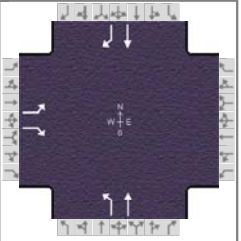
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		32.0			10.0	118.0		108.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.1			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		28.0			2.4			
Green Extension Time ( g <sub>e</sub> ), s		0.0			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			0.36			

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate ( v ), veh/h	389		17				18	1555			213	240
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900			1900	1610
Queue Service Time ( g <sub>s</sub> ), s	26.0		1.3				0.4	112.0			6.1	3.9
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	26.0		1.3				0.4	112.0			6.1	3.9
Green Ratio ( g/C )	0.17		0.21				0.73	0.75			0.68	0.85
Capacity ( c ), veh/h	314		344				880	1419			1292	1374
Volume-to-Capacity Ratio ( X )	1.241		0.050				0.021	1.096			0.165	0.175
Back of Queue ( Q ), ft/ln ( 95 th percentile)	869.9		23.1				6.5	2077			114.5	42.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)	34.8		0.9				0.3	83.1			4.6	1.7
Queue Storage Ratio ( RQ ) ( 95 th percentile)	9.67		0.16				0.04	4.15			0.23	0.09
Uniform Delay ( d <sub>1</sub> ), s/veh	62.0		46.9				5.6	19.0			8.6	1.9
Incremental Delay ( d <sub>2</sub> ), s/veh	132.8		0.0				0.0	54.8			0.3	0.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay ( d ), s/veh	194.8		46.9				5.6	73.8			8.9	2.2
Level of Service ( LOS )	F		D				A	F			A	A
Approach Delay, s/veh / LOS	188.6		F	0.0			73.0	E		5.3		A
Intersection Delay, s/veh / LOS	79.7						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.97	B	1.97	B	0.66	A	1.88	B
Bicycle LOS Score / LOS		F			3.08	C	1.24	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.99
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Lewisburg and Critz Lane	File Name	4_fupm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	237		34				14	367			1044	695

Signal Information																
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	No	Simult. Gap E/W	On	Green	6.0	101.0	27.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
				Red	0.0	2.0	2.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		33.0			10.0	117.0		107.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.2			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		20.8			2.3			
Green Extension Time ( g <sub>e</sub> ), s		0.3			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		0.07			0.28			

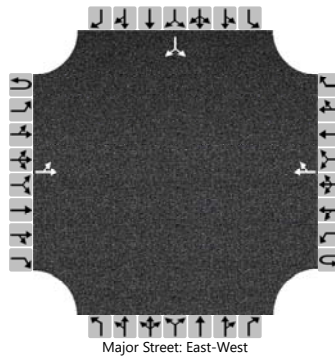
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate ( v ), veh/h	239		34				14	371			1055	702
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900			1900	1610
Queue Service Time ( g <sub>s</sub> ), s	18.8		2.5				0.3	9.5			61.1	17.0
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	18.8		2.5				0.3	9.5			61.1	17.0
Green Ratio ( g/C )	0.18		0.22				0.73	0.74			0.67	0.85
Capacity ( c ), veh/h	326		354				265	1406			1279	1374
Volume-to-Capacity Ratio ( X )	0.735		0.097				0.053	0.264			0.824	0.511
Back of Queue ( Q ), ft/ln ( 95 th percentile)	355.4		46.6				9.5	167.9			889.4	190.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)	14.2		1.9				0.4	6.7			35.6	7.6
Queue Storage Ratio ( RQ ) ( 95 th percentile)	3.95		0.33				0.06	0.34			1.78	0.38
Uniform Delay ( d <sub>1</sub> ), s/veh	58.1		46.6				19.3	6.3			18.0	2.9
Incremental Delay ( d <sub>2</sub> ), s/veh	7.4		0.0				0.0	0.5			6.1	1.4
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay ( d ), s/veh	65.5		46.7				19.3	6.8			24.1	4.2
Level of Service ( LOS )	E		D				B	A			C	A
Approach Delay, s/veh / LOS	63.2		E	0.0			7.2	A		16.2		B
Intersection Delay, s/veh / LOS	20.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.97	B	1.97	B	0.66	A	1.88	B
Bicycle LOS Score / LOS		F			1.12	A	3.39	C

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.82		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		244	311				285	66						94		147
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

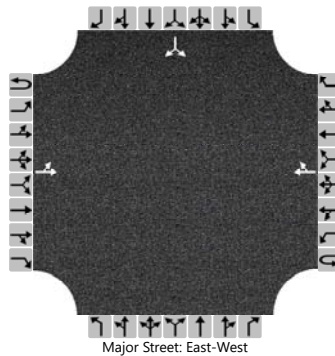
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		298														294	
Capacity, c (veh/h)		1142														225	
v/c Ratio		0.26														1.31	
95% Queue Length, Q <sub>95</sub> (veh)		1.0														15.7	
Control Delay (s/veh)		9.3														209.8	
Level of Service (LOS)		A														F	
Approach Delay (s/veh)		5.8												209.8			
Approach LOS														F			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		189	300				352	103						96		567
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

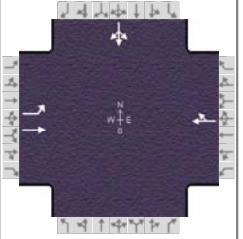
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		203														713	
Capacity, c (veh/h)		1084														449	
v/c Ratio		0.19														1.59	
95% Queue Length, Q <sub>95</sub> (veh)		0.7														39.8	
Control Delay (s/veh)		9.1														298.3	
Level of Service (LOS)		A														F	
Approach Delay (s/veh)		4.8												298.3			
Approach LOS														F			



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	AM Peak Hour	PHF	0.82
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_fuam_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	244	311			285	66				94	0	147

Signal Information				Signal Phases										
Cycle, s	60.0	Reference Phase	2	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Offset, s	0	Reference Point	End	Green	8.0	21.7	12.4	0.0	0.0	0.0	1	2	3	4
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				

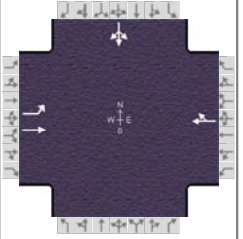
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	14.0	41.6		27.7				18.4
Change Period, ( $Y+R_c$ ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( $MAH$ ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( $g_s$ ), s	7.6							12.1
Green Extension Time ( $g_e$ ), s	0.4	0.0		0.0				0.4
Phase Call Probability	0.99							0.99
Max Out Probability	0.00							0.03

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	298	379			428						294	
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1900			1838						1682	
Queue Service Time ( $g_s$ ), s	5.6	6.1			11.6						10.1	
Cycle Queue Clearance Time ( $g_c$ ), s	5.6	6.1			11.6						10.1	
Green Ratio ( $g/C$ )	0.53	0.59			0.36						0.21	
Capacity ( $c$ ), veh/h	522	1128			663						347	
Volume-to-Capacity Ratio ( $X$ )	0.570	0.336			0.645						0.846	
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	78.3	89.1			219.8						177	
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	3.1	3.6			8.8						7.1	
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00	0.00			0.00						0.00	
Uniform Delay ( $d_1$ ), s/veh	10.3	6.2			16.0						22.9	
Incremental Delay ( $d_2$ ), s/veh	0.4	0.8			4.8						3.4	
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0						0.0	
Control Delay ( $d$ ), s/veh	10.6	7.0			20.8						26.3	
Level of Service (LOS)	B	A			C						C	
Approach Delay, s/veh / LOS	8.6	A		20.8	C		0.0			26.3	C	
Intersection Delay, s/veh / LOS	16.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.34	A	1.67	B	1.71	B	1.94	B
Bicycle LOS Score / LOS	1.60	B	1.19	A			0.97	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	PM Peak Hour	PHF	0.93
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_fupm_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	189	300			352	103				96	0	567

Signal Information				Phase Diagram										
Cycle, s	130.0	Reference Phase	2	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Offset, s	0	Reference Point	End	Green	11.8	41.3	58.9	0.0	0.0	0.0	1	2	3	4
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0	5	6	7	8

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	17.8	65.1		47.3				64.9
Change Period, ( $Y+R_c$ ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( $MAH$ ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( $g_s$ ), s	11.5							56.9
Green Extension Time ( $g_e$ ), s	0.4	0.0		0.0				1.9
Phase Call Probability	1.00							1.00
Max Out Probability	0.00							0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	203	323			489						713	
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1900			1826						1636	
Queue Service Time ( $g_s$ ), s	9.5	14.5			32.5						54.9	
Cycle Queue Clearance Time ( $g_c$ ), s	9.5	14.5			32.5						54.9	
Green Ratio ( $g/C$ )	0.42	0.45			0.32						0.45	
Capacity ( $c$ ), veh/h	283	864			580						741	
Volume-to-Capacity Ratio ( $X$ )	0.719	0.373			0.843						0.962	
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	186.2	274.9			582.7						785	
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	7.4	11.0			23.3						31.4	
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00	0.00			0.00						0.00	
Uniform Delay ( $d_1$ ), s/veh	30.1	23.3			41.3						34.5	
Incremental Delay ( $d_2$ ), s/veh	1.3	1.2			13.9						11.7	
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0						0.0	
Control Delay ( $d$ ), s/veh	31.4	24.5			55.2						46.2	
Level of Service (LOS)	C	C			E						D	
Approach Delay, s/veh / LOS	27.2	C		55.2	E		0.0			46.2	D	
Intersection Delay, s/veh / LOS	43.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.40	A	1.71	B	1.74	B	1.97	B
Bicycle LOS Score / LOS	1.36	A	1.29	A			1.66	B

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Thompson's Sta and Pantall			
Agency or Co.	FTG				E/W Street Name	Thompson's Station Road			
Date Performed	Sept 2018				N/S Street Name	Pantall Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	AM Peak Hour				Peak Hour Factor	0.89			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR				LR							
Volume (V), veh/h	0	244	311		0		285	66					0	94		147
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	274	349		0		320	74					0	106		165
Right-Turn Bypass	None				None				None							
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		623.00			394.00						271.00	
Entry Volume veh/h		623.00			394.00						271.00	
Circulating Flow (v <sub>c</sub> ), pc/h	106			274			729			320		
Exiting Flow (v <sub>ex</sub> ), pc/h	455			485			348			0		
Capacity (c <sub>PCE</sub> ), pc/h		1238.58			1043.53						995.70	
Capacity (c), veh/h		1238.58			1043.53						995.70	
v/c Ratio (x)		0.50			0.38						0.27	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.3			7.4						6.3	
Lane LOS		A			A						A	
95% Queue, veh		2.9			1.8						1.1	
Approach Delay, s/veh	8.3			7.4						6.3		
Approach LOS	A			A						A		
Intersection Delay, s/veh   LOS	7.6						A					

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's Sta and Pantall		
Agency or Co.	FTG			E/W Street Name	Thompson's Station Road		
Date Performed	Sept 2018			N/S Street Name	Pantall Road		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Project Description	10886 (Total)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR				LR							
Volume (V), veh/h	0	189	300		0		352	103					0	96		567
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	191	303		0		356	104					0	97		573
Right-Turn Bypass	None				None				None							
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

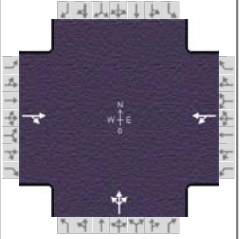
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		494.00			460.00						670.00	
Entry Volume veh/h		494.00			460.00						670.00	
Circulating Flow (v <sub>c</sub> ), pc/h	97			191			591			356		
Exiting Flow (v <sub>ex</sub> ), pc/h	400			929			295			0		
Capacity (c <sub>PCE</sub> ), pc/h		1250.00			1135.72						959.80	
Capacity (c), veh/h		1250.00			1135.72						959.80	
v/c Ratio (x)		0.40			0.41						0.70	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.7			7.3						15.4	
Lane LOS		A			A						C	
95% Queue, veh		1.9			2.0						6.0	
Approach Delay, s/veh	6.7			7.3						15.4		
Approach LOS	A			A						C		
Intersection Delay, s/veh   LOS	10.5						B					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.90
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_fuam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h		136	110	216	237		576	0	421			

Signal Information												
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	34.0	54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		40.0		40.0		60.0		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		6.0		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.2		
Queue Clearance Time ( $g_s$ ), s						56.0		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.0		
Phase Call Probability						1.00		
Max Out Probability						1.00		

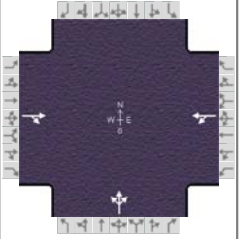
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		273			503			1108				
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1758			918			1720				
Queue Service Time ( $g_s$ ), s		12.1			21.9			54.0				
Cycle Queue Clearance Time ( $g_c$ ), s		12.1			34.0			54.0				
Green Ratio ( $g/C$ )		0.34			0.34			0.54				
Capacity ( $c$ ), veh/h		598			365			929				
Volume-to-Capacity Ratio ( $X$ )		0.457			1.377			1.193				
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		225.6			1085.9			1573				
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		9.0			43.4			62.9				
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( $d_1$ ), s/veh		25.8			40.7			23.0				
Incremental Delay ( $d_2$ ), s/veh		2.5			186.2			97.5				
Initial Queue Delay ( $d_3$ ), s/veh		0.0			0.0			0.0				
Control Delay ( $d$ ), s/veh		28.3			226.9			120.5				
Level of Service ( LOS)		C			F			F				
Approach Delay, s/veh / LOS	28.3	C		226.9	F		120.5	F		0.0		
Intersection Delay, s/veh / LOS	135.5						F					

Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	1.40	A	1.40	A	1.73	B	1.73
Bicycle LOS Score / LOS	0.94	A	1.32	A	2.32	B		



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_fupm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		329	521	644	286		144	0	187			

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	63.0	15.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		69.0		69.0		21.0		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						17.0		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.0		
Phase Call Probability						1.00		
Max Out Probability						1.00		

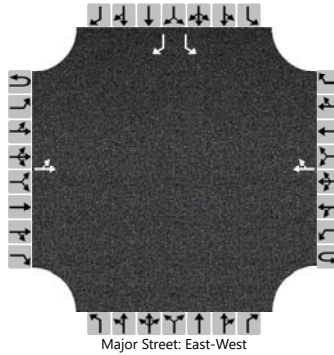
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		895			979			348				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1711			422			1691				
Queue Service Time ( g <sub>s</sub> ), s		29.6			33.4			15.0				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		29.6			63.0			15.0				
Green Ratio ( g/C )		0.70			0.70			0.17				
Capacity ( c ), veh/h		1198			363			282				
Volume-to-Capacity Ratio ( X )		0.747			2.698			1.236				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		354.4			3763.7			631.1				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		14.2			150.5			25.2				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		8.5			31.4			37.5				
Incremental Delay ( d <sub>2</sub> ), s/veh		4.3			771.9			133.0				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		12.8			803.3			170.5				
Level of Service ( LOS)		B			F			F				
Approach Delay, s/veh / LOS	12.8	B		803.3	F		170.5	F		0.0		
Intersection Delay, s/veh / LOS	385.8						F					

Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	1.34	A	1.34	A	1.73	B	1.73
Bicycle LOS Score / LOS	1.96	B	2.10	B	1.06	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.91		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0		1	0	1	
Configuration		LT						TR						L		R
Volume (veh/h)		32	155				404	465						88		83
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

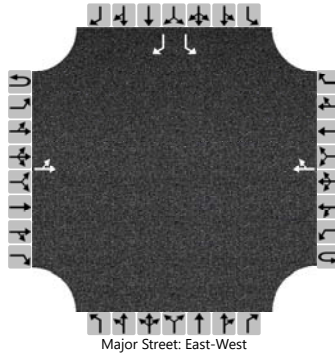
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		35												97		91	
Capacity, c (veh/h)		728												279		443	
v/c Ratio		0.05												0.35		0.21	
95% Queue Length, Q <sub>95</sub> (veh)		0.2												1.5		0.8	
Control Delay (s/veh)		10.2												24.6		15.2	
Level of Service (LOS)		B												C		C	
Approach Delay (s/veh)		2.2												20.0			
Approach LOS														C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		71	399				312	101						585		86
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

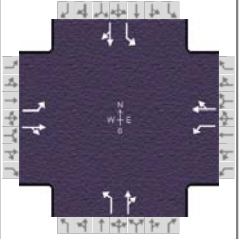
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		76												629		92	
Capacity, c (veh/h)		1127												257		663	
v/c Ratio		0.07												2.44		0.14	
95% Queue Length, Q <sub>95</sub> (veh)		0.2												51.1		0.5	
Control Delay (s/veh)		8.4												691.1		11.3	
Level of Service (LOS)		A												F		B	
Approach Delay (s/veh)		1.9												604.0			
Approach LOS														F			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	AM Peak Hour	PHF	0.95
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_fuam.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	218	56	136	219	102	198	96	1310	102	54	872	177

Signal Information				Signal Timing (s)																				
Cycle, s	140.0	Reference Phase	2	Green	5.3	0.5	89.1	9.0	2.0	10.0	Yellow	4.0	0.0	4.0	4.0	0.0	4.0	Red	2.0	0.0	2.0	2.0	0.0	2.0
Offset, s	0	Reference Point	End																					
Uncoordinated	No	Simult. Gap E/W	On																					
Force Mode	Fixed	Simult. Gap N/S	On																					

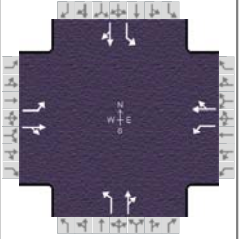
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.0	18.0	15.0	16.0	11.9	95.7	11.3	95.1
Change Period, ( $Y+R_c$ ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s	13.0	14.0	11.0	12.0	4.7		3.5	
Green Extension Time ( $g_e$ ), s	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.98		0.89	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( $v$ ), veh/h	229	202		231	316		101	1486		57	1104	
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1685		1810	1698		1810	1876		1810	1844	
Queue Service Time ( $g_s$ ), s	11.0	12.0		9.0	10.0		2.7	89.7		1.5	75.9	
Cycle Queue Clearance Time ( $g_c$ ), s	11.0	12.0		9.0	10.0		2.7	89.7		1.5	75.9	
Green Ratio ( $g/C$ )	0.15	0.09		0.14	0.07		0.68	0.64		0.67	0.64	
Capacity ( $c$ ), veh/h	194	144		168	121		176	1201		121	1174	
Volume-to-Capacity Ratio ( $X$ )	1.185	1.399		1.374	2.603		0.574	1.237		0.471	0.941	
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	335.4	553.9		445.7	1157		100.9	2625.6		57	1127.9	
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	13.4	22.2		17.8	46.3		4.0	105.0		2.3	45.1	
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	3.73	3.96		4.46	7.23		0.63	5.25		0.36	2.26	
Uniform Delay ( $d_1$ ), s/veh	58.6	64.0		59.9	65.0		32.9	25.2		36.0	23.0	
Incremental Delay ( $d_2$ ), s/veh	123.5	216.0		201.3	744.8		1.1	114.2		1.1	15.4	
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( $d$ ), s/veh	182.1	280.0		261.3	809.8		34.0	139.3		37.1	38.5	
Level of Service ( LOS )	F	F		F	F		C	F		D	D	
Approach Delay, s/veh / LOS	227.9	F		578.3	F		132.6	F		38.4	D	
Intersection Delay, s/veh / LOS	179.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.96	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	1.20	A	1.39	A	3.11	C	2.40	B

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_fupm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	325	109	254	242	106	130	177	1305	314	115	1420	323

Signal Information				Signal Phases								
Cycle, s	140.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	7.2	4.9	81.9	7.0	1.0	8.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	4.0	4.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	2.0	2.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	20.0	21.0	13.0	14.0	18.1	92.8	13.2	87.9
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	16.0	17.0	9.0	10.0	11.9		7.1	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		0.99	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.00	

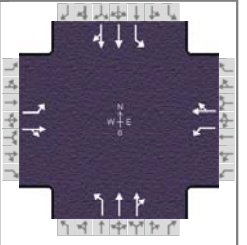
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	335	374		249	243		182	1669		119	1797	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1687		1810	1729		1810	1836		1810	1839	
Queue Service Time ( g <sub>s</sub> ), s	14.0	15.0		7.0	8.0		9.9	86.8		5.1	81.9	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	14.0	15.0		7.0	8.0		9.9	86.8		5.1	81.9	
Green Ratio ( g/C )	0.17	0.11		0.11	0.06		0.68	0.62		0.64	0.58	
Capacity ( c ), veh/h	232	181		142	99		208	1138		144	1075	
Volume-to-Capacity Ratio ( X )	1.442	2.070		1.758	2.463		0.877	1.466		0.821	1.671	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	623.4	1242.5		645.3	892.8		278.4	3885.3		193.3	4899.1	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	24.9	49.7		25.8	35.7		11.1	155.4		7.7	196.0	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	6.93	8.87		6.45	5.58		1.74	7.77		1.21	9.80	
Uniform Delay ( d <sub>1</sub> ), s/veh	56.8	62.5		62.7	66.0		48.8	26.6		42.2	29.1	
Incremental Delay ( d <sub>2</sub> ), s/veh	221.5	499.9		368.4	687.7		8.5	214.6		4.4	306.1	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	278.3	562.4		431.1	753.7		57.4	241.2		46.6	335.2	
Level of Service ( LOS )	F	F		F	F		E	F		D	F	
Approach Delay, s/veh / LOS	428.2	F		590.3	F		223.1	F		317.3	F	
Intersection Delay, s/veh / LOS	325.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.96	B	1.89	B	1.90	B
Bicycle LOS Score / LOS	1.66	B	1.30	A	3.54	D	3.65	D



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other		
Jurisdiction	Thompson's Station, TN		Time Period	AM Peak Hour	PHF	0.95	
Urban Street	Columbia Pike		Analysis Year	2020 (Total)	Analysis Period	1 > 7:00	
Intersection	Columbia Pk and Thom...		File Name	8_fuam_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	218	56	136	219	102	198	96	1310	102	54	872	177

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	4.8	0.9	42.6	7.0	5.5	15.2			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
				Red	2.0	0.0	2.0	2.0	0.0	2.0			

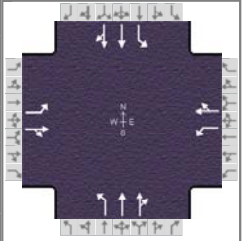
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	13.0	21.2	18.5	26.7	11.6	49.5	10.8	48.6
Change Period, (Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway (MAH), s	3.1	3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g <sub>s</sub> ), s	9.0	13.6	12.3	20.1	5.1		3.7	
Green Extension Time (g <sub>e</sub> ), s	0.0	0.7	0.2	0.6	0.2	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.94		0.79	
Max Out Probability	1.00	0.22	0.60	0.41	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	229	202		231	316		101	750	736	57	569	536
Adjusted Saturation Flow Rate (s), veh/h/ln	1810	1685		1810	1698		1810	1900	1851	1810	1900	1788
Queue Service Time (g <sub>s</sub> ), s	7.0	11.6		10.3	18.1		3.1	36.8	37.3	1.7	24.5	24.5
Cycle Queue Clearance Time (g <sub>c</sub> ), s	7.0	11.6		10.3	18.1		3.1	36.8	37.3	1.7	24.5	24.5
Green Ratio (g/C)	0.22	0.15		0.29	0.21		0.48	0.44	0.44	0.47	0.43	0.43
Capacity (c), veh/h	205	257		342	352		268	827	806	173	810	763
Volume-to-Capacity Ratio (X)	1.118	0.787		0.674	0.898		0.377	0.907	0.914	0.328	0.702	0.702
Back of Queue (Q), ft/ln (95 th percentile)	298.8	223.2		201.9	348.7		55	658.1	656.2	31.1	427.8	409.1
Back of Queue (Q), veh/ln (95 th percentile)	12.0	8.9		8.1	13.9		2.2	26.3	26.2	1.2	17.1	16.4
Queue Storage Ratio (RQ) (95 th percentile)	3.32	1.59		2.02	2.18		0.34	1.32	1.31	0.19	0.86	0.82
Uniform Delay (d <sub>1</sub> ), s/veh	38.4	40.8		29.8	38.6		17.9	26.4	26.5	22.8	23.5	23.5
Incremental Delay (d <sub>2</sub> ), s/veh	98.2	7.0		2.2	17.3		0.3	15.5	16.6	0.4	5.0	5.4
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	136.7	47.8		32.0	55.9		18.2	41.9	43.0	23.2	28.5	28.8
Level of Service (LOS)	F	D		C	E		B	D	D	C	C	C
Approach Delay, s/veh / LOS	95.1		F	45.8		D	40.9		D	28.4		C
Intersection Delay, s/veh / LOS	44.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	1.20	A	1.39	A	1.80	B	1.45	A

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other		
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97		
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00		
Intersection	Columbia Pk and Thom...	File Name	8_fupm_imp.xus				
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	325	109	254	242	106	130	177	1305	314	115	1420	323

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.7	1.4	41.9	7.0	4.0	6.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
				Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.0	16.0	13.0	12.0	13.1	49.3	11.7	47.9
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	13.0	12.0	9.0	8.0	6.9		5.0	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	0.99		0.95	
Max Out Probability	1.00	1.00	1.00	1.00	0.00		0.01	

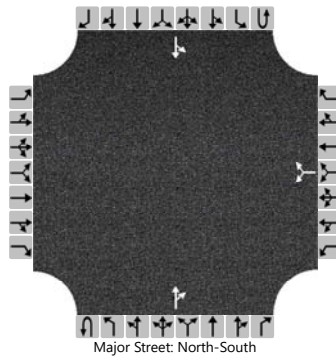
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	335	374		249	243		182	849	820	119	907	890
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1687		1810	1729		1810	1900	1774	1810	1900	1780
Queue Service Time ( g <sub>s</sub> ), s	11.0	10.0		7.0	6.0		4.9	37.7	40.2	3.0	41.9	41.9
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	11.0	10.0		7.0	6.0		4.9	37.7	40.2	3.0	41.9	41.9
Green Ratio ( g/C )	0.19	0.11		0.14	0.07		0.54	0.48	0.48	0.53	0.47	0.47
Capacity ( c ), veh/h	301	188		221	115		223	914	854	198	885	829
Volume-to-Capacity Ratio ( X )	1.113	1.996		1.130	2.111		0.820	0.928	0.961	0.598	1.025	1.074
Back of Queue ( Q ), ft/ln ( 95 th percentile)	337.1	1126.7		310.5	785.2		89.8	664.8	695.5	51.9	875.6	969.6
Back of Queue ( Q ), veh/ln ( 95 th percentile)	13.5	45.1		12.4	31.4		3.6	26.6	27.8	2.1	35.0	38.8
Queue Storage Ratio ( RQ ) ( 95 th percentile)	3.75	8.05		3.11	4.91		0.56	1.33	1.39	0.32	1.75	1.94
Uniform Delay ( d <sub>1</sub> ), s/veh	36.6	40.0		38.9	42.0		21.4	21.9	22.5	20.4	24.0	24.0
Incremental Delay ( d <sub>2</sub> ), s/veh	85.6	466.6		100.0	528.1		2.9	16.8	22.7	1.1	36.8	52.9
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh	122.1	506.6		139.0	570.1		24.2	38.7	45.2	21.5	60.8	77.0
Level of Service ( LOS )	F	F		F	F		C	D	D	C	F	F
Approach Delay, s/veh / LOS	325.0		F	351.8		F	40.1		D	65.9		E
Intersection Delay, s/veh / LOS	121.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.30	B	2.30	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	1.66	B	1.30	A	2.02	B	2.07	B

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and N. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Northern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						3		21			287	1		8	201	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.40		6.20							4.10		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.50		3.30							2.20		

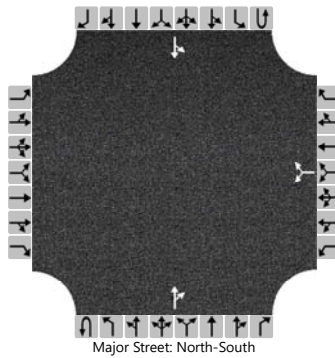
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						27									9		
Capacity, c (veh/h)						684									1251		
v/c Ratio						0.04									0.01		
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.0		
Control Delay (s/veh)						10.5									7.9		
Level of Service (LOS)						B									A		
Approach Delay (s/veh)					10.5								0.4				
Approach LOS					B												

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and N. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Northern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		15			285	3		24	665	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		

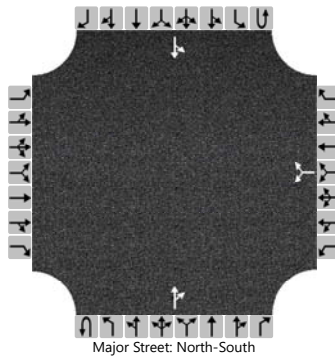
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						19								27		
Capacity, c (veh/h)						576								1251		
v/c Ratio						0.03								0.02		
95% Queue Length, Q <sub>95</sub> (veh)						0.1								0.1		
Control Delay (s/veh)						11.5								7.9		
Level of Service (LOS)						B								A		
Approach Delay (s/veh)					11.5								0.6			
Approach LOS					B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and S. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Southern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	AM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						13		16			272	4		5	199	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.40		6.20							4.10		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.50		3.30							2.20		

## Delay, Queue Length, and Level of Service

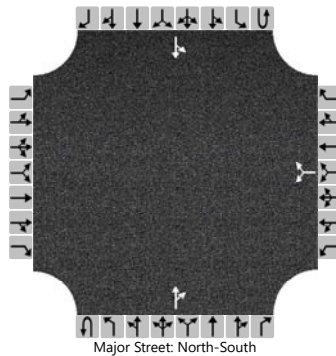
Flow Rate, v (veh/h)						32									6		
Capacity, c (veh/h)						613									1265		
v/c Ratio						0.05									0.00		
95% Queue Length, Q <sub>95</sub> (veh)						0.2									0.0		
Control Delay (s/veh)						11.2									7.9		
Level of Service (LOS)						B									A		
Approach Delay (s/veh)					11.2								0.2				
Approach LOS					B												



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and S. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Southern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						8		10			278	14		18	649	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type   Storage						Undivided										

## Critical and Follow-up Headways

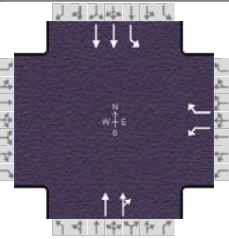
Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.40		6.20							4.10		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.50		3.30							2.20		

## Delay, Queue Length, and Level of Service

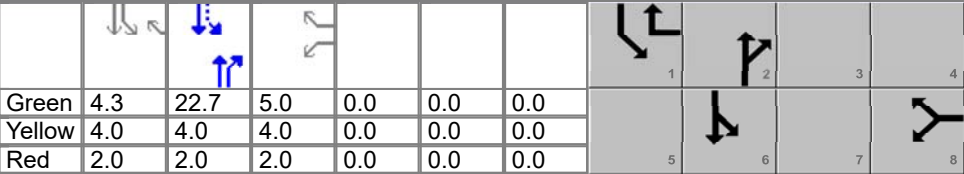
Flow Rate, v (veh/h)						20								20		
Capacity, c (veh/h)						380								1247		
v/c Ratio						0.05								0.02		
95% Queue Length, Q <sub>95</sub> (veh)						0.2								0.0		
Control Delay (s/veh)						15.0								7.9		
Level of Service (LOS)						C								A		
Approach Delay (s/veh)						15.0								0.4		
Approach LOS						C										

**TOTAL PROJECTED SATURDAY CONDITIONS**

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	FTG			Duration, h	0.25	
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other	
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.98	
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00	
Intersection	Columbia Pk and Critz L...	File Name	1_fupm.xus			
Project Description	10886					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h				6		120		259	24	89	332	

Signal Information														
Cycle, s	50.0	Reference Phase	2	Green	4.3	22.7	5.0	0.0	0.0	0.0				
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

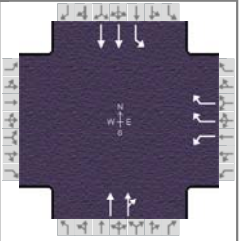
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				11.0		28.7	10.3	39.0
Change Period, ( $Y+R_c$ ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s				5.4			3.1	
Green Extension Time ( $g_e$ ), s				0.0		0.0	0.1	0.0
Phase Call Probability				0.83			0.72	
Max Out Probability				1.00			0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate ( $v$ ), veh/h				6		122		146	143	91		339
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln				1810		1610		1900	1843	1810		1809
Queue Service Time ( $g_s$ ), s				0.2		3.4		3.4	2.3	1.1		1.8
Cycle Queue Clearance Time ( $g_c$ ), s				0.2		3.4		3.4	2.3	1.1		1.8
Green Ratio ( $g/C$ )				0.10		0.19		0.45	0.45	0.58		0.66
Capacity ( $c$ ), veh/h				181		299		863	837	727		2388
Volume-to-Capacity Ratio ( $X$ )				0.034		0.409		0.169	0.171	0.125		0.142
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)				2.7		50.1		36.2	35.8	11.7		15.2
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)				0.1		2.0		1.4	1.4	0.5		0.6
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)				0.03		0.31		0.07	0.07	0.07		0.03
Uniform Delay ( $d_1$ ), s/veh				20.3		17.9		8.1	8.1	5.0		3.2
Incremental Delay ( $d_2$ ), s/veh				0.0		0.3		0.4	0.4	0.0		0.1
Initial Queue Delay ( $d_3$ ), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay ( $d$ ), s/veh				20.4		18.3		8.5	8.5	5.0		3.3
Level of Service (LOS)				C		B		A	A	A		A
Approach Delay, s/veh / LOS	0.0			18.4		B	8.5	A		3.7		A
Intersection Delay, s/veh / LOS				7.5				A				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	1.88	B	0.64	A
Bicycle LOS Score / LOS				F	0.73	A	0.84	A

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	FTG			Duration, h	0.25		
Analyst	FTG		Analysis Date	12/21/2014		Area Type	Other
Jurisdiction	Thompson's Station, TN		Time Period	PM Peak Hour		PHF	0.98
Urban Street	Columbia Pike		Analysis Year	2020 (Total)		Analysis Period	1 > 7:00
Intersection	Columbia Pk and Critz L...		File Name	1_fupm_imp.xus			
Project Description	10886						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h				6		120		259	24	89	332	

Signal Information				Signal Timing (s)									
Cycle, s	50.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	4.3	22.7	5.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		8.3	1.0	4.0
Phase Duration, s				11.0		28.7	10.3	39.0
Change Period, ( Y+R <sub>c</sub> ), s				6.0		6.0	6.0	6.0
Max Allow Headway ( MAH ), s				3.4		0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s				3.8			3.1	
Green Extension Time ( g <sub>e</sub> ), s				0.1		0.0	0.1	0.0
Phase Call Probability				0.83			0.72	
Max Out Probability				1.00			0.00	

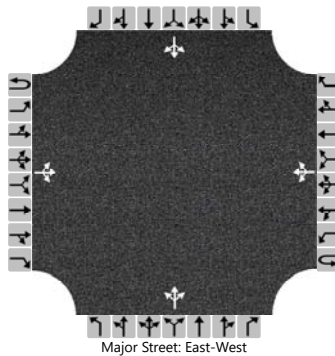
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12	1	6		
Adjusted Flow Rate ( v ), veh/h				6		122	146	143	91	339		
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1810		1425	1900	1843	1810	1809		
Queue Service Time ( g <sub>s</sub> ), s				0.2		1.8	3.4	2.3	1.1	1.8		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				0.2		1.8	3.4	2.3	1.1	1.8		
Green Ratio ( g/C )				0.10		0.19	0.45	0.45	0.58	0.66		
Capacity ( c ), veh/h				181		530	863	837	727	2388		
Volume-to-Capacity Ratio ( X )				0.034		0.231	0.169	0.171	0.125	0.142		
Back of Queue ( Q ), ft/ln ( 95 th percentile)				2.7		23.8	36.2	35.8	11.7	15.2		
Back of Queue ( Q ), veh/ln ( 95 th percentile)				0.1		1.0	1.4	1.4	0.5	0.6		
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.03		0.15	0.07	0.07	0.07	0.03		
Uniform Delay ( d <sub>1</sub> ), s/veh				20.3		17.3	8.1	8.1	5.0	3.2		
Incremental Delay ( d <sub>2</sub> ), s/veh				0.0		0.1	0.4	0.4	0.0	0.1		
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0	0.0	0.0		
Control Delay ( d ), s/veh				20.4		17.4	8.5	8.5	5.0	3.3		
Level of Service ( LOS )				C		B	A	A	A	A		
Approach Delay, s/veh / LOS	0.0			17.5			8.5			3.7		
Intersection Delay, s/veh / LOS	7.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.13	B	2.30	B	2.07	B	0.64	A
Bicycle LOS Score / LOS				F	0.73	A	0.84	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Clayton Arnold/Paddock		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.92		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		6	51	56		19	53	22		55	11	19		10	13	18
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		7				21					92					45	
Capacity, c (veh/h)		1529				1485					740					784	
v/c Ratio		0.00				0.01					0.12					0.06	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.4					0.2	
Control Delay (s/veh)		7.4				7.5					10.6					9.9	
Level of Service (LOS)		A				A					B					A	
Approach Delay (s/veh)		0.4				1.6				10.6				9.9			
Approach LOS										B				A			



# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Clayton Arnold			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Clayton Arnold Road			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	6	51	56	0	19	53	22	0	55	11	19	0	10	13	18
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow Rate (v <sub>pc</sub> ), pc/h	0	7	55	61	0	21	58	24	0	60	12	21	0	11	14	20
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		123.00			103.00			93.00			45.00	
Entry Volume veh/h		123.00			103.00			93.00			45.00	
Circulating Flow (v <sub>c</sub> ), pc/h	46			79			73			139		
Exiting Flow (v <sub>ex</sub> ), pc/h	87			138			43			96		
Capacity (c <sub>pc</sub> ), pc/h		1316.74			1273.16			1280.98			1197.58	
Capacity (c), veh/h		1316.74			1273.16			1280.98			1197.58	
v/c Ratio (x)		0.09			0.08			0.07			0.04	

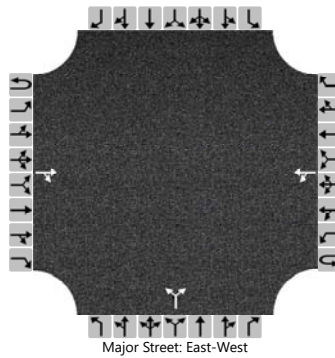
## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.5			3.5			3.4			3.3	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			0.3			0.2			0.1	
Approach Delay, s/veh	3.5			3.5			3.4			3.3		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	3.4						A					

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Critz and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Critz Lane		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.95		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			52	28		47	70			24		53				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.10					6.40		6.20			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.20					3.50		3.30			

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						49						81				
Capacity, c (veh/h)						1525						894				
v/c Ratio						0.03						0.09				
95% Queue Length, Q <sub>95</sub> (veh)						0.1						0.3				
Control Delay (s/veh)						7.4						9.4				
Level of Service (LOS)						A						A				
Approach Delay (s/veh)					3.1				9.4							
Approach LOS									A							

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	FTG				Intersection	Critz and Pantall			
Agency or Co.	FTG				E/W Street Name	Critz Lane			
Date Performed	Sept 2018				N/S Street Name	Pantall Lane			
Analysis Year	2020				Analysis Time Period (hrs)	0.25			
Time Analyzed	PM Peak Hour				Peak Hour Factor	0.92			
Project Description	10886 (Total)				Jurisdiction	Thompson's Station, TN			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Lane Assignment			TR				LT				LR					
Volume (V), veh/h	0		52	28	0	47	70		0	24		53				
Percent Heavy Vehicles, %	0		0	0	0	0	0		0	0		0				
Flow Rate (v <sub>PCE</sub> ), pc/h	0		57	30	0	51	76		0	26		58				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763				
Follow-Up Headway (s)		2.6087			2.6087			2.6087				

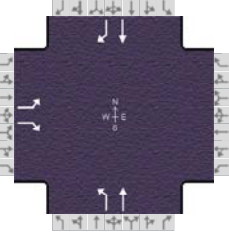
## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		87.00			127.00			84.00				
Entry Volume veh/h		87.00			127.00			84.00				
Circulating Flow (v <sub>c</sub> ), pc/h	51			26			57			153		
Exiting Flow (v <sub>ex</sub> ), pc/h	115			102			0			81		
Capacity (c <sub>PCE</sub> ), pc/h		1310.05			1343.88			1302.05				
Capacity (c), veh/h		1310.05			1343.88			1302.05				
v/c Ratio (x)		0.07			0.09			0.06				

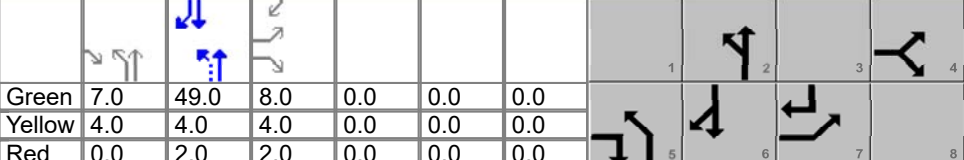
## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.3			3.4			3.3				
Lane LOS		A			A			A				
95% Queue, veh		0.2			0.3			0.2				
Approach Delay, s/veh	3.3			3.4			3.3					
Approach LOS	A			A			A					
Intersection Delay, s/veh   LOS	3.3						A					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	FTG			Duration, h	0.25	
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other	
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.99	
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00	
Intersection	Lewisburg and Critz Lane	File Name	4_fupm.xus			
Project Description	10886					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	81		24				10	307			319	107

Signal Information																		
Cycle, s	80.0	Reference Phase	2	Green	7.0	49.0	8.0	0.0	0.0	0.0								
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0								
Uncoordinated	No	Simult. Gap E/W	On	Red	0.0	2.0	2.0	0.0	0.0	0.0								
Force Mode	Fixed	Simult. Gap N/S	On															

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		14.0			11.0	66.0		55.0
Change Period, ( Y+R <sub>c</sub> ), s		6.0			4.0	6.0		6.0
Max Allow Headway ( MAH ), s		3.2			3.1	0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		5.4			2.1			
Green Extension Time ( g <sub>e</sub> ), s		0.0			0.0	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			0.01			

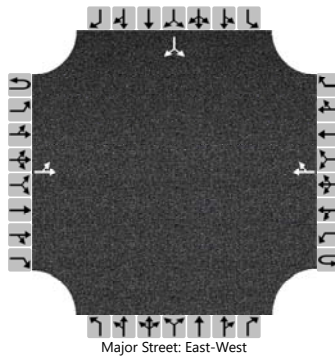
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7		14				5	2		6		16
Adjusted Flow Rate ( v ), veh/h	82		24				10	310		322		108
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810		1610				1810	1900		1900		1610
Queue Service Time ( g <sub>s</sub> ), s	3.4		1.0				0.1	3.9		6.3		1.7
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	3.4		1.0				0.1	3.9		6.3		1.7
Green Ratio ( g/C )	0.10		0.19				0.72	0.75		0.61		0.71
Capacity ( c ), veh/h	181		302				821	1425		1164		1147
Volume-to-Capacity Ratio ( X )	0.452		0.080				0.012	0.218		0.277		0.094
Back of Queue ( Q ), ft/ln ( 95 th percentile)	66.5		16.7				1.4	47		104.5		19.4
Back of Queue ( Q ), veh/ln ( 95 th percentile)	2.7		0.7				0.1	1.9		4.2		0.8
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.74		0.12				0.01	0.09		0.21		0.04
Uniform Delay ( d <sub>1</sub> ), s/veh	33.9		26.8				3.5	3.0		7.2		3.5
Incremental Delay ( d <sub>2</sub> ), s/veh	0.7		0.0				0.0	0.4		0.6		0.2
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0		0.0		0.0
Control Delay ( d ), s/veh	34.6		26.9				3.5	3.3		7.8		3.7
Level of Service ( LOS )	C		C				A	A		A		A
Approach Delay, s/veh / LOS	32.8		C	0.0			3.3	A	6.8		A	
Intersection Delay, s/veh / LOS	8.7						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.95	B	1.95	B	0.64	A	1.87	B
Bicycle LOS Score / LOS		F			1.02	A	1.20	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Pantall		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		53	188				294	8						8		44
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

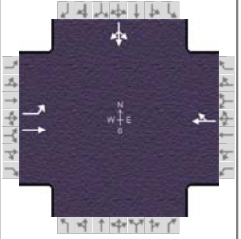
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		57														56	
Capacity, c (veh/h)		1246														653	
v/c Ratio		0.05														0.09	
95% Queue Length, Q <sub>95</sub> (veh)		0.1														0.3	
Control Delay (s/veh)		8.0														11.0	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		2.1												11.0			
Approach LOS														B			



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Jan 17, 2018	Area Type	Other
Jurisdiction	Thompson's Station Road	Time Period	PM Peak Hour	PHF	0.93
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Pa...	File Name	5_fupm_sig.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	53	188			294	8				8	0	44

Signal Information				Phase Diagram								
Cycle, s	70.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	4.0	44.0	4.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
		Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				12.0
Phase Duration, s	10.0	60.0		50.0				10.0
Change Period, ( $Y+R_c$ ), s	6.0	6.0		6.0				6.0
Max Allow Headway ( $MAH$ ), s	3.1	0.0		0.0				3.3
Queue Clearance Time ( $g_s$ ), s	2.6							4.3
Green Extension Time ( $g_e$ ), s	0.0	0.0		0.0				0.0
Phase Call Probability	0.67							0.66
Max Out Probability	0.00							0.60

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2			6	16				7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	57	202			325						56	
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1900			1891						1638	
Queue Service Time ( $g_s$ ), s	0.6	1.9			5.4						2.3	
Cycle Queue Clearance Time ( $g_c$ ), s	0.6	1.9			5.4						2.3	
Green Ratio ( $g/C$ )	0.71	0.77			0.63						0.06	
Capacity ( $c$ ), veh/h	798	1466			1189						93	
Volume-to-Capacity Ratio ( $X$ )	0.071	0.138			0.273						0.601	
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	6.4	17			80.7						42.4	
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	0.3	0.7			3.2						1.7	
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00	0.00			0.00						0.00	
Uniform Delay ( $d_1$ ), s/veh	3.4	2.0			5.8						32.2	
Incremental Delay ( $d_2$ ), s/veh	0.0	0.2			0.6						2.3	
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0						0.0	
Control Delay ( $d$ ), s/veh	3.4	2.2			6.4						34.5	
Level of Service (LOS)	A	A			A						C	
Approach Delay, s/veh / LOS	2.5		A	6.4		A	0.0			34.5		C
Intersection Delay, s/veh / LOS	7.3						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.30	A	1.64	B	1.72	B	1.95	B
Bicycle LOS Score / LOS	0.92	A	1.02	A			0.58	A

# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's Sta and Pantall		
Agency or Co.	FTG			E/W Street Name	Thompson's Station Road		
Date Performed	Sept 2018			N/S Street Name	Pantall Road		
Analysis Year	2020			Analysis Time Period (hrs)	0.25		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.99		
Project Description	10886 (Total)			Jurisdiction	Thompson's Station, TN		

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
Lane Assignment	LT				TR				LR							
Volume (V), veh/h	0	53	188		0		294	8					0	8		44
Percent Heavy Vehicles, %	0	0	0		0		0	0					0	0		0
Flow Rate (v <sub>PCE</sub> ), pc/h	0	54	190		0		297	8					0	8		44
Right-Turn Bypass	None				None				None							
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763						4.9763	
Follow-Up Headway (s)		2.6087			2.6087						2.6087	

## Flow Computations, Capacity and v/c Ratios

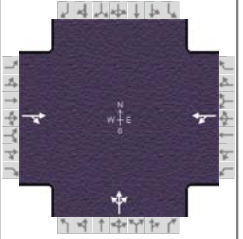
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		244.00			305.00						52.00	
Entry Volume veh/h		244.00			305.00						52.00	
Circulating Flow (v <sub>c</sub> ), pc/h	8			54			252			297		
Exiting Flow (v <sub>ex</sub> ), pc/h	198			341			62			0		
Capacity (c <sub>PCE</sub> ), pc/h		1368.78			1306.04						1019.33	
Capacity (c), veh/h		1368.78			1306.04						1019.33	
v/c Ratio (x)		0.18			0.23						0.05	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.1			4.8						4.0	
Lane LOS		A			A						A	
95% Queue, veh		0.6			0.9						0.2	
Approach Delay, s/veh	4.1			4.8			4.0					
Approach LOS	A			A			A					
Intersection Delay, s/veh   LOS	4.4						A					

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	Sep 26, 2018	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Thompson's Station Road	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Thompson's Sta and Bu...	File Name	6_fupm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		69	179	299	39		126	0	172			

Signal Information												
Cycle, s	50.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	26.7	11.3	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		12.0		
Phase Duration, s		32.7		32.7		17.3		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		6.0		
Max Allow Headway ( MAH ), s		0.0		0.0		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s						10.8		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.6		
Phase Call Probability						0.99		
Max Out Probability						0.00		

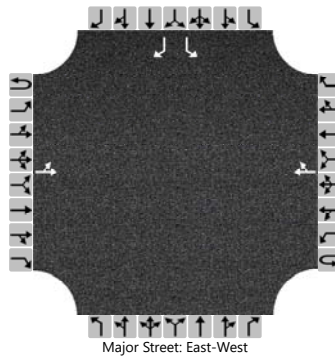
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		261			356			314				
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1682			1019			1689				
Queue Service Time ( g <sub>s</sub> ), s		4.3			11.1			8.8				
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		4.3			15.4			8.8				
Green Ratio ( g/C )		0.53			0.53			0.23				
Capacity ( c ), veh/h		899			680			381				
Volume-to-Capacity Ratio ( X )		0.291			0.523			0.823				
Back of Queue ( Q ), ft/ln ( 95 th percentile)		52.6			120			137.2				
Back of Queue ( Q ), veh/ln ( 95 th percentile)		2.1			4.8			5.5				
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00			0.00			0.00				
Uniform Delay ( d <sub>1</sub> ), s/veh		6.4			10.4			18.4				
Incremental Delay ( d <sub>2</sub> ), s/veh		0.8			2.9			1.7				
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0			0.0			0.0				
Control Delay ( d ), s/veh		7.2			13.3			20.1				
Level of Service ( LOS )		A			B			C				
Approach Delay, s/veh / LOS	7.2	A		13.3	B		20.1	C		0.0		
Intersection Delay, s/veh / LOS	13.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.35	A	1.35	A	1.71	B	1.71	B
Bicycle LOS Score / LOS	0.92	A	1.07	A	1.01	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Thompson's St and Clayton		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Thompson's Sta Road		
Analysis Year	2020			North/South Street	Clayton Arnold Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume (veh/h)		17	76				76	89						172		91
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized														No		
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

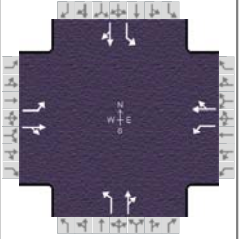
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18												185		98
Capacity, c (veh/h)		1411												735		926
v/c Ratio		0.01												0.25		0.11
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.0		0.4
Control Delay (s/veh)		7.6												11.5		9.3
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		1.5												10.8		
Approach LOS														B		

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_fupm.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	17	13	64	88	43	36	32	257	67	13	306	6

Signal Information				Phase Diagrams									
Cycle, s	70.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	1.4	1.5	32.4	1.7	3.2	5.8			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.7	11.8	11.0	15.1	8.8	39.8	7.4	38.4
Change Period, ( Y+R <sub>c</sub> ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( MAH ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( g <sub>s</sub> ), s	2.6	5.2	5.1	5.0	2.6		2.3	
Green Extension Time ( g <sub>e</sub> ), s	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability	0.29	0.97	0.83	0.99	0.47		0.23	
Max Out Probability	0.06	1.00	1.00	0.04	0.00		0.00	

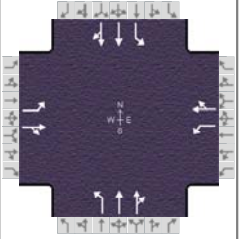
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	18	79		91	81		33	334		13	322	
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1810	1653		1810	1756		1810	1832		1810	1893	
Queue Service Time ( g <sub>s</sub> ), s	0.6	3.2		3.1	3.0		0.6	8.1		0.3	7.7	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	0.6	3.2		3.1	3.0		0.6	8.1		0.3	7.7	
Green Ratio ( g/C )	0.11	0.08		0.15	0.13		0.50	0.48		0.48	0.46	
Capacity ( c ), veh/h	226	137		281	227		555	886		499	876	
Volume-to-Capacity Ratio ( X )	0.078	0.578		0.323	0.359		0.059	0.377		0.027	0.367	
Back of Queue ( Q ), ft/ln ( 95 th percentile)	11.4	57.6		58	54.2		10	140.9		4.3	141.3	
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.5	2.3		2.3	2.2		0.4	5.6		0.2	5.7	
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.13	0.41		0.58	0.34		0.06	0.28		0.03	0.28	
Uniform Delay ( d <sub>1</sub> ), s/veh	28.2	30.9		26.4	27.8		9.2	11.4		10.0	12.2	
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1	1.4		0.2	0.4		0.0	1.2		0.0	1.2	
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh	28.2	32.3		26.7	28.2		9.3	12.6		10.0	13.4	
Level of Service ( LOS )	C	C		C	C		A	B		A	B	
Approach Delay, s/veh / LOS	31.6	C		27.4	C		12.3	B		13.2	B	
Intersection Delay, s/veh / LOS	17.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.65	A	0.77	A	1.09	A	1.04	A



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	FTG			Duration, h	0.25
Analyst	FTG	Analysis Date	12/21/2014	Area Type	Other
Jurisdiction	Thompson's Station, TN	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Columbia Pike	Analysis Year	2020 (Total)	Analysis Period	1 > 7:00
Intersection	Columbia Pk and Thom...	File Name	8_fupm_imp.xus		
Project Description	10886				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	17	13	64	88	43	36	32	257	67	13	306	6

Signal Information				Signal Phases									
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	1.2	1.3	23.1	1.5	3.2	5.7			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.5	11.7	10.7	14.9	8.5	30.4	7.2	29.1
Change Period, ( $Y+R_c$ ), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Allow Headway ( $MAH$ ), s	3.1	3.2	3.1	3.2	3.1	0.0	3.1	0.0
Queue Clearance Time ( $g_s$ ), s	2.5	4.7	4.6	4.5	2.6		2.3	
Green Extension Time ( $g_e$ ), s	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability	0.25	0.95	0.78	0.98	0.42		0.20	
Max Out Probability	0.01	0.24	1.00	0.01	0.00		0.00	

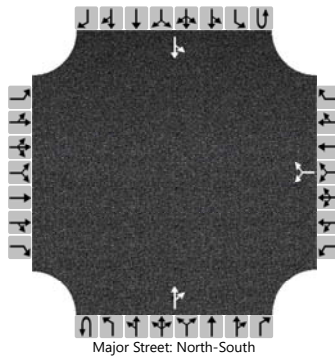
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( $v$ ), veh/h	18	79		91	81		33	171	163	13	161	161
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1810	1653		1810	1756		1810	1900	1766	1810	1900	1887
Queue Service Time ( $g_s$ ), s	0.5	2.7		2.6	2.5		0.6	3.5	3.6	0.3	3.4	3.4
Cycle Queue Clearance Time ( $g_c$ ), s	0.5	2.7		2.6	2.5		0.6	3.5	3.6	0.3	3.4	3.4
Green Ratio ( $g/C$ )	0.12	0.09		0.17	0.15		0.43	0.41	0.41	0.40	0.38	0.38
Capacity ( $c$ ), veh/h	263	157		327	259		549	774	719	489	731	726
Volume-to-Capacity Ratio ( $X$ )	0.067	0.506		0.277	0.314		0.060	0.220	0.227	0.027	0.220	0.221
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	9.3	46.8		46.5	43.5		9.8	63.5	61.4	4.2	62.9	62.8
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	0.4	1.9		1.9	1.7		0.4	2.5	2.5	0.2	2.5	2.5
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.10	0.33		0.47	0.27		0.06	0.13	0.12	0.03	0.13	0.13
Uniform Delay ( $d_1$ ), s/veh	23.5	25.8		21.7	22.9		10.1	11.6	11.6	10.9	12.4	12.4
Incremental Delay ( $d_2$ ), s/veh	0.0	0.9		0.2	0.3		0.0	0.7	0.7	0.0	0.7	0.7
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( $d$ ), s/veh	23.5	26.8		21.8	23.1		10.1	12.2	12.4	10.9	13.1	13.1
Level of Service (LOS)	C	C		C	C		B	B	B	B	B	B
Approach Delay, s/veh / LOS	26.2		C	22.4		C	12.1		B	13.0		B
Intersection Delay, s/veh / LOS	15.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.28	B	1.89	B	1.89	B
Bicycle LOS Score / LOS	0.65	A	0.77	A	0.79	A	0.76	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and N. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Northern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		18			59	3		21	54	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.40		6.20							4.10		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.50		3.30							2.20		

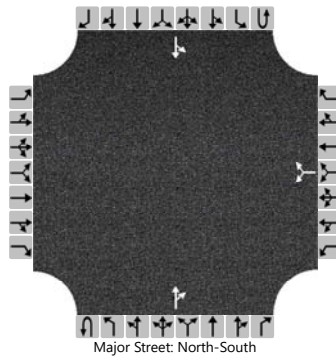
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						22									23		
Capacity, c (veh/h)						978									1545		
v/c Ratio						0.02									0.02		
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.0		
Control Delay (s/veh)						8.8									7.4		
Level of Service (LOS)						A									A		
Approach Delay (s/veh)					8.8								2.1				
Approach LOS					A												

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	FTG			Intersection	Pantall Rd and S. Access		
Agency/Co.	FTG			Jurisdiction	Thompson's Station, TN		
Date Performed	Sept 2018			East/West Street	Southern Project Access		
Analysis Year	2020			North/South Street	Pantall Road		
Time Analyzed	PM Peak Hour			Peak Hour Factor	0.90		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	10886 (Total)						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						11		13			49	12		15	41	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.40		6.20							4.10		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.50		3.30							2.20		

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						27									17		
Capacity, c (veh/h)						929									1546		
v/c Ratio						0.03									0.01		
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.0		
Control Delay (s/veh)						9.0									7.4		
Level of Service (LOS)						A									A		
Approach Delay (s/veh)					9.0								2.0				
Approach LOS					A												

**APPENDIX C  
TRIP GENERATION**

**TRIP GENERATION CALCULATIONS - Single-family Homes**

The following calculations are based on the data compiled for ITE Land Use Code 210.

**Average Daily Traffic**

$$\ln(T) = 0.92 \ln(X) + 2.71$$

$$\ln(T) = 0.92 \ln(92) + 2.71$$

$$T = 962 \text{ vehicles}$$

$$\text{Enter} = 0.50 (962) = 481 \text{ vehicles}$$

$$\text{Exit} = 0.50 (962) = 481 \text{ vehicles}$$

**AM traffic during peak hour of adjacent street**

$$T = 0.71 (X) + 4.80$$

$$T = 0.71 (87) + 4.80$$

$$T = 71 \text{ vehicles}$$

$$\text{Enter} = 0.25 (71) = 18 \text{ vehicles}$$

$$\text{Exit} = 0.75 (71) = 53 \text{ vehicles}$$

**PM traffic during peak hour of adjacent street**

$$\ln(T) = 0.96 \ln(X) + 0.20$$

$$\ln(T) = 0.96 \ln(87) + 0.20$$

$$T = 94 \text{ vehicles}$$

$$\text{Enter} = 0.63 (94) = 59 \text{ vehicles}$$

$$\text{Exit} = 0.37 (94) = 35 \text{ vehicles}$$



**APPENDIX D**  
**RELEVANT PAGES FROM NCHRP REPORT 457:**  
***ENGINEERING STUDY GUIDE FOR EVALUATING INTERSECTION IMPROVEMENTS***

# **NCHRP**

## **REPORT 457**

**NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM**

### **Evaluating Intersection Improvements: An Engineering Study Guide**

**TRANSPORTATION RESEARCH BOARD**

**NATIONAL RESEARCH COUNCIL**

can also indirectly reduce the delay to the left-turn or through movements by lessening their need to compete for service with the right-turn movement.

One disadvantage of adding a lane to the minor-road approach is that it may require reallocating the existing pavement or widening of the approach cross section. Sometimes the pavement width needed for the additional lane is available within the existing roadway cross section. In this instance, the only impact is a reallocation of the paved surface through modification of the pavement markings. However, in downtown settings this reallocation may require the removal of some curb parking stalls and can affect adjacent business significantly. Occasionally, the cross section must be widened to provide for the additional lane. If the needed lane width can be provided within the available right-of-way, the cost may be limited to that of construction. However, if additional right-of-way is needed, the costs of acquiring this property in urban settings can be high.

**Guidance.** The literature does not offer guidance regarding conditions where a second approach lane would benefit from the operation of a minor-road approach. However, the procedures in Chapter 17 of the *Highway Capacity Manual 2000* (15) can be used to identify major- and minor- road volume combinations that would benefit operationally from the provision of a second approach lane or bay. Bonneson and Fontaine (20) developed Figure 2-4 using these procedures and an assumed upper limit of 0.7 for the shared-lane, minor-road volume-to-capacity ratio.

**Application.** Figure 2-4 indicates the conditions that may justify the use of two approach lanes. Use of the information in this figure requires two types of data:

1. Major-road approach volume for the peak hour of the average day and
2. Minor-road turn movement volume for the peak hour of the average day (used to compute right-turn percentage).

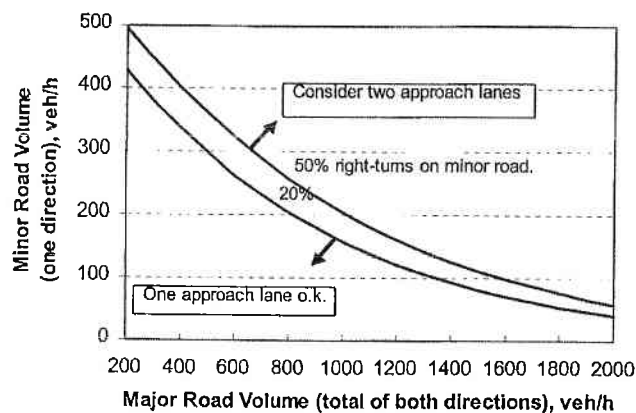


Figure 2-4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

Figure 2-4 would be used once for each minor-road approach to the intersection. The appropriate trend line would be identified on the basis of the percentage of right-turns on the subject minor-road approach. If the volume combination for the major and minor roads intersects above or to the right of this trend line, a second traffic lane should be considered for the subject minor-road approach. If a bay is selected for addition to the intersection, it should be long enough to store vehicles 95 percent of the time (i.e., the bay should not overflow more than 5 percent of the time). Techniques for estimating the 95<sup>th</sup> percentile storage length are provided in the section, [Increase the Length of the Turn Bay](#).

#### Add a Left-Turn Bay on the Major Road

**Introduction.** Provision of a left-turn bay on the major road to a two-way stop-controlled intersection can significantly improve operations and safety at the intersection. A left-turn bay effectively separates those vehicles that are slowing or stopped to turn from those vehicles in through traffic lanes. This separation minimizes turn-related crashes and eliminates unnecessary delay to through vehicles. Data reported by Neuman (21) indicate that the crash rate for unsignalized intersections can be reduced by 35 to 75 percent through the provision of a left-turn bay.

One disadvantage of adding a bay to the major-road approach is that it may require reallocating the existing pavement or widening of the approach cross section. Sometimes the pavement width needed for the additional lane is available within the existing roadway cross section. However, in downtown settings this reallocation may require the removal of some curb parking stalls and can affect adjacent business significantly. Occasionally, the cross section must be widened to provide for the turn bay. If the needed width can be provided within the available right-of-way, the cost may be limited to that of construction. However, if additional right-of-way is needed, the costs of acquiring this property in urban settings can be high.

**Guidance.** Neuman (21) suggests that the following guidelines should be used to determine when to provide a left-turn bay on the major road of a two-way stop-controlled intersection:

1. A left-turn lane should be considered at any median crossover on a divided, high-speed road.
2. A left-turn lane should be provided on the unstopped approach of a high-speed rural highway when it intersects with other arterials or collectors.
3. A left-turn lane is recommended on the unstopped approach of any intersection when the combination of intersection volumes intersect above or to the right of the appropriate trend line shown in Figure 2-5.

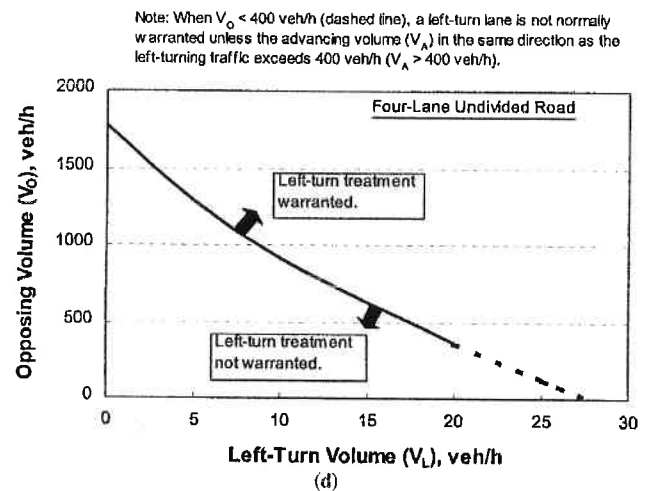
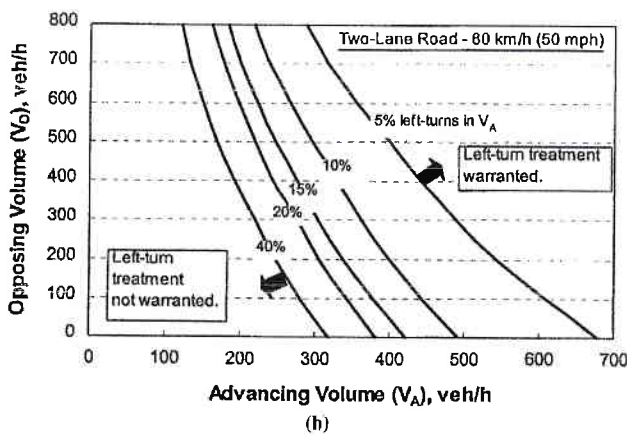
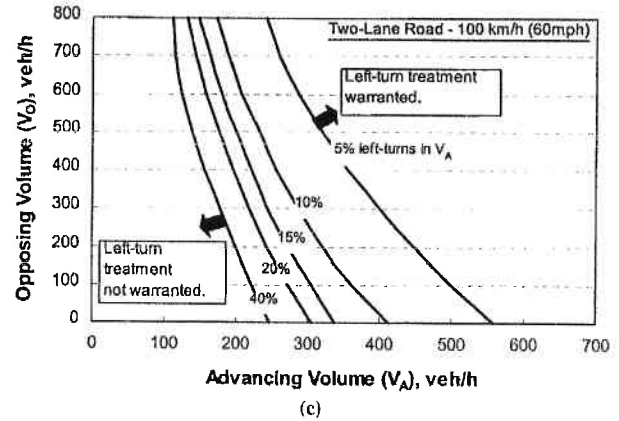
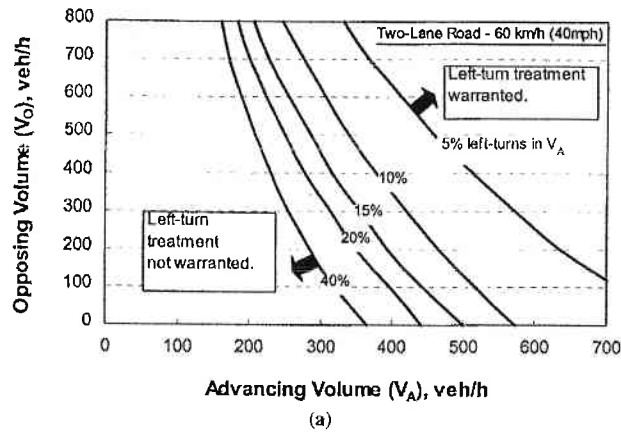


Figure 2-5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

**Application.** The guidance stated in the preceding section defines the conditions that may justify the provision of a left-turn bay. Application of this guidance requires two types of data:

1. Major-road turn movement volume for the peak hour of the average day and
2. Major-road 85<sup>th</sup> percentile speed (posted speed can be substituted if data are unavailable).

Use of Figure 2-5 requires determination of the opposing volume, the advancing volume, and the operating speed. The opposing volume should include only the right-turn and through movements on the approach across from (and heading in the opposite direction of) the subject major-road approach. The advancing volume should include the left-turn, right-turn, and through movements on the subject approach. The operating speed can be estimated as the 85<sup>th</sup> percentile speed. If the operating speed does not coincide with 60, 80, or 100 km/h (i.e., 40, 50, or 60 mph), then interpolation can

be used or, as a more conservative approach, the operating speed can be rounded up to the nearest speed for which a figure is provided.

In application, Figure 2-5 is used once for each major-road approach to the intersection. The appropriate trend line is identified on the basis of the percentage of left-turns on the subject major-road approach. If the advancing and opposing volume combination intersects above or to the right of this trend line, a left-turn bay should be considered for the subject approach. If a bay is included at the intersection, it should be long enough to store left-turn vehicles 99.5 percent of the time (i.e., the bay should not overflow more than 0.5 percent of the time). Techniques for estimating this storage length are provided in the section, [Increase the Length of the Turn Bay](#).

#### Add a Right-Turn Bay on the Major Road

**Introduction.** Provision of a right-turn bay on the major road to a two-way stop-controlled intersection can signifi-



cantly improve operations and safety at the intersection. A right-turn bay effectively separates those vehicles that are slowing or stopped to turn from those vehicles in the through traffic lanes. This separation minimizes turn-related collisions (e.g., angle, rear-end, and same-direction-sideswipe) and eliminates unnecessary delay to through vehicles.

One disadvantage of adding a bay to the major-road approach is that it may require reallocating the existing pavement or widening of the approach cross section. Sometimes the pavement width needed for the additional lane is available within the existing roadway cross section. However, in downtown settings this reallocation may require the removal of some curb parking stalls and can affect adjacent business significantly. Occasionally, the cross section must be widened to provide for the turn bay. If the needed width can be provided within the available right-of-way, the cost may be limited to that of construction. However, if additional right-of-way is needed, the costs of acquiring this property in urban settings can be high.

**Guidance.** Hasan and Stokes (22) developed guidelines for determining when to provide a right-turn bay on the major road of a two-way stop-controlled intersection. These guidelines were based on an evaluation of the operating and collision costs associated with the right-turn maneuver relative to the cost of constructing a right-turn bay. The operating costs included those of road-user fuel and delay. Separate guidelines were developed for two-lane and four-lane roadways. These guidelines are shown in Figure 2-6.

**Application.** The guidance described in the preceding section defines conditions that may justify the provision of a right-turn bay. Application of this guidance requires two types of data:

1. Major-road turn movement volume for the peak hour of the average day and
2. Major-road 85<sup>th</sup> percentile speed (posted speed can be substituted if data are unavailable).

Figure 2-6 should be consulted once for each major-road approach. If the combination of major-road approach volume and right-turn volume intersects above or to the right of the trend line corresponding to the major-road operating speed, then a right-turn bay is a viable alternative.

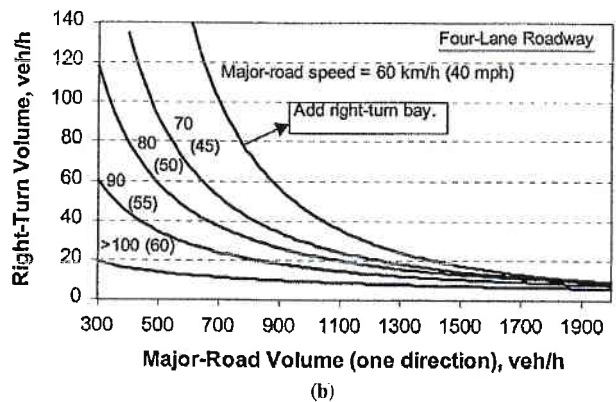
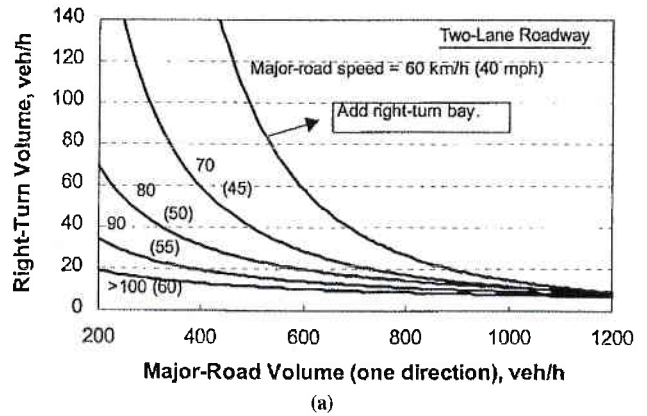


Figure 2-6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

*Increase Length of Turn Bay*

**Introduction.** Turn bay length can affect the safety and operation of the intersection approach significantly. This effect becomes more negative as the frequency with which vehicles exceed the available storage increases. Also, for unstopped approaches, this effect becomes more negative as more of the turning vehicle's deceleration occurs in the through lane, prior to the bay. The need to provide adequate storage length, deceleration length, or both is dependent on the type of approach control used and whether the vehicle is turning left or right. Table 2-13 identifies the appropriate bay

TABLE 2-13 Turn-bay length components at unsignalized intersections

Approach Control	Length Components	
	Left-Turn Bay	Right-Turn Bay
Unstopped	Storage Length + Deceleration Length	Deceleration Length
Stopped	Storage Length	Storage Length



**APPENDIX E  
RESULTS OF E-TRIMS QUERIES FOR CRASH DATA**

Query: Crash County = WILLIAMSON

CR\_CRASH.County = WILLIAMSON

CR\_CRASH.Route = 0A561

CR\_CRASH.Date of Crash > 7/31/2015 And CR\_CRASH.Date of Crash <= 8/31/2018

BLM

	Relation to First Junction	Relation to First Roadway	Urban or Rural	County	Route	Sp Cse	Co Seq	Case Number	Location	Year Of Crash
0.594	NON_JUNCTION	On Roadway	--	WILLIAMSON	0A561	0-NONE	1	101318469	Along Roadway	2016
1.234	NON_JUNCTION	On Roadway	--	WILLIAMSON	0A561	0-NONE	1	101101923	Along Roadway	2016
1.188	NON_JUNCTION	Shoulder	--	WILLIAMSON	0A561	0-NONE	1	101106335	Along Roadway	2016
1.029	NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A561	0-NONE	1	101967446	Along Roadway	2018
1.032	NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	0A561	0-NONE	1	101392115	Along Roadway	2016
0.595	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101284801	Along Roadway	2016
0.794	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101329295	Along Roadway	2016
1.116	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101594264	Along Roadway	2017
1.188	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101178800	Along Roadway	2016
1.207	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	102119145	Along Roadway	2018
1.213	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101569051	Along Roadway	2017
1.227	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	100973705	Along Roadway	2015
1.231	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	101806387	Along Roadway	2017
1.252	NON_JUNCTION	--	--	WILLIAMSON	0A561	0-NONE	1	102012753	Along Roadway	2018
0.598	--	--	--	WILLIAMSON	0A561	0-NONE	1	101096478	Along Roadway	2016

Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Injuries	Total Other Injuries	Total Veh	First Harmful Event	Manner of First Collision	Weather Cond	Light Conditions	Locate Type
8/2/2016	1145	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	SIDESWIPE, SAME DIR	Cloudy	Daylight	Automatic
2/8/2016	1445	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	REAR-END	Snow	Daylight	Automatic
2/15/2016	1730	Prop Damage (over)	0	0	0	0	0	1 Ditch	NO COLLISION W/ VEHICLE	Rain	Dark-Not Lighted	Automatic
4/5/2018	818	Prop Damage (over)	0	0	0	0	0	1 Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
9/29/2016	645	Prop Damage (over)	0	0	0	0	0	1 Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
7/13/2016	1022	Prop Damage (over)	0	0	0	0	0	2 Parked Motor Vehicle	SIDESWIPE, SAME DIR	Clear	Daylight	Automatic
8/16/2016	2100	Prop Damage (over)	0	0	0	0	0	1 Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
3/26/2017	1100	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic
4/21/2016	1540	Prop Damage (over)	0	0	0	0	0	3 Vehicle in Transport	REAR-END	Rain	Daylight	Automatic
8/22/2018	1707	Prop Damage (over)	0	0	0	0	0	3 Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
2/28/2017	1800	Prop Damage (over)	0	0	0	0	0	1 Deer (Animal)	NO COLLISION W/ VEHICLE	Rain	Dark-Not Lighted	Automatic
10/2/2015	1635	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	REAR-END	Rain	Daylight	Automatic
10/27/2017	2130	Prop Damage (over)	0	0	0	0	0	1 Ditch	NO COLLISION W/ VEHICLE	Rain	Dark-Not Lighted	Automatic
5/15/2018	1835	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	ANGLE	Clear	Daylight	Automatic
1/30/2016	1213	Prop Damage (under)	0	0	0	0	0	2 --	--	--	--	Automatic

Query: Crash County = WILLIAMSON

CR\_CRASH.County = WILLIAMSON

CR\_CRASH.Route = 0A306

CR\_CRASH.Date of Crash > 8/1/2015 And CR\_CRASH.Date of Crash <= 8/31/2018

BLM

Relation to First Junction	Relation to First Roadway	Urban or Rural	County	Route	Sp Cse	Co Seq	Case Number	Location	Year Of Crash
0.003 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	101939497	Along Roadway	2018
0.003 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	102031476	Along Roadway	2018
1.471 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	101808758	Along Roadway	2017
1.909 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	101180947	Along Roadway	2016
2.006 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	101813152	Along Roadway	2017
2.332 NON_JUNCTION	Shoulder	--	WILLIAMSON	0A306	0-NONE	1	101406094	Along Roadway	2016
1.184 NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A306	0-NONE	1	101388274	Along Roadway	2016
1.394 NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A306	0-NONE	1	101506729	Along Roadway	2017
2.319 NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A306	0-NONE	1	101828121	Along Roadway	2017
2.323 NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A306	0-NONE	1	101664340	Along Roadway	2017
2.409 NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	0A306	0-NONE	1	101163679	Along Roadway	2016
0.026 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	102004178	Along Roadway	2018
0.062 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	101547938	Along Roadway	2017
0.476 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	101497427	Along Roadway	2017
0.589 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	101650734	Along Roadway	2017
0.982 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	102042318	Along Roadway	2018
1.828 NON_JUNCTION	--	--	WILLIAMSON	0A306	0-NONE	1	101032969	Along Roadway	2015
1.472 INTERSECTION	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	102036771	At an Intersection	2018
1.909 INTERSECTION RELATED	On Roadway	--	WILLIAMSON	0A306	0-NONE	1	101048143	At an Intersection	2015
1.909 DRIVEWAY, ALLEY ACCESS, ETC.	--	--	WILLIAMSON	0A306	0-NONE	1	101982156	At an Intersection	2018

Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Injuries	Total Other Injuries	Total Veh	First Harmful Event	Manner of First Collision	Weather Cond	Light Conditions	Locate Type	
3/10/2018	654	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, OPP DIR	Cloudy	Daylight	Automatic	
6/2/2018	2226	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Cloudy	Dark-Not Lighted	Automatic	
10/29/2017	1158	Suspected Minor Injury	0	1	0	0	1	2	Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic
4/24/2016	1258	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight	Automatic	
11/2/2017	721	Prop Damage (over)	0	0	0	0	1	Deer (Animal)	NO COLLISION W/ VEHICLE	Cloudy	Daylight	Automatic	
10/14/2016	1757	Suspected Minor Injury	0	3	0	0	3	Ditch	NO COLLISION W/ VEHICLE	Rain	Dark-Not Lighted	Automatic	
9/23/2016	0	Prop Damage (over)	0	0	0	0	1	Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic	
1/10/2017	1345	Fatal	1	1	0	0	1	Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	--	
11/16/2017	2017	Prop Damage (over)	0	0	0	0	0	1	Earth Embankment	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
6/3/2017	1713	Suspected Minor Injury	0	1	0	0	1	Standing Tree	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic	
4/13/2016	2215	Suspected Minor Injury	0	1	0	0	1	1	Earth Embankment	NO COLLISION W/ VEHICLE	Cloudy	Dark-Not Lighted	Automatic
5/3/2018	702	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
2/8/2017	728	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic
1/6/2017	725	Prop Damage (over)	0	0	0	0	0	5	Vehicle in Transport	REAR-END	Snow	Daylight	Automatic
5/20/2017	1230	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
6/13/2018	2100	Prop Damage (over)	0	0	0	0	0	1	Other Animal	NO COLLISION W/ VEHICLE	Clear	DARK-UNKNOWN LIGHTING	Automatic
11/20/2015	35	Prop Damage (over)	0	0	0	0	0	1	Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dark-Lighted	Automatic
6/8/2018	841	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
12/12/2015	1520	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic
4/18/2018	1205	Prop Damage (over)	0	0	0	0	0	2	Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic



Query: Crash County = WILLIAMSON

CR\_CRASH.County = WILLIAMSON

CR\_CRASH.Route = 0A558

CR\_CRASH.Date of Crash > 8/1/2015 And CR\_CRASH.Date of Crash <= 7/31/2018

BLM

Relation to First Junction	Relation to First Roadway	Urban or Rural	County	Route	Sp Cse	Co Seq	Case Number	Location	Year Of Crash
1.068 NON_JUNCTION	On Roadway	--	WILLIAMSON	0A558	0-NONE	1	101690793	Along Roadway	2017
0.444 NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	0A558	0-NONE	1	101120826	Along Roadway	2016
0.47 NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	0A558	0-NONE	1	102090873	Along Roadway	2018
0.618 NON_JUNCTION	--	--	WILLIAMSON	0A558	0-NONE	1	101609173	Along Roadway	2017
1.217 NON_JUNCTION	--	--	WILLIAMSON	0A558	0-NONE	1	101300685	Along Roadway	2016
1.248 NON_JUNCTION	--	--	WILLIAMSON	0A558	0-NONE	1	102022372	Along Roadway	2018

Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Injuries	Total Other Injuries	Total Veh	First Harmful Event	Manner of First Collision	Weather Cond	Light Conditions	Locate Type
6/30/2017	2100	Suspected Minor Injury	0	1	0	0	1	1 Paved Surface-Irregular	NO COLLISION W/ VEHICLE	Cloudy	Dark-Not Lighted	--
2/21/2016	0	Suspected Serious Injury	0	2	2	0	0	1 Standing Tree	NO COLLISION W/ VEHICLE	Rain	Dark-Not Lighted	Automatic
7/27/2018	1055	Prop Damage (over)	0	0	0	0	0	1 Standing Tree	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
4/7/2017	1900	Prop Damage (over)	0	0	0	0	0	1 Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dusk	Automatic
7/22/2016	1041	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	SIDESWIPE, SAME DIR	Cloudy	Daylight	Automatic
5/25/2018	1635	Prop Damage (over)	0	0	0	0	0	2 Vehicle in Transport	REAR-END	Rain	Daylight	Automatic

Query: Crash County = WILLIAMSON

CR\_CRASH.County = WILLIAMSON

CR\_CRASH.Route = 01928

CR\_CRASH.Log Mile > 1.000 And CR\_CRASH.Log Mile <= 3.600

CR\_CRASH.Date of Crash > 7/31/2015 And CR\_CRASH.Date of Crash <= 8/31/2018

BLM	Relation to First Junction	Relation to First Roadway	Urban or Rural	County	Route	Sp Cse	Co Seq	Case Number	Location	Year Of Crash
1.255	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101466439	Along Roadway	2016
2.188	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101951025	Along Roadway	2018
2.244	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101623510	Along Roadway	2017
2.331	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101070821	Along Roadway	2015
2.586	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101069340	Along Roadway	2015
2.88	NON_JUNCTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101650732	Along Roadway	2017
1.318	NON_JUNCTION	Shoulder	--	WILLIAMSON	01928	0-NONE	1	101317654	Along Roadway	2016
1.336	NON_JUNCTION	Shoulder	--	WILLIAMSON	01928	0-NONE	1	101128325	Along Roadway	2016
1.562	NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	01928	0-NONE	1	101316995	Along Roadway	2016
3.236	NON_JUNCTION	Roadside -- Left	--	WILLIAMSON	01928	0-NONE	1	101869464	Along Roadway	2017
1.757	NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	01928	0-NONE	1	102041314	Along Roadway	2018
1.899	NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	01928	0-NONE	1	101954466	Along Roadway	2018
2.843	NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	01928	0-NONE	1	101399602	Along Roadway	2016
3.493	NON_JUNCTION	Roadside -- Right	--	WILLIAMSON	01928	0-NONE	1	101702534	Along Roadway	2017
1.785	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101191011	Along Roadway	2016
1.903	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101238467	At an Intersection	2016
1.903	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	102111784	At an Intersection	2018
1.991	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	102107094	Along Roadway	2018
2.13	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101420867	At an Intersection	2016
2.151	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101161705	Along Roadway	2016
2.183	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101618726	Along Roadway	2017
2.896	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101183688	Along Roadway	2016
3.075	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101406994	Along Roadway	2016
3.571	NON_JUNCTION	--	--	WILLIAMSON	01928	0-NONE	1	101365129	Along Roadway	2016
1.903	INTERSECTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101157512	At an Intersection	2016
1.903	INTERSECTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101189592	At an Intersection	2016
1.903	INTERSECTION	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101746732	At an Intersection	2017
1.159	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	101843072	At an Intersection	2017
1.903	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	101235325	At an Intersection	2016
1.903	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	101486988	At an Intersection	2016
1.903	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	101725250	At an Intersection	2017
2.13	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	102027076	At an Intersection	2018
2.89	INTERSECTION	--	--	WILLIAMSON	01928	0-NONE	1	101619412	At an Intersection	2017
1.903	INTERSECTION RELATED	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101101058	At an Intersection	2016
1.903	INTERSECTION RELATED	--	--	WILLIAMSON	01928	0-NONE	1	101943710	At an Intersection	2018
2.13	INTERSECTION RELATED	--	--	WILLIAMSON	01928	0-NONE	1	101065689	At an Intersection	2015
2.13	INTERSECTION RELATED	--	--	WILLIAMSON	01928	0-NONE	1	101098247	At an Intersection	2016
1.466	DRIVEWAY, ALLEY ACCESS, ETC.	On Roadway	--	WILLIAMSON	01928	0-NONE	1	101070340	Along Roadway	2015
1.911	OTHER	Outside Trafficway	--	WILLIAMSON	01928	0-NONE	1	101079128	Along Roadway	2016

Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Injuries	Total Other Injuries	Total Veh	First Harmful Event	Manner of First Collision	Weather Cond	Light Conditions	Locate Type
11/30/2016	1601	Suspected Minor Injury	0	2	0	2	3	Vehicle in Transport	SIDESWIPE, OPP DIR	Clear	Daylight	--
3/20/2018	1405	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Rain	Daylight	Automatic
4/23/2017	1420	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, OPP DIR	Cloudy	Daylight	Automatic
12/28/2015	1042	Suspected Minor Injury	0	1	0	1	1	Overturn	NO COLLISION W/ VEHICLE	Rain	Daylight	Automatic
12/29/2015	1735	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Dark-Not Lighted	Automatic
5/20/2017	1110	Prop Damage (over)	0	0	0	0	3	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
7/28/2016	1852	Suspected Minor Injury	0	1	0	1	1	Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
3/5/2016	1541	Suspected Minor Injury	0	1	0	1	1	Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
7/30/2016	1856	Prop Damage (over)	0	0	0	0	1	Fence	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
12/20/2017	2012	Suspected Minor Injury	0	1	0	1	1	Wall	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
6/11/2018	2140	Prop Damage (over)	0	0	0	0	1	Ditch	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
3/24/2018	737	Prop Damage (over)	0	0	0	0	1	Ditch	NO COLLISION W/ VEHICLE	Cloudy	Daylight	Automatic
10/3/2016	1300	Suspected Minor Injury	0	1	0	1	1	Culvert	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
7/13/2017	1504	Prop Damage (over)	0	0	0	0	1	Mail Box	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
5/9/2016	0	Prop Damage (over)	0	0	0	0	1	Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
6/3/2016	1759	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Rain	Daylight	Automatic
8/16/2018	1340	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Rain	Daylight	Automatic
8/11/2018	712	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight	Automatic
10/23/2016	1232	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Clear	Daylight	Automatic
4/10/2016	1709	Prop Damage (over)	0	0	0	0	1	Thrown or Falling Object	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
4/18/2017	1626	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Rain	Daylight	Automatic
4/28/2016	1805	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight	Automatic
10/18/2016	2200	Prop Damage (over)	0	0	0	0	1	Deer (Animal)	NO COLLISION W/ VEHICLE	Clear	Dark-Not Lighted	Automatic
9/20/2016	645	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
4/4/2016	1645	Suspected Minor Injury	0	1	0	1	1	Other Non-Collision	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic
5/6/2016	1615	Suspected Minor Injury	0	1	0	1	2	Vehicle in Transport	ANGLE	Clear	Daylight	Automatic
8/30/2017	1613	Suspected Minor Injury	0	1	0	1	4	Vehicle in Transport	REAR-END	Cloudy	Daylight	Automatic
11/29/2017	2024	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Dark-Not Lighted	Automatic
5/29/2016	1550	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight	Automatic
12/24/2016	1744	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Rain	Dark-Not Lighted	Automatic
8/4/2017	954	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Rain	Daylight	Automatic
5/29/2018	1600	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Rain	Daylight	Automatic
4/18/2017	646	Prop Damage (over)	0	0	0	0	1	Utility Pole	NO COLLISION W/ VEHICLE	Cloudy	Daylight	Automatic
2/5/2016	1741	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Cloudy	Dark-Not Lighted	Automatic
3/13/2018	1631	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
12/23/2015	1135	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, OPP DIR	Cloudy	Daylight	Automatic
1/27/2016	1538	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight	Automatic
12/29/2015	1213	Suspected Minor Injury	0	2	0	2	3	Vehicle in Transport	HEAD-ON	Clear	Daylight	Automatic
1/17/2016	1510	Suspected Serious Injury	0	1	1	0	2	Ditch	NO COLLISION W/ VEHICLE	Clear	Daylight	Automatic





## **Summary of TIS Recommendations (revised)**

The original TIS had made two traffic-related recommendations, summarized in the previous comment memorandum dated August 24, 2018:

- A. Site Access: The revised TIS retains the same site access recommendations from the original study, namely to establish two site access points with dedicated inbound left-turn lanes.
- B. Widen Pantall Road (removed): The TIS no longer proposes to widen Pantall Road, which is in keeping with Comment 9 from the August 2018 memorandum since the Town recently conducted widening on Pantall Road in spring 2017.

This review finds that both of these items are appropriate. However, **the Town should confirm that the new plans include 30' ROW dedication to comply with Town standard for Collector roadways** as was discussed in Recommendation Comment B2 of the August 2018 comments.

The revised TIS also includes an additional recommendation to address impacts at the intersection of Thompson's Station Road & Pantall Road. The July 2018 TIS had shown impacts from increased delay at this location due to the addition of site-generated traffic but did not recommend improvements to address these issues. This omission was cited in Recommendation Comment C2 in the August 2018 comments. To address this comment, the October 2018 TIS includes the following language:

*A short-term improvement would be the construction of a separate southbound left turn lane. This turn lane would help to reduce the delays for southbound left and right turns. To date, no estimate of probable cost has been prepared for this turn lane. However, it would be reasonable to assume that this turn lane could include approximately 300 linear feet of grading and pavement. At \$100 per linear foot, this improvement would cost approximately \$30,000. **The developer of the Littlebury project has agreed to contribute one-third the cost of this improvement, or \$10,000.** Therefore, this contribution should be made a condition of approval for the Littlebury residential project. (page 60)*

Subsequent discussions with the Applicant have revised the Applicant's contribution to \$20,000 to increase the development's share of the improvement costs and to provide a contingency for construction cost overruns. **This review finds that the recommendation to add a turn lane along the southbound approach is a reasonable proposal to address impacts at the intersection of Thompson's Station Road & Pantall Road in the immediate future, and that the proposed \$20,000 contribution is appropriate given the level of site traffic impacts along the Pantall Road corridor.**

This intersection currently handles a high volume of southbound right-turning traffic, particularly during PM peak periods, and providing separate left- and right-turn lanes should reduce delays and improve safety at the intersection. Preliminary traffic modeling confirms that the improved intersection with a southbound left-turn lane is projected to operate at an acceptable level of service in the near-term, generally performing equal to or better than the existing intersection even with the addition of site trips.

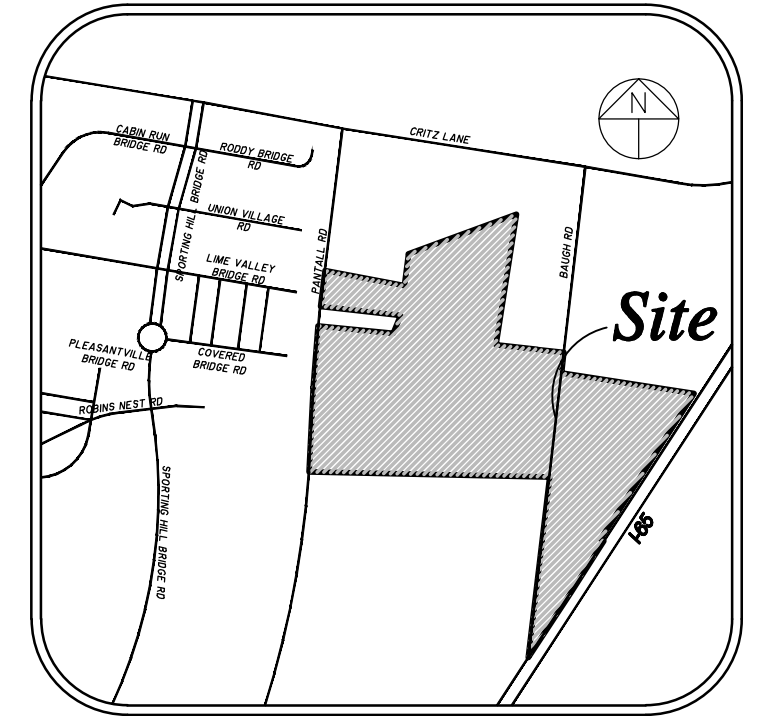
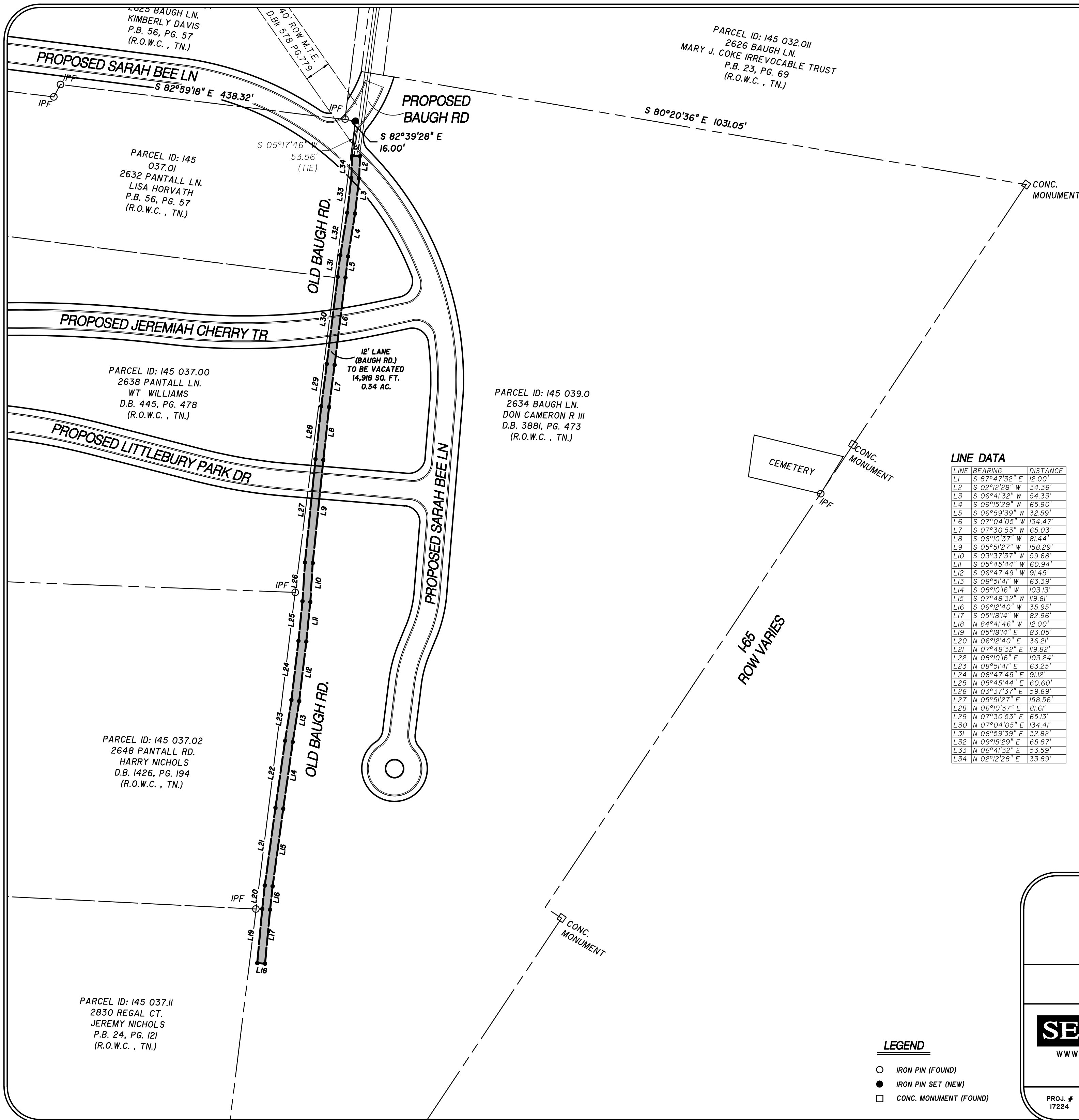
At some point in the future, traffic volumes from other developments and generally traffic growth in the region are expected to increase delays at this intersection to a level where an intersection upgrade would be required. This finding was presented in the 2015 *Town of Thompson's Station*

*Traffic Impact Study Comprehensive Update* and was confirmed by this TIS, which recommended that the intersection eventually be converted to signal or roundabout control once the region is sufficiently built out. However, the Applicant's proposal to add a southbound turn lane is sufficient to mitigate impacts from the Littlebury development specifically, and as such the Applicant should not be required to contribute additional funds towards the eventual intersection upgrade.

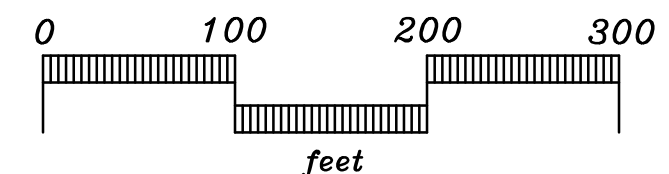
### ***Review of August 2018 Comments for Follow-Up***

The revised TIS and subsequent discussions with the Applicant successfully address all comments that were included in the August 2018 memorandum:

1. New Development Program: Program increased to 92 units, matching included site plan
2. Lack of Crash Data Analysis: Exports from E-TRIMS are included. Further analysis by Barge indicates that historic crash rates along Pantall Road do not exceed statewide average rates
3. Signal Control at Thompson's Station Road & Buckner Lane: Corrected in revised study
4. Stop Control at Thompson's Station & Clayton Arnold Roads: Corrected in revised study
5. Background Traffic Volumes: Corrected in revised study
6. Saturday Peak Demand: The revised study conducted Saturday counts to address this comment analytically. No issues were found during Saturday periods
7. Distribution of New School Trips: The revised study conducted new AM/PM period counts to directly incorporate trips associated with the new school
8. Unaddressed Impacts at Thompson's Station & Pantall Roads: The Applicant has committed to contribute funds towards adding a southbound left-turn lane at this location
9. Pantall Road Widening: No longer recommended, in keeping with August 2018 comments
10. Provisions for Baugh Road Connection: Site plan now includes provisions for future connectivity



LOCATION MAP  
N.T.S.



LINE DATA

LINE	BEARING	DISTANCE
L1	S 87°47'32" E	12.00'
L2	S 02°12'28" W	34.36'
L3	S 06°41'32" W	54.33'
L4	S 09°15'29" W	65.90'
L5	S 06°59'39" W	32.59'
L6	S 07°04'05" W	134.47'
L7	S 07°30'53" W	65.03'
L8	S 06°10'37" W	81.44'
L9	S 05°51'27" W	158.29'
L10	S 03°37'37" W	59.69'
L11	S 05°43'44" W	60.94'
L12	S 06°47'49" W	91.45'
L13	S 08°51'41" W	63.39'
L14	S 08°10'16" W	103.13'
L15	S 07°48'32" W	119.61'
L16	S 06°12'40" W	35.95'
L17	S 05°18'14" W	82.96'
L18	N 84°41'46" W	12.00'
L19	N 05°18'14" E	83.05'
L20	N 06°12'40" E	36.21'
L21	N 07°48'32" E	119.82'
L22	N 08°10'16" E	103.24'
L23	N 08°51'41" E	63.25'
L24	N 06°47'49" E	91.12'
L25	N 05°45'44" E	60.60'
L26	N 03°37'37" E	59.69'
L27	N 05°51'27" E	158.56'
L28	N 06°10'37" E	81.61'
L29	N 07°30'53" E	65.13'
L30	N 07°04'05" E	134.41'
L31	N 06°59'39" E	32.82'
L32	N 09°15'29" E	65.87'
L33	N 06°41'32" E	53.59'
L34	N 02°12'28" E	33.89'

LEGEND

- IRON PIN (FOUND)
- IRON PIN SET (NEW)
- CONC. MONUMENT (FOUND)

SURVEY EXHIBIT

EXHIBIT TO VACATE  
BAUGH RD.  
(LITTLEBURY)

THOMPSON'S STATION, TENNESSEE  
11th CIVIL DISTRICT OF WILLIAMSON COUNTY

**SEC, Inc.** SITE ENGINEERING CONSULTANTS  
 ENGINEERING • SURVEYING • LAND PLANNING  
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 PHONE (615) 890-7901 • FAX (615) 895-2567

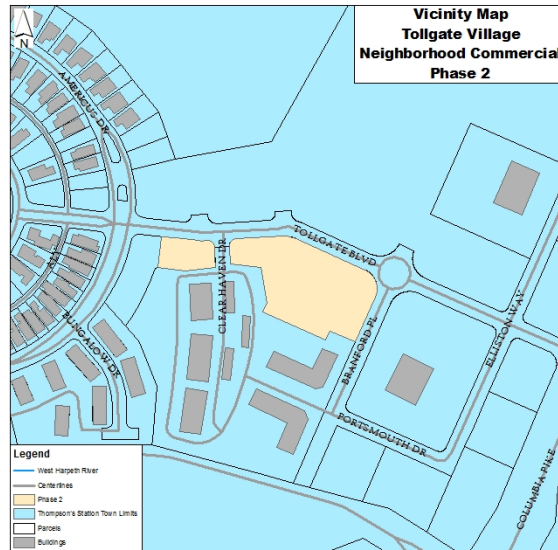
PROJ. # 17224	DATE: 10-15-2018 REV.:	FILE: 17224 BAUGH RD. EXHIBIT	DRAWN BY: ACAD/JWK	SCALE: 1" = 100'	SHEET 1 OF 1
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**Thompson's Station Planning Commission**  
**Staff Report –Item 2 (PP 2018-008)**  
**October 25, 2018**

**Preliminary plat for Phase 2A of the “Town Center” for Tollgate Village which consists of 27 lots.**

**PROJECT DESCRIPTION**

A request to approve the preliminary plat for Phase 2A of “Town Center” within Tollgate Village to create 27 lots.



**BACKGROUND**

On August 28, 2017, the Planning Commission reviewed a preliminary plat for the creation of 59 lots was submitted for the creation of 59 lots for phase 2 (commercial section) of Tollgate Village. Staff cited concerns in the report related to the adequacy of the trip generation analysis, the amount of recorded open space and geotechnical had not been submitted for the project area. Therefore, the Planning Commission denied the request due to inadequate trip generation analysis and no geotechnical report for the site.

**ANALYSIS**

**Preliminary Plat**

The preliminary plat provides an analysis of the site’s special features and the response to those features (LDO Section 5.4.3). This preliminary plat for phase 2A-Town Center includes the creation of 27 lots within a 3.28-acre site.

*Zoning*

The project is located within Tollgate Village which has two zoning designations. A portion of the site containing seven townhomes is located within the D3 zoning and the remaining portion of the project site is located within the NC (Neighborhood Commercial) zoning district. The D3 zone permits the development of single-family, townhomes and other residential land uses. The NC zone includes “neighborhood commercial activities, small scale businesses, and high intensity residential” (Section 1.2.7.b.iv.) which includes residential uses, such as townhomes, mixed use buildings and condominiums.

*Lot Standards*

The townhome lots will vary in size with a minimum of 20 feet for lot widths. Proposed setbacks are 10 feet for the front yard, 7.5 feet for the side yard and 20 feet for the rear yard with a minimum

of a 20-foot driveway. Any development of the lots will need to comply with the development standards set forth for the zoning designations.

#### *Roadways*

Tollgate Boulevard is complete and accepted by the Town and no additional roadways are proposed as part of this plat. Tollgate Boulevard has a sidewalk with landscape strip between the road and the sidewalk and pedestrian access is provided throughout the site to the civic and open space areas.

Access is proposed from the existing driveway on Tollgate Village Boulevard, however additional access will be proposed from Branford Place also.

#### *Natural Resources*

A natural resource map was submitted for the site which shows that no creeks, streams or other water bodies are present on site, no trees exist on site. A geotechnical report was submitted for the project site and all recommendations shall be adhered to during the construction of any development on site.

#### *Traffic Improvements*

Significant concerns were noted in the review of the original trip generation analysis. Therefore, after discussions with the Town's traffic engineer, a revised traffic study was submitted on Friday, October 12, 2018. The revised study was completed to collect current traffic count data, quantify existing traffic demand along Tollgate Boulevard, and update the expected future land uses within Tollgate Village.

Staff has forwarded the study to the Town's traffic engineer, however, there was not adequate time for a thorough review by the time of staff reports. Therefore, the traffic engineer will present their review of the traffic study at the Commission meeting.

#### *Open Space*

The open space required for the Tollgate Village subdivision is 120 acres of which all is recorded.

#### *Sewer*

The Tollgate Village development has approval for 943 sewer taps. The subdivision has a total commitment recorded or otherwise approved of 832 taps. With the total commitment of taps, the development has 111 taps remaining for the entire development including the outparcels that may not be owned by the MBSC developer. Staff recommends that any commitments to the owners of the outparcels be submitted to the Town. It should also be noted that phase 16 does have a preliminary plat approval which includes 105 taps. Staff anticipates that this plat will result in the need for 50 taps based on the site plan submitted for approval. Any future approvals shall be limited to the number of taps available.

### **RECOMMENDATION**

Should the Planning Commission wish to approve the plat, Staff recommends the Planning Commission incorporate the following contingencies:

1. Prior to the approval of construction plans, all applicable codes and regulations shall be addressed to the satisfaction of the Town Engineer. Any corrections or issues with the drawings related to regulations may be subject to further Planning Commission review.
2. Prior to the approval of construction drawings, a drainage study shall be submitted to verify that storm water is managed adequately on site.
3. All landscape buffers shall be incorporated into any future site plan approvals and shall be installed and maintained in a healthy manner.



4. Any signage proposed for the subdivision shall comply requirements set forth within the Land Development Ordinance and shall be located within the open space and maintained by the homeowner's association.
5. All recommendations within the geotechnical report shall be adhered to during construction activities. Any new information or features not identified shall be subject to the review by a geotechnical engineer.
6. Any change of use or expansion of the project site shall conform to the requirements set forth within the Land Development Ordinance and shall be approved prior to the implementation of any changes to the project.
7. All future approvals for any development shall be subject to the availability of sewer taps.

**ATTACHMENT**

Preliminary Plat

Traffic Study dated October 12, 2018



**GENERAL NOTES**

- THE PURPOSE OF THIS PLAT IS TO CREATE 27 MIXED USE LOTS.
- BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE STATE PLANE COORDINATE SYSTEM OF 1983. GPS EQUIPMENT WAS USED DURING THE COURSE OF THE SURVEY ON THE SITE TO DETERMINE THE POSITION OF TWO CONTROL POINTS FOR ESTABLISHING THE BEARING BASE. THE EQUIPMENT USED: LEICA, MODEL: GX 1250, DUAL-FREQUENCY RECEIVER. THE TYPE OF SURVEY: NETWORK ADJUSTED REAL TIME KINEMATIC. CONTROL POINTS FOR BEARING BASE FOR PROJECT AND ROAD LOCATION IMPROVEMENTS.
- BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN FLOOD ZONE "X" (OTHER AREAS), AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAPS NO. 471820035F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2006, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE ADMINISTRATION REPORT; COMMUNITY NO. 470424, PANEL NO. 0335, SUFFIX F, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PREMISES IS SITUATED. SAID MAP DEFINES ZONE "X" UNDER "OTHER AREAS" AS "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."
- THIS PROPERTY IS CURRENTLY ZONED NC - (NEIGHBORHOOD COMMERCIAL) AND DC3 - (HIGH INTENSITY RESIDENTIAL), PER THOMPSON'S STATION LAND DEVELOPMENT ORDINANCE, DATED JUNE 13, 2017.
 

<p><b>NC SETBACK REQUIREMENTS:</b></p> <p>PRIMARY FRONTAGE - 12' MAXIMUM                  SECONDARY FRONTAGE - 10' MAXIMUM                  SIDE LOT LINE - 0' MINIMUM                  REAR LOT LINE - 5' MINIMUM</p>	<p><b>DC3 SETBACK REQUIREMENTS:</b></p> <p>PRIMARY FRONTAGE - 10' MAXIMUM                  SECONDARY FRONTAGE - 10' MAXIMUM                  SIDE LOT LINE AGGREGATE - 15' TOTAL, 5' MINIMUM                  REAR LOT LINE - 20' MINIMUM</p>
--	---
- THIS SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ABOVE GRADE AND UNDERGROUND UTILITIES SHOWN WERE TAKEN FROM VISIBLE APPURTENANCES, PUBLIC RECORDS, AND/OR MAPS PREPARED BY OTHERS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THEREFORE, RELIANCE UPON THE TYPE, SIZE AND LOCATION OF UTILITIES SHOWN SHOULD BE DONE SO WITH THIS CIRCUMSTANCE CONSIDERED. DETAILED VERIFICATION OF EXISTENCE, LOCATION AND DEPTH SHOULD ALSO BE MADE PRIOR TO ANY DECISION RELATIVE THERETO IS MADE. AVAILABILITY AND COST OF SERVICE SHOULD BE CONFIRMED WITH THE APPROPRIATE UTILITY COMPANY. IN TENNESSEE, IT IS A REQUIREMENT, PER "THE UNDERGROUND UTILITY DAMAGE PREVENTION ACT", THAT ANYONE WHO ENGAGES IN EXCAVATION MUST NOTIFY ALL KNOWN UNDERGROUND UTILITY OWNERS NO LESS THAN THREE (3) NOR MORE THAN TEN (10) WORKING DAYS PRIOR TO THE DATE OF THEIR INTENT TO EXCAVATE AND ALSO TO AVOID ANY POSSIBLE HAZARD OR CONFLICT. TENNESSEE ONE CALL, DIAL 811.
- ELEVATIONS SHOWN HEREON ARE BASED ON NAVD 88. CONTOURS ARE AT TWO FOOT INTERVALS AND ARE BASED ON A FIELD RUN SURVEY BY RAGAN-SMITH ASSOCIATES ON JULY 12, 2016 USING RANDOM SPOT ELEVATIONS. CONTOURS WERE DERIVED USING SURFACE MODELING TECHNIQUES.
- ALL PUBLIC STREETS AND DRAINAGE STRUCTURES WITHIN THE RIGHTS-OF-WAY WILL BE MAINTAINED BY THE TOWN OF THOMPSON'S STATION.
- SANITARY SEWER LINES AND STORM LINES SHOWN HEREON WERE TAKEN FROM A PRELIMINARY DESIGN FOR THIS SECTION. FINAL PLACEMENT OF UTILITIES WILL BE DEPICTED ON THE FINAL PLAT.
- DOMESTIC WATER SUPPLY INFORMATION SHOWN HEREON IS BASED ON A PRELIMINARY DESIGN FOR THIS SECTION. FINAL PLACEMENT TO BE DESIGNED BY OTHERS AND INCLUDED ON THE FINAL PLAT. WATER TO BE PROVIDED BY H.B.815.
- THE RECORDING OF THE FINAL PLAT VOIDS, VACATES AND SUPERCEDES LOTS 3302 AND 3303 AND A PORTION OF LOT 3304 AS SHOWN ON THE FINAL PLAT ENTITLED "TOLLGATE VILLAGE, SECTION 33 (LOTS 3301-3304) AND REVISION TO SECTION 20 (LOT 20.6)" OF RECORD IN PLAT BOOK P60, PAGE 86, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.
- I HEREBY STATE THAT THIS SURVEY WAS DONE IN COMPLIANCE WITH THE CURRENT TENNESSEE MINIMUM STANDARDS OF PRACTICE AND THIS IS A CATEGORY I SURVEY AND THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY IS 1:43,595.

DATE: AUGUST 29, 2018  
 JOHN T. DARNALL, TN RLS #1571

LOT	SQ. FT. ±	ACRES ±
201	92,816	2.13
202	2,997	0.07
203	2,200	0.05
204	2,200	0.05
205	2,995	0.07
206	4,060	0.09
207	1,996	0.05
209	1,622	0.04
210	1,197	0.03
211	1,197	0.03
212	1,780	0.04
213	1,780	0.04
214	1,197	0.03
215	1,631	0.04
216	1,554	0.04
217	1,152	0.03
218	1,152	0.03
219	1,687	0.04
220	1,746	0.04
221	1,192	0.03
222	1,192	0.03
223	1,192	0.03
224	1,609	0.04
225	2,654	0.06
226	1,693	0.04
227	2,585	0.06

**LEGEND**

○(R) IRON ROD (OLD)	⊕ FIBER OPTIC BOX
● IRON ROD (NEW) (1/2" x 18" W/ CAP STAMPED "RAGAN SMITH & ASSOCIATES")	⊕ IRRIGATION CONTROL VALVE
○(PK) PK NAIL (OLD)	—SA— SANITARY SEWER LINE
⊕ FIRE HYDRANT	⊕ ELECTRIC BOX
⊕ WATER VALVE	—W— WATER LINE
⊕ WATER METER	—FM— FORCE MAIN
⊕ REINFORCED CONCRETE PIPE	⊕ LIGHT STANDARD
○ SANITARY SEWER MANHOLE	⊕ YARD LIGHT
○ SEWER CLEAN-OUT	⊕ PUBLIC UTILITY AND DRAINAGE EASEMENT
○ AREA DRAIN	⊕ PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENT
⊕ CATCH BASIN/CURB INLET	⊕ TRANSFORMER PAD
⊕ STORM MANHOLE	⊕ REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN
— S— SIDEWALK	

**DEED REFERENCE**  
 MAP 132, PARCELS 001.07, 001.08 AND 001.09 BEING A PORTION OF THE SAME PROPERTY CONVEYED TO MBSC TN HOMEBUILDER, LLC, FROM TGF 2010, LLC OF RECORD IN BOOK 5264, PAGE 242, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

**PLAT REFERENCE**  
 BEING LOTS 3302 AND 3303 AND A PORTION OF LOT 3304 AS SHOWN ON THE FINAL PLAT ENTITLED "TOLLGATE VILLAGE, SECTION 33 (LOTS 3301-3304) AND REVISION TO SECTION 20 (LOT 20.6)" OF RECORD IN PLAT BOOK P60, PAGE 86, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

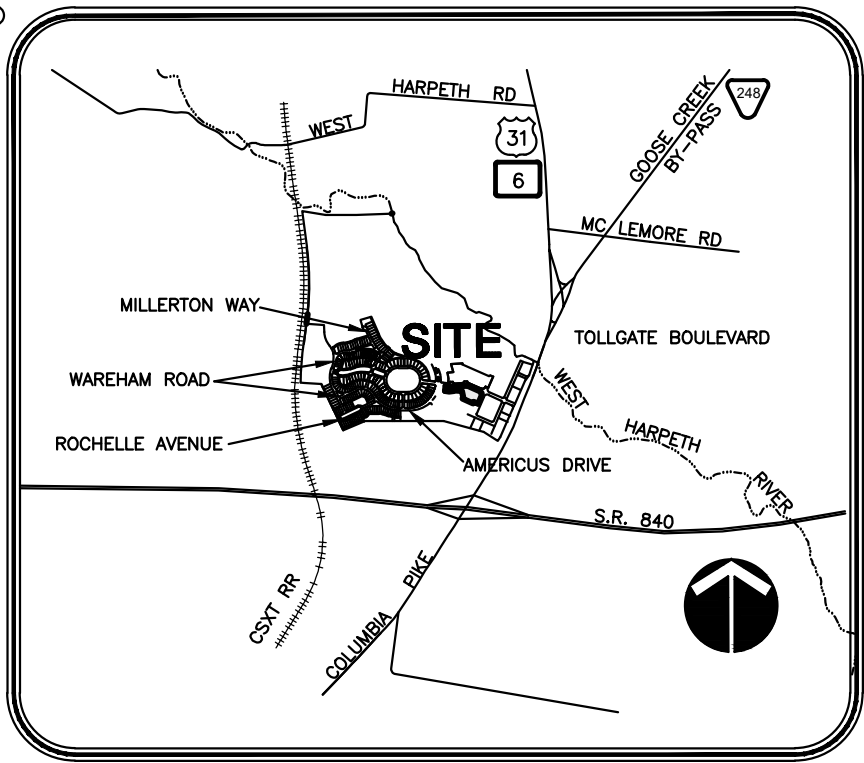
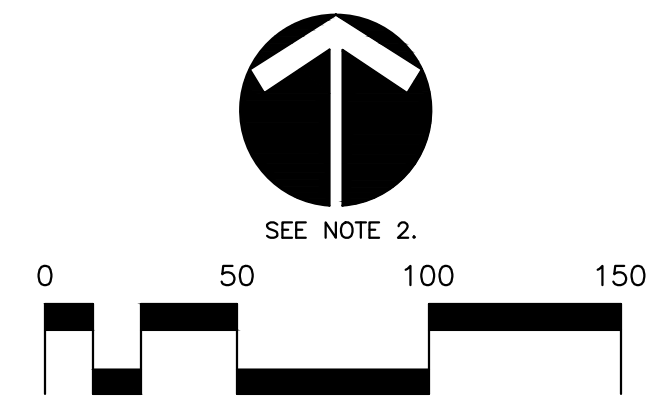
**PROPERTY MAP REFERENCE**  
 BEING PARCELS 001.07 AND 001.08 AS SHOWN ON WILLIAMSON COUNTY PROPERTY MAP 132.

**CURVE TABLE**

CURVE	LENGTH	RADIUS	CENTRAL ANGLE	CHD BRG	CHORD	TANGENT
C8	39.28'	25.00'	90°00'54"	S48°28'38"E	35.36'	25.01
C9	39.27'	25.00'	90°00'00"	N41°31'49"E	35.36'	25.00
C10	33.29'	70.00'	27°15'04"	S79°51'06"E	32.98'	16.97
C11	117.81'	75.00'	90°00'08"	S21°13'35"E	106.07'	75.00
C12	28.38'	25.00'	65°02'06"	S29°01'58"W	26.88'	15.94
C13	10.89'	25.00'	24°57'54"	S74°01'58"W	10.81'	5.53
C14	85.26'	75.00'	65°08'05"	S33°39'28"E	80.74'	47.90
C15	32.55'	75.00'	24°51'55"	S11°20'32"W	32.29'	16.53

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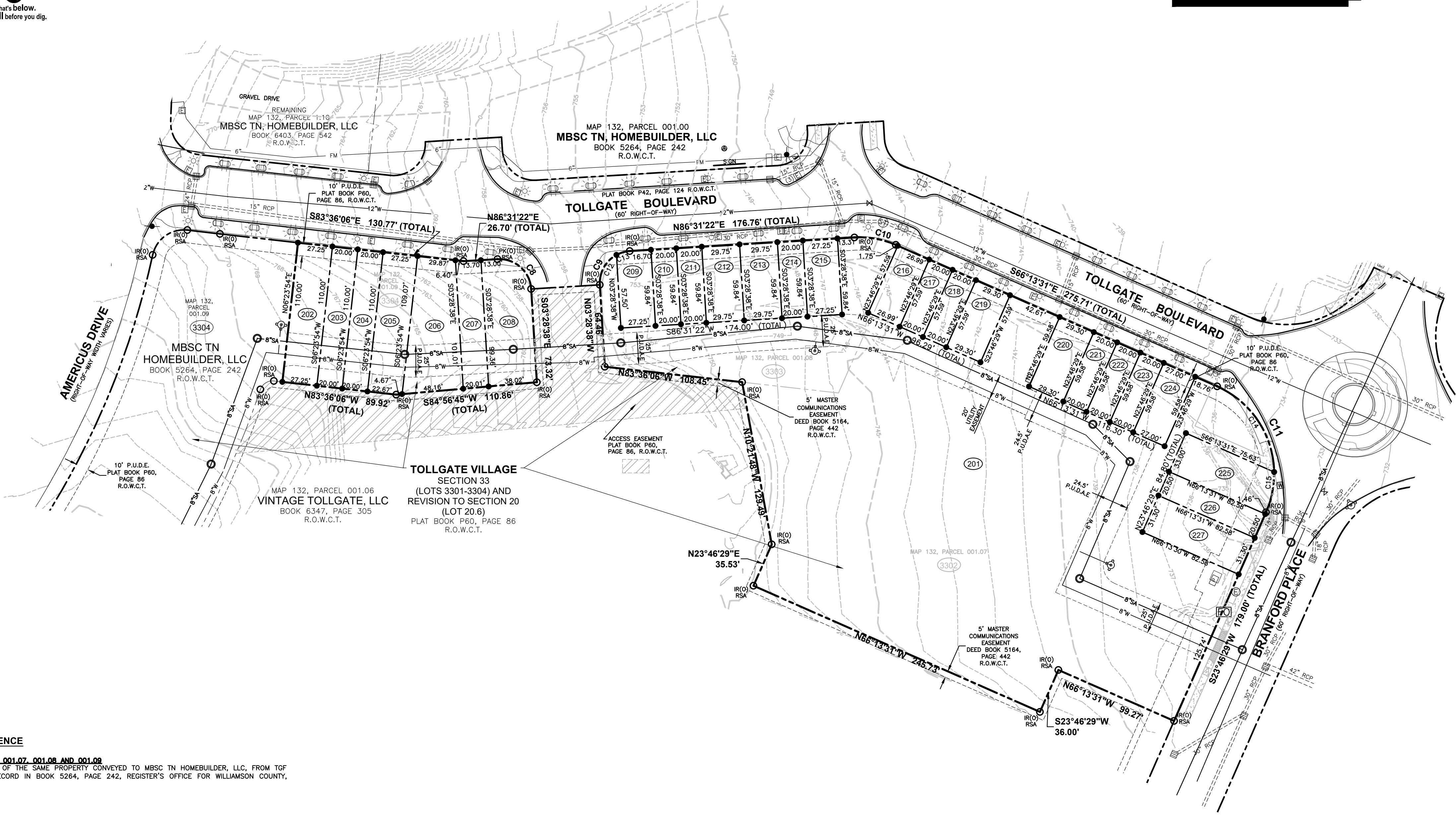
**OWNER/DEVELOPER**  
 MBSC TN HOMEBUILDERS, LLC  
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 312 S. GAY STREET, SUITE 200  
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**PHASE 2A**  
 LOTS 201-227

**SITE DATA TABLE (PHASE 2A)**

TOTAL LOT AREA	- 3.28 AC. ±
TOTAL R.O.W. AREA	- 0.00 AC. ±
TOTAL SITE AREA	- 3.28 AC. ±
TOTAL LINEAR FEET OF ROAD	- 0 FT.



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**TOLLGATE VILLAGE  
 TOWN CENTER - PHASE 2A  
 FOR  
 MBSC TN HOMEBUILDER, LLC**

TOWN OF THOMPSON'S STATION, FOURTH CIVIL DISTRICT, WILLIAMSON COUNTY, TENNESSEE

**PRELIMINARY PLAT**

1 of 1

REVISIONS

WK. ORDER	1172	JTD	KCK	1"=50'	DATE: AUGUST 29, 2018
JOB NO.	10081	APPROVED BY:	DRAWN:	SCALE:	

**TOTAL AREA = 142,697 SQUARE FEET OR 3.28 ACRES ±**



**TRAFFIC IMPACT STUDY**

for

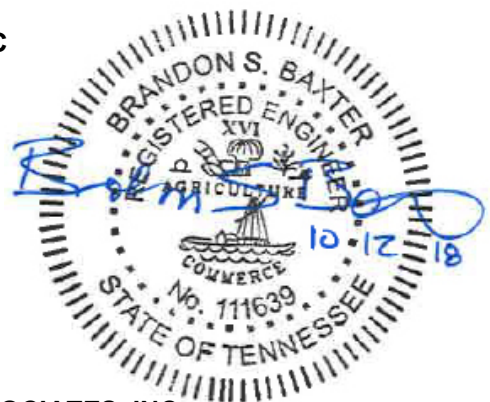
**TOLLGATE VILLAGE**

**Thompson's Station, Tennessee**

**October 12, 2018**

**Prepared for:**

**MBSC TN HOMEBUILDERS, LLC  
402 S. Gay Street, Suite 202  
Knoxville, Tennessee 37902**



**Prepared by:**

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**TOLLGATE VILLAGE**  
**TRAFFIC IMPACT STUDY**

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**TOLLGATE VILLAGE**  
**TRAFFIC IMPACT STUDY**

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## EXECUTIVE SUMMARY

### INTRODUCTION

Tollgate Village is located on the west side of Columbia Pike (US Highway 31 / State Route 6) between Independence High School and the West Harpeth River in the Town of Thompson's Station, Tennessee. The purpose of this traffic impact study is to review the access needs and roadway improvements for traffic mitigation at Tollgate Village.

### BACKGROUND TRAFFIC

Based upon the proposed development schedule, the years 2020 and 2027 will be used to analyze the impact of Tollgate Village.

To establish background traffic growth, TDOT historical traffic data was obtained in the project vicinity. Traffic growth due to outside developments and general population growth was based upon linear regression analysis of the historical traffic count data. Background traffic growth was established by increasing existing traffic by **3 percent annually** for the period from 2016 to 2027.

### SITE TRAFFIC

The traffic impact of Tollgate Village is based upon a calculation of the number of vehicle trips that will enter and/or exit the site. The analysis periods of this report are the a.m. and p.m. peak hours of a typical weekday. Therefore, trips were generated according to the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9<sup>th</sup> Edition*. The total future estimated trip generation for Tollgate Village is shown in the table below.

TOLLGATE VILLAGE								
FUTURE TRIP GENERATION								
Land Use	Total Units	Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
Single Family Homes	236 homes	2,291	32	98	130	88	56	144
Apartments (Multifamily Housing, Mid-Rise)	32 units	173	2	11	13	9	6	15
Multifamily Housing (Low-Rise)	231 units	1,706	32	69	101	33	34	67
Retail, including: <ul style="list-style-type: none"> <li>• Shopping Center</li> <li>• Drug Store</li> <li>• Hair Salon</li> <li>• Veterinarian</li> <li>• Walk-In Bank</li> <li>• Copy, Print, and Express Ship Store</li> </ul>	28,722 sf 12,900 sf 1,400 sf 2,140 sf 3,500 sf 1,400 sf	3,763	171	103	274	154	148	302
Office, including: <ul style="list-style-type: none"> <li>• General Office</li> <li>• Medical Office</li> </ul>	45,242 sf 34,600 sf	1,734	116	3	119	44	162	206
Restaurant, including: <ul style="list-style-type: none"> <li>• Quality Restaurant</li> <li>• High-Turnover Sit Down</li> <li>• Fast Food w/o Drive Thru</li> </ul>	7,171 sf 4,900 sf 2,500 sf	2,017	39	27	66	60	30	90
Day Care Center	50 students	225	23	20	43	20	22	42
<b>TOTAL</b>		<b>11,909</b>	<b>415</b>	<b>331</b>	<b>746</b>	<b>408</b>	<b>458</b>	<b>866</b>

## **TRAFFIC ANALYSIS**

The following public intersections were analyzed for capacity deficiencies and improvement needs:

- Columbia Pike at Tollgate Boulevard
- Columbia Pike at North Access
- Columbia Pike at Declaration Way
- Declaration Way at Branford Place

For these intersections, the following traffic scenarios were analyzed, where applicable:

- 2016 Existing Traffic
- 2022 Background Traffic
- 2022 Total Traffic that contains all traffic projected in the study area, including the completion of residential development at Tollgate Village
- 2027 Background Traffic
- 2027 Total Traffic that contains all traffic projected in the study area, including the full build-out of Tollgate Village

## **CONCLUSIONS AND RECOMMENDATIONS**

### **General Conclusions and Recommendations**

- Access to Columbia Pike for Tollgate Village can be provided at level of service D or better via the existing Tollgate Boulevard and Secondary Access (North) routes. Secondary access to Declaration Way as currently shown on the Tollgate Village Concept Plan will provide additional connectivity for Tollgate Village and Independence High School but is not necessary to address traffic congestion due to Tollgate Village and will not result in a significant change or improvement to the level of service at the intersections on Columbia Pike.

### **Columbia Pike at Tollgate Boulevard**

- The traffic signal and turn lane improvements that were constructed at this intersection by the Tollgate Village developer in 2017 provide additional capacity and traffic control for the full build-out of Tollgate Village. In the future, traffic operations at this intersection are expected to be characterized by overall level of service B during the a.m. and p.m. peak hours with individual turning movements operating at level of service D or better.
- No additional laneage or traffic control modifications are recommended for this intersection to mitigate the impact of the Tollgate Village development.

### **Columbia Pike at Secondary Access (North)**

- The Columbia Pike access located north of Tollgate Boulevard in the area of the existing Shelter Insurance Office Building was constructed by the Tollgate Village developer in 2018.
- Based on previous traffic impact study findings and recommendations, the Secondary Access (North) is restricted to right-in/right-out only access at Columbia Pike due to the width of Columbia Pike and proximity to the bridge over the West Harpeth River.
- The Secondary Access (North) should be modified to provide full turning movement access when Columbia Pike has been widened by TDOT to consist of a five-lane roadway to the north of Tollgate Village and across the West Harpeth River.
- Future widening of Columbia Pike by TDOT should provide the extension of the existing five-lane section north of Tollgate Village and across the West Harpeth River. The extension of this roadway section will provide a northbound left turn lane for the North Access to Tollgate Village.

- When the North Access to Tollgate Village is converted to provide full turning movement access, a southbound right turn lane should be constructed on Columbia Pike. The final design of the Columbia Pike widening, the West Harpeth River crossing, and impacts to adjacent utilities and floodways/floodplains should be considered when determining the feasibility and final design of this right turn lane.

#### Columbia Pike at Declaration Way

- Williamson County Schools should continue to utilize a traffic control officer to direct traffic at this intersection during peak arrival and dismissal periods. Based upon the high volume and peaking characteristics of the school traffic, a permanent traffic signal installation could be considered as an alternative to the continued use of a traffic control officer.
- The existing Independence High School traffic uses the shoulder of Columbia Pike as a southbound right turn lane during the peak morning arrival period. The existing southbound right turn lane on Columbia Pike at Declaration Way could be extended to have a length of 500 feet with a taper length of 100 feet as part of future TDOT 3R (Resurfacing, Restoring, or Rehabilitation) projects on Columbia Pike to be reflective of the actual roadway usage in the area.
- As previously discussed, a secondary access from Tollgate Village to Declaration Way is shown in the current Tollgate Village Concept Plan. This access will provide additional connectivity for Tollgate Village and Independence High School but is not necessary to address traffic congestion due to Tollgate Village and will not result in a significant change or improvement to the level of service at other intersections on Columbia Pike.

#### Tollgate Village Secondary Access (South)

- The Tollgate Village developer, Town staff, and Williamson County Schools staff should continue to coordinate on the agreements necessary to obtain right-of-way or an easement to access and use Declaration Way between the proposed Secondary Access (South) and Columbia Pike.
- The Secondary Access (South) does not need to be constructed as part of any current phase of development at Tollgate Village because the access is not necessary to address traffic congestion, will not result in a significant change or improvement to the level of service at other intersections on Columbia Pike, and because the agreements involving the Town of Thompson's Station and Williamson County Schools have not been approved by the appropriate decision-making bodies and have not been prepared or executed.
- A schedule for the construction of the Secondary Access (South) should be established when the appropriate approvals are received from the appropriate decision-making bodies at the Town of Thompson's Station and Williamson County Schools and when the necessary agreements have been prepared and executed.
- When the Tollgate Village Secondary Access (South) is constructed, new pavement markings consistent with the MUTCD should be installed on Declaration Way between Columbia Pike and the South Access.
- The intersection of Declaration Way and the Secondary Access (South) should operate as a two-way stop control intersection. The South Access should be the minor street with stop control and Declaration Way should be the major street without stop control.

**I. INTRODUCTION**

**A. Purpose of Study**

The purpose of this study is to evaluate the access needs and analyze the transportation related impacts of future development at the Tollgate Village community in the Town of Thompson's Station, Tennessee. Traffic impact studies have been previously prepared for Tollgate Village as warranted by concept plan and/or site plan submittals. Prior to this report, the most recent traffic impact study for Tollgate Village was prepared in February 2017. The preparation of an updated traffic impact study has been completed due to the circumstances noted below.

- Traffic counts for the February 2017 Tollgate Village Traffic Impact Study were conducted in November 2016 and January 2017 and are more than 18 months old at this time. For development impact analyses, traffic count data is generally preferred to be less than 12 months and should not be more than 18 to 24 months old.
- For sections of Tollgate Village that have not yet been developed, a speculative development scenario based on what the existing zoning allows was prepared for the estimation of future trips as part of the February 2017 Tollgate Village Traffic Impact Study. Since that time, concept plan updates and site plan submittals/approvals have provided clarity and new information about development plans in portions of these areas.
- The Town of Thompson's Station engaged a new traffic engineering consultant in the summer of 2017 that has not previously reviewed a comprehensive traffic impact study for the Tollgate Village development.
- The Town of Thompson's Station Board of Mayor and Alderman adopted updates to the subdivision regulations within the Town's Land Development Ordinance (LDO) in September 2018. The updates include the addition of traffic study requirements to the thoroughfares section of the subdivision regulations.

This report has been requested by Town of Thompson's Station planning staff and the Town's traffic engineering consultant to address transportation impacts and estimated trip generation as part of preliminary plat and site plan reviews for proposed sections of residential and retail/commercial development at Tollgate Village.

**B. Study Methodology**

The existing conditions and future full build-out of Tollgate Village were evaluated based on the requirements of the Town of Thompson's Station and guidance from the Institute of Transportation Engineers (ITE) related to analysis of site development transportation impacts. The requirements and guidance include the following elements.

- Inventory of the existing transportation system and an assessment of its adequacy
- Establishment of a full build-out horizon year and background traffic growth
- Estimation of future development traffic
- Transportation analyses to evaluate project access alternatives and to assess any site or non-site related impacts on the system
- Development of conclusions and recommendations for project access and roadway improvements.

This report documents the elements outlined above and includes the information collected and analysis completed to develop the conclusions and recommendations.

## II. PROJECT DESCRIPTION

### A. Existing Development

As shown in Figure 1, Tollgate Village is located on the west side of Columbia Pike (US Highway 31 / State Route 6) between Independence High School and the West Harpeth River in the Town of Thompson's Station, Tennessee. The Tollgate Village Concept Plan includes a total area of 345.9 acres. At the time that the traffic counts for this traffic study were conducted, the development at Tollgate Village consisted of the land uses and units shown in Table 1 below.

<b>TABLE 1</b>				
<b>TOLLGATE VILLAGE – EXISTING DEVELOPMENT CONDITIONS <sup>(1)</sup></b>				
<b>Location and/or Description</b>	<b>Land Use</b>	<b>Development Summary <sup>(2)</sup></b>		
		<b>Completed and/or Occupied</b>	<b>Not Completed and/or Occupied</b>	<b>Total</b>
Residential Area	Single Family	408 homes	236 homes	644 homes
	Condominiums Townhomes	81 units	-	81 units
Vintage Tollgate	Apartments	169 units	32 units	201 units
Shelter Insurance Office Building	General Office	15,000 sf	7,500 sf	22,500 sf
	Medical Office	7,500 sf	-	7,500 sf
Tollgate Medical Plaza	Medical Office	31,200 sf	15,600 sf	46,800 sf
<sup>(1)</sup> Based on previous project approvals and site/field observations in September 2018				
<sup>(2)</sup> Does not include vacant tracts in the NC zoned area (see Section II.B below)				

Figure 2 shows an aerial layout of Tollgate Village including a summary of the existing development.

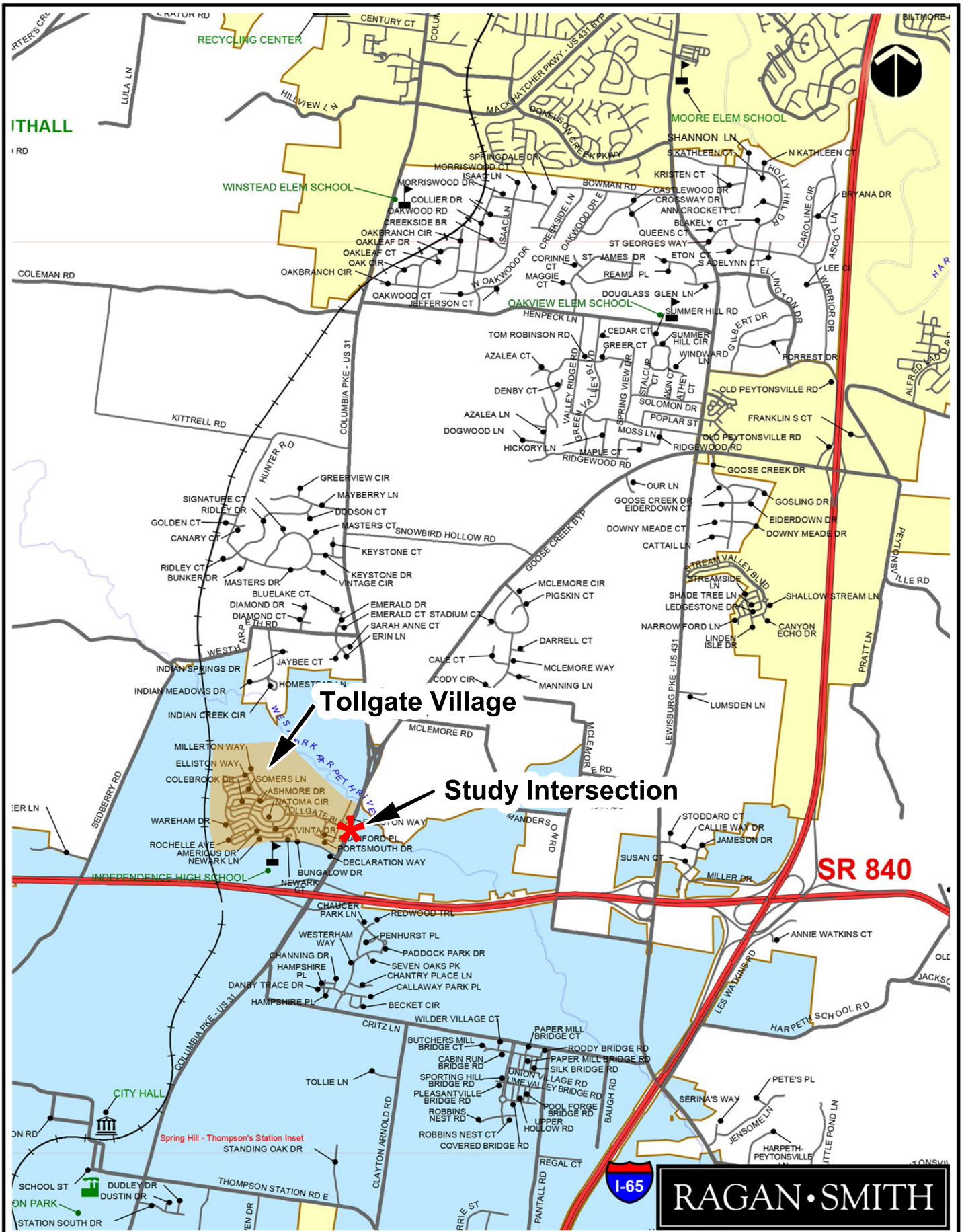
### B. Proposed Development

The remaining single-family residential areas at Tollgate Village consist of Sections 15, 16 and 17 that will include a total of 259 homes. In Section 15, there are currently 28 homes constructed and occupied. Additionally, five (5) homes in other completed sections of Tollgate Village were not complete at the time of this study and will be considered as part of the proposed development. Therefore, the remaining proposed single family residential development at Tollgate Village will consist of 236 homes as shown in Table 1 above.

The sections of Tollgate Village that remain vacant at the time of this study include residential and commercial areas with the High Intensity Residential (D3) and Neighborhood Commercial (NC) zoning designations. These zoning districts are intended for higher density residential development and neighborhood commercial activities, small-scale businesses, and high intensity residential.

To assess the future traffic impact of the vacant tracts in the NC zoned area at Tollgate Village, the Town of Thompson's Station Land Development Ordinance was used to identify potential allowable uses for establishing a feasible development scenario for the commercial area. This scenario was established in order to estimate future traffic for analysis purposes only. It is not binding and does not restrict the uses and sizes of development in the commercial area. Development in the commercial area will be subject to the allowable uses and standards of the Town's Land Development Ordinance. An illustration of the possible development scenario is included in the Appendix of this report.





**Tollgate Village  
Location Map**

**Figure  
1**





Figure  
2



C. Project Access

Access to Tollgate Village includes an existing primary access and future, proposed secondary access as described below.

- Primary Access – Primary access to Tollgate Village is provided by Tollgate Boulevard. Tollgate Boulevard intersects Columbia Pike approximately 1,875 feet north of the State Route 840 interchange and approximately 1,900 feet south of the Goose Creek Bypass (State Route 248). Tollgate Boulevard consists of one (1) lane for traffic entering Tollgate Village and two (2) lanes for traffic exiting Tollgate Village. The exiting lane assignment on Tollgate Boulevard includes one (1) right turn lane and one (1) left turn lane with storage lengths of approximately 200 feet. A traffic signal was installed at this intersection by the Tollgate Village developer in December 2016.
- Secondary Access (North) – Secondary Access to Tollgate Village is provided by a roadway connection to Columbia Pike approximately 640 feet north of Tollgate Boulevard. This access was constructed in 2018. Due to the existing laneage and roadway geometry on Columbia Pike, this access to Tollgate Village is currently restricted to right-in/right-out movements only.
- Secondary Access (South) – The Tollgate Village Concept Plan includes a proposed connection to Declaration Way, the existing access drive to Independence High School. Access at this location will require an agreement with the Williamson County Schools system.

D. Phasing and Timing

The build-out of Tollgate Village is occurring in multiple phases with the development schedule largely influenced by market conditions. For the future traffic analysis in this report, it will be assumed that the single-family residential sections and Tollgate Town Center (Phases 1, 2A, and future phases) are complete in the year 2022 and that full build-out of Tollgate Village occurs in the year 2027.

### III. EXISTING CONDITIONS

#### A. Transportation System

The existing transportation system in the area that provides access to Tollgate Village consists of arterial, collector, and private roadways. The following roadways will comprise the study area for consideration of traffic mitigation measures at Tollgate Village.

- **Columbia Pike (US Highway 31 / State Route 6)** in the study area is classified as a minor arterial on the Tennessee Department of Transportation (TDOT) functional classification system and is listed as an arterial in the General Plan for Thompson's Station. The current Thompson's Station Road Map does not indicate a classification for Columbia Pike. The Columbia Pike corridor connects the Cities of Franklin and Columbia and passes through the Town of Thompson's Station and the City of Spring Hill. Within the vicinity of Tollgate Village, Columbia Pike transitions from a two-lane to a five-lane roadway between the West Harpeth River and Tollgate Boulevard. The five-lane section of Columbia Pike continues to the south beyond State Route 840. The posted speed limit on Columbia Pike is 45 mph.
- **Tollgate Boulevard** is listed as a collector roadway in the General Plan for Thompson's Station. The current Thompson's Station Road Map does not indicate a classification for Tollgate Boulevard. Tollgate Boulevard is two-lane roadway and provides primary access to Tollgate Village. Tollgate Boulevard ends within the Tollgate Village development and does not provide access to any area adjacent to or beyond the area included on the Tollgate Village concept plan. The posted speed limit on Tollgate Boulevard is 30 mph.
- **Independence High School Access** is a private drive providing access from Columbia Pike to Independence High School. This private drive generally consists of a three-lane section with one travel lane in each direction and a two-way continuous left turn lane. At Columbia Pike, a median and exclusive left and right turn lanes are provided.

Figure 1 shows the location of Tollgate Village and the intersection of Columbia Pike at Tollgate Boulevard. Figure 2 shows an aerial layout of the Tollgate Village community.

#### B. Traffic Volumes

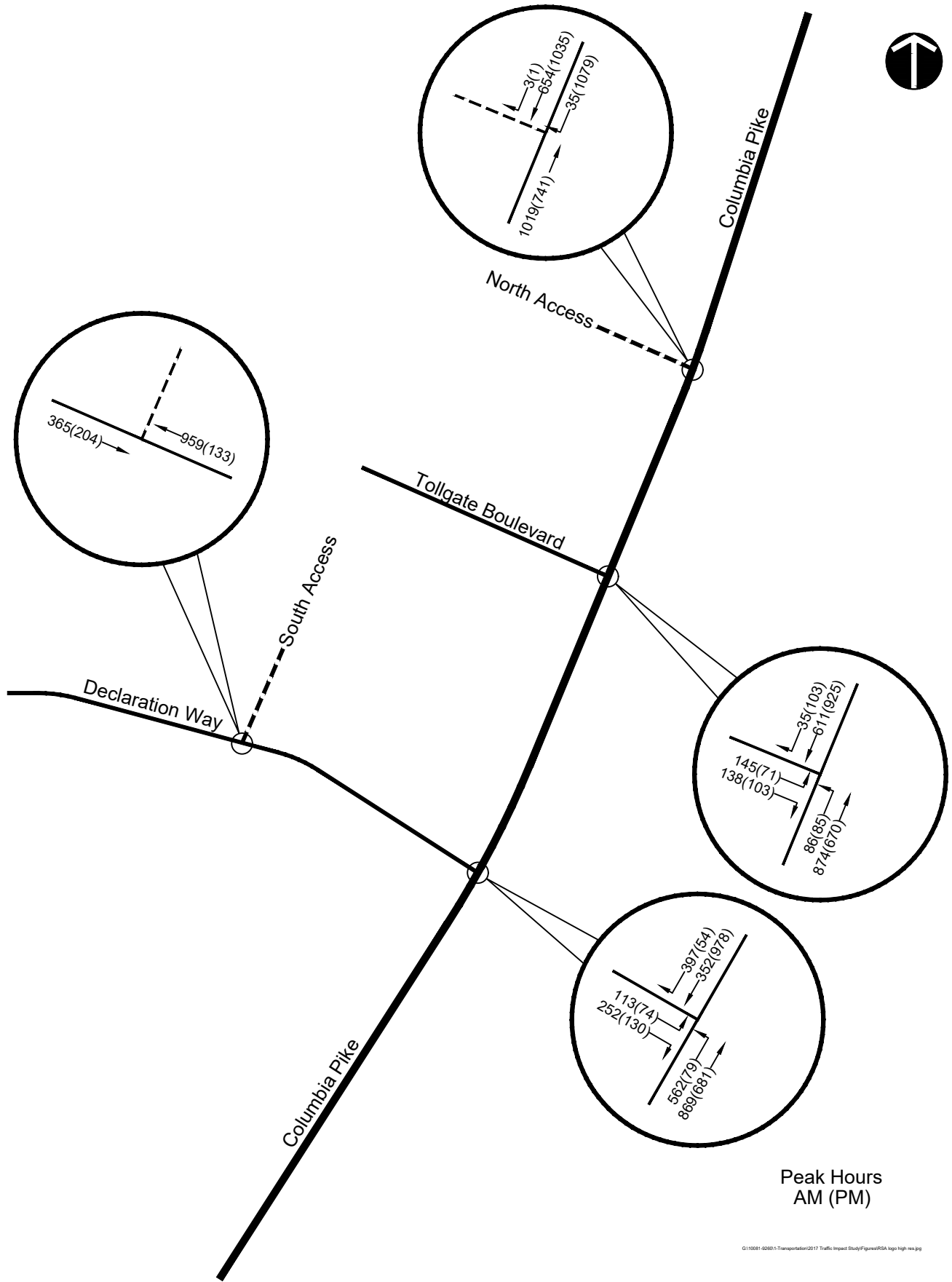
In order to assess the adequacy of the local transportation system, an evaluation of the current operational quality of intersections within the study area was required.

The peak hour of the adjacent street traffic was used to evaluate the traffic operations for access at Tollgate Village. To identify the peak periods for analysis, traffic counts were conducted in September 2018 at the following intersections:

- Columbia Pike at Tollgate Boulevard
- Columbia Pike at Tollgate Village Secondary Access (North)
- Columbia Pike at Declaration Way

The traffic counts were conducted from 6:00 a.m. to 9:00 a.m. and to 2:00 – 7:00 p.m. to identify the peak hour of traffic for analysis. According to the traffic counts conducted on Columbia Pike, the a.m. and p.m. peak hours in the study area for intersection analysis are **6:45 a.m. – 7:45 a.m.**, and **4:45 p.m. – 5:45 p.m.**, respectively.

Figure 3 shows the existing peak hour traffic volumes for the intersections in the study area.



Tollgate Village  
2018 Existing Traffic Volumes

Figure  
**3**



#### IV. FORECASTED BACKGROUND TRAFFIC

##### A. Introduction

Based on the proposed development schedule, the years 2022 and 2027 will be used to analyze the traffic impact of Tollgate Village.

Before any impacts to the study area could be addressed, some estimate of background traffic volumes for the horizon years 2022 and 2027 had to be established. Background traffic volumes were established by estimating potential growth due to small scale development and/or general population growth in the area.

##### B. Specific Development Growth

No specific, approved developments are located within the immediate study area on Columbia Pike. Traffic growth from developments outside of the study area was accounted for by applying an annual growth rate as described below.

##### C. Annual Growth

To establish traffic growth due to population growth or small scale development, Tennessee Department of Transportation (TDOT) historical traffic count data was obtained at locations within the general project vicinity. The TDOT historical traffic count data includes traffic volume counts conducted annually on Columbia Pike and the Goose Creek Bypass beginning in 1985. The available historical count data was tabulated for each location and analyzed to identify patterns or growth trends.

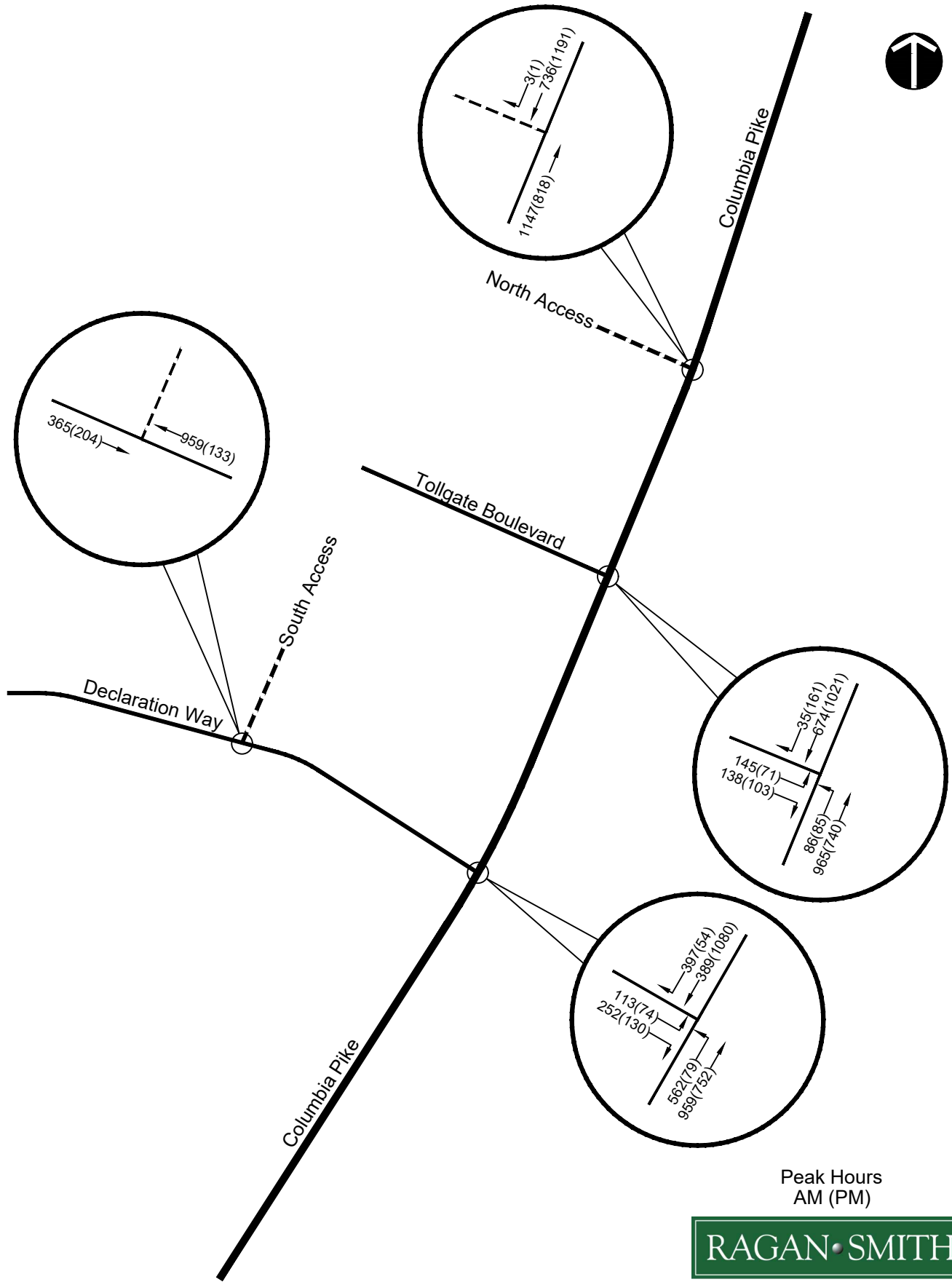
Based upon linear regression analysis of this data, we will use a **2.5 percent annual growth rate** as the base growth for the existing traffic volumes.

##### D. Background Traffic

Background traffic for the future traffic forecasts was compiled based on the following:

- 2018 existing traffic data
- 2.5% annual increase of traffic volumes for the period from 2016 to 2022
- 2.5% annual increase of traffic volumes for the period from 2016 to 2027

Background traffic volumes on the future roadway, representing existing traffic volumes plus background growth, for the year 2022 are shown in Figure 4. Background traffic volumes on the future roadway, representing existing traffic volumes plus background growth, for the year 2027 are shown in Figure 5.

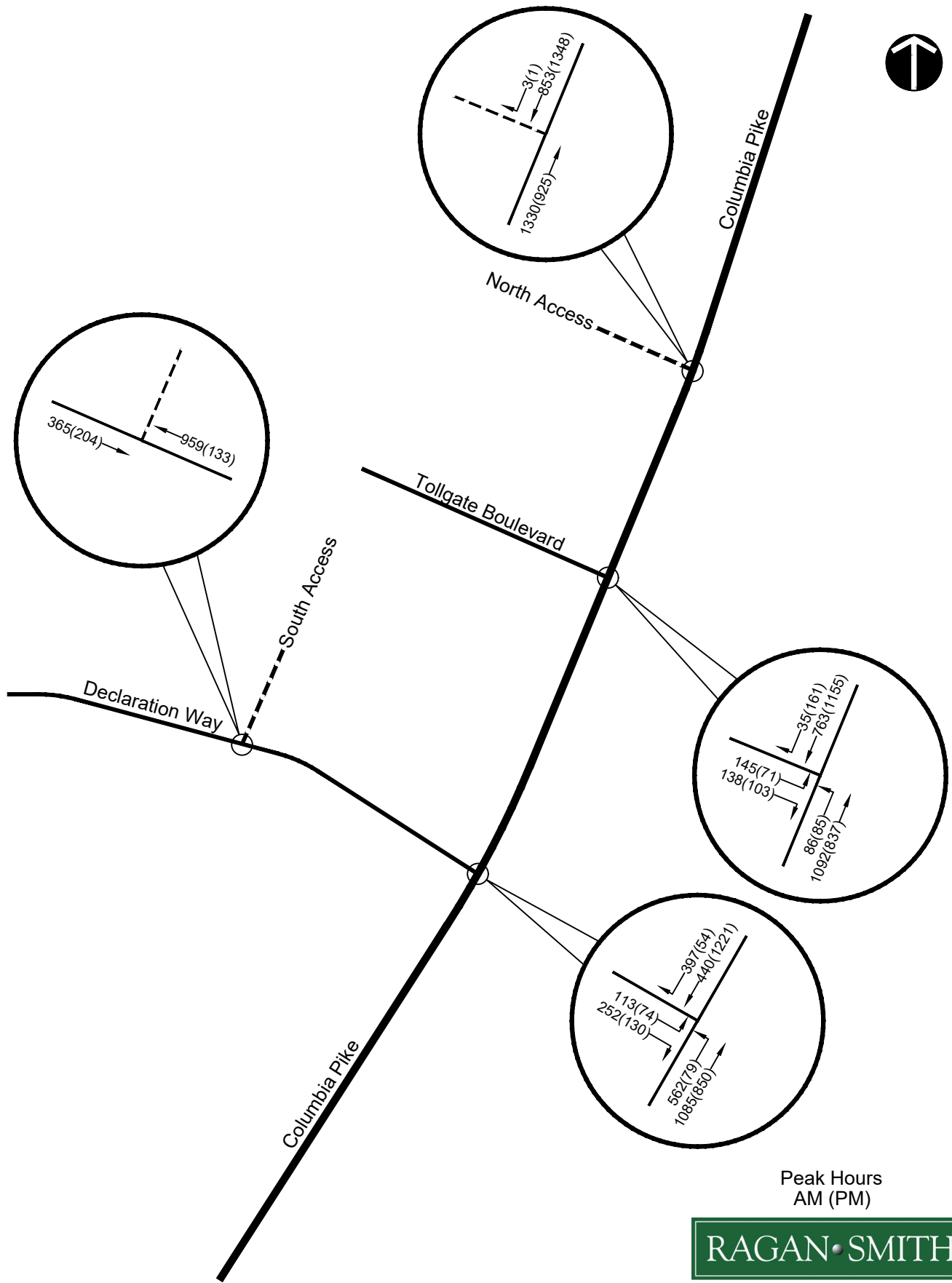


Peak Hours  
AM (PM)



Tollgate Village  
2022 Background Traffic Volumes

Figure  
4



Tollgate Village  
2027 Background Traffic Volumes

Figure  
**5**

**V. PROPOSED SITE TRAFFIC**

**A. Local Trip Generation Data**

To quantify site-related impacts within the study area, some estimate of future site trip generation and traffic assignment needed to be established. In many cases, trip generation rates for proposed developments are established using information for the weekday a.m. and p.m. peak hour of the adjacent street as shown in the *Trip Generation Manual, 10<sup>th</sup> Edition* published by the Institute of Transportation Engineers (ITE).

Previous traffic engineering experience for the single-family home and apartment uses at Tollgate Village has indicated that the actual trip generation for these uses at Tollgate Village may have different trip-making characteristics than the data that is presented in the *ITE Trip Generation Manual, 10<sup>th</sup> Edition*. Therefore, local data was collected at Tollgate Village for the existing single-family home and apartment uses to compare to *ITE Trip Generation Manual* estimates. A comparison of the trip generation data that was collected locally at Tollgate Village and the trip generation estimates presented in the *ITE Trip Generation Manual* is shown in Table 2 below.

TABLE 2								
TRIP GENERATION DATA COMPARISON								
Land Use	# of Units	Data Source	A.M. Peak Hour			P.M. Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
Single-Family Homes and Multifamily Housing (Low-Rise)	408 homes 81 Multifamily	ITE	88	249	337	288	167	455
		Local	67	202	269	183	116	299
	% Difference		- 23.9	- 18.9	- 20.2	- 36.5	- 30.5	- 34.3
Apartments (Multifamily Housing, Mid-Rise)	169 units	ITE	15	39	54	40	27	67
		Local	13	55	68	50	29	79
	% Difference		+ 15.4	+ 41.0	+ 25.9	+ 25.0	+ 7.4	+ 17.9

As indicated by the data in Table 2, the specific, local trip generation data collected for Tollgate Village is lower than the comparative trip generation rates presented in the *ITE Trip Generation Manual, 10<sup>th</sup> Edition*. Based upon the guidance in the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition* related to the use of local data to estimate trip generation, the weighted average rate during the peak hours for the local trip data is appropriate for use as a stand-alone local estimator. Therefore, the peak hour trip generation estimates for the remaining single-family home and apartment uses will use the trip rates from the locally collected data. The estimated trip generation for the remaining portions of the approved single-family home and apartment uses at Tollgate Village is shown in Table 3 below.

TABLE 3								
TRIP GENERATION: REMAINING APPROVED RESIDENTIAL								
Land Use	Total Units	Daily Trips <sup>(1)</sup>	A.M. Peak Hour <sup>(2)</sup>			P.M. Peak Hour <sup>(2)</sup>		
			Enter	Exit	Total	Enter	Exit	Total
Single Family Homes	236 homes	2,291	32	98	130	88	56	144
Apartments (Multifamily Housing, Mid-Rise)	32 units	173	2	11	13	9	6	15
<b>TOTAL</b>		<b>2,464</b>	<b>34</b>	<b>109</b>	<b>143</b>	<b>97</b>	<b>62</b>	<b>159</b>
<sup>(1)</sup> Estimated from the <i>ITE Trip Generation Manual, 10<sup>th</sup> Edition</i>								
<sup>(2)</sup> Estimated from locally collected data								

B. Horizon Year 2022 Trip Generation

For the horizon year 2022, the trip generation for Tollgate Village will include the remaining approved residential shown in Table 3 and the Tollgate Village Town Center (phases 1, 2A, and future phases). The Tollgate Town Center will consist of 231 multifamily (low-rise) residential units, 22,822 square feet of retail space, 7,171 square feet of restaurant space, and 17,742 square feet of office space. The trip generation for the Tollgate Village Town Center was estimated using the data presented in the ITE *Trip Generation Manual*, 10<sup>th</sup> Edition. Table 4 below shows the unadjusted trip generation for the Tollgate Village Town Center.

<b>TABLE 4</b>									
<b>UNADJUSTED TRIP GENERATION: TOLLGATE VILLAGE TOWN CENTER</b>									
Land Use	ITE <sup>(1)</sup> LUC	Total Units	Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing (Low-Rise)	220	231 units	1,706	35	90	125	91	63	154
Retail	820	22,822 sf	2,201	101	62	163	87	95	182
Restaurant (Quality Restaurant)	931	7,171 sf	601	26	6	32	36	23	59
General Office	710	17,742 sf	198	32	4	36	15	70	85
<b>TOTAL</b>			<b>4,706</b>	<b>194</b>	<b>162</b>	<b>356</b>	<b>229</b>	<b>251</b>	<b>480</b>
<small>(1) ITE LUC = Institute of Transportation Engineers (Trip Generation Manual) Land Use Code</small>									

Since the Tollgate Village Town Center will contain a mix of office, retail, restaurant, and residential land uses, some trip interaction between these uses is expected. These types of trips between different uses within a mixed-use development are defined as “internal” trips because they do not require the use of any roadway facilities outside of the development site. The impact and net effect of internal trips can be established using the methodology shown in the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition. For the retail, restaurant, office, and multifamily housing land uses at the Tollgate Village Town Center, the ITE *Trip Generation Handbook* indicates that approximately 16 percent of the a.m. peak hour trips and 26 percent of the p.m. peak hour trips will be internally captured. The single-family homes and apartments at Tollgate Village were not included in the internal capture reduction.

Table 5 below shows the total trip generation for Tollgate Village in the horizon year 2022 conditions. This includes the remaining approved residential trips shown in Table 3, the vacant portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center trips with peak hour reductions for internally captured trips.

<b>TABLE 5</b>								
<b>TRIP GENERATION: HORIZON YEAR 2022</b>								
Land Use	Total Units	Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
Single Family Homes	236 homes	2,291	32	98	130	88	56	144
Apartments	32 units	173	2	11	13	9	6	15
Multifamily Housing (Low-Rise)	231 units	1,706	34	82	116	62	49	111
Retail	22,822 sf	2,201	95	20	115	66	60	126
Restaurant	7,171 sf	601	7	3	10	21	9	30
General Office	25,242 sf	279	70	5	75	26	108	134
Medical Office	15,600 sf	512						
<b>TOTAL</b>		<b>7,763</b>	<b>240</b>	<b>219</b>	<b>459</b>	<b>272</b>	<b>288</b>	<b>560</b>



C. Horizon Year 2027 Trip Generation

As previously discussed in Section II.B of this report, potential development in the commercial area and outparcels at Tollgate Village was identified using the Town of Thompson's Station Land Development Ordinance to establish a feasible development scenario for the commercial area. This scenario was established in order to estimate future traffic for analysis purposes only. It is not binding and does not restrict the uses and sizes of development in the commercial area. Development in this area will be subject to the allowable uses and standards of the Town's Land Development Ordinance. An unadjusted estimate of trip generation for the future development scenario, including the Tollgate Village Town Center and the Tollgate Village commercial outparcels, is shown in Table 6.

<b>TABLE 6</b>									
<b>TRIP GENERATION: FUTURE DEVELOPMENT SCENARIO</b>									
Land Use	ITE <sup>(1)</sup> LUC	Total Units	Daily Trips	A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing (Low-Rise)	220	231 units	1,706	35	90	125	91	63	154
Retail (Shopping Center)	820	28,722 sf	2,574	103	63	166	104	112	216
Drug Store	880	12,900 sf	1,143	36	20	56	54	56	110
Hair Salon	918	1,400 sf	n/a	1	1	2	1	2	3
Veterinarian	640	2,140 sf	46	4	4	8	4	4	8
Walk-In Bank	911	3,500 sf	n/a	41	38	79	47	45	92
Copy, Print, and Express Ship Store	920	1,400 sf	n/a	3	1	4	4	6	10
General Office	710	45,242 sf	492	73	10	83	21	94	115
Medical Office	720	34,600 sf	1,242	68	19	87	33	86	119
Restaurant (Quality Restaurant)	931	7,171 sf	601	26	6	32	36	23	59
Restaurant (High-Turnover Sit Down)	932	4,900 sf	550	27	22	49	30	18	48
Restaurant (Fast Food w/o Drive Thru)	933	2,500 sf	866	39	26	65	36	35	71
Day Care Center	565	50 students	225	23	20	43	20	22	42
<b>TOTAL</b>			<b>9,445</b>	<b>479</b>	<b>320</b>	<b>799</b>	<b>481</b>	<b>566</b>	<b>1,047</b>
<sup>(1)</sup> ITE LUC = Institute of Transportation Engineers (Trip Generation Manual) Land Use Code									

As previously discussed, since the Tollgate Village Town Center and Tollgate Village commercial outparcels will contain a mix of office, retail, restaurant, and residential land uses, some trip interaction between these uses is expected. These types of trips between different uses within a mixed-use development are defined as "internal" trips because they do not require the use of any roadway facilities outside of the development site. The impact and net effect of internal trips can be established using the methodology shown in the ITE *Trip Generation Handbook, 3<sup>rd</sup> Edition*. For the retail, restaurant, office, and multifamily housing land uses at the Tollgate Village Town Center and Tollgate Village commercial outparcels, the ITE *Trip Generation Handbook* indicates that approximately 26 percent of the a.m. peak hour trips and 34 percent of the p.m. peak hour trips will be internally captured. The single-family homes and apartments at Tollgate Village were not included in the internal capture reduction.

Table 5 below shows the total trip generation for Tollgate Village in the horizon year 2027 conditions. This includes the remaining approved residential trips shown in Table 3, the Tollgate Village Town Center, and the Tollgate Village commercial outparcels scenario based on the Town's Land Development Ordinance with peak hour reductions for internally captured trips in the Town Center and commercial outparcels.

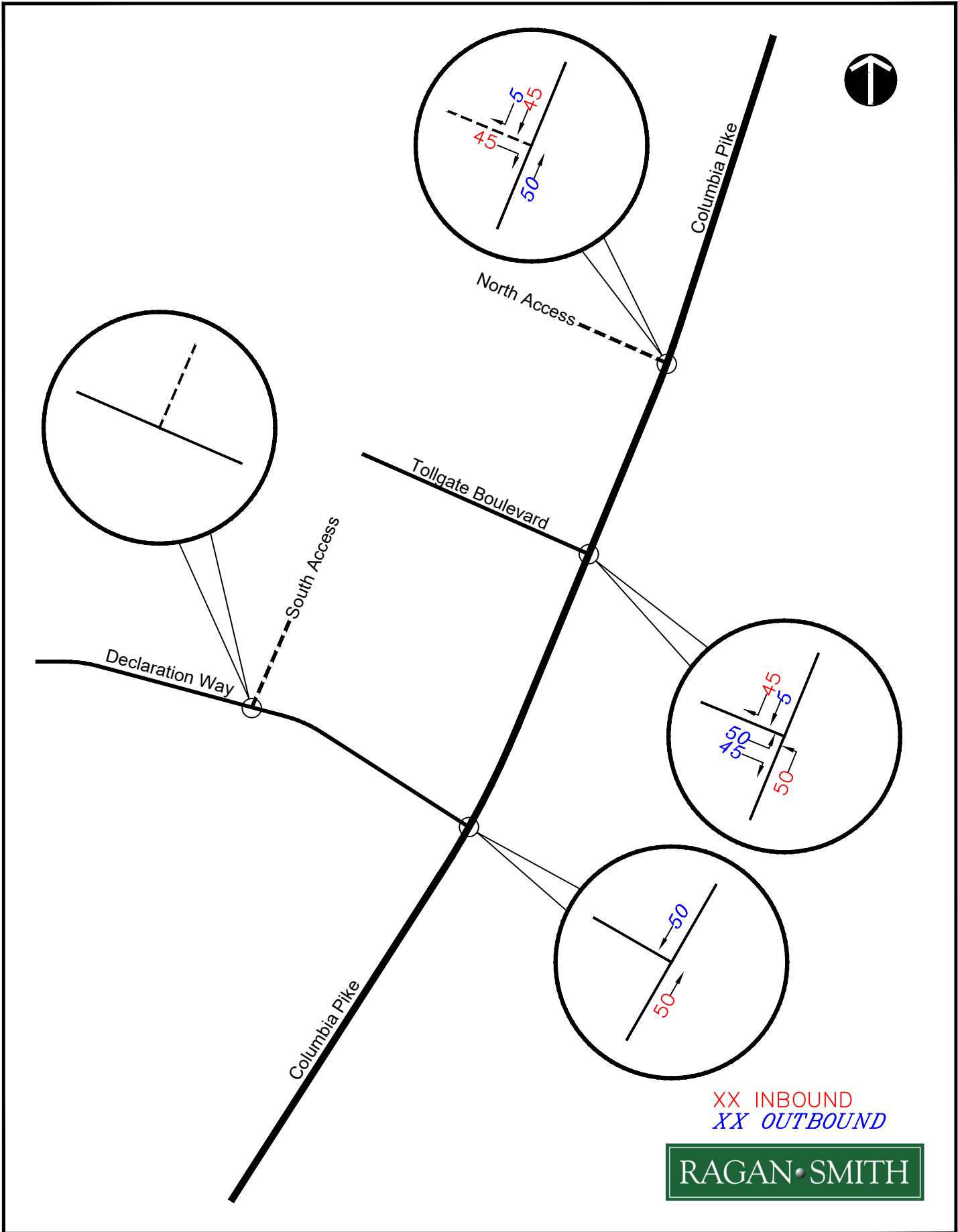
<b>TABLE 7</b>								
<b>TRIP GENERATION: HORIZON YEAR 2027</b>								
<b>Land Use</b>	<b>Total Units</b>	<b>Daily Trips</b>	<b>A.M. Peak Hour</b>			<b>P.M. Peak Hour</b>		
			<b>Enter</b>	<b>Exit</b>	<b>Total</b>	<b>Enter</b>	<b>Exit</b>	<b>Total</b>
Single Family Homes	236 homes	2,291	32	98	130	88	56	144
Apartments (Multifamily Housing, Mid-Rise)	32 units	173	2	11	13	9	6	15
Multifamily Housing (Low-Rise)	231 units	1,706	32	69	101	33	34	67
Retail, including: <ul style="list-style-type: none"> <li>• Shopping Center</li> <li>• Drug Store</li> <li>• Hair Salon</li> <li>• Veterinarian</li> <li>• Walk-In Bank</li> <li>• Copy, Print, and Express Ship Store</li> </ul>	28,722 sf 12,900 sf 1,400 sf 2,140 sf 3,500 sf 1,400 sf	3,763	171	103	274	154	148	302
Office, including: <ul style="list-style-type: none"> <li>• General Office</li> <li>• Medical Office</li> </ul>	45,242 sf 34,600 sf	1,734	116	3	119	44	162	206
Restaurant, including: <ul style="list-style-type: none"> <li>• Quality Restaurant</li> <li>• High-Turnover Sit Down</li> <li>• Fast Food w/o Drive Thru</li> </ul>	7,171 sf 4,900 sf 2,500 sf	2,017	39	27	66	60	30	90
Day Care Center	50 students	225	23	20	43	20	22	42
<b>TOTAL</b>		<b>11,909</b>	<b>415</b>	<b>331</b>	<b>746</b>	<b>408</b>	<b>458</b>	<b>866</b>

**D. Site Trip Distribution and Assignment**

Site trips were distributed based primarily upon the prevalent commuter patterns in the area and the proximity and routes to major transportation facilities. Figures 6 and 7 show the distribution of residential and mixed-use/commercial site trips, respectively, for Tollgate Village.

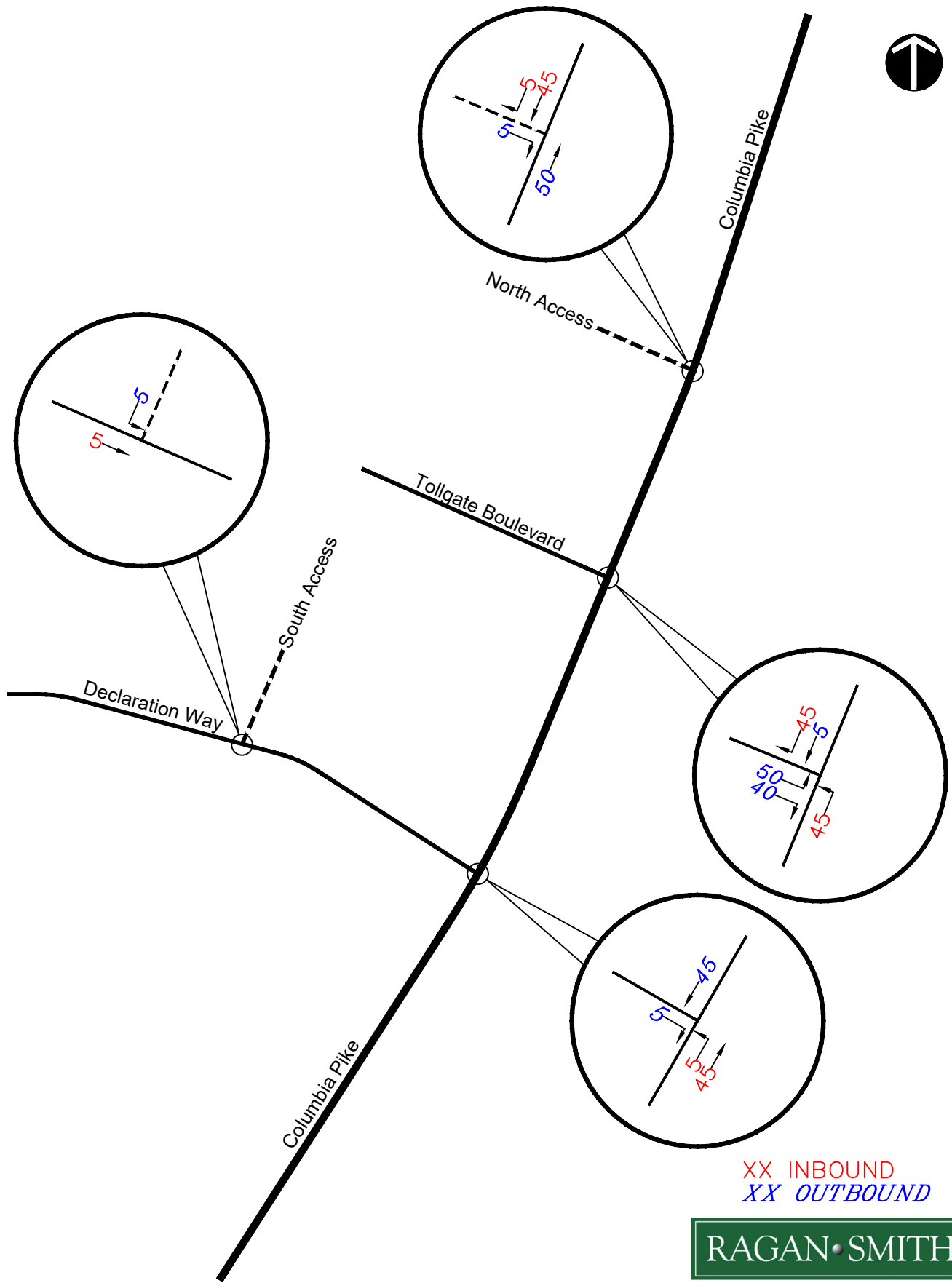
Site traffic volumes generated by future sections of Tollgate Village in the horizon year 2022 are shown in Figure 8. The accumulation of existing, background growth, and site-generated traffic for the horizon year 2022 is shown in Figure 9.

Site traffic volumes generated by future sections of Tollgate Village in the horizon year 2027 are shown in Figure 10. The accumulation of existing, background growth, and site-generated traffic for the horizon year 2027 is shown in Figure 11.



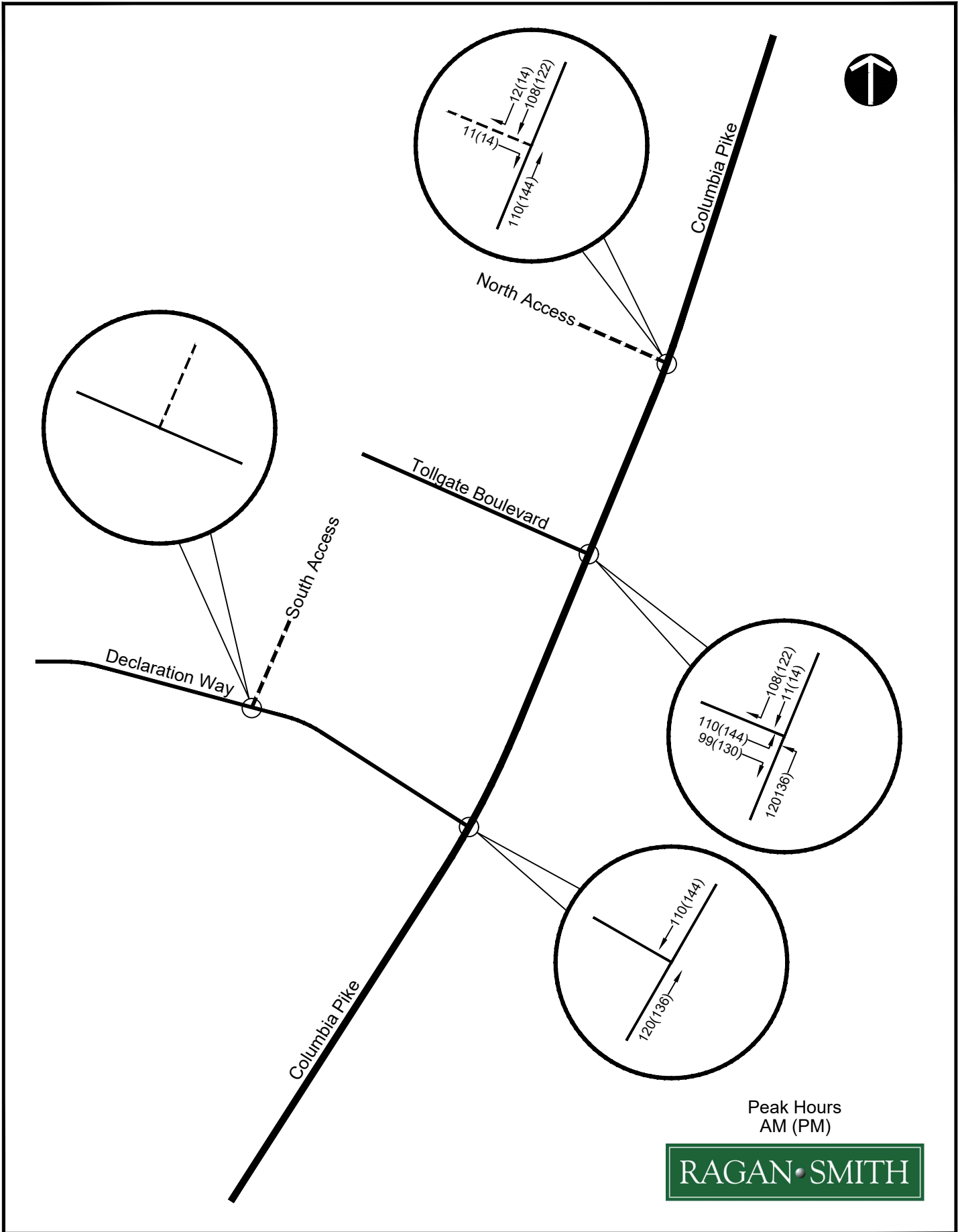
Tollgate Village  
2022 Site Trip Distribution

Figure  
**6**



Tollgate Village  
2027 Site Trip Distribution

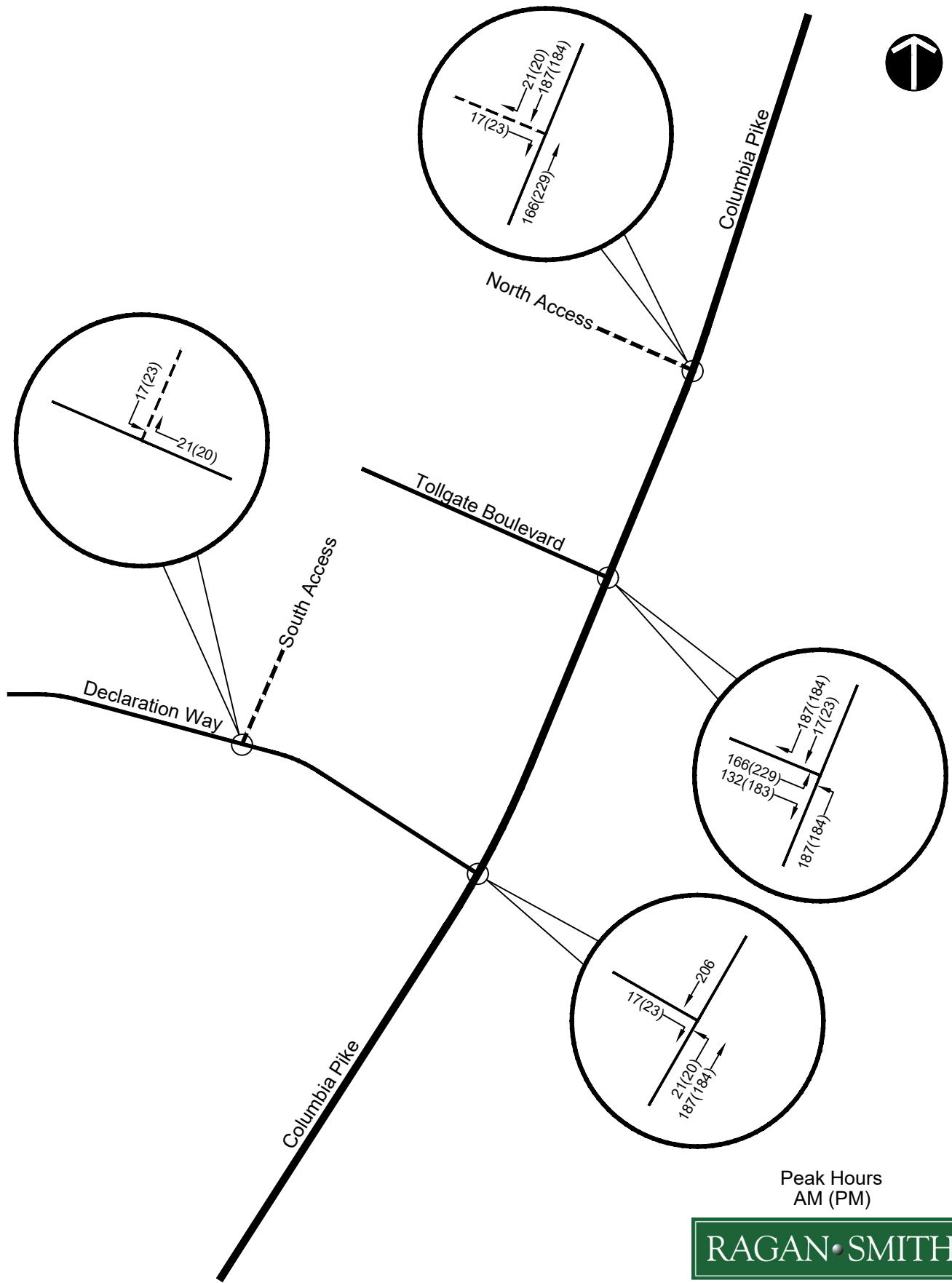
Figure  
7



Tollgate Village  
2022 Site Traffic Volumes

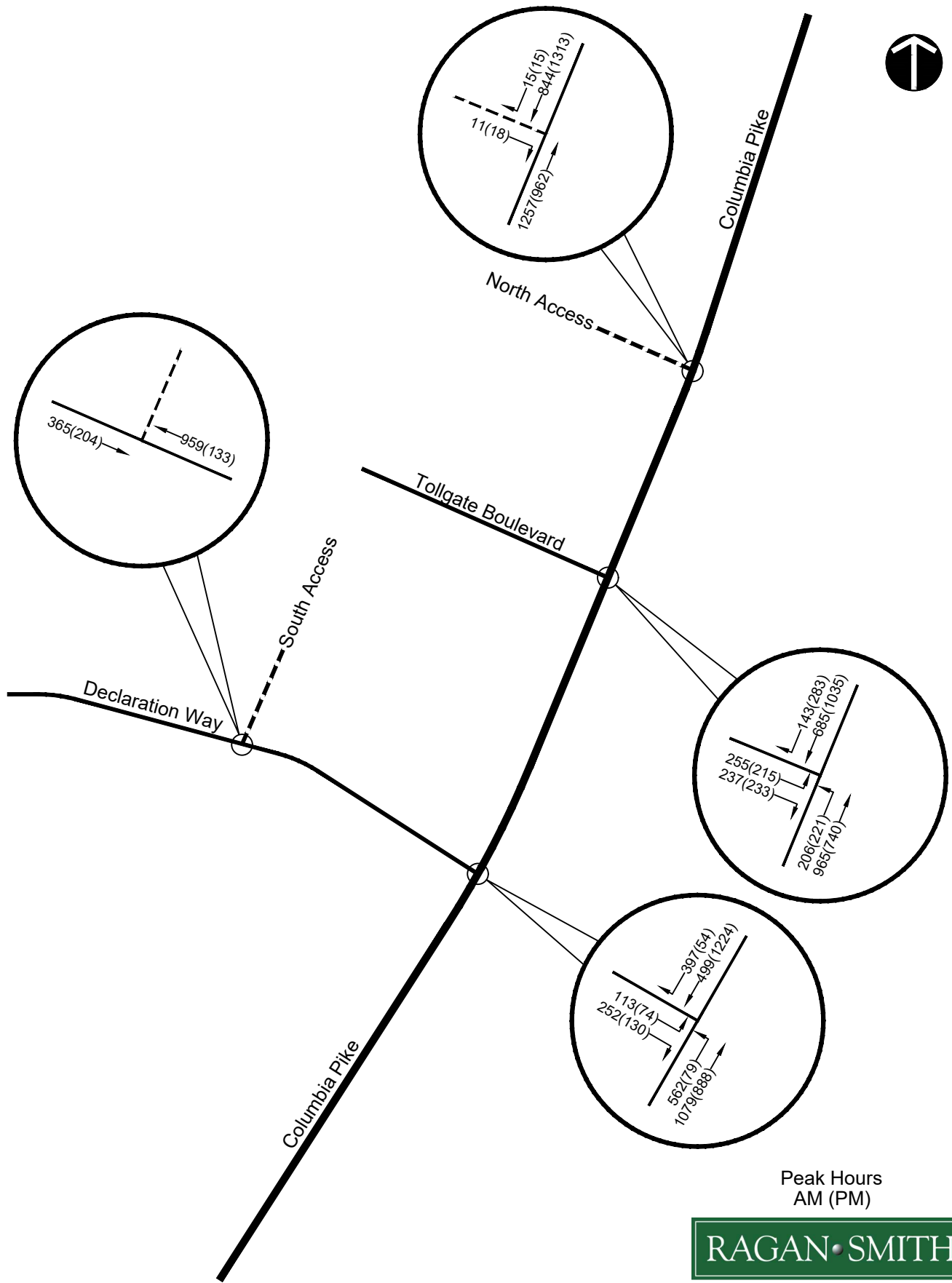
Figure  
**8**





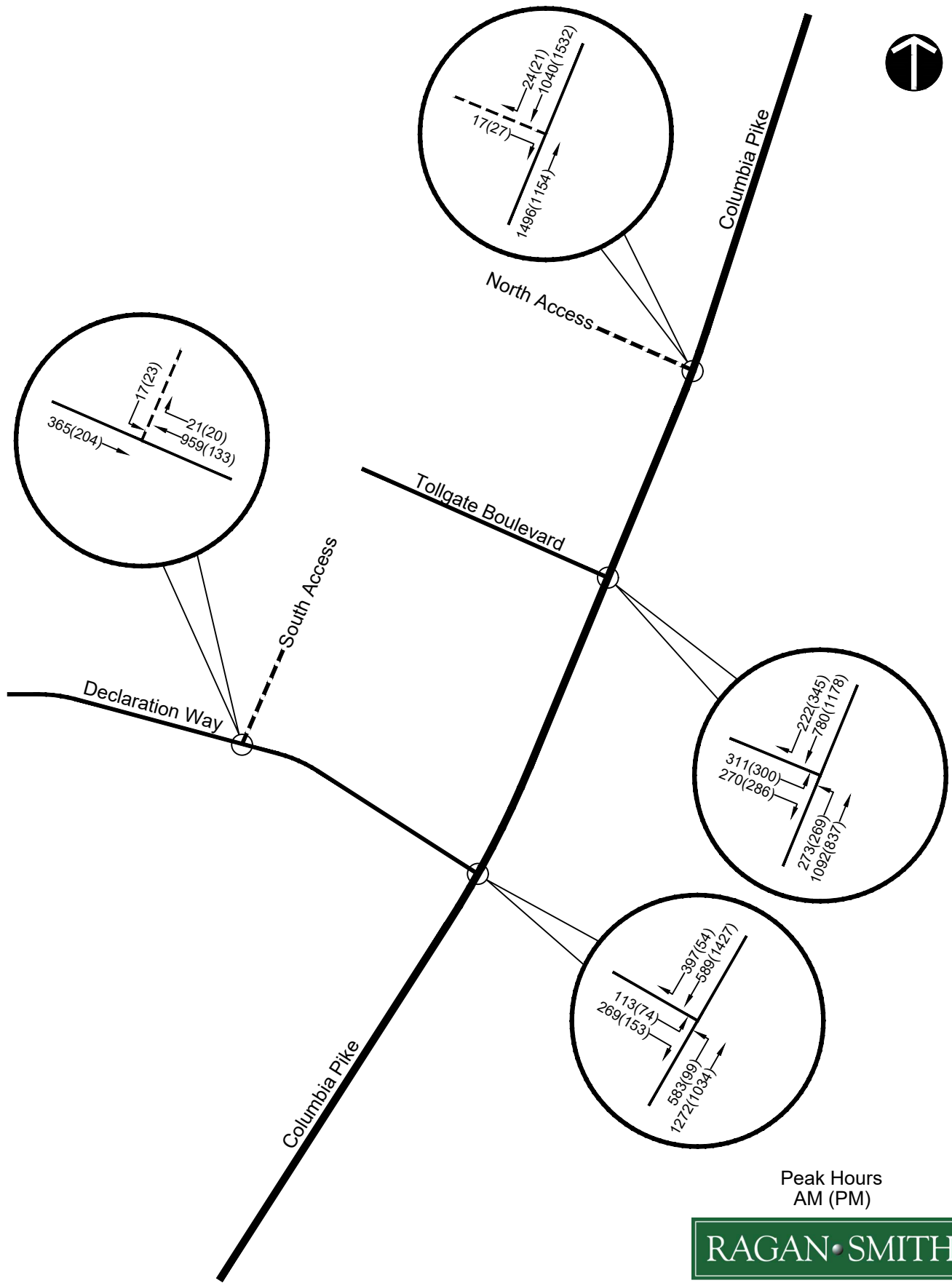
Tollgate Village  
2027 Site Traffic Volumes

Figure  
9



Tollgate Village  
2022 Total Traffic Volumes

Figure  
**10**



Peak Hours  
AM (PM)



Tollgate Village  
2027 Total Traffic Volumes

Figure  
**11**

**VI. TRANSPORTATION ANALYSIS**

**A. Intersection Capacity Analysis**

In order to determine the quality of existing traffic operations and identify capacity deficiencies, intersection capacity analyses were conducted at the following intersections.

- Columbia Pike at Tollgate Boulevard
- Columbia Pike at North Access
- Columbia Pike at Declaration Way
- Declaration Way at Branford Place

Capacity analyses were conducted according to the methodology and procedures outlined in the *Highway Capacity Manual*, HCM 2010, published by Transportation Research Board. Capacity analysis results for the a.m. peak hour are shown in Table 8.

TABLE 8						
INTERSECTION CAPACITY ANALYSIS RESULTS – A.M. PEAK HOUR						
Intersection	Condition <sup>(1)</sup>	Level of Service (avg. delay/vehicle – sec.)				
		Existing	2022 Horizon		2027 Horizon	
			Back-ground	Total	Back-ground	Total
Columbia Pike at Tollgate Boulevard	Overall Intersection	A (8.9)	A (8.8)	B (11.9)	A (8.9)	B (14.3)
	NB Left	A (6.9)	A (6.8)	B (10.0)	A (6.9)	B (14.0)
	NB Thru	A (5.3)	A (5.2)	A (7.1)	A (5.4)	A (8.7)
	SB Thru	B (10.3)	B (10.0)	B (14.5)	B (10.1)	B (17.7)
	SB Right	A (4.7)	A (4.5)	A (5.4)	A (4.3)	A (5.9)
	EB Left	B (19.6)	C (20.9)	C (23.8)	C (22.2)	C (28.5)
	EB Right	B (16.2)	B (17.4)	B (16.8)	B (18.6)	B (18.3)
Columbia Pike at Secondary Access (North)	TWSC EB Right	-	-	B (11.8)	-	B (13.2)
Columbia Pike at Declaration Way	NB Left	F (89.5)	F (122.2)	F (125.7)	F (125.0)	F (144.9)
	TWSC EB Left	E (55.5)	E (57.8)	E (58.3)	E (58.2)	E (58.9)
	TWSC EB Right	F (144.6)	F (182.4)	F (186.2)	F (185.5)	F (223.5)
Declaration Way at Branford Place	TWSC SB Left	-	-	-	-	C (19.9)

<sup>(1)</sup> TWSC = Two-way Stop Control

Capacity analysis results for the p.m. peak hour are shown in Table 9.

TABLE 9						
INTERSECTION CAPACITY ANALYSIS RESULTS – P.M. PEAK HOUR						
Intersection	Condition <sup>(1)</sup>	Level of Service (avg. delay/vehicle – sec.)				
		Existing	2022 Horizon		2027 Horizon	
			Back-ground	Total	Back-ground	Total
Columbia Pike at Tollgate Boulevard	Overall Intersection	A (8.5)	A (8.4)	B (13.2)	A (8.5)	B (18.6)
	NB Left	A (7.3)	A (7.5)	B (14.7)	A (8.0)	C (29.0)
	NB Thru	A (4.1)	A (4.0)	A (5.6)	A (3.8)	A (7.5)
	SB Thru	B (10.2)	B (10.1)	B (15.1)	B (10.1)	C (21.6)
	SB Right	A (4.6)	A (4.4)	A (5.4)	A (4.1)	A (5.8)
	EB Left	C (21.3)	C (23.1)	C (29.7)	C (25.7)	D (37.0)
	EB Right	B (19.1)	C (20.9)	C (22.3)	C (23.4)	C (25.1)
Columbia Pike at Secondary Access (North)	TWSC EB Right	-	-	C (15.3)	C (15.0)	C (18.0)
Columbia Pike at Declaration Way	NB Left	B (11.2)	B (11.9)	B (13.4)	B (13.1)	C (16.4)
	TWSC EB Left	D (32.7)	E (39.1)	F (57.8)	F (51.7)	F (105.3)
	TWSC EB Right	B (14.9)	C (16.1)	C (18.7)	C (18.1)	D (25.3)
Declaration Way at Branford Place	TWSC SB Left	-	-	-	-	B (10.6)

<sup>(1)</sup> TWSC = Two-way Stop Control

Level of service (LOS) criteria for unsignalized intersections is shown in Table 10.

TABLE 10		
LEVEL OF SERVICE DESCRIPTIONS FOR UNSIGNALIZED INTERSECTIONS		
Level of Service	Description	Control Delay (sec. /veh.)
A	Usually no conflicting traffic	0 - 10
B	Occasionally some delay due to conflicting traffic	> 10 - 15
C	Delay is noticeable but not inconveniencing	> 15 - 25
D	Delay is noticeable and irritating, increased risk taking	> 25 - 35
E	Delay approaches tolerance level, risk taking likely	> 35 - 50
F	Delay exceeds tolerance level, high likelihood of risk taking	> 50

Source: Highway Capacity Manual, HCM 2010



Level of service (LOS) criteria for signalized intersections is shown in Table 11.

<b>TABLE 11</b>		
<b>LEVEL OF SERVICE DESCRIPTIONS FOR SIGNALIZED INTERSECTIONS</b>		
<b>Level of Service</b>	<b>Description</b>	<b>Control Delay (sec. /veh.)</b>
A	Volume-to-capacity ratio is low, progression is extremely favorable, most vehicles travel through intersection without stopping.	0 - 10
B	Volume-to-capacity ratio is low, progression is good and/or short cycle lengths is present, more vehicles stop than for LOS A.	> 10 – 20
C	Progression is favorable and/or cycle length is moderate, number of vehicles stopping is significant although many still pass through intersection without stopping.	> 20 – 35
D	Volume-to-capacity ratio is high, progression is ineffective, cycle length is long, many vehicles stop.	> 35 – 55
E	Volume-to-capacity ratio is high, progression is unfavorable, cycle length is long, many vehicles stop.	> 55 – 80
F	Volume-to-capacity ratio is very high, progression is very poor, cycle length is long, most cycles fail to clear the queue.	> 80
Source: <u>Highway Capacity Manual</u> , HCM 2010		

## **VII. CONCLUSIONS AND RECOMMENDATIONS**

### **A. Introduction**

Based upon a review of the existing and future proposed conditions within the study area, we offer the conclusions and recommendations shown below.

### **B. General Conclusions and Recommendations**

- Access to Columbia Pike for Tollgate Village can be provided at level of service D or better via the existing Tollgate Boulevard and Secondary Access (North) routes. Secondary access to Declaration Way as currently shown on the Tollgate Village Concept Plan will provide additional connectivity for Tollgate Village and Independence High School but is not necessary to address traffic congestion due to Tollgate Village and will not result in a significant change or improvement to the level of service at the intersections on Columbia Pike.

### **C. Columbia Pike at Tollgate Boulevard**

- The traffic signal and turn lane improvements that were constructed at this intersection by the Tollgate Village developer in 2017 provide additional capacity and traffic control for the full build-out of Tollgate Village. In the future, traffic operations at this intersection are expected to be characterized by overall level of service B during the a.m. and p.m. peak hours with individual turning movements operating at level of service D or better.
- No additional laneage or traffic control modifications are recommended for this intersection to mitigate the impact of the Tollgate Village development.

### **D. Columbia Pike at Secondary Access (North)**

- The Columbia Pike access located north of Tollgate Boulevard in the area of the existing Shelter Insurance Office Building was constructed by the Tollgate Village developer in 2018.
- Based on previous traffic impact study findings and recommendations, the Secondary Access (North) is restricted to right-in/right-out only access at Columbia Pike due to the width of Columbia Pike and proximity to the bridge over the West Harpeth River.
- The Secondary Access (North) should be modified to provide full turning movement access when Columbia Pike has been widened by TDOT to consist of a five-lane roadway to the north of Tollgate Village and across the West Harpeth River.
- Future widening of Columbia Pike by TDOT should provide the extension of the existing five-lane section north of Tollgate Village and across the West Harpeth River. The extension of this roadway section will provide a northbound left turn lane for the North Access to Tollgate Village.
- When the North Access to Tollgate Village is converted to provide full turning movement access, a southbound right turn lane should be constructed on Columbia Pike. The final design of the Columbia Pike widening, the West Harpeth River crossing, and impacts to adjacent utilities and floodways/floodplains should be considered when determining the feasibility and final design of this right turn lane.

E. Columbia Pike at Declaration Way

- Williamson County Schools should continue to utilize a traffic control officer to direct traffic at this intersection during peak arrival and dismissal periods. Based upon the high volume and peaking characteristics of the school traffic, a permanent traffic signal installation could be considered as an alternative to the continued use of a traffic control officer.
- The existing Independence High School traffic uses the shoulder of Columbia Pike as a southbound right turn lane during the peak morning arrival period. The existing southbound right turn lane on Columbia Pike at Declaration Way could be extended to have a length of 500 feet with a taper length of 100 feet as part of future TDOT 3R (Resurfacing, Restoring, or Rehabilitation) projects on Columbia Pike to be reflective of the actual roadway usage in the area.
- As previously discussed, a secondary access from Tollgate Village to Declaration Way is shown in the current Tollgate Village Concept Plan. This access will provide additional connectivity for Tollgate Village and Independence High School but is not necessary to address traffic congestion due to Tollgate Village and will not result in a significant change or improvement to the level of service at other intersections on Columbia Pike.

F. Tollgate Village Secondary Access (South)

- The Tollgate Village developer, Town staff, and Williamson County Schools staff should continue to coordinate on the agreements necessary to obtain right-of-way or an easement to access and use Declaration Way between the proposed Secondary Access (South) and Columbia Pike.
- The Secondary Access (South) does not need to be constructed as part of any current phase of development at Tollgate Village because the access is not necessary to address traffic congestion, will not result in a significant change or improvement to the level of service at other intersections on Columbia Pike, and because the agreements involving the Town of Thompson's Station and Williamson County Schools have not been approved by the appropriate decision-making bodies and have not been prepared or executed.
- A schedule for the construction of the Secondary Access (South) should be established when the appropriate approvals are received from the appropriate decision-making bodies at the Town of Thompson's Station and Williamson County Schools and when the necessary agreements have been prepared and executed.
- When the Tollgate Village Secondary Access (South) is constructed, new pavement markings consistent with the MUTCD should be installed on Declaration Way between Columbia Pike and the South Access.
- The intersection of Declaration Way and the Secondary Access (South) should operate as a two-way stop control intersection. The South Access should be the minor street with stop control and Declaration Way should be the major street without stop control.



## **APPENDIX**

- A. TRAFFIC COUNTS**
- B. TRIP GENERATION WORKSHEETS**
- C. TRAFFIC ASSIGNMENT WORKSHEETS**
- D. CAPACITY ANALYSIS WORKSHEETS – EXISTING CONDITIONS**
- E. CAPACITY ANALYSIS WORKSHEETS – 2022 BACKGROUND CONDITIONS**
- F. CAPACITY ANALYSIS WORKSHEETS – 2022 TOTAL TRAFFIC CONDITIONS**
- G. CAPACITY ANALYSIS WORKSHEETS – 2027 BACKGROUND CONDITIONS**
- H. CAPACITY ANALYSIS WORKSHEETS – 2027 TOTAL TRAFFIC CONDITIONS**





**APPENDIX A**  
**TRAFFIC COUNTS**







Date: 5-Sep-18  
 Location: Columbia Pk @ Tollgate Blvd

A.M. Peak Hour (6:00 - 9:00)

Time	Columbia Pike			Columbia Pike			Tollgate Blvd			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
6:45 - 7:00	18	223	0	0	111	6	25	0	31	0	0	0
7:00 - 7:15	23	171	0	0	241	5	35	0	27	0	0	0
7:15 - 7:30	21	187	0	0	188	8	37	0	56	0	0	0
7:30 - 7:45	24	293	0	0	71	16	48	0	24	0	0	0
<b>6:45 - 7:45</b>	<b>86</b>	<b>874</b>	<b>0</b>	<b>0</b>	<b>611</b>	<b>35</b>	<b>145</b>	<b>0</b>	<b>138</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.941

P.M. Peak Hour (2:00 - 7:00)

Time	Columbia Pike			Columbia Pike			Tollgate Blvd			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
16:45 - 17:00	29	163	0	0	220	42	16	0	21	0	0	0
17:00 - 17:15	14	177	0	0	259	44	22	0	33	0	0	0
17:15 - 17:30	26	161	0	0	248	36	12	0	27	0	0	0
17:30 - 17:45	16	169	0	0	198	39	21	0	22	0	0	0
<b>16:45 - 17:45</b>	<b>85</b>	<b>670</b>	<b>0</b>	<b>0</b>	<b>925</b>	<b>161</b>	<b>71</b>	<b>0</b>	<b>103</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.918









Date: 5-Sep-18  
 Location: Columbia Pk @ Secondary Access (North)

A.M. Peak Hour (6:30 - 9:00)

Time	Columbia Pike			Columbia Pike			Secondary Access (North)			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
6:45 - 7:00	0	249	0	0	122	1	1	0	0	0	0	0
7:00 - 7:15	0	203	0	0	249	1	0	0	0	0	0	0
7:15 - 7:30	0	224	0	0	199	1	0	0	0	0	0	0
7:30 - 7:45	0	343	0	0	84	0	0	0	0	0	0	0
<b>6:45 - 7:45</b>	<b>0</b>	<b>1019</b>	<b>0</b>	<b>0</b>	<b>654</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.925

P.M. Peak Hour (2:00 - 7:00)

Time	Columbia Pike			Columbia Pike			Secondary Access (North)			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
16:45 - 17:00	0	179	0	0	261	0	0	0	2	0	0	0
17:00 - 17:15	0	197	0	0	304	0	0	0	2	0	0	0
17:15 - 17:30	0	175	0	0	278	1	0	0	0	0	0	0
17:30 - 17:45	0	190	0	0	236	0	0	0	0	0	0	0
<b>16:45 - 17:45</b>	<b>0</b>	<b>741</b>	<b>0</b>	<b>0</b>	<b>1079</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.907







Date: 5-Sep-18  
 Location: Columbia Pk @ Declaration Way

A.M. Peak Hour (6:00 - 9:00)

Time	Columbia Pike			Columbia Pike			Declaration Way			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
6:45 - 7:00	152	238	0	0	83	53	5	0	20	0	0	0
7:00 - 7:15	121	187	0	0	88	176	16	0	80	0	0	0
7:15 - 7:30	194	156	0	0	99	148	47	0	75	0	0	0
7:30 - 7:45	95	288	0	0	82	20	45	0	77	0	0	0
<b>6:45 - 7:45</b>	<b>562</b>	<b>869</b>	<b>0</b>	<b>0</b>	<b>352</b>	<b>397</b>	<b>113</b>	<b>0</b>	<b>252</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.885

P.M. Peak Hour (2:00 - 7:00)

Time	Columbia Pike			Columbia Pike			Declaration Way			-		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
16:45 - 17:00	27	172	0	0	225	14	18	0	37	0	0	0
17:00 - 17:15	11	183	0	0	286	11	14	0	25	0	0	0
17:15 - 17:30	18	175	0	0	258	12	10	0	21	0	0	0
17:30 - 17:45	23	151	0	0	209	17	32	0	47	0	0	0
<b>16:45 - 17:45</b>	<b>79</b>	<b>681</b>	<b>0</b>	<b>0</b>	<b>978</b>	<b>54</b>	<b>74</b>	<b>0</b>	<b>130</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: 0.942









Date: 5-Sep-18  
 Location: Tollgate Blvd @ Vintage Tollgate

A.M. Peak Hour (6:00 - 9:00)

Time	Vintage Tollgate			-			Tollgate Blvd			Tollgate Blvd		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
0:00 - 0:15	0	0	0	0	0	0	0	0	0	0	0	0
0:15 - 0:30	0	0	0	0	0	0	0	0	0	0	0	0
0:30 - 0:45	0	0	0	0	0	0	0	0	0	0	0	0
0:45 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0
<b>0:00 - 1:00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: #DIV/0!

P.M. Peak Hour (2:00 - 7:00)

Time	Vintage Tollgate			-			Tollgate Blvd			Tollgate Blvd		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0
<b>12:00 - 13:00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: #DIV/0!







Date: 5-Sep-18  
 Location: Branford Place @ Vintage Tollgate

A.M. Peak Hour (6:00 - 9:00)

Time	-			Branford Place			Vintage Tollgate			Portsmouth Dr		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
0:00 - 0:15	0	0	0	0	0	0	0	0	0	0	0	0
0:15 - 0:30	0	0	0	0	0	0	0	0	0	0	0	0
0:30 - 0:45	0	0	0	0	0	0	0	0	0	0	0	0
0:45 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0
<b>0:00 - 1:00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: #DIV/0!

P.M. Peak Hour (2:00 - 7:00)

Time	-			Branford Place			Vintage Tollgate			Portsmouth Dr		
	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0
<b>12:00 - 13:00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Peak Hour Factor: #DIV/0!

## **APPENDIX B**

# **TRIP GENERATION WORKSHEETS**

**TRIP GENERATION SUMMARY: 2022 HORIZON YEAR**

*Trip Generation Manual, 10<sup>th</sup> Edition, Institute of Transportation Engineers*

LUC	Land Use	# of Units	Trip Generation						
			Daily	A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
220	Multifamily Housing (Low-Rise)	231 Dwelling Units	1,706	35	90	125	91	63	154
565	Day Care Center	0 Students	0	0	0	0	0	0	0
640	Animal Hospital/Veterinary Clinic	0 GSF	0	0	0	0	0	0	0
710	General Office Building	25,242 GSF	279	43	6	49	17	76	93
720	Medical-Dental Office Building	15,600 GSF	512	34	9	43	15	40	55
820	Shopping Center	22,822 GSF	2,201	101	62	163	87	95	182
880	Pharmacy/Drugstore without Drive-Through Window	0 GSF	0	0	0	0	0	0	0
911	Walk-in Bank	0 GSF	n/a	0	0	0	0	0	0
918	Hair Salon	0 GSF	n/a	0	0	0	0	0	0
920	Copy, Print, and Express Ship Store	0 GSF	n/a	0	0	0	0	0	0
931	Quality Restaurant	7,171 GSF	601	26	6	32	36	23	59
932	High-Turnover (Sit-Down) Restaurant	0 GSF	0	0	0	0	0	0	0
933	Fast Food Restaurant without Drive-Through Window	0 GSF	0	0	0	0	0	0	0
<b>TOTAL:</b>			<b>5,299</b>	<b>239</b>	<b>173</b>	<b>412</b>	<b>246</b>	<b>297</b>	<b>543</b>



## TRIP GENERATION

**Multifamily Housing (Low-Rise):            231    Dwelling Units**

Use ITE Land Use Code 220 (Multifamily Housing, Low-Rise) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$T = 7.56(X) - 40.86$$

$$T = 7.56(231) - 40.86$$

$$T = 1706$$

### A.M. Peak Hour of of Generator

$$\ln(T) = 0.94 \ln(X) - 0.29$$

$$\ln(T) = 0.94 \ln(231) - 0.29$$

$$T = 125$$

$$\text{Enter} = 0.28(125) = 35$$

$$\text{Exit} = 0.72(125) = 90$$

### P.M. Peak Hour of Generator

$$T = 0.66(X) + 1.41$$

$$T = 0.66(231) + 1.41$$

$$T = 154$$

$$\text{Enter} = 0.59(154) = 91$$

$$\text{Exit} = 0.41(154) = 63$$

## TRIP GENERATION

**General Office Building - 25,242 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 710 (General Office Building) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$\ln(T) = 0.97 \ln(X) + 2.50$$

$$\ln(T) = 0.97 \ln(25.242) + 2.50$$

$$T = 279$$

### A.M. Peak Hour of the Generator

$$\ln(T) = 0.88 \ln(X) + 1.06$$

$$\ln(T) = 0.88 \ln(25.242) + 1.06$$

$$T = 49$$

$$\text{Enter} = 0.88(49) = 43$$

$$\text{Exit} = 0.12(49) = 6$$

### P.M. Peak Hour of the Generator

$$T = 1.10 (X) + 65.39$$

$$T = 1.10 (25.242) + 65.39$$

$$T = 93$$

$$\text{Enter} = 0.18(93) = 17$$

$$\text{Exit} = 0.82(93) = 76$$

## TRIP GENERATION

**Medical Office Building - 15,600 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 720 (Medical Office Building) and associated trip generation rates for 24-hour total trips and peak hour of the adjacent street trips.

### Average Daily Traffic

$$T = 38.42(X) - 87.62$$

$$T = 38.42(15.6) - 87.62$$

$$T = 512$$

### A.M. Peak Hour of Adjacent Street Traffic

$$\ln(T) = 0.89 \ln(X) + 1.31$$

$$\ln(T) = 0.89 \ln(15.6) + 1.31$$

$$T = 43$$

$$\text{Enter} = 0.78(43) = 34$$

$$\text{Exit} = 0.22(43) = 9$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 3.39(X) + 2.02$$

$$T = 3.39(15.6) + 2.02$$

$$T = 55$$

$$\text{Enter} = 0.28(55) = 15$$

$$\text{Exit} = 0.72(55) = 40$$

## TRIP GENERATION

Shopping Center - 22,822 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 820 (Shopping Center) and associated trip generation rates for 24-hour total trips and peak hour of the adjacent street trips.

### Average Daily Traffic

$$\ln(T) = 0.68 \ln(X) + 5.57$$

$$\ln(T) = 0.68 \ln(22.822) + 5.57$$

$$T = 2201$$

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 0.50 (X) + 151.78$$

$$T = 0.50(0) + 151.78$$

$$T = 163$$

$$\text{Enter} = 0.62(163) = 101$$

$$\text{Exit} = 0.38(163) = 62$$

### P.M. Peak Hour of Adjacent Street Traffic

$$\ln(T) = 0.74 \ln(X) + 2.89$$

$$\ln(T) = 0.74 \ln(22.822) + 2.89$$

$$T = 182$$

$$\text{Enter} = 0.48(182) = 87$$

$$\text{Exit} = 0.52(182) = 95$$

## TRIP GENERATION

Quality Restaurant - 7,171 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 931 (Quality Restaurant) and associated trip generation rates for 24-hour total trips and peak hour trips.

### Average Daily Traffic

$$T = 83.84(X)$$

$$T = 83.84(7.171)$$

$$T = 601$$

### A.M. Peak Hour of Generator

$$T = 4.47(X)$$

$$T = 4.47(7.171)$$

$$T = 32$$

$$\text{Enter} = 0.80(32) = 26$$

$$\text{Exit} = 0.20(32) = 6$$

### P.M. Peak Hour of Generator

$$T = 8.28(X)$$

$$T = 8.28(7.171)$$

$$T = 59$$

$$\text{Enter} = 0.61(59) = 36$$

$$\text{Exit} = 0.39(59) = 23$$

NCHRP 684 Internal Trip Capture Estimation Tool					
<b>Project Name:</b>	Tollgate Village			<b>Organization:</b>	Ragan-Smith Associates
<b>Project Location:</b>	Thompson's Station, TN			<b>Performed By:</b>	bsb
<b>Scenario Description:</b>	Town Center			<b>Date:</b>	10/4/2018
<b>Analysis Year:</b>	2022			<b>Checked By:</b>	
<b>Analysis Period:</b>	AM Street Peak Hour			<b>Date:</b>	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710 & 720	40,842	GSF	92	77	15
Retail	820	22,822	GSF	163	101	62
Restaurant	931	7,171	GSF	32	26	6
Cinema/Entertainment				0		
Residential	220	231	Units	125	35	90
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				412	239	173

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses <sup>2</sup>						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	6	0	0	0
Retail	3		8	0	1	0
Restaurant	2	1		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	5	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	412	239	173
Internal Capture Percentage	16%	14%	19%
External Vehicle-Trips <sup>5</sup>	346	206	140
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	9%	67%
Retail	6%	19%
Restaurant	73%	50%
Cinema/Entertainment	N/A	N/A
Residential	3%	9%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1



<b>Project Name:</b>	Tollgate Village
<b>Analysis Period:</b>	AM Street Peak Hour

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	77	77	1.00	15	15
Retail	1.00	101	101	1.00	62	62
Restaurant	1.00	26	26	1.00	6	6
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	35	35	1.00	90	90
Hotel	1.00	0	0	1.00	0	0

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	9	0	0	0
Retail	18		8	0	9	0
Restaurant	2	1		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	18	0		0
Hotel	0	0	0	0	0	

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		32	6	0	0	0
Retail	3		13	0	1	0
Restaurant	11	8		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	17	5	0		0
Hotel	2	4	2	0	0	

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	7	70	77	70	0	0
Retail	6	95	101	95	0	0
Restaurant	19	7	26	7	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	34	35	34	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	10	5	15	5	0	0
Retail	12	50	62	50	0	0
Restaurant	3	3	6	3	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	8	82	90	82	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A  
<sup>2</sup>Person-Trips  
<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator  
\*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
<b>Project Name:</b>	Tollgate Village			<b>Organization:</b>	Ragan-Smith Associates
<b>Project Location:</b>	Thompson's Station, TN			<b>Performed By:</b>	bsb
<b>Scenario Description:</b>	Town Center			<b>Date:</b>	10/4/2018
<b>Analysis Year:</b>	2022			<b>Checked By:</b>	
<b>Analysis Period:</b>	PM Street Peak Hour			<b>Date:</b>	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710 & 720	40,842	GSF	148	32	116
Retail	820	22,822	GSF	182	87	95
Restaurant	931	7,171	GSF	59	36	23
Cinema/Entertainment				0		
Residential	220	231	Units	154	91	63
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				543	246	297

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses <sup>2</sup>						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1000	1000		1000	
Retail					1000	
Restaurant					1000	
Cinema/Entertainment					1000	
Residential		1000	1000			
Hotel					1000	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	2	0
Retail	2		10	0	23	0
Restaurant	1	9		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	7	4	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	543	246	297
Internal Capture Percentage	26%	29%	24%
External Vehicle-Trips <sup>5</sup>	401	175	226
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	19%	7%
Retail	24%	37%
Restaurant	42%	61%
Cinema/Entertainment	N/A	N/A
Residential	32%	22%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

<b>Project Name:</b>	Tollgate Village
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	32	32	1.00	116	116
Retail	1.00	87	87	1.00	95	95
Restaurant	1.00	36	36	1.00	23	23
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	91	91	1.00	63	63
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		18	4	0	2	0
Retail	2		28	4	23	5
Restaurant	1	9		2	4	2
Cinema/Entertainment	0	0	0		0	0
Residential	3	20	10	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	4	0
Retail	10		10	0	42	0
Restaurant	10	44		0	15	0
Cinema/Entertainment	2	3	1		4	0
Residential	18	7	4	0		0
Hotel	0	2	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	6	26	32	26	0	0
Retail	21	66	87	66	0	0
Restaurant	15	21	36	21	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	29	62	91	62	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	8	108	116	108	0	0
Retail	35	60	95	60	0	0
Restaurant	14	9	23	9	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	14	49	63	49	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

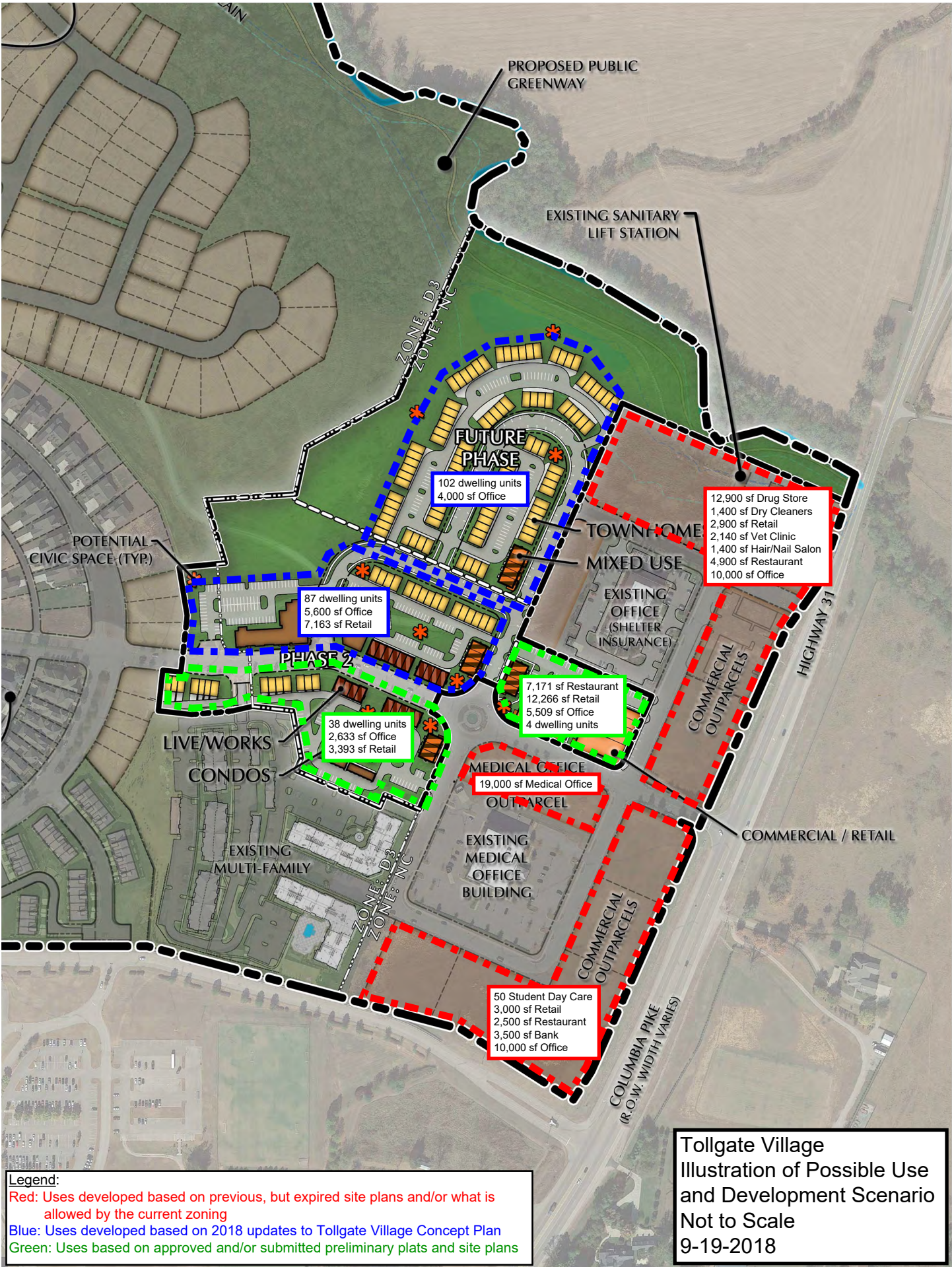
<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

\*Indicates computation that has been rounded to the nearest whole number.





PROPOSED PUBLIC GREENWAY

EXISTING SANITARY LIFT STATION

ZONE: D3  
ZONE: NC

FUTURE PHASE

102 dwelling units  
4,000 sf Office

12,900 sf Drug Store  
1,400 sf Dry Cleaners  
2,900 sf Retail  
2,140 sf Vet Clinic  
1,400 sf Hair/Nail Salon  
4,900 sf Restaurant  
10,000 sf Office

POTENTIAL CIVIC SPACE (TYP)

87 dwelling units  
5,600 sf Office  
7,163 sf Retail

TOWNHOME MIXED USE

EXISTING OFFICE (SHELTER INSURANCE)

PHASE 2

7,171 sf Restaurant  
12,266 sf Retail  
5,509 sf Office  
4 dwelling units

LIVE/WORKS CONDOS

38 dwelling units  
2,633 sf Office  
3,393 sf Retail

COMMERCIAL OUTPARCELS

HIGHWAY 31

EXISTING MULTI-FAMILY

MEDICAL OFFICE OUTPARCEL  
19,000 sf Medical Office

COMMERCIAL / RETAIL

EXISTING MEDICAL OFFICE BUILDING

50 Student Day Care  
3,000 sf Retail  
2,500 sf Restaurant  
3,500 sf Bank  
10,000 sf Office

COLUMBIA PIKE (R.O.W. WIDTH VARIES)

**Legend:**  
 Red: Uses developed based on previous, but expired site plans and/or what is allowed by the current zoning  
 Blue: Uses developed based on 2018 updates to Tollgate Village Concept Plan  
 Green: Uses based on approved and/or submitted preliminary plats and site plans

Tollgate Village  
 Illustration of Possible Use and Development Scenario  
 Not to Scale  
 9-19-2018

**TRIP GENERATION SUMMARY: FUTURE DEVELOPMENT SUMMARY**

*Trip Generation Manual, 10<sup>th</sup> Edition, Institute of Transportation Engineers*

LUC	Land Use	# of Units	Trip Generation						
			Daily	A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
220	Multifamily Housing (Low-Rise)	231 Dwelling Units	1,706	35	90	125	91	63	154
565	Day Care Center	50 Students	225	23	20	43	20	22	42
640	Animal Hospital/Veterinary Clinic	2,140 GSF	46	4	4	8	4	4	8
710	General Office Building	45,242 GSF	492	73	10	83	21	94	115
720	Medical-Dental Office Building	34,600 GSF	1,242	68	19	87	33	86	119
820	Shopping Center	28,722 GSF	2,574	103	63	166	104	112	216
880	Pharmacy/Drugstore without Drive-Through Window	12,900 GSF	1,143	36	20	56	54	56	110
911	Walk-in Bank	3,500 GSF	n/a	41	38	79	47	45	92
918	Hair Salon	1,400 GSF	n/a	1	1	2	1	2	3
920	Copy, Print, and Express Ship Store	1,400 GSF	n/a	3	1	4	4	6	10
931	Quality Restaurant	7,171 GSF	601	26	6	32	36	23	59
932	High-Turnover (Sit-Down) Restaurant	4,900 GSF	550	27	22	49	30	18	48
933	Fast Food Restaurant without Drive-Through Window	2,500 GSF	866	39	26	65	36	35	71
<b>TOTAL:</b>			<b>9,445</b>	<b>479</b>	<b>320</b>	<b>799</b>	<b>481</b>	<b>566</b>	<b>1,047</b>

## TRIP GENERATION

**Multifamily Housing (Low-Rise):            231    Dwelling Units**

Use ITE Land Use Code 220 (Multifamily Housing, Low-Rise) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$T = 7.56(X) - 40.86$$

$$T = 7.56(231) - 40.86$$

$$T = 1706$$

### A.M. Peak Hour of of Generator

$$\ln(T) = 0.94 \ln(X) - 0.29$$

$$\ln(T) = 0.94 \ln(231) - 0.29$$

$$T = 125$$

$$\text{Enter} = 0.28(125) = 35$$

$$\text{Exit} = 0.72(125) = 90$$

### P.M. Peak Hour of Generator

$$T = 0.66(X) + 1.41$$

$$T = 0.66(231) + 1.41$$

$$T = 154$$

$$\text{Enter} = 0.59(154) = 91$$

$$\text{Exit} = 0.41(154) = 63$$



## TRIP GENERATION

**Day Care Center:            50        Students**

Use ITE Land Use Code 565 (Day Care Center) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$T = 3.56(X) + 47.23$$

$$T = 3.56(50) + 47.23$$

$$T = 225$$

### A.M. Peak Hour of of Generator

$$\ln(T) = 0.77 \ln(X) + 0.74$$

$$\ln(T) = 0.77 \ln(50) + 0.74$$

$$T = 43$$

$$\text{Enter} = 0.53(43) = 23$$

$$\text{Exit} = 0.47(43) = 20$$

### P.M. Peak Hour of Generator

$$\ln(T) = 0.78 \ln(X) + 0.68$$

$$\ln(T) = 0.78 \ln() + 0.68$$

$$T = 42$$

$$\text{Enter} = 0.47(42) = 20$$

$$\text{Exit} = 0.53(42) = 22$$

## TRIP GENERATION

**Day Care Center:        2,140    Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 640 (Animal Hospital/Veterinary Clinic) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$T = 21.5(X)$$

$$T = 21.5(2.14)$$

$$T = 46$$

### A.M. Peak Hour of of Generator

$$T = 3.73(X)$$

$$T = 3.73(2.14)$$

$$T = 8$$

$$\text{Enter} = 0.53(8) = 4$$

$$\text{Exit} = 0.47(8) = 4$$

### P.M. Peak Hour of Generator

$$T = 3.83(X)$$

$$T = 3.83(2.14)$$

$$T = 8$$

$$\text{Enter} = 0.52(8) = 4$$

$$\text{Exit} = 0.48(8) = 4$$

## TRIP GENERATION

**General Office Building - 45,242 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 710 (General Office Building) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

$$\ln(T) = 0.97 \ln(X) + 2.50$$

$$\ln(T) = 0.97 \ln(45.242) + 2.50$$

$$T = 492$$

### A.M. Peak Hour of the Generator

$$\ln(T) = 0.88 \ln(X) + 1.06$$

$$\ln(T) = 0.88 \ln(45.242) + 1.06$$

$$T = 83$$

$$\text{Enter} = 0.88(83) = 73$$

$$\text{Exit} = 0.12(83) = 10$$

### P.M. Peak Hour of the Generator

$$T = 1.10 (X) + 65.39$$

$$T = 1.10 (45.242) + 65.39$$

$$T = 115$$

$$\text{Enter} = 0.18(115) = 21$$

$$\text{Exit} = 0.82(115) = 94$$

## TRIP GENERATION

**Medical Office Building - 34,600 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 720 (Medical Office Building) and associated trip generation rates for 24-hour total trips and peak hour of the adjacent street trips.

### Average Daily Traffic

$$T = 38.42(X) - 87.62$$

$$T = 38.42(34.6) - 87.62$$

$$T = 1242$$

### A.M. Peak Hour of Adjacent Street Traffic

$$\ln(T) = 0.89 \ln(X) + 1.31$$

$$\ln(T) = 0.89 \ln(34.6) + 1.31$$

$$T = 87$$

$$\text{Enter} = 0.78(87) = 68$$

$$\text{Exit} = 0.22(87) = 19$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 3.39(X) + 2.02$$

$$T = 3.39(34.6) + 2.02$$

$$T = 119$$

$$\text{Enter} = 0.28(119) = 33$$

$$\text{Exit} = 0.72(119) = 86$$

## TRIP GENERATION

Shopping Center - 28,722 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 820 (Shopping Center) and associated trip generation rates for 24-hour total trips and peak hour of the adjacent street trips.

### Average Daily Traffic

$$\ln(T) = 0.68 \ln(X) + 5.57$$

$$\ln(T) = 0.68 \ln(28.722) + 5.57$$

$$T = 2574$$

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 0.50 (X) + 151.78$$

$$T = 0.50(0) + 151.78$$

$$T = 166$$

$$\text{Enter} = 0.62(166) = 103$$

$$\text{Exit} = 0.38(166) = 63$$

### P.M. Peak Hour of Adjacent Street Traffic

$$\ln(T) = 0.74 \ln(X) + 2.89$$

$$\ln(T) = 0.74 \ln(28.722) + 2.89$$

$$T = 216$$

$$\text{Enter} = 0.48(216) = 104$$

$$\text{Exit} = 0.52(216) = 112$$

## TRIP GENERATION

Pharmacy/Drugstore without Drive-Through Window - 12,900 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 880 (Pharmacy/Drugstore without Drive-Through Window) and associated trip generation rates for 24-hour total trips and peak hour of the adjacent street trips.

### Average Daily Traffic

$$\ln(T) = 0.99 \ln(X) + 4.51$$

$$\ln(T) = 0.99 \ln(12.9) + 4.51$$

$$T = 1143$$

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 10.22(X) - 75.70$$

$$T = 10.22(12.9) - 75.70$$

$$T = 56$$

$$\text{Enter} = 0.65(56) = 36$$

$$\text{Exit} = 0.35(56) = 20$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 8.51(X)$$

$$T = 8.51(12.9)$$

$$T = 110$$

$$\text{Enter} = 0.49(110) = 54$$

$$\text{Exit} = 0.51(110) = 56$$



## TRIP GENERATION

Drive-in Bank - 3,500 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 911 (Walk-in Bank) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

No Average Rate or Equation is Provided

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 22.54(X)$$

$$T = 22.54(3.5)$$

$$T = 79$$

$$\text{Enter} = 0.52(79) = 41$$

$$\text{Exit} = 0.48(79) = 38$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 26.40(X)$$

$$T = 26.40(3.5)$$

$$T = 92$$

$$\text{Enter} = 0.51(92) = 47$$

$$\text{Exit} = 0.49(92) = 45$$

## TRIP GENERATION

**Hair Salon: 1,400 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 918 (Hair Salon) and associated trip generation rates for 24-hour total trips and peak hour of the generator trips.

### Average Daily Traffic

No Average Rate or Equation is Provided

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 1.21(X)$$

$$T = 1.21(1.4)$$

$$T = 2$$

$$\text{Enter} = 0.50(2) = 1$$

$$\text{Exit} = 0.50(2) = 1$$

\* Directional Distribution no available,  
50% entering/50% exiting used for this study

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 1.94(X)$$

$$T = 1.94(1.4)$$

$$T = 3$$

$$\text{Enter} = 0.38(3) = 1$$

$$\text{Exit} = 0.62(3) = 2$$

## TRIP GENERATION

**Copy, Print, and Express Ship Store: 1,400 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 920 (Copy, Print, and Express Ship Store) and associated trip generation rates for 24-hour total trips and peak hour of the

### Average Daily Traffic

No Average Rate or Equation is Provided

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 2.78(X)$$

$$T = 2.78(1.4)$$

$$T = 4$$

$$\text{Enter} = 0.75(4) = 3$$

$$\text{Exit} = 0.25(4) = 1$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 7.42(X)$$

$$T = 7.42(1.4)$$

$$T = 10$$

$$\text{Enter} = 0.44(10) = 4$$

$$\text{Exit} = 0.56(10) = 6$$

## TRIP GENERATION

Quality Restaurant - 7,171 Sq. Feet Gross Floor Area (X = GSF/1000)

Use ITE Land Use Code 931 (Quality Restaurant) and associated trip generation rates for 24-hour total trips and peak hour trips.

### Average Daily Traffic

$$T = 83.84(X)$$

$$T = 83.84(7.171)$$

$$T = 601$$

### A.M. Peak Hour of Generator

$$T = 4.47(X)$$

$$T = 4.47(7.171)$$

$$T = 32$$

$$\text{Enter} = 0.80(32) = 26$$

$$\text{Exit} = 0.20(32) = 6$$

### P.M. Peak Hour of Generator

$$T = 8.28(X)$$

$$T = 8.28(7.171)$$

$$T = 59$$

$$\text{Enter} = 0.61(59) = 36$$

$$\text{Exit} = 0.39(59) = 23$$

## TRIP GENERATION

**High-Turnover (Sit-Down) Restaurant - 4,900 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 932 (High-Turnover (Sit-Down) Restaurant) and associated trip generation rates for 24-hour total trips and peak hour trips.

### Average Daily Traffic

$$T = 112.18(X)$$

$$T = 112.18(4.9)$$

$$T = 550$$

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 9.94(X)$$

$$T = 9.94(4.9)$$

$$T = 49$$

$$\text{Enter} = 0.55(49) = 27$$

$$\text{Exit} = 0.45(49) = 22$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 9.77(X)$$

$$T = 9.77(4.9)$$

$$T = 48$$

$$\text{Enter} = 0.62(48) = 30$$

$$\text{Exit} = 0.38(48) = 18$$

## TRIP GENERATION

**Fast Food Restaurant  
without Drive-Through Window - 2,500 Sq. Feet Gross Floor Area (X = GSF/1000)**

Use ITE Land Use Code 933 (Fast Food Restaurant without Drive-Through Window) and associated trip generation rates for 24-hour total trips and peak hour trips.

### Average Daily Traffic

$$T = 346.23(X)$$

$$T = 346.23(2.5)$$

$$T = 866$$

### A.M. Peak Hour of Adjacent Street Traffic

$$T = 89.03(X) - 157.40$$

$$T = 89.03(2.5) - 157.40$$

$$T = 65$$

$$\text{Enter} = 0.60(65) = 39$$

$$\text{Exit} = 0.40(65) = 26$$

### P.M. Peak Hour of Adjacent Street Traffic

$$T = 28.34(X)$$

$$T = 28.34(2.5)$$

$$T = 71$$

$$\text{Enter} = 0.50(71) = 36$$

$$\text{Exit} = 0.50(71) = 35$$



NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Tollgate Village			Organization:	Ragan-Smith Associates
Project Location:	Thompson's Station, TN			Performed By:	bsb
Scenario Description:	Town Center			Date:	10/4/2018
Analysis Year:	2027			Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710 & 720	79,842	GSF	170	141	29
Retail	Various	50,062	GSF	315	188	127
Restaurant	Various	14,571	GSF	146	92	54
Cinema/Entertainment				0		
Residential	220	231	Units	125	35	90
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				756	456	300

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses <sup>2</sup>						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	18	0	0	0
Retail	6		17	0	1	0
Restaurant	17	8		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	18	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	756	456	300
Internal Capture Percentage	26%	21%	33%
External Vehicle-Trips <sup>5</sup>	560	358	202
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	18%	90%
Retail	9%	19%
Restaurant	58%	50%
Cinema/Entertainment	N/A	N/A
Residential	9%	23%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<b>Project Name:</b>	Tollgate Village
<b>Analysis Period:</b>	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	141	141	1.00	29	29
Retail	1.00	188	188	1.00	127	127
Restaurant	1.00	92	92	1.00	54	54
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	35	35	1.00	90	90
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	18	0	0	0
Retail	37		17	0	18	0
Restaurant	17	8		0	2	2
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	18	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		60	21	0	0	0
Retail	6		46	0	1	0
Restaurant	20	15		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	4	32	18	0		0
Hotel	4	8	6	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	25	116	141	116	0	0
Retail	17	171	188	171	0	0
Restaurant	53	39	92	39	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	32	35	32	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	26	3	29	3	0	0
Retail	24	103	127	103	0	0
Restaurant	27	27	54	27	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	21	69	90	69	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A  
<sup>2</sup>Person-Trips  
<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator  
\*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
<b>Project Name:</b>	Tollgate Village			<b>Organization:</b>	Ragan-Smith Associates
<b>Project Location:</b>	Thompson's Station, TN			<b>Performed By:</b>	bsb
<b>Scenario Description:</b>	Town Center			<b>Date:</b>	10/4/2018
<b>Analysis Year:</b>	2027			<b>Checked By:</b>	
<b>Analysis Period:</b>	PM Street Peak Hour			<b>Date:</b>	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office	710 & 720	79,842	GSF	234	54	180
Retail	Various	50,062	GSF	439	214	225
Restaurant	Various	14,571	GSF	178	102	76
Cinema/Entertainment				0		
Residential	220	231	Units	154	91	63
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				1,005	461	544

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses <sup>2</sup>						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1000	1000		1000	
Retail					1000	
Restaurant					1000	
Cinema/Entertainment					1000	
Residential		1000	1000			
Hotel					1000	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		13	2	0	3	0
Retail	5		30	0	42	0
Restaurant	2	31		0	13	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	16	10	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,005	461	544
Internal Capture Percentage	34%	37%	31%
External Vehicle-Trips <sup>5</sup>	665	291	374
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	19%	10%
Retail	28%	34%
Restaurant	41%	61%
Cinema/Entertainment	N/A	N/A
Residential	64%	46%
Hotel	N/A	N/A

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

<b>Project Name:</b>	Tollgate Village
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	54	54	1.00	180	180
Retail	1.00	214	214	1.00	225	225
Restaurant	1.00	102	102	1.00	76	76
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	91	91	1.00	63	63
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		27	5	0	3	0
Retail	5		65	9	54	11
Restaurant	2	31		6	13	5
Cinema/Entertainment	0	0	0		0	0
Residential	3	20	10	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		13	2	0	4	0
Retail	17		30	0	42	0
Restaurant	16	107		0	15	0
Cinema/Entertainment	3	9	3		4	0
Residential	31	16	11	0		0
Hotel	0	4	5	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	10	44	54	44	0	0
Retail	60	154	214	154	0	0
Restaurant	42	60	102	60	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	58	33	91	33	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	18	162	180	162	0	0
Retail	77	148	225	148	0	0
Restaurant	46	30	76	30	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	29	34	63	34	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips

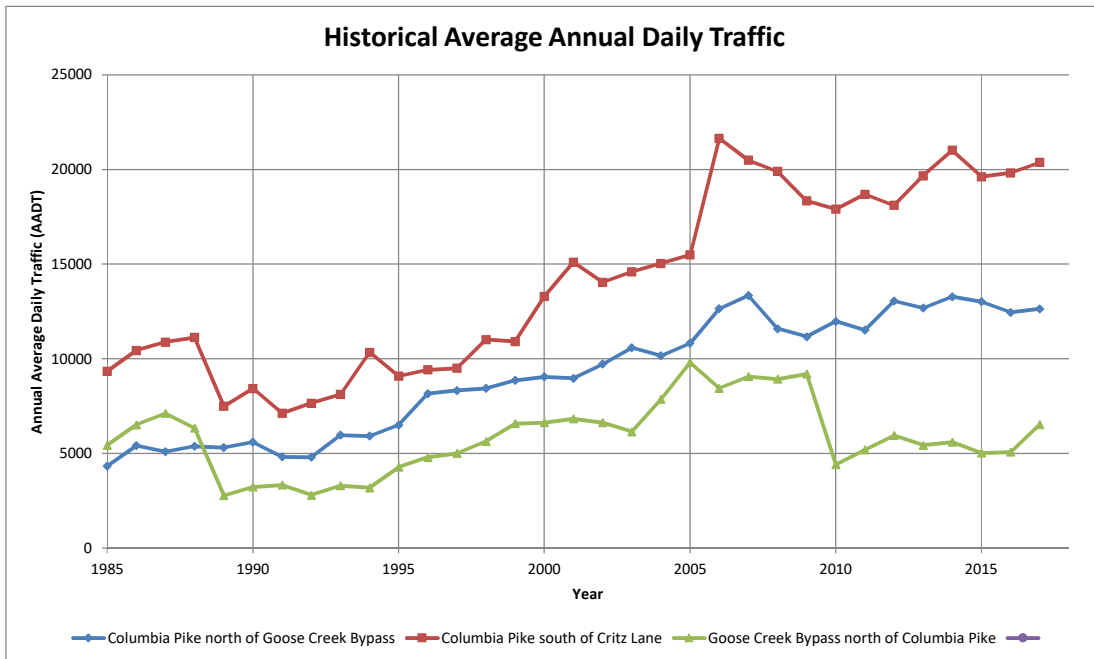
<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

\*Indicates computation that has been rounded to the nearest whole number.

**APPENDIX C**

**TRAFFIC ASSIGNMENT WORKSHEETS**

HISTORICAL TRAFFIC COUNT DATA				
Year	Columbia Pike north of Goose Creek Bypass	Columbia Pike south of Critz Lane	Goose Creek Bypass north of Columbia Pike	
1985	4334	9342	5436	
1986	5414	10443	6523	
1987	5093	10883	7119	
1988	5376	11127	6339	
1989	5310	7490	2780	
1990	5600	8427	3228	
1991	4817	7117	3332	
1992	4800	7654	2800	
1993	5968	8121	3304	
1994	5917	10337	3191	
1995	6506	9079	4283	
1996	8162	9418	4796	
1997	8326	9499	5010	
1998	8438	11015	5644	
1999	8863	10915	6579	
2000	9051	13289	6632	
2001	8968	15108	6831	
2002	9724	14037	6631	
2003	10583	14599	6149	
2004	10163	15037	7866	
2005	10816	15488	9804	
2006	12646	21645	8447	
2007	13345	20488	9065	
2008	11593	19891	8932	
2009	11170	18342	9199	
2010	11976	17900	4411	
2011	11513	18685	5191	
2012	13049	18101	5953	
2013	12682	19666	5441	
2014	13281	21013	5604	
2015	13018	19620	5027	
2016	12450	19816	5077	
2017	12640	20370	6540	



		Columbia Pike north of Goose Creek Bypass	Columbia Pike south of Critz Lane	Goose Creek Bypass north of Columbia Pike	-
Analysis Period	Begin	2004	2002	2010	-
	End	2017	2017	2017	-
Future Year		2027	2027	2027	-
Forecasted Traffic Volume		14477	24418	7289	-
Annual Growth Rate		1.37%	1.83%	1.09%	-
Growth Factor		1.145	1.199	1.115	-



TRAFFIC VOLUME WORKSHEET  
 SPECIFIC NON-SITE TRIP GENERATION &  
 PROPOSED DEVELOPMENT TRIP GENERATION



TOLLGATE VILLAGE TRIP GENERATION 2022 HORIZON YEAR							
Development	Daily	A.M. Peak Hour			P.M. Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	7,763	240	219	459	272	288	560
				0			0
				0			0
				0			0
				0			0
				0			0
<b>TOTAL</b>	<b>7,763</b>	<b>240</b>	<b>219</b>	<b>459</b>	<b>272</b>	<b>288</b>	<b>560</b>

TOLLGATE VILLAGE TRIP GENERATION 2027 HORIZON YEAR							
Development	Daily	A.M. Peak Hour			P.M. Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Tollgate Village (Full Build-Out)	11,909	415	331	746	408	458	866
				0			0
				0			0
				0			0
				0			0
				0			0
<b>TOTAL</b>	<b>11,909</b>	<b>415</b>	<b>331</b>	<b>746</b>	<b>408</b>	<b>458</b>	<b>866</b>

**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT TOLLGATE BOULEVARD  
A.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound Tollgate Boulevard			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018 EXISTING TRAFFIC VOLUMES	86	874		611	35		145		138			
2022 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%/year)		2.5			2.5							
Growth Factor	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	91	0	0	63	0	0	0	0	0	0	0
2022 Background Traffic Volumes	86	965	0	0	674	35	145	0	138	0	0	0
2022 SITE TRAFFIC VOLUMES												
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)												
% In	50					45						
% Out					5		50		45			
Trips	120	0	0	0	11	108	110	0	99	0	0	0
2022 Site Traffic Volumes	120	0	0	0	11	108	110	0	99	0	0	0
2022 TOTAL TRAFFIC VOLUMES	206	965	0	0	685	143	255	0	237	0	0	0

2027 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%)		2.5			2.5							
Growth Factor	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	218	0	0	152	0	0	0	0	0	0	0
2027 Background Traffic Volumes	86	1092	0	0	763	35	145	0	138	0	0	0
2027 TOTAL TRAFFIC VOLUMES												
Tollgate Village (Full Build-Out)												
% In	45					45						
% Out					5		50		40			
Trips	187	0	0	0	17	187	166	0	132	0	0	0
2027 Site Traffic Volumes	187	0	0	0	17	187	166	0	132	0	0	0
2027 TOTAL TRAFFIC VOLUMES	273	1092	0	0	780	222	311	0	270	0	0	0

**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT TOLLGATE BOULEVARD  
P.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound Tollgate Boulevard			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018 EXISTING TRAFFIC VOLUMES	85	670		925	161		71		103			
2022 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%/year)		2.5			2.5							
Growth Factor	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	70	0	0	96	0	0	0	0	0	0	0
2022 Background Traffic Volumes	85	740	0	0	1021	161	71	0	103	0	0	0
2022 SITE TRAFFIC VOLUMES												
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In	50				45						
	% Out				5		50		45			
	Trips	136	0	0	0	14	122	144	0	130	0	0
2022 Site Traffic Volumes		136	0	0	0	14	122	144	0	130	0	0
2022 TOTAL TRAFFIC VOLUMES		221	740	0	0	1035	283	215	0	233	0	0

2027 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%)		2.5			2.5							
Growth Factor	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	167	0	0	230	0	0	0	0	0	0	0
2027 Background Traffic Volumes	85	837	0	0	1155	161	71	0	103	0	0	0
2027 TOTAL TRAFFIC VOLUMES												
Tollgate Village (Full Build-Out)	% In	45				45						
	% Out				5		50		40			
	Trips	184	0	0	0	23	184	229	0	183	0	0
2027 Site Traffic Volumes		184	0	0	0	23	184	229	0	183	0	0
2027 TOTAL TRAFFIC VOLUMES		269	837	0	0	1178	345	300	0	286	0	0

**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT NORTH ACCESS  
A.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound North Access			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018 EXISTING TRAFFIC VOLUMES	1019			654	3		0					
2022 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%/year)	3.0			3.0								
Growth Factor	1.00	1.13	1.00	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	128	0	0	82	0	0	0	0	0	0	0
2022 Background Traffic Volumes	0	1147	0	0	736	3	0	0	0	0	0	0
2022 SITE TRAFFIC VOLUMES												
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In			45			5					
	% Out			50			5					
	0	110	0	0	108	12	0	0	11	0	0	0
2022 Site Traffic Volumes	0	110	0	0	108	12	0	0	11	0	0	0
2022 TOTAL TRAFFIC VOLUMES	0	1257	0	0	844	15	0	0	11	0	0	0

2027 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%)	3.0			3.0								
Growth Factor	1.00	1.30	1.00	1.00	1.30	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	311	0	0	199	0	0	0	0	0	0	0
2027 Background Traffic Volumes	0	1330	0	0	853	3	0	0	0	0	0	0
2027 TOTAL TRAFFIC VOLUMES												
Tollgate Village (Full Build-Out)	% In			45			5					
	% Out			50			5					
	0	166	0	0	187	21	0	0	17	0	0	0
2027 Site Traffic Volumes	0	166	0	0	187	21	0	0	17	0	0	0
2027 TOTAL TRAFFIC VOLUMES	0	1496	0	0	1040	24	0	0	17	0	0	0

**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT NORTH ACCESS  
P.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound North Access			Westbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2018 EXISTING TRAFFIC VOLUMES	741			1079	1		4						
2022 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%/year)	2.5			2.5									
Growth Factor	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	77	0	0	112	0	0	0	0	0	0	0	
2022 Background Traffic Volumes	0	818	0	0	1191	1	0	0	4	0	0	0	
2022 SITE TRAFFIC VOLUMES													
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In			45	5								
	% Out	50					5						
	Trips	0	144	0	0	122	14	0	0	14	0	0	0
2022 Site Traffic Volumes	0	144	0	0	122	14	0	0	14	0	0	0	
2022 TOTAL TRAFFIC VOLUMES	0	962	0	0	1313	15	0	0	18	0	0	0	

2027 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%)	2.5			2.5									
Growth Factor	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	184	0	0	269	0	0	0	0	0	0	0	
2027 Background Traffic Volumes	0	925	0	0	1348	1	0	0	4	0	0	0	
2027 TOTAL TRAFFIC VOLUMES													
Tollgate Village (Full Build-Out)	% In			45	5								
	% Out	50					5						
	Trips	0	229	0	0	184	20	0	0	23	0	0	0
2027 Site Traffic Volumes	0	229	0	0	184	20	0	0	23	0	0	0	
2027 TOTAL TRAFFIC VOLUMES	0	1154	0	0	1532	21	0	0	27	0	0	0	

**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT DECLARATION WAY  
A.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound Declaration Way			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018 EXISTING TRAFFIC VOLUMES	562	869		352	397		113		252			
2022 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%/year)		2.5			2.5							
Growth Factor	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	90	0	0	37	0	0	0	0	0	0	0
2022 Background Traffic Volumes	562	959	0	0	389	397	113	0	252	0	0	0
2022 SITE TRAFFIC VOLUMES												
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In	50			50							
	% Out											
	Trips	0	120	0	0	110	0	0	0	0	0	0
2022 Site Traffic Volumes		0	120	0	0	110	0	0	0	0	0	0
2022 TOTAL TRAFFIC VOLUMES	562	1079	0	0	499	397	113	0	252	0	0	0

2027 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%)		2.5			2.5							
Growth Factor	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	216	0	0	88	0	0	0	0	0	0	0
2027 Background Traffic Volumes	562	1085	0	0	440	397	113	0	252	0	0	0
2027 TOTAL TRAFFIC VOLUMES												
Tollgate Village (Full Build-Out)	% In	5	45		45			5				
	% Out							17				
	Trips	21	187	0	0	149	0	0	0	17	0	0
2027 Site Traffic Volumes		21	187	0	0	149	0	0	0	17	0	0
2027 TOTAL TRAFFIC VOLUMES	583	1272	0	0	589	397	113	0	269	0	0	0



**TRAFFIC VOLUME WORKSHEET  
COLUMBIA PIKE AT DECLARATION WAY  
P.M. PEAK HOUR**



Description	Northbound Columbia Pike			Southbound Columbia Pike			Eastbound Declaration Way			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2018 EXISTING TRAFFIC VOLUMES	79	681		978	54		74		130			
2022 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%/year)		2.5			2.5							
Growth Factor	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	71	0	0	102	0	0	0	0	0	0	0
2022 Background Traffic Volumes	79	752	0	0	1080	54	74	0	130	0	0	0
2022 SITE TRAFFIC VOLUMES												
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In	50			50							
	% Out											
	Trips	0	136	0	0	144	0	0	0	0	0	0
2022 Site Traffic Volumes		0	136	0	0	144	0	0	0	0	0	0
2022 TOTAL TRAFFIC VOLUMES	79	888	0	0	1224	54	74	0	130	0	0	0

2027 BACKGROUND TRAFFIC VOLUMES												
<i>Annual Background Growth</i>												
Growth Rate (%)		2.5			2.5							
Growth Factor	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annual Background Growth Trips	0	169	0	0	243	0	0	0	0	0	0	0
2027 Background Traffic Volumes	79	850	0	0	1221	54	74	0	130	0	0	0
2027 TOTAL TRAFFIC VOLUMES												
Tollgate Village (Full Build-Out)	% In	5	45		45			5				
	% Out											
	Trips	20	184	0	0	206	0	0	23	0	0	0
2027 Site Traffic Volumes		20	184	0	0	206	0	0	23	0	0	0
2027 TOTAL TRAFFIC VOLUMES	99	1034	0	0	1427	54	74	0	153	0	0	0

**TRAFFIC VOLUME WORKSHEET  
DECLARATION WAY AT SOUTH ACCESS  
A.M. PEAK HOUR**



Description	Northbound			Southbound South Access			Eastbound Declaration Way			Westbound Declaration Way			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2018 EXISTING TRAFFIC VOLUMES								365			959		
2022 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%/year)													
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	
2022 Background Traffic Volumes	0	0	0	0	0	0	0	365	0	0	959	0	
2022 SITE TRAFFIC VOLUMES													
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In												
	% Out												
	Trips	0	0	0	0	0	0	0	0	0	0	0	0
2022 Site Traffic Volumes		0	0	0	0	0	0	0	0	0	0	0	0
2022 TOTAL TRAFFIC VOLUMES		0	0	0	0	0	0	0	365	0	0	959	0

2027 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%)													
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	
2027 Background Traffic Volumes		0	0	0	0	0	0	0	365	0	0	959	0
2027 TOTAL TRAFFIC VOLUMES													
Tollgate Village (Full Build-Out)	% In			5								5	
	% Out			17	0	0	0	0	0	0	0	21	
	Trips	0	0	0	17	0	0	0	0	0	0	0	21
2027 Site Traffic Volumes		0	0	0	17	0	0	0	0	0	0	0	21
2027 TOTAL TRAFFIC VOLUMES		0	0	0	17	0	0	0	365	0	0	959	21

**TRAFFIC VOLUME WORKSHEET  
DECLARATION WAY AT SOUTH ACCESS  
P.M. PEAK HOUR**



Description	Northbound			Southbound South Access			Eastbound Declaration Way			Westbound Declaration Way			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2018 EXISTING TRAFFIC VOLUMES							204			133			
2022 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%/year)													
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	
2022 Background Traffic Volumes	0	0	0	0	0	0	0	204	0	0	133	0	
2022 SITE TRAFFIC VOLUMES													
Tollgate Village (Vacant Portions of the Shelter Insurance Office Building and the Tollgate Medical Plaza, and the Tollgate Village Town Center)	% In												
	% Out												
	Trips	0	0	0	0	0	0	0	0	0	0	0	0
2022 Site Traffic Volumes		0	0	0	0	0	0	0	0	0	0	0	0
2022 TOTAL TRAFFIC VOLUMES		0	0	0	0	0	0	0	204	0	0	133	0

2027 BACKGROUND TRAFFIC VOLUMES													
<i>Annual Background Growth</i>													
Growth Rate (%)													
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Annual Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	
2027 Background Traffic Volumes		0	0	0	0	0	0	0	204	0	0	133	0
2027 TOTAL TRAFFIC VOLUMES													
Tollgate Village (Full Build-Out)	% In			5								5	
	% Out			23	0	0	0	0	0	0	0	20	
	Trips	0	0	0	23	0	0	0	0	0	0	0	20
2027 Site Traffic Volumes		0	0	0	23	0	0	0	0	0	0	0	20
2027 TOTAL TRAFFIC VOLUMES		0	0	0	23	0	0	0	204	0	0	133	20



## **APPENDIX D**

# **CAPACITY ANALYSIS WORKSHEETS EXISTING CONDITIONS**

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018

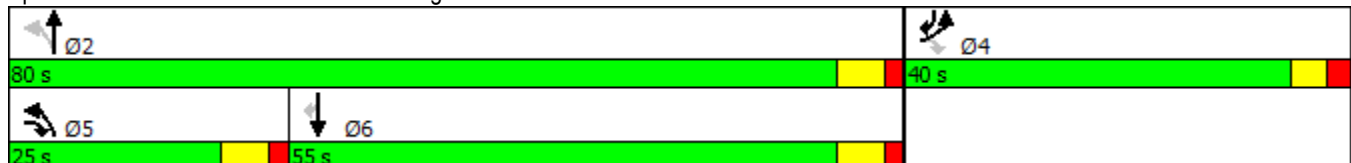


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	145	138	86	874	611	35
Future Volume (vph)	145	138	86	874	611	35
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 52.3  
 Natural Cycle: 40  
 Control Type: Semi Act-Uncoord













Splits and Phases: 1: Columbia Pk & Tollgate Blvd





HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	145	138	86	874	611	35		
Future Volume (veh/h)	145	138	86	874	611	35		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	158	150	93	950	664	38		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	275	344	467	2098	1410	889		
Arrive On Green	0.15	0.15	0.06	0.59	0.40	0.40		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	158	150	93	950	664	38		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	3.7	3.6	1.2	6.7	6.3	0.5		
Cycle Q Clear(g_c), s	3.7	3.6	1.2	6.7	6.3	0.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	275	344	467	2098	1410	889		
V/C Ratio(X)	0.57	0.44	0.20	0.45	0.47	0.04		
Avail Cap(c_a), veh/h	1386	1335	1119	5813	3849	2002		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	17.7	15.4	6.7	5.1	10.0	4.7		
Incr Delay (d2), s/veh	1.9	0.9	0.2	0.2	0.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.5	6.2	1.1	5.8	5.6	0.5		
LnGrp Delay(d),s/veh	19.6	16.2	6.9	5.3	10.3	4.7		
LnGrp LOS	B	B	A	A	B	A		
Approach Vol, veh/h	308			1043	702			
Approach Delay, s/veh	18.0			5.4	10.0			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		32.7		12.4	8.8	24.0		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		8.7		5.7	3.2	8.3		
Green Ext Time (p_c), s		10.1		1.3	0.2	9.7		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.9					
HCM 2010 LOS			A					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1019	645	3
Future Vol, veh/h	0	0	0	1019	645	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	1108	701	3

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	352	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	644	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	644	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	-	-	-

# Timings

## 3: Columbia Pk & Declaration Way

10/11/2018

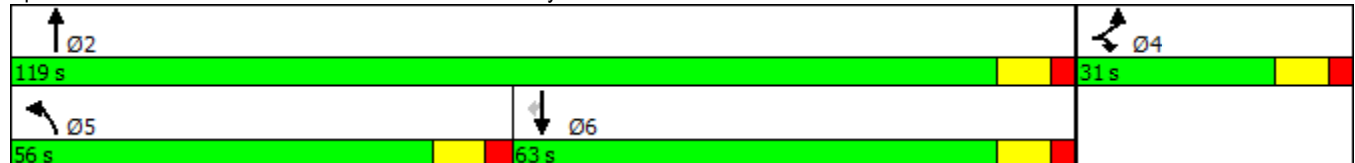


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	113	252	562	869	352	397
Future Volume (vph)	113	252	562	869	352	397
Turn Type	Prot	Prot	Prot	NA	NA	Perm
Protected Phases	4	4	5	2	6	
Permitted Phases						6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	15.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	56.0	119.0	63.0	63.0
Total Split (%)	20.7%	20.7%	37.3%	79.3%	42.0%	42.0%
Yellow Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min

### Intersection Summary













Cycle Length: 150  
 Actuated Cycle Length: 138.2  
 Natural Cycle: 110  
 Control Type: Actuated-Uncoordinated

### Splits and Phases: 3: Columbia Pk & Declaration Way



HCM 2010 Signalized Intersection Summary  
 3: Columbia Pk & Declaration Way

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	113	252	562	869	352	397		
Future Volume (veh/h)	113	252	562	869	352	397		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	120	268	598	924	374	422		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	275	245	587	2543	1148	513		
Arrive On Green	0.15	0.15	0.33	0.72	0.32	0.32		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	120	268	598	924	374	422		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	8.7	22.0	47.0	14.1	11.3	34.9		
Cycle Q Clear(g_c), s	8.7	22.0	47.0	14.1	11.3	34.9		
Prop In Lane	1.00	1.00	1.00				1.00	
Lane Grp Cap(c), veh/h	275	245	587	2543	1148	513		
V/C Ratio(X)	0.44	1.09	1.02	0.36	0.33	0.82		
Avail Cap(c_a), veh/h	275	245	587	2740	1345	602		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	54.4	60.0	47.5	7.6	36.3	44.2		
Incr Delay (d2), s/veh	1.1	84.6	42.0	0.1	0.2	7.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	7.8	27.7	53.7	11.1	9.5	23.0		
LnGrp Delay(d),s/veh	55.5	144.6	89.5	7.7	36.4	52.1		
LnGrp LOS	E	F	F	A	D	D		
Approach Vol, veh/h	388			1522	796			
Approach Delay, s/veh	117.0			39.9	44.7			
Approach LOS	F			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5	6		
Phs Duration (G+Y+Rc), s	111.1		31.0		56.0	55.1		
Change Period (Y+Rc), s	9.0		9.0		9.0	9.0		
Max Green Setting (Gmax), s	110.0		22.0		47.0	54.0		
Max Q Clear Time (g_c+I1), s	16.1		24.0		49.0	36.9		
Green Ext Time (p_c), s	14.7		0.0		0.0	9.2		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			52.4					
HCM 2010 LOS			D					

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	103	85	670	925	161
Future Volume (vph)	71	103	85	670	925	161
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 58  
 Natural Cycle: 45  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	71	103	85	670	925	161		
Future Volume (veh/h)	71	103	85	670	925	161		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	77	112	92	728	1005	175		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	230	297	372	2295	1680	972		
Arrive On Green	0.13	0.13	0.06	0.65	0.47	0.47		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	77	112	92	728	1005	175		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	2.0	3.1	1.2	4.7	10.7	2.5		
Cycle Q Clear(g_c), s	2.0	3.1	1.2	4.7	10.7	2.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	230	297	372	2295	1680	972		
V/C Ratio(X)	0.33	0.38	0.25	0.32	0.60	0.18		
Avail Cap(c_a), veh/h	1217	1178	939	5106	3381	1748		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.4	18.3	6.9	4.0	9.9	4.6		
Incr Delay (d2), s/veh	0.8	0.8	0.3	0.1	0.3	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	1.9	5.3	1.1	4.0	9.0	2.7		
LnGrp Delay(d),s/veh	21.3	19.1	7.3	4.1	10.2	4.6		
LnGrp LOS	C	B	A	A	B	A		
Approach Vol, veh/h	189			820	1180			
Approach Delay, s/veh	20.0			4.4	9.4			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		39.3		12.0	8.9	30.3		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		6.7		5.1	3.2	12.7		
Green Ext Time (p_c), s		12.7		0.8	0.2	11.7		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.5					
HCM 2010 LOS			A					
<b>Notes</b>								



Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	4	0	741	1079	1
Future Vol, veh/h	0	4	0	741	1079	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	4	0	805	1173	1

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	587	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	453	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	453	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	453	-	-
HCM Lane V/C Ratio	-	0.01	-	-
HCM Control Delay (s)	-	13	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↕↕	↕↕	↗
Traffic Vol, veh/h	74	130	79	681	978	54
Future Vol, veh/h	74	130	79	681	978	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	560	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	138	84	724	1040	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1570	520	1040	0	-	0
Stage 1	1040	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	101	501	664	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	555	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	88	501	664	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	485	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.4	1.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	664	-	207	501	-	-
HCM Lane V/C Ratio	0.127	-	0.38	0.276	-	-
HCM Control Delay (s)	11.2	-	32.7	14.9	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.7	1.1	-	-

## **APPENDIX E**

# **CAPACITY ANALYSIS WORKSHEETS 2022 BACKGROUND CONDITIONS**

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	145	138	86	965	674	35
Future Volume (vph)	145	138	86	965	674	35
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	43.0	30.0	30.0	77.0	47.0	43.0
Total Split (%)	35.8%	25.0%	25.0%	64.2%	39.2%	35.8%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 53.8  
 Natural Cycle: 45  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	145	138	86	965	674	35		
Future Volume (veh/h)	145	138	86	965	674	35		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	154	147	91	1027	717	37		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	267	335	455	2138	1470	909		
Arrive On Green	0.15	0.15	0.06	0.60	0.42	0.42		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	154	147	91	1027	717	37		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	3.7	3.7	1.2	7.5	6.9	0.5		
Cycle Q Clear(g_c), s	3.7	3.7	1.2	7.5	6.9	0.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	267	335	455	2138	1470	909		
V/C Ratio(X)	0.58	0.44	0.20	0.48	0.49	0.04		
Avail Cap(c_a), veh/h	1463	1402	1284	5419	3129	1667		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.4	16.0	6.6	5.1	9.9	4.5		
Incr Delay (d2), s/veh	2.0	0.9	0.2	0.2	0.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.6	6.2	1.0	6.5	6.0	0.5		
LnGrp Delay(d),s/veh	20.4	16.9	6.9	5.3	10.2	4.5		
LnGrp LOS	C	B	A	A	B	A		
Approach Vol, veh/h	301			1118	754			
Approach Delay, s/veh	18.7			5.4	9.9			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	34.0		12.4		8.8		25.3	
Change Period (Y+Rc), s	* 6		5.5		* 6		* 6	
Max Green Setting (Gmax), s	* 71		37.5		* 24		* 41	
Max Q Clear Time (g_c+I1), s	9.5		5.7		3.2		8.9	
Green Ext Time (p_c), s	11.4		1.3		0.2		10.4	
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.8					
HCM 2010 LOS			A					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1147	736	3
Future Vol, veh/h	0	0	0	1147	736	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	1247	800	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1425	402	803	0	-	0
Stage 1	802	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	126	598	817	-	-	-
Stage 1	402	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	126	598	817	-	-	-
Mov Cap-2 Maneuver	259	-	-	-	-	-
Stage 1	402	-	-	-	-	-
Stage 2	497	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	817	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Timings

3: Columbia Pk & Declaration Way

10/11/2018

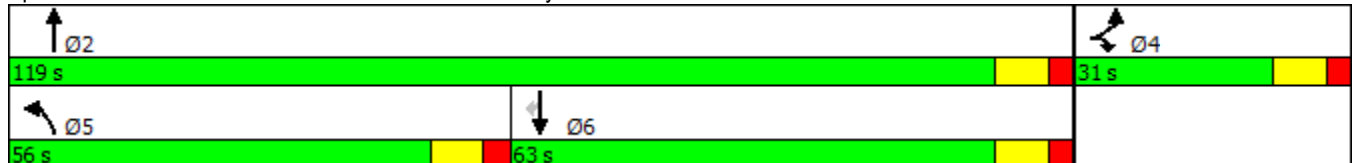


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	113	252	562	959	389	397
Future Volume (vph)	113	252	562	959	389	397
Turn Type	Prot	Prot	Prot	NA	NA	Perm
Protected Phases	4	4	5	2	6	
Permitted Phases						6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	15.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	56.0	119.0	63.0	63.0
Total Split (%)	20.7%	20.7%	37.3%	79.3%	42.0%	42.0%
Yellow Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None

Intersection Summary

Cycle Length: 150  
 Actuated Cycle Length: 141.5  
 Natural Cycle: 140  
 Control Type: Actuated-Uncoordinated













Splits and Phases: 3: Columbia Pk & Declaration Way





HCM 2010 Signalized Intersection Summary  
 3: Columbia Pk & Declaration Way

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	113	252	562	959	389	397		
Future Volume (veh/h)	113	252	562	959	389	397		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	128	286	639	1090	442	451		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	268	240	573	2566	1203	538		
Arrive On Green	0.15	0.15	0.32	0.72	0.34	0.34		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	128	286	639	1090	442	451		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	9.6	22.0	47.0	17.8	13.7	38.2		
Cycle Q Clear(g_c), s	9.6	22.0	47.0	17.8	13.7	38.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	268	240	573	2566	1203	538		
V/C Ratio(X)	0.48	1.19	1.11	0.42	0.37	0.84		
Avail Cap(c_a), veh/h	268	240	573	2677	1314	588		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	56.4	61.7	49.2	8.0	36.2	44.3		
Incr Delay (d2), s/veh	1.3	120.7	73.0	0.1	0.2	9.7		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.4	31.7	62.2	13.5	11.0	25.1		
LnGrp Delay(d),s/veh	57.8	182.4	122.2	8.1	36.4	54.0		
LnGrp LOS	E	F	F	A	D	D		
Approach Vol, veh/h	414			1729	893			
Approach Delay, s/veh	143.8			50.2	45.3			
Approach LOS	F			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5	6		
Phs Duration (G+Y+Rc), s	114.4		31.0		56.0	58.4		
Change Period (Y+Rc), s	9.0		9.0		9.0	9.0		
Max Green Setting (Gmax), s	110.0		22.0		47.0	54.0		
Max Q Clear Time (g_c+I1), s	19.8		24.0		49.0	40.2		
Green Ext Time (p_c), s	19.8		0.0		0.0	9.2		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			61.6					
HCM 2010 LOS			E					

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018

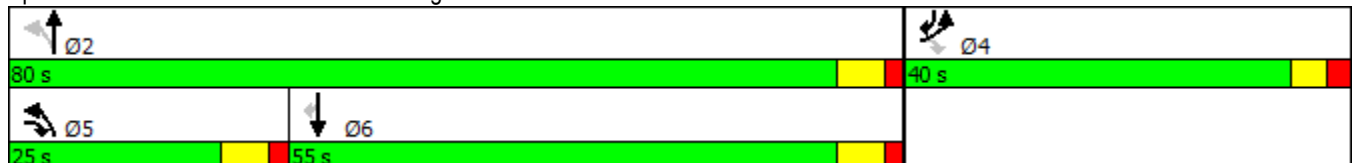


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	103	85	740	1021	161
Future Volume (vph)	71	103	85	740	1021	161
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 61.3  
 Natural Cycle: 50  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	71	103	85	740	1021	161		
Future Volume (veh/h)	71	103	85	740	1021	161		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	77	112	92	804	1110	175		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	218	284	353	2369	1787	1010		
Arrive On Green	0.12	0.12	0.06	0.67	0.50	0.50		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	77	112	92	804	1110	175		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	2.1	3.4	1.2	5.3	12.4	2.5		
Cycle Q Clear(g_c), s	2.1	3.4	1.2	5.3	12.4	2.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	218	284	353	2369	1787	1010		
V/C Ratio(X)	0.35	0.39	0.26	0.34	0.62	0.17		
Avail Cap(c_a), veh/h	1140	1106	881	4782	3166	1640		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	22.1	20.0	7.1	3.9	9.8	4.3		
Incr Delay (d2), s/veh	1.0	0.9	0.4	0.1	0.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.0	5.7	1.1	4.7	10.2	2.7		
LnGrp Delay(d),s/veh	23.1	20.9	7.5	4.0	10.1	4.4		
LnGrp LOS	C	C	A	A	B	A		
Approach Vol, veh/h	189			896	1285			
Approach Delay, s/veh	21.8			4.3	9.4			
Approach LOS	C			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		42.7		12.1	9.0	33.7		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		7.3		5.4	3.2	14.4		
Green Ext Time (p_c), s		15.1		0.8	0.2	13.3		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.4					
HCM 2010 LOS			A					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	4	0	818	1191	1
Future Vol, veh/h	0	4	0	818	1191	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	4	0	889	1295	1

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	648	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	413	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	413	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	413	-	-
HCM Lane V/C Ratio	-	0.011	-	-
HCM Control Delay (s)	-	13.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↕↕	↕↕	↗
Traffic Vol, veh/h	74	130	79	752	1080	54
Future Vol, veh/h	74	130	79	752	1080	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	560	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	138	84	800	1149	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1717	574	1149	0	-	0
Stage 1	1149	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	81	462	604	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 70	462	604	-	-	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	456	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.4	1.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	604	-	182	462	-	-
HCM Lane V/C Ratio	0.139	-	0.433	0.299	-	-
HCM Control Delay (s)	11.9	-	39.1	16.1	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	0.5	-	2	1.2	-	-

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

## **APPENDIX F**

# **CAPACITY ANALYSIS WORKSHEETS 2022 TOTAL TRAFFIC CONDITIONS**

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	255	237	206	965	685	143
Future Volume (vph)	255	237	206	965	685	143
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	43.0	30.0	30.0	77.0	47.0	43.0
Total Split (%)	35.8%	25.0%	25.0%	64.2%	39.2%	35.8%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 69.1  
 Natural Cycle: 50  
 Control Type: Semi Act-Uncoord













Splits and Phases: 1: Columbia Pk & Tollgate Blvd





HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	255	237	206	965	685	143		
Future Volume (veh/h)	255	237	206	965	685	143		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	271	252	219	1027	729	152		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	385	518	460	2095	1351	960		
Arrive On Green	0.21	0.21	0.11	0.59	0.38	0.38		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	271	252	219	1027	729	152		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	8.2	7.4	3.9	9.8	9.4	2.5		
Cycle Q Clear(g_c), s	8.2	7.4	3.9	9.8	9.4	2.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	385	518	460	2095	1351	960		
V/C Ratio(X)	0.70	0.49	0.48	0.49	0.54	0.16		
Avail Cap(c_a), veh/h	1154	1204	1002	4272	2467	1469		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	21.4	16.1	9.3	6.9	14.2	5.3		
Incr Delay (d2), s/veh	2.4	0.7	0.8	0.2	0.3	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	7.7	11.3	3.6	8.3	8.1	3.1		
LnGrp Delay(d),s/veh	23.8	16.8	10.0	7.1	14.5	5.4		
LnGrp LOS	C	B	B	A	B	A		
Approach Vol, veh/h	523			1246	881			
Approach Delay, s/veh	20.4			7.6	12.9			
Approach LOS	C			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	40.8		18.0		12.4		28.5	
Change Period (Y+Rc), s	* 6		5.5		* 6		* 6	
Max Green Setting (Gmax), s	* 71		37.5		* 24		* 41	
Max Q Clear Time (g_c+I1), s	11.8		10.2		5.9		11.4	
Green Ext Time (p_c), s	12.7		2.3		0.7		11.0	
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			11.9					
HCM 2010 LOS			B					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑↑	↑↑	
Traffic Vol, veh/h	0	11	0	1257	844	15
Future Vol, veh/h	0	11	0	1257	844	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	12	0	1366	917	16

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1609	467	934	0	-	0
Stage 1	926	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	95	542	729	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	463	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	95	542	729	-	-	-
Mov Cap-2 Maneuver	223	-	-	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	463	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	729	-	-	542	-	-
HCM Lane V/C Ratio	-	-	-	0.022	-	-
HCM Control Delay (s)	0	-	0	11.8	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	-

Timings

3: Columbia Pk & Declaration Way

10/11/2018

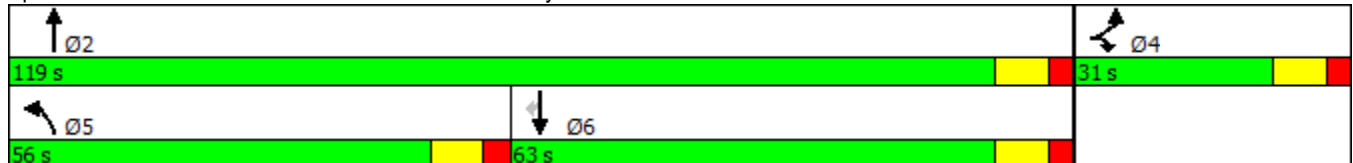


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	113	252	562	1079	499	397
Future Volume (vph)	113	252	562	1079	499	397
Turn Type	Prot	Prot	Prot	NA	NA	Perm
Protected Phases	4	4	5	2	6	
Permitted Phases						6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	15.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	56.0	119.0	63.0	63.0
Total Split (%)	20.7%	20.7%	37.3%	79.3%	42.0%	42.0%
Yellow Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None

Intersection Summary













Cycle Length: 150  
 Actuated Cycle Length: 141.7  
 Natural Cycle: 140  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Columbia Pk & Declaration Way



HCM 2010 Signalized Intersection Summary  
 3: Columbia Pk & Declaration Way

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	113	252	562	1079	499	397		
Future Volume (veh/h)	113	252	562	1079	499	397		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	128	286	639	1226	567	451		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	267	238	569	2572	1219	545		
Arrive On Green	0.15	0.15	0.32	0.73	0.34	0.34		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	128	286	639	1226	567	451		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	9.7	22.0	47.0	21.2	18.3	38.2		
Cycle Q Clear(g_c), s	9.7	22.0	47.0	21.2	18.3	38.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	267	238	569	2572	1219	545		
V/C Ratio(X)	0.48	1.20	1.12	0.48	0.47	0.83		
Avail Cap(c_a), veh/h	267	238	569	2659	1305	584		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	57.0	62.2	49.7	8.4	37.5	44.0		
Incr Delay (d2), s/veh	1.3	124.0	76.0	0.1	0.3	9.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.5	32.0	62.9	15.5	14.0	25.0		
LnGrp Delay(d),s/veh	58.3	186.2	125.7	8.5	37.8	53.1		
LnGrp LOS	E	F	F	A	D	D		
Approach Vol, veh/h	414			1865	1018			
Approach Delay, s/veh	146.7			48.7	44.5			
Approach LOS	F			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5	6		
Phs Duration (G+Y+Rc), s	115.4		31.0		56.0	59.4		
Change Period (Y+Rc), s	9.0		9.0		9.0	9.0		
Max Green Setting (Gmax), s	110.0		22.0		47.0	54.0		
Max Q Clear Time (g_c+I1), s	23.2		24.0		49.0	40.2		
Green Ext Time (p_c), s	26.2		0.0		0.0	10.2		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			59.7					
HCM 2010 LOS			E					

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	215	233	221	740	1035	283
Future Volume (vph)	215	233	221	740	1035	283
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 85.2  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

### Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	215	233	221	740	1035	283		
Future Volume (veh/h)	215	233	221	740	1035	283		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	234	253	240	804	1125	308		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	343	466	362	2298	1653	1060		
Arrive On Green	0.19	0.19	0.10	0.65	0.47	0.47		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	234	253	240	804	1125	308		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	8.6	9.5	4.4	7.4	17.8	5.8		
Cycle Q Clear(g_c), s	8.6	9.5	4.4	7.4	17.8	5.8		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	343	466	362	2298	1653	1060		
V/C Ratio(X)	0.68	0.54	0.66	0.35	0.68	0.29		
Avail Cap(c_a), veh/h	873	939	665	3664	2426	1413		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.0	21.5	12.9	5.7	14.9	5.2		
Incr Delay (d2), s/veh	2.4	1.0	2.1	0.1	0.5	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.0	13.5	4.6	6.5	13.5	7.2		
LnGrp Delay(d),s/veh	29.3	22.5	15.0	5.8	15.4	5.4		
LnGrp LOS	C	C	B	A	B	A		
Approach Vol, veh/h	487			1044	1433			
Approach Delay, s/veh	25.8			7.9	13.2			
Approach LOS	C			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		52.4		19.1	13.0	39.4		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		9.4		11.5	6.4	19.8		
Green Ext Time (p_c), s		17.0		2.1	0.7	13.6		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			13.4					
HCM 2010 LOS			B					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑↑	↑↑	
Traffic Vol, veh/h	0	18	0	962	1313	15
Future Vol, veh/h	0	18	0	962	1313	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	20	0	1046	1427	16

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1958	722	1443	0	-	0
Stage 1	1435	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	56	369	466	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	56	369	466	-	-	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	559	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	466	-	-	369	-	-
HCM Lane V/C Ratio	-	-	-	0.053	-	-
HCM Control Delay (s)	0	-	0	15.3	-	-
HCM Lane LOS	A	-	A	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-



HCM 2010 TWSC  
 3: Columbia Pk & Declaration Way

10/11/2018

**Intersection**

Int Delay, s/veh 3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑↑	↑↑	↗
Traffic Vol, veh/h	74	130	79	888	1224	54
Future Vol, veh/h	74	130	79	888	1224	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	560	-	-	150
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	80	141	86	965	1330	59

**Major/Minor**

	Minor2	Major1	Major2			
Conflicting Flow All	1984	665	1330	0	-	0
Stage 1	1330	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 53	403	515	-	-	-
Stage 1	211	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 44	403	515	-	-	-
Mov Cap-2 Maneuver	144	-	-	-	-	-
Stage 1	211	-	-	-	-	-
Stage 2	399	-	-	-	-	-

**Approach**

	EB	NB	SB
HCM Control Delay, s	32.9	1.1	0
HCM LOS	D		

**Minor Lane/Major Mvmt**

	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	515	-	144	403	-	-
HCM Lane V/C Ratio	0.167	-	0.559	0.351	-	-
HCM Control Delay (s)	13.4	-	57.8	18.7	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.6	-	2.8	1.5	-	-

**Notes**

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

## **APPENDIX G**

# **CAPACITY ANALYSIS WORKSHEETS 2027 BACKGROUND CONDITIONS**

Timings

1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	145	138	86	1092	763	35
Future Volume (vph)	145	138	86	1092	763	35
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	43.0	30.0	30.0	77.0	47.0	43.0
Total Split (%)	35.8%	25.0%	25.0%	64.2%	39.2%	35.8%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 56.3  
 Natural Cycle: 45  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	145	138	86	1092	763	35		
Future Volume (veh/h)	145	138	86	1092	763	35		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	154	147	91	1162	812	37		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	260	324	436	2218	1590	957		
Arrive On Green	0.14	0.14	0.06	0.63	0.45	0.45		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	154	147	91	1162	812	37		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	4.0	4.0	1.2	9.1	8.2	0.5		
Cycle Q Clear(g_c), s	4.0	4.0	1.2	9.1	8.2	0.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	260	324	436	2218	1590	957		
V/C Ratio(X)	0.59	0.45	0.21	0.52	0.51	0.04		
Avail Cap(c_a), veh/h	1357	1304	1200	5025	2902	1556		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.1	17.6	6.6	5.2	9.8	4.2		
Incr Delay (d2), s/veh	2.2	1.0	0.2	0.2	0.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.8	0.2	1.1	7.9	7.2	0.5		
LnGrp Delay(d),s/veh	22.2	18.6	6.9	5.4	10.1	4.3		
LnGrp LOS	C	B	A	A	B	A		
Approach Vol, veh/h	301			1253	849			
Approach Delay, s/veh	20.4			5.5	9.8			
Approach LOS	C			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5		6	
Phs Duration (G+Y+Rc), s	37.3		12.7		8.9		28.5	
Change Period (Y+Rc), s	* 6		5.5		* 6		* 6	
Max Green Setting (Gmax), s	* 71		37.5		* 24		* 41	
Max Q Clear Time (g_c+I1), s	11.1		6.0		3.2		10.2	
Green Ext Time (p_c), s	14.3		1.3		0.2		12.3	
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.9					
HCM 2010 LOS			A					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1330	853	3
Future Vol, veh/h	0	0	0	1330	853	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	1446	927	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1652	465	930	0	-	0
Stage 1	929	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	89	544	731	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	89	544	731	-	-	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	441	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	731	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	0	0	-	-
HCM Lane LOS	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Timings

3: Columbia Pk & Declaration Way

10/11/2018

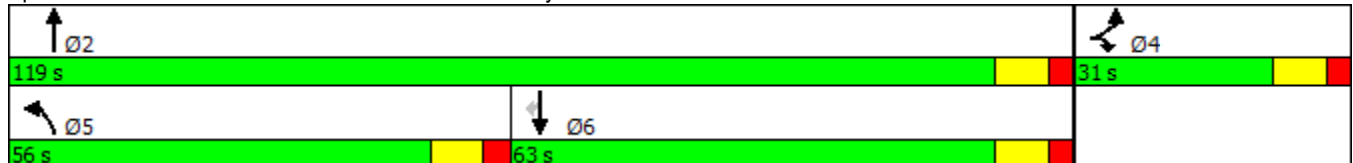


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	113	252	562	1085	440	397
Future Volume (vph)	113	252	562	1085	440	397
Turn Type	Prot	Prot	Prot	NA	NA	Perm
Protected Phases	4	4	5	2	6	
Permitted Phases						6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	15.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	56.0	119.0	63.0	63.0
Total Split (%)	20.7%	20.7%	37.3%	79.3%	42.0%	42.0%
Yellow Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None

Intersection Summary

Cycle Length: 150  
 Actuated Cycle Length: 141.7  
 Natural Cycle: 140  
 Control Type: Actuated-Uncoordinated













Splits and Phases: 3: Columbia Pk & Declaration Way



# HCM 2010 Signalized Intersection Summary

## 3: Columbia Pk & Declaration Way

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	113	252	562	1085	440	397		
Future Volume (veh/h)	113	252	562	1085	440	397		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	128	286	639	1233	500	451		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	267	238	570	2571	1216	544		
Arrive On Green	0.15	0.15	0.32	0.73	0.34	0.34		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	128	286	639	1233	500	451		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	9.7	22.0	47.0	21.4	15.8	38.2		
Cycle Q Clear(g_c), s	9.7	22.0	47.0	21.4	15.8	38.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	267	238	570	2571	1216	544		
V/C Ratio(X)	0.48	1.20	1.12	0.48	0.41	0.83		
Avail Cap(c_a), veh/h	267	238	570	2662	1307	585		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	56.9	62.1	49.6	8.4	36.7	44.1		
Incr Delay (d2), s/veh	1.3	123.4	75.4	0.1	0.2	9.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.4	32.0	62.8	15.6	12.3	25.0		
LnGrp Delay(d),s/veh	58.2	185.5	125.0	8.5	36.9	53.3		
LnGrp LOS	E	F	F	A	D	D		
Approach Vol, veh/h	414			1872	951			
Approach Delay, s/veh	146.1			48.3	44.7			
Approach LOS	F			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2		4		5	6		
Phs Duration (G+Y+Rc), s	115.2		31.0		56.0	59.2		
Change Period (Y+Rc), s	9.0		9.0		9.0	9.0		
Max Green Setting (Gmax), s	110.0		22.0		47.0	54.0		
Max Q Clear Time (g_c+I1), s	23.4		24.0		49.0	40.2		
Green Ext Time (p_c), s	24.8		0.0		0.0	10.0		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay	59.7							
HCM 2010 LOS	E							



# Timings

## 1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	103	85	837	1155	161
Future Volume (vph)	71	103	85	837	1155	161
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary

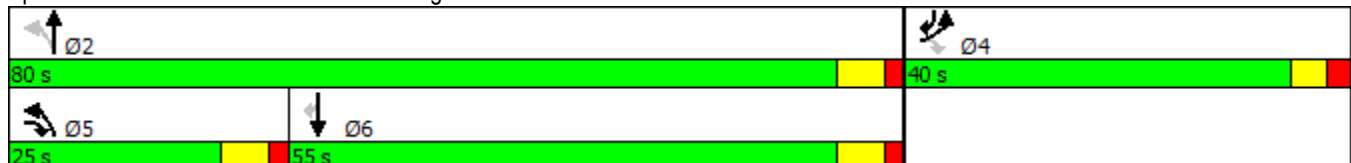
Cycle Length: 120

Actuated Cycle Length: 66.7

Natural Cycle: 55













Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	71	103	85	837	1155	161		
Future Volume (veh/h)	71	103	85	837	1155	161		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	77	112	92	910	1255	175		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	203	266	326	2459	1918	1056		
Arrive On Green	0.11	0.11	0.05	0.69	0.54	0.54		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	77	112	92	910	1255	175		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	2.4	3.7	1.2	6.3	15.0	2.5		
Cycle Q Clear(g_c), s	2.4	3.7	1.2	6.3	15.0	2.5		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	203	266	326	2459	1918	1056		
V/C Ratio(X)	0.38	0.42	0.28	0.37	0.65	0.17		
Avail Cap(c_a), veh/h	1047	1019	808	4392	2908	1508		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	24.5	22.4	7.6	3.7	9.7	4.0		
Incr Delay (d2), s/veh	1.2	1.1	0.5	0.1	0.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.2	6.2	1.1	5.5	11.7	2.7		
LnGrp Delay(d),s/veh	25.7	23.4	8.0	3.8	10.1	4.1		
LnGrp LOS	C	C	A	A	B	A		
Approach Vol, veh/h	189			1002	1430			
Approach Delay, s/veh	24.3			4.2	9.3			
Approach LOS	C			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		47.4		12.2	9.1	38.3		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		8.3		5.7	3.2	17.0		
Green Ext Time (p_c), s		19.0		0.8	0.2	15.3		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			8.5					
HCM 2010 LOS			A					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	4	0	925	1348	1
Future Vol, veh/h	0	4	0	925	1348	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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	4	0	1005	1465	1

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	733	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	363	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	363	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	363	-	-
HCM Lane V/C Ratio	-	0.012	-	-
HCM Control Delay (s)	-	15	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0	-	-

**Intersection**

Int Delay, s/veh 3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↕	↕	↗
Traffic Vol, veh/h	74	130	79	850	1221	54
Future Vol, veh/h	74	130	79	850	1221	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	560	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	138	84	904	1299	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1919	649	1299	0	-	0
Stage 1	1299	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 59	412	529	-	-	-
Stage 1	220	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 50	412	529	-	-	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	220	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.3	1.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	529	-	152	412	-	-
HCM Lane V/C Ratio	0.159	-	0.518	0.336	-	-
HCM Control Delay (s)	13.1	-	51.7	18.1	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.6	-	2.5	1.5	-	-

**Notes**

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

## **APPENDIX H**

# **CAPACITY ANALYSIS WORKSHEETS 2027 TOTAL TRAFFIC CONDITIONS**

Timings

1: Columbia Pk & Tollgate Blvd

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	311	270	273	1092	780	222
Future Volume (vph)	311	270	273	1092	780	222
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	43.0	30.0	30.0	77.0	47.0	43.0
Total Split (%)	35.8%	25.0%	25.0%	64.2%	39.2%	35.8%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 84  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	311	270	273	1092	780	222		
Future Volume (veh/h)	311	270	273	1092	780	222		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	331	287	290	1162	830	236		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	429	588	441	2133	1388	1017		
Arrive On Green	0.24	0.24	0.13	0.60	0.39	0.39		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	331	287	290	1162	830	236		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	12.3	9.9	6.2	13.9	13.4	4.6		
Cycle Q Clear(g_c), s	12.3	9.9	6.2	13.9	13.4	4.6		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	429	588	441	2133	1388	1017		
V/C Ratio(X)	0.77	0.49	0.66	0.54	0.60	0.23		
Avail Cap(c_a), veh/h	945	1048	816	3499	2020	1305		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	25.6	17.7	12.3	8.4	17.3	5.8		
Incr Delay (d2), s/veh	3.0	0.6	1.7	0.2	0.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	10.6	14.4	5.7	11.1	10.7	6.1		
LnGrp Delay(d),s/veh	28.5	18.3	14.0	8.7	17.7	5.9		
LnGrp LOS	C	B	B	A	B	A		
Approach Vol, veh/h	618			1452	1066			
Approach Delay, s/veh	23.8			9.7	15.1			
Approach LOS	C			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		49.3		22.5	15.1	34.2		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 71		37.5	* 24	* 41		
Max Q Clear Time (g_c+I1), s		15.9		14.3	8.2	15.4		
Green Ext Time (p_c), s		16.6		2.8	0.9	12.8		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			14.3					
HCM 2010 LOS			B					
<b>Notes</b>								



Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	0	1496	1040	24
Future Vol, veh/h	0	17	0	1496	1040	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	18	0	1626	1130	26

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1956	578	1157	0	-	0
Stage 1	1143	-	-	-	-	-
Stage 2	813	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	56	459	600	-	-	-
Stage 1	266	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	56	459	600	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	266	-	-	-	-	-
Stage 2	396	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	600	-	-	459	-	-
HCM Lane V/C Ratio	-	-	-	0.04	-	-
HCM Control Delay (s)	0	-	0	13.2	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	-

# Timings

## 3: Columbia Pk & Declaration Way

10/11/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	113	269	583	1272	589	397
Future Volume (vph)	113	269	583	1272	589	397
Turn Type	Prot	Prot	Prot	NA	NA	Perm
Protected Phases	4	4	5	2	6	
Permitted Phases						6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	15.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	56.0	119.0	63.0	63.0
Total Split (%)	20.7%	20.7%	37.3%	79.3%	42.0%	42.0%
Yellow Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0	9.0	9.0	9.0	9.0	9.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None

### Intersection Summary

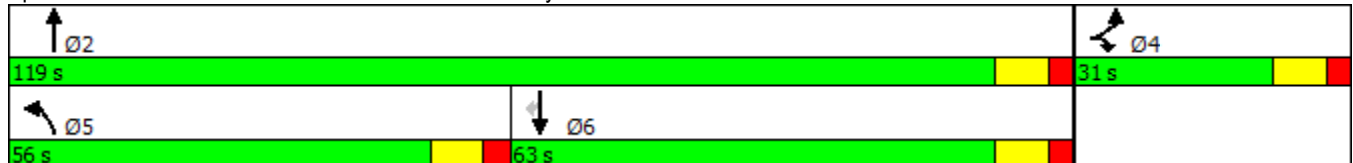
Cycle Length: 150

Actuated Cycle Length: 142.3

Natural Cycle: 140













Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Columbia Pk & Declaration Way



HCM 2010 Signalized Intersection Summary  
 3: Columbia Pk & Declaration Way

10/11/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	113	269	583	1272	589	397		
Future Volume (veh/h)	113	269	583	1272	589	397		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	128	306	662	1445	669	451		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	265	236	565	2579	1236	553		
Arrive On Green	0.15	0.15	0.32	0.73	0.35	0.35		
Sat Flow, veh/h	1774	1583	1774	3632	3632	1583		
Grp Volume(v), veh/h	128	306	662	1445	669	451		
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1770	1770	1583		
Q Serve(g_s), s	9.8	22.0	47.0	27.6	22.4	38.2		
Cycle Q Clear(g_c), s	9.8	22.0	47.0	27.6	22.4	38.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	265	236	565	2579	1236	553		
V/C Ratio(X)	0.48	1.30	1.17	0.56	0.54	0.82		
Avail Cap(c_a), veh/h	265	236	565	2640	1296	580		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	57.5	62.7	50.2	9.2	38.5	43.7		
Incr Delay (d2), s/veh	1.4	160.7	94.7	0.3	0.4	8.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	8.5	36.2	68.0	19.3	16.5	24.9		
LnGrp Delay(d),s/veh	58.9	223.5	144.9	9.4	38.9	52.2		
LnGrp LOS	E	F	F	A	D	D		
Approach Vol, veh/h	434			2107	1120			
Approach Delay, s/veh	174.9			52.0	44.3			
Approach LOS	F			D	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		116.5		31.0	56.0	60.5		
Change Period (Y+Rc), s		9.0		9.0	9.0	9.0		
Max Green Setting (Gmax), s		110.0		22.0	47.0	54.0		
Max Q Clear Time (g_c+I1), s		29.6		24.0	49.0	40.2		
Green Ext Time (p_c), s		35.1		0.0	0.0	11.3		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			64.2					
HCM 2010 LOS			E					

HCM 2010 TWSC  
 4: Declaration Way & Branford Place

10/11/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	0	365	959	21	17	0
Future Vol, veh/h	0	365	959	21	17	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	397	1042	23	18	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1065	0	-	0	1451 1054
Stage 1	-	-	-	-	1054 -
Stage 2	-	-	-	-	397 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	654	-	-	-	144 275
Stage 1	-	-	-	-	335 -
Stage 2	-	-	-	-	679 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	654	-	-	-	144 275
Mov Cap-2 Maneuver	-	-	-	-	260 -
Stage 1	-	-	-	-	335 -
Stage 2	-	-	-	-	679 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	654	-	-	-	260
HCM Lane V/C Ratio	-	-	-	-	0.071
HCM Control Delay (s)	0	-	-	-	19.9
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

# Timings

## 1: Columbia Pk & Tollgate Blvd

10/12/2018

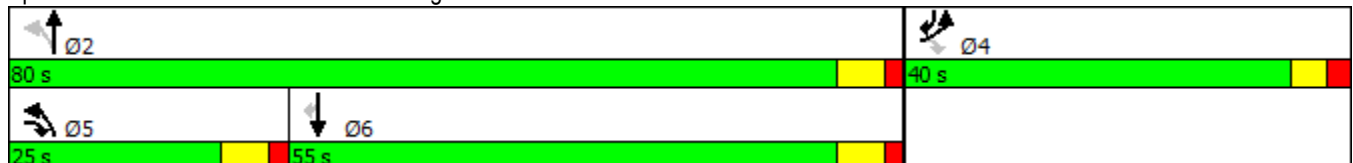


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	300	286	269	837	1178	345
Future Volume (vph)	300	286	269	837	1178	345
Turn Type	Prot	pm+ov	pm+pt	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	4.0	4.0	10.0	10.0	7.0
Minimum Split (s)	12.5	10.0	10.0	16.0	16.0	12.5
Total Split (s)	40.0	25.0	25.0	80.0	55.0	40.0
Total Split (%)	33.3%	20.8%	20.8%	66.7%	45.8%	33.3%
Yellow Time (s)	3.2	4.3	4.3	4.3	4.3	3.2
All-Red Time (s)	2.3	1.7	1.7	1.7	1.7	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	6.0	6.0	6.0	6.0	5.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None

### Intersection Summary













Cycle Length: 120  
 Actuated Cycle Length: 102.9  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Columbia Pk & Tollgate Blvd



HCM 2010 Signalized Intersection Summary  
 1: Columbia Pk & Tollgate Blvd

10/12/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	300	286	269	837	1178	345		
Future Volume (veh/h)	300	286	269	837	1178	345		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1863	1900		
Adj Flow Rate, veh/h	326	311	292	910	1280	375		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	2	2	0		
Cap, veh/h	403	544	338	2298	1657	1116		
Arrive On Green	0.22	0.22	0.11	0.65	0.47	0.47		
Sat Flow, veh/h	1810	1615	1810	3632	3632	1615		
Grp Volume(v), veh/h	326	311	292	910	1280	375		
Grp Sat Flow(s),veh/h/ln	1810	1615	1810	1770	1770	1615		
Q Serve(g_s), s	15.3	14.2	7.5	10.9	27.1	8.4		
Cycle Q Clear(g_c), s	15.3	14.2	7.5	10.9	27.1	8.4		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	403	544	338	2298	1657	1116		
V/C Ratio(X)	0.81	0.57	0.86	0.40	0.77	0.34		
Avail Cap(c_a), veh/h	695	805	514	2916	1931	1241		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	33.1	24.4	19.6	7.4	19.9	5.6		
Incr Delay (d2), s/veh	3.9	0.9	9.4	0.1	1.7	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	12.8	18.9	12.5	9.1	19.6	10.6		
LnGrp Delay(d),s/veh	37.0	25.4	29.1	7.6	21.6	5.8		
LnGrp LOS	D	C	C	A	C	A		
Approach Vol, veh/h	637			1202	1655			
Approach Delay, s/veh	31.3			12.8	18.0			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		64.3		25.5	16.3	48.0		
Change Period (Y+Rc), s		* 6		5.5	* 6	* 6		
Max Green Setting (Gmax), s		* 74		34.5	* 19	* 49		
Max Q Clear Time (g_c+I1), s		12.9		17.3	9.5	29.1		
Green Ext Time (p_c), s		22.2		2.7	0.7	13.0		
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			18.6					
HCM 2010 LOS			B					
<b>Notes</b>								

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↕↕	↕↕	
Traffic Vol, veh/h	0	27	0	1154	1532	21
Future Vol, veh/h	0	27	0	1154	1532	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	1	-	-	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	29	0	1254	1665	23

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2304	844	1688	0	-	0
Stage 1	1677	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	32	307	375	-	-	-
Stage 1	137	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	32	307	375	-	-	-
Mov Cap-2 Maneuver	107	-	-	-	-	-
Stage 1	137	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	375	-	-	307	-	-
HCM Lane V/C Ratio	-	-	-	0.096	-	-
HCM Control Delay (s)	0	-	0	18	-	-
HCM Lane LOS	A	-	A	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	-



Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↕↕	↕↕	↗
Traffic Vol, veh/h	74	153	99	1034	1427	54
Future Vol, veh/h	74	153	99	1034	1427	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	560	-	-	150
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	80	166	108	1124	1551	59

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2328	776	1551	0	-	0
Stage 1	1551	-	-	-	-	-
Stage 2	777	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 31	340	423	-	-	-
Stage 1	161	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 23	340	423	-	-	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	161	-	-	-	-	-
Stage 2	308	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	51.4	1.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	423	-	106	340	-	-
HCM Lane V/C Ratio	0.254	-	0.759	0.489	-	-
HCM Control Delay (s)	16.4	-	105.3	25.3	-	-
HCM Lane LOS	C	-	F	D	-	-
HCM 95th %tile Q(veh)	1	-	4.1	2.6	-	-

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

HCM 2010 TWSC  
 4: Declaration Way & Branford Place

10/12/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	0	204	133	20	23	0
Future Vol, veh/h	0	204	133	20	23	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	222	145	22	25	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	166	0	-	0	377 155
Stage 1	-	-	-	-	155 -
Stage 2	-	-	-	-	222 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1412	-	-	-	625 891
Stage 1	-	-	-	-	873 -
Stage 2	-	-	-	-	815 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1412	-	-	-	625 891
Mov Cap-2 Maneuver	-	-	-	-	669 -
Stage 1	-	-	-	-	873 -
Stage 2	-	-	-	-	815 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1412	-	-	-	669
HCM Lane V/C Ratio	-	-	-	-	0.037
HCM Control Delay (s)	0	-	-	-	10.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

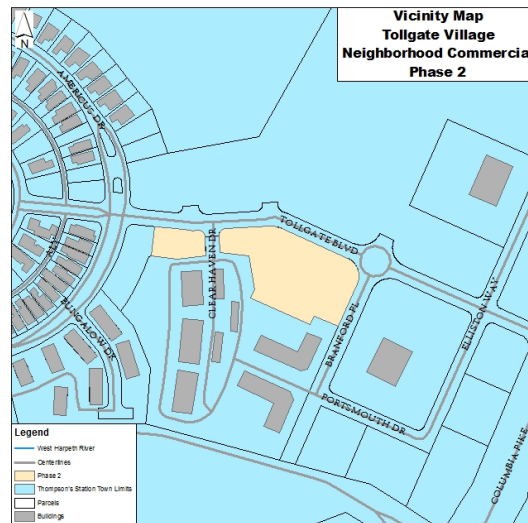


**Thompson's Station Planning Commission**  
**Staff Report - Item 3 (SP 2018-007, DR 2018-004)**  
**October 25, 2018**

**Request for site plan approval of 12 condominiums, one mixed-use building with three units and 2,633 square feet of commercial, two live work buildings with nine units and 3,393 square feet of commercial and 14 townhomes located along Tollgate Boulevard.**

**REQUEST**

The applicant, Ragan Smith, on behalf of Regent Homes is requesting approval of a site plan for the development of 12 condominiums, a mixed-use building, two live work buildings and 14 townhomes located along the south side of Tollgate Boulevard within the D3 and Neighborhood Commercial (NC) zoning districts in the community of Tollgate Village.



**BACKGROUND**

The Tollgate Village site development plan dated April 2014 consists of a variety of housing throughout the site with commercial/office located in proximity to Columbia Pike (State Route 6). The existing housing includes 201 apartments (located on Branford Place, south of Tollgate Boulevard), 30 condominiums (located along Americus), 61 townhomes (along Bungalow Drive, Newark Lane and Rochelle Lane) and single-family residences within Sections 1-15, 17 and 18 and preliminary plat approval for phase 16. Existing nonresidential uses include the medical office building and a general office building located in the front sections of the development along Tollgate Boulevard and Elliston Way.

A rezoning was completed to zone the front portion of Tollgate Village as NC (neighborhood commercial) to permit the land uses that were previously approved through the site development process. The NC zone was then amended to permit additional residential uses, such as townhomes. Phase 1 of the “town center” area of Tollgate Village located along the north side of Tollgate Boulevard between Elliston Way and a future extension of Branford Place was approved for mixed use, live work and commercial uses. The construction drawings are under review by Town Staff for this project.

**ANALYSIS**

**Site Plan**

Site plan is a plan presenting the general details of the development proposal and review by the Planning Commission is required for all multi-family and non-residential developments to ensure

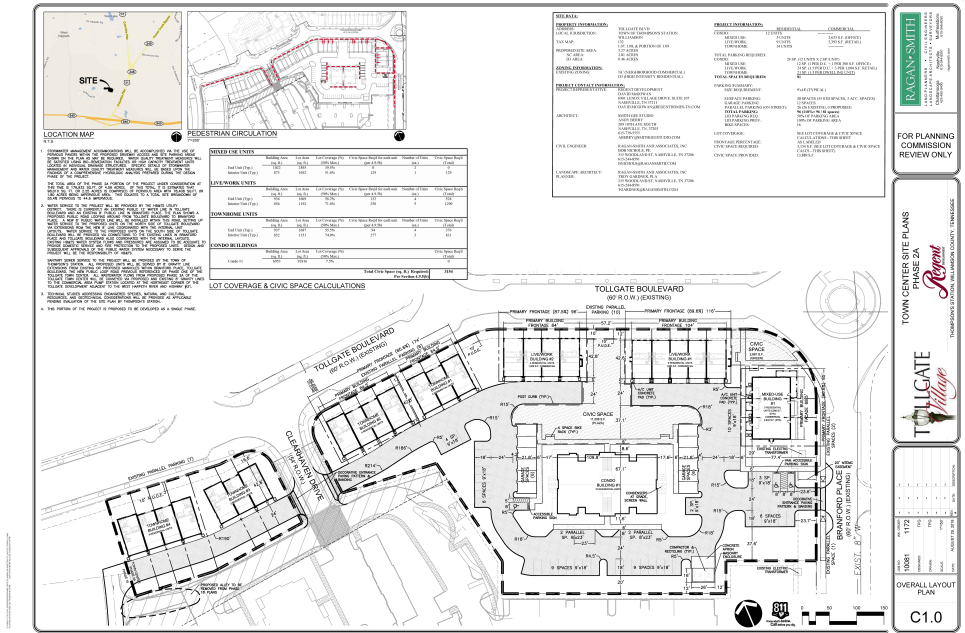
“compliance with the development and design standards” (Section 5.4.4) of the Land Development Ordinance.

### Plat Requirements

The project site is one parcel; however, a preliminary plat was submitted for the subdivision of the property into the necessary lots for the development of this site plan. By creating legal lots for each of the proposed units or buildings, the property lines will be set thereby allowing the details of the site plan to be accurate.

### Project Description

The project site which is 3.28 acres is located along the south side of Tollgate Boulevard between Branford Place and Americus Drive. The proposal consists of eight buildings. One condominium building with 12 units will be located in the interior of the site adjacent to the apartments (on Branford Place). One mixed use building with a total of 2,633 square feet of commercial uses and three residential units (5,266 square feet) will be located at the southwest corner of Tollgate Boulevard and Branford Place. Two live work buildings with a total of 3,393 square feet of commercial and nine 9 residential units will be located along Tollgate Boulevard, west of Branford Place. Four townhomes buildings with a total of 14 units will be located along Tollgate Boulevard.



### Zoning

The project site is located within two zoning districts: D3 and NC. The D3 zone is “intended for higher, density residential development where urban services and facilities, including public sewer, are provided or where the extension of such services and facilities will be available prior to development.” Seven of the townhomes are proposed within this district the D3 district and are permitted. The Neighborhood Commercial zone “should include neighborhood commercial activities, small-scale businesses, and high intensity residential” (LDO Section 1.2.7). The remaining townhomes, condominiums, live work along with mixed use building are permitted within the NC zone.

### Neighborhood Commercial Standards

**Please note, the analysis of this project with regard to the development standards is based the assumption the property will be subdivided as submitted with the preliminary plat. Any changes to the plat may result in a revision to the site plan.**

Primary building frontage is a 12-foot maximum. The mixed building 1 does not conform to the maximum setback, however there is a 20-foot easement for utilities along this frontage. Therefore, the proposed setback can be permitted to accommodate the easement. The condominium building is also setback beyond both the MTEMC easement and an easement for the sewer and therefore can also be approved at the proposed setback. All other buildings conform to the primary frontage setback. Access to the parking located behind the buildings is provided from Branford Place and Tollgate Boulevard (via Clearhaven Drive) and all parking will maintain a minimum of a 20-foot landscaped setback. Primary building frontage is 60% minimum and the proposed buildings meet the frontage requirement. Density is permitted at 12 units per acre. The proposed site area is 3.28 acres with 38 residential units, however, approximately .46 acres is located within the D3 zone with the remaining 2.81 acres within the NC zone. The project consists of seven units within the D3 zone and 30 units within the remaining acreage for a density of 10.7 units per acre.

Mixed use buildings are defined as “residential use combined with commercial use within the same building through superimposition or adjacency. This building type is urban in character and frequently is a multi-story building with residential uses above commercial uses. Residential uses within a mixed-use building shall not exceed 75% of the total use except within the G3 sector” (Section 1.3). Mixed use building 1 is three stories with 7,899 square feet and three residential units using 5,266 square feet for a total of 67% of the overall building with the remaining square footage as commercial square footage.

#### Section 4.11.1

*Buildings should be located along road frontage with parking located in the rear.*

Seven of the buildings are located along the road frontage setback behind the required landscaping and any easements and the condominium building is located within the interior of the site beyond a sewer easement. All onsite parking is located within the interior of the site.

*Lot coverage shall not exceed the standards of Table 4.10 through Table 4.13 and shall include the footprint of all structures on the site.*

Lot coverage permitted is 50% for nonresidential and 90% for residential. Several buildings on site exceed 50% and therefore, additional civic space within ¼ mile of the units is required. Therefore, 3,154 square feet of civic space is required and provided on site. The project includes two civic space areas: a plaza around the condominium building and a green at the southwest corner of Tollgate Boulevard and Branford Place. All residential units are within a ¼ mile of the proposed civic space.

*Construction shall incorporate masonry and brick or shall match the character of the surrounding area. No vinyl is permitted. Metal siding is discouraged and shall be used only as an accent treatment. Building facades shall include varied wall planes and roof lines, projections and recesses, window articulation and natural color schemes.*

Building heights are limited to three stories. The ground floor can be no less than 11 feet in height and shall The proposed condominium building, townhomes, live work units are three story brick buildings and the garages are single story. The materials and colors of the buildings will be required to be consistent on all four elevations and the glazing requirements will need to be satisfied. The buildings consist of varied wall planes, balconies, proportionate windows with window treatments. The elevation notes specify the buildings are brick with stone accents and asphalt shingle roofing with accent metal roofing.

The Design Guidelines seek to promote design excellence in character and compatibility of development to its surroundings and the project will be subject to design review by the DRC upon



approval of the site plan. Upon approval of the site plan the Design Review Commission will review the project.

*Groupings of buildings shall be used instead of long linear rows of buildings. Building massing shall incorporate varied rooflines, building heights and other architectural features.*

Several buildings are proposed along the roadways with various lengths and massing with civic space and entry points separating the buildings. As noted above, all architecture will be reviewed by the Design Review Commission once site approval is granted.

*Entry drives shall be designed to incorporate enhanced paving, landscaping and other features which complement the building architecture.*

Enhanced paving consisting of a decorative pattern and banding will be incorporated into the driveway entrance along Branford Place. Clearhaven Drive is a private road entering the site and should include the decorative paving to match the other driveway entrances.

*Each development shall include trash areas that will be designed to accommodate two trash bins, one which will be designed for recycling. The trash enclosure shall be enclosed by a masonry wall that matches the architecture of the buildings on site. In addition, a landscape planter shall be utilized to provide screening around the trash enclosure.*

A trash area, including recycling is provided along the south/interior property line and is proposed to be enclosed by a masonry wall with landscaping.

*All ground or building mounted mechanical equipment shall be landscaped to reduce visibility from adjacent properties, rights-of-way and parking areas.*

All equipment is shown at grade and will be screened.

*No temporary structures shall be permitted.*

No temporary structures are proposed.

### Parking

Given the potential for uses within the buildings, the applicant has provided a breakdown of parking including the number of spaces for office and retail within the live work and mixed-use buildings. The amount of parking is likely to require 81 parking spaces; however, the project includes 96 parking spaces. Therefore, the project is subject to the low impact design (LID). The LID will be achieved using permeable pavers within the parking areas and the drive aisles.

### Landscaping

The site is zone Neighborhood Commercial and the properties surrounding are zoned NC thereby requiring a type 1 buffer which is composed of “intermittent visual obstruction” along the property lines. The plan shows adequate trees and shrubs planted along the interior property line as the buffer between this site and the neighboring property. To ensure completion of the landscaping improvements in accordance with the approved plan, a performance surety should be set to ensure the landscaping. The opinion of probable cost submitted to the Town was \$61,191 therefore Staff recommends the amount of the surety be set at \$71,000 which includes a 15% contingency.

### Lighting

Lighting will be installed throughout the project site to provide lighting within the parking lot and on the buildings. A photometric plan was submitted demonstrating that the lighting will not have a negative impact to the surrounding roadways and properties.



### Open Space

The open space required for the Tollgate Village subdivision is 120 acres and as of this submittal all open space is recorded.

### Geotechnical Information

A geotechnical report was submitted for the project site and all recommendations during the development process should be incorporated into the contingencies for approval of the project.

### Traffic

Significant concerns were noted in the review of the original trip generation analysis. Therefore, after discussions with the Town's traffic engineer, a revised traffic study was submitted on Friday, October 12, 2018. The revised study was completed to collect current traffic count data, quantify existing traffic demand along Tollgate Boulevard, and update the expected future land uses within Tollgate Village.

Staff has forwarded the study to the Town's traffic engineer, however, there was not adequate time for a thorough review by the time of staff reports. Therefore, the traffic engineer will present their review of the traffic study at the Commission meeting.

### Sewer

The Tollgate Village development has approval for 943 sewer taps. To date, Staff believes 832 taps are committed for the neighborhood. The developer submitted a site plan without any documentation on the number of sewer taps necessary for the project. Therefore, the Town's sewer engineer has reviewed the site plan for section 2A and based on the proposed land uses has determined that 50 taps will be necessary for the project (see attached). Therefore, the project does have sewer availability, however, these 50 will reduce the number of taps available for the remaining development.

### RECOMMENDATION

Approval to the plat should incorporate the following contingencies:

1. Prior to the issuance of grading or building permits, the project site shall be subdivided into legal lots for the project.
2. Prior to the issuance of grading or building permits, approval of the project design by the Design Review Commission shall be obtained.
3. Prior to the issuance of grading or building permits, approval/acceptance of a written shared parking agreement is required.
4. Prior to the issuance of grading or building permits, construction drawings shall be reviewed and approved. Any corrections or issues with the drawings related to regulations may be subject to further Planning Commission review. Any upgrades to the utility infrastructure necessary for the project shall be incorporated into the construction plans and shall be completed by the applicant.
5. Prior to the issuance of building permits, floor plans and parking analysis for each use shall be submitted and shall meet the requirements set forth within the Land Development Ordinance.
6. Within 60 days of project approval, a performance agreement and surety in the amount of \$71,000 for on-site landscaping improvements shall be submitted.
7. Prior to installation of the landscaping, the applicant shall meet with staff to confirm location of all landscaping.

8. Prior to the issuance of a building permits, the plans shall be modified/corrected to include a table showing the window glazing conforms to the LDO and enhanced paving to match Branford Place shall be installed at the Clearhaven Drive entrance.
9. Prior to the installation of signage, a master sign plan shall be submitted for review and approval.
10. All recommendations from the Geotechnical Report dated August 27, 2018 shall be adhered to throughout the development of the project.
11. Any change of use or expansion of the project site shall conform to the requirements set forth within the Zoning Ordinance and shall be approved prior to the implementation of any changes to the project.

#### ATTACHMENTS

Site plan packet

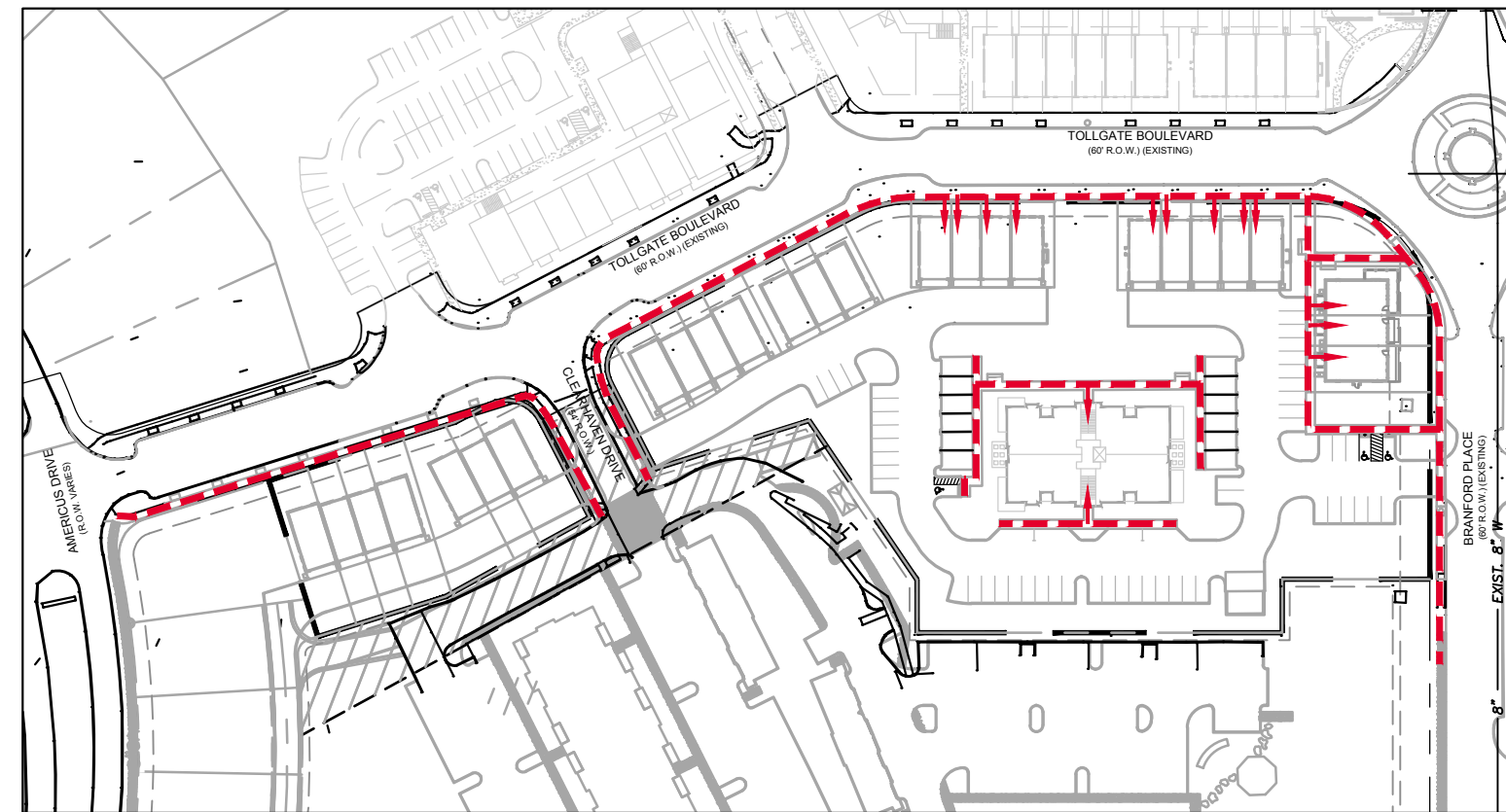
Traffic Study (dated October 12, 2018)

Sewer tap analysis (provided by town sewer engineer)





LOCATION MAP  
N.T.S.



PEDESTRIAN CIRCULATION  
1"=200'

- STORMWATER MANAGEMENT ACCOMMODATIONS WILL BE ACCOMPLISHED VIA THE USE OF PERVIOUS PAVERS WITHIN THE PROPOSED DRIVEWAY ACCESS AND SITE PARKING AREAS SHOWN ON THE PLAN AS MAY BE REQUIRED. WATER QUALITY TREATMENT MEASURES WILL BE SATISFIED USING BIO-REMEDIATION FACILITIES OR HIGH CAPACITY TREATMENT UNITS LOCATED IN INDIVIDUAL DRAINAGE STRUCTURES. SPECIFIC DETAILS OF STORMWATER MANAGEMENT AND WATER QUALITY TREATMENT MEASURES WILL BE BASED UPON THE FINDINGS OF A COMPREHENSIVE HYDROLOGIC ANALYSIS PREPARED DURING THE DESIGN PHASE OF THE PROJECT.  
  
THE TOTAL AREA OF THE PHASE 2A PORTION OF THE PROJECT UNDER CONSIDERATION AT THIS TIME IS 176,932 SQ.FT. OF 4.06 ACRES. OF THIS TOTAL, IT IS ESTIMATED THAT 98,010 SQ. FT. OR 2.25 ACRES IS COMPRISED OF PERVIOUS AREA WITH 78,408 SQ.FT. OR 1.80 ACRES BEING IMPERVIOUS AREA. THIS EQUATES TO A TOTAL SITE BREAKDOWN OF 55.4% PERVIOUS TO 44.6% IMPERVIOUS.
- WATER SERVICE TO THE PROJECT WILL BE PROVIDED BY THE HB&TS UTILITY DISTRICT. THERE IS CURRENTLY AN EXISTING PUBLIC 12" WATER LINE IN TOLLGATE BOULEVARD AND AN EXISTING 8" PUBLIC LINE IN BRANFORD PLACE. THE PLAN SHOWS A PROPOSED PUBLIC ROAD LOOPING AROUND FROM TOLLGATE BOULEVARD TO BRANFORD PLACE. A NEW 8" PUBLIC WATER LINE WILL BE INSTALLED WITHIN THIS ROAD, SETTING UP WATER SERVICE TO THE PROPOSED UNITS ON THE NORTH SIDE OF TOLLGATE BOULEVARD VIA EXTENSIONS FROM THE NEW 8" LINE COORDINATED WITH THE INTERNAL UNIT LAYOUTS. WATER SERVICE TO THE PROPOSED UNITS ON THE SOUTH SIDE OF TOLLGATE BOULEVARD WILL BE PROVIDED VIA CONNECTIONS TO THE EXISTING LINES IN BRANFORD PLACE AND TOLLGATE BOULEVARD ALSO COORDINATED WITH THE INTERNAL LAYOUTS. EXISTING HB&TS WATER SYSTEM FLOWS AND PRESSURES ARE ASSUMED TO BE ADEQUATE TO PROVIDE DOMESTIC SERVICE AND FIRE PROTECTION TO THE PROPOSED UNITS. DESIGN AND SUBSEQUENT APPROVALS OF THE PUBLIC WATER SYSTEM NECESSARY TO SERVE THE PROJECT WILL BE THE RESPONSIBILITY OF HB&TS.  
  
SANITARY SEWER SERVICE TO THE PROJECT WILL BE PROVIDED BY THE TOWN OF THOMPSON'S STATION. ALL PROPOSED UNITS WILL BE SERVED BY 8" GRAVITY LINE EXTENSIONS FROM EXISTING OR PROPOSED MANHOLES WITHIN BRANFORD PLACE, TOLLGATE BOULEVARD, THE NEW PUBLIC LOOP ROAD PREVIOUSLY REFERENCED OR PHASE ONE OF THE TOLLGATE TOWN CENTER. ALL WASTEWATER FLOWS FROM PROPOSED PHASE 2A OF THE TOLLGATE TOWN CENTER WILL BE CONVEYED VIA PROPOSED AND EXISTING 8" GRAVITY LINES TO THE COMMERCIAL AREA PUMP STATION LOCATED AT THE NORTHEAST CORNER OF THE TOLLGATE DEVELOPMENT ADJACENT TO THE WEST HARPEATH RIVER AND HIGHWAY #31.
- TECHNICAL STUDIES ADDRESSING ENDANGERED SPECIES, NATURAL AND CULTURAL RESOURCES, AND GEOTECHNICAL CONSIDERATIONS WILL BE PROVIDED AS APPLICABLE PENDING EVALUATION OF THE SITE PLAN BY THOMPSON'S STATION.
- THIS PORTION OF THE PROJECT IS PROPOSED TO BE DEVELOPED AS A SINGLE PHASE.

MIXED USE UNITS						
	Building Area (sq. ft.)	Lot Area (sq. ft.)	Lot Coverage (%) (50% Max.)	Civic Space Req'd for each unit (per 4.9.5b)	Number of Units (ea.)	Civic Space Req'd (Total)
End Unit (Typ.)	1022	2585	39.5%	0	2	0
Interior Unit (Typ.)	873	1692	51.6%	129	1	129
LIVE/WORK UNITS						
	Building Area (sq. ft.)	Lot Area (sq. ft.)	Lot Coverage (%) (50% Max.)	Civic Space Req'd for each unit (per 4.9.5b)	Number of Units (ea.)	Civic Space Req'd (Total)
End Unit (Typ.)	936	1609	58.2%	132	4	528
Interior Unit (Typ.)	854	1192	71.6%	258	5	1290
TOWNHOME UNITS						
	Building Area (sq. ft.)	Lot Area (sq. ft.)	Lot Coverage (%) (50% Max.)	Civic Space Req'd for each unit (per 4.9.5b)	Number of Units (ea.)	Civic Space Req'd (Total)
End Unit (Typ.)	937	1687	55.5%	94	4	376
Interior Unit (Typ.)	852	1151	74.0%	277	3	831
CONDO BUILDINGS						
	Building Area (sq. ft.)	Lot Area (sq. ft.)	Lot Coverage (%) (50% Max.)	Civic Space Req'd (Total)		
Condo #1	6953	92816	7.5%	0		
<b>Total Civic Space (sq. ft.) Required: Per Section 4.9.5(b)</b>						<b>3154</b>

LOT COVERAGE & CIVIC SPACE CALCULATIONS

**SITE DATA:**

**PROPERTY INFORMATION:**  
ADDRESS: TOLLGATE BLVD  
LOCAL JURISDICTION: TOWN OF THOMPSON'S STATION  
TAX MAP: WILLIAMSON  
PROPOSED SITE AREA: 1.07, 1.08, & PORTION OF 1.09  
NC AREA: 3.27 ACRES  
D3 AREA: 2.81 ACRES  
0.46 ACRES

**ZONING INFORMATION:**  
EXISTING ZONING: NC (NEIGHBORHOOD COMMERCIAL)  
D3 (HIGH INTENSITY RESIDENTIAL)

**PROJECT CONTACT INFORMATION:**  
PROJECT REPRESENTATIVE: REGENT DEVELOPMENT  
DAVID MCGOWAN  
6901 LENOX VILLAGE DRIVE, SUITE 107  
NASHVILLE, TN 37211  
DAVID.MCGOWAN@REGENTHOMES-TN.COM

**ARCHITECT:**  
SMITH GEE STUDIO  
ANDY BERRY  
209 10TH AVE SOUTH  
NASHVILLE, TN, 37203  
615-739-5555  
ABERRY@SMITHGEESTUDIO.COM

**CIVIL ENGINEER:**  
RAGAN-SMITH AND ASSOCIATES, INC  
BOB NICHOLS, PE.  
315 WOODLAND ST., NASHVILLE, TN 37206  
615-244-8591  
BNICHOLS@RAGANSMITH.COM

**LANDSCAPE ARCHITECT/  
PLANNER:**  
RAGAN-SMITH AND ASSOCIATES, INC  
TROY GARDNER, PLA  
315 WOODLAND ST., NASHVILLE, TN 37206  
615-244-8591  
TGARDNER@RAGANSMITH.COM

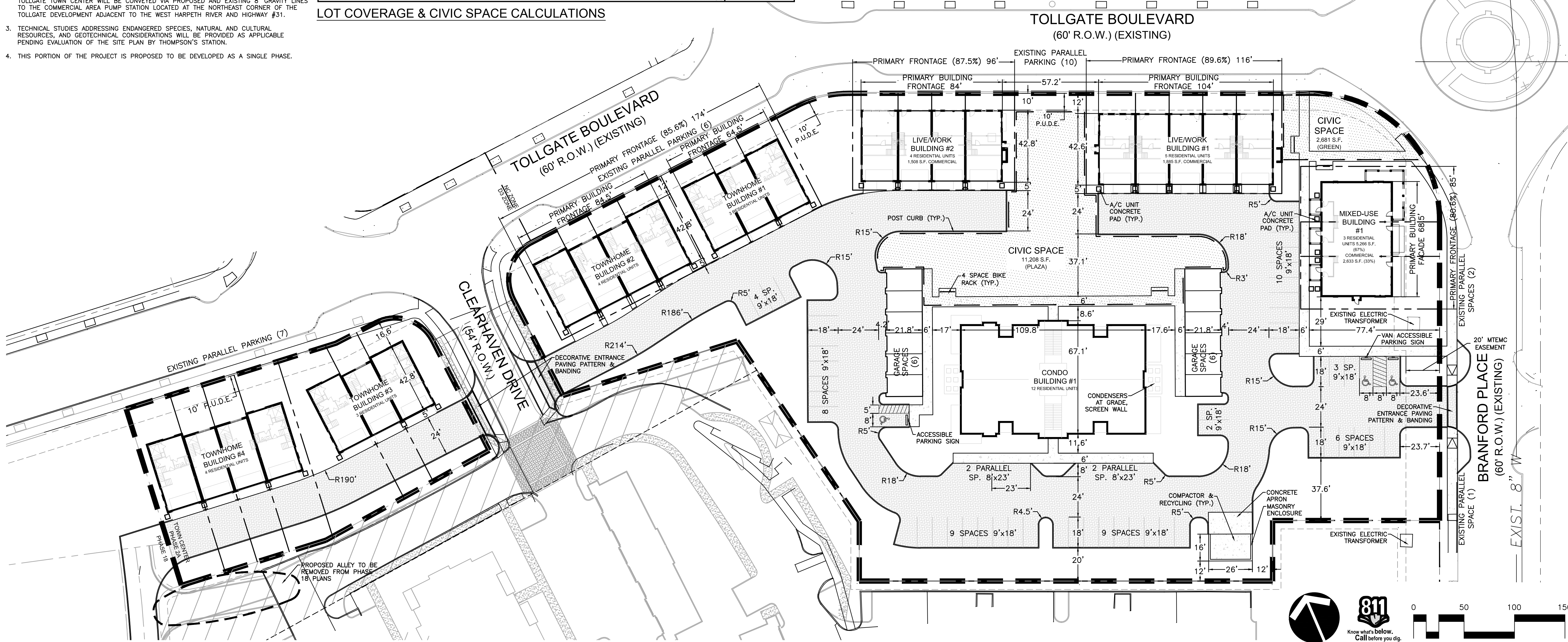
**PROJECT INFORMATION:**

	RESIDENTIAL	COMMERCIAL
CONDO:	12 UNITS	
MIXED USE:	3 UNITS	2,633 S.F. (OFFICE)
LIVE/WORK:	9 UNITS	3,393 S.F. (RETAIL)
TOWNHOME:	14 UNITS	

**TOTAL PARKING REQUIRED:**  
CONDO: 24 SP. (12 UNITS X 2 SP./UNIT)  
MIXED USE: 12 SP. (1 PER D.U. + 1 PER 300 S.F. OFFICE)  
LIVE/WORK: 24 SP. (1.5 PER D.U. + 3 PER 1,000 S.F. RETAIL)  
TOWNHOME: 21 SP. (1.5 PER DWELLING UNIT)  
**81**

**PARKING SUMMARY:**  
REGENT DEVELOPMENT: 9x18" (TYPICAL)  
DAVID MCGOWAN: 58 SPACES (55 STD SPACES, 3 ACC. SPACES)  
SMITH GEE STUDIO: 12 SPACES  
ANDY BERRY: 26 (26 EXISTING, 0 PROPOSED)  
TOTAL PARKING: 96 (118% = 96 / 81 SPACES)  
LID PARKING (REQUIRED): 50% OF PARKING AREA  
LID PARKING (PROPOSED): 100% OF PARKING AREA  
BIKE SPACES: 16

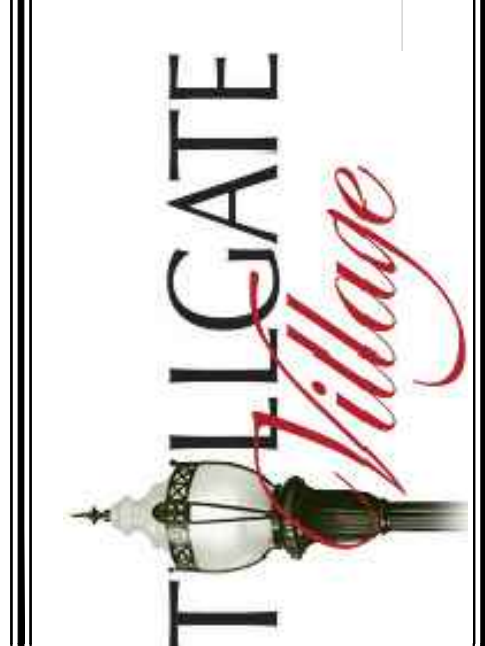
**LOT COVERAGE:** SEE LOT COVERAGE & CIVIC SPACE CALCULATIONS - THIS SHEET  
**FRONTAGE PERCENTAGE:** AS LABELED  
**CIVIC SPACE REQUIRED:** 3,154 S.F. (SEE LOT COVERAGE & CIVIC SPACE CALCS - THIS SHEET)  
**CIVIC SPACE PROVIDED:** 13,889 S.F.



**RAGAN SMITH**  
LAND PLANNERS • CIVIL ENGINEERS  
LANDSCAPE ARCHITECTS • SURVEYORS  
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FOR DESIGN COMMITTEE REVIEW ONLY

TOWN CENTER SITE PLANS  
PHASE 2A  
Regent Development  
THOMPSON'S STATION, WILLIAMSON COUNTY, TENNESSEE



JOB NO.	WK. ORDER	DESIGNED:	DRAWN:	SCALE:	DATE:	REV.	DESCRIPTION:
10081	1172	TPG	TPG	1"=50'	10/12/18	1	(TDS) PER TOWN COMMENTS
					AUGUST 28, 2018		

OVERALL LAYOUT PLAN  
**C1.0**

DATE: 10/12/18  
DRAWN BY: TPG  
DESIGNED BY: TPG  
SCALE: 1"=50'  
JOB NO: 10081  
WK. ORDER: 1172

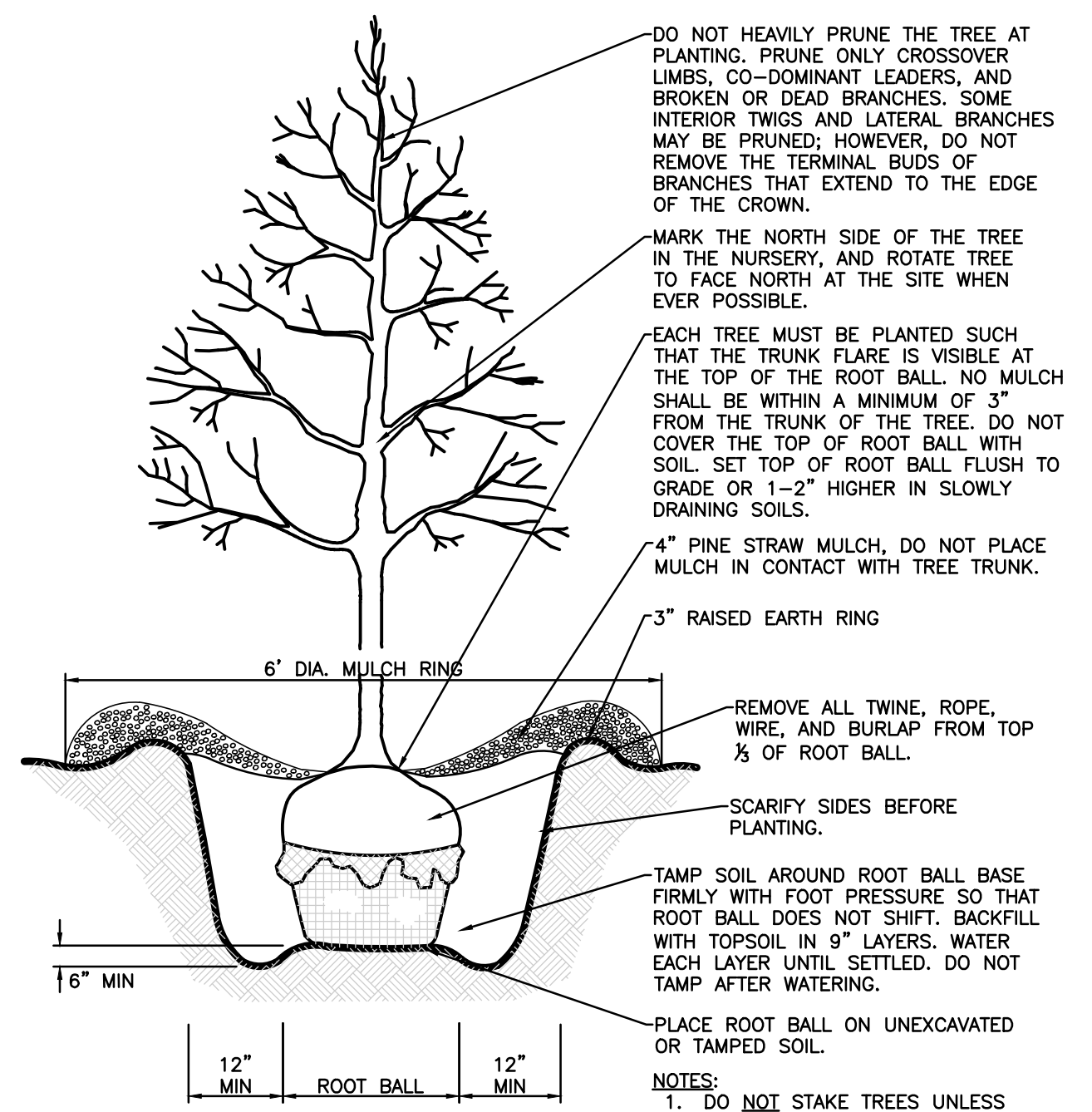


TREES	QTY	BOTANICAL NAME / COMMON NAME	TYPE	SIZE	HEIGHT	SPACING	REMARKS
AB	11	ACER SACCHARUM 'BALSTA' TM / FALL FIESTA SUGAR MAPLE	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE, EVENLY BRANCHED; FULL SYMMETRICAL CROWN
CN	8	CARPINUS CAROLINIANA 'NATIVE FLAME' / NATIVE FLAME HORNBEAM	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE, STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
CF	5	CERCIS CANADENSIS 'FOREST PANSY' TM / FOREST PANSY REDBUD	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE TRUNK; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
GA	4	QINKGO BILOBA 'AUTUMN GOLD' TM / MAIDENHAIR TREE	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE, STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
JB2	10	JUNIPERUS VIRGINIANA 'BRODIE' / BRODIE COLUMNAR CEDAR	EVERGREEN	-----	6-8' HT	AS SHOWN	FULL TO GROUND; STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
JT	7	JUNIPERUS VIRGINIANA 'TAYLOR' / TAYLOR EASTERN REDCEDAR	EVERGREEN	-----	6-8' HT	AS SHOWN	FULL TO GROUND; STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
LS	2	LIQUIDAMBAR STYRACIFLUA 'SLENDER SILHOUETTE' / COLUMNAR SWEET GUM	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE, STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN
QH	21	QUERCUS PHELLOS 'HIGHTOWER' / WILLOW OAK	DECIDUOUS	3" CAL.		AS SHOWN	B&B; 7" CLEAR TRUNK; SINGLE, STRAIGHT CENTRAL LEADER; EVENLY BRANCHED; FULL SYMMETRICAL CROWN

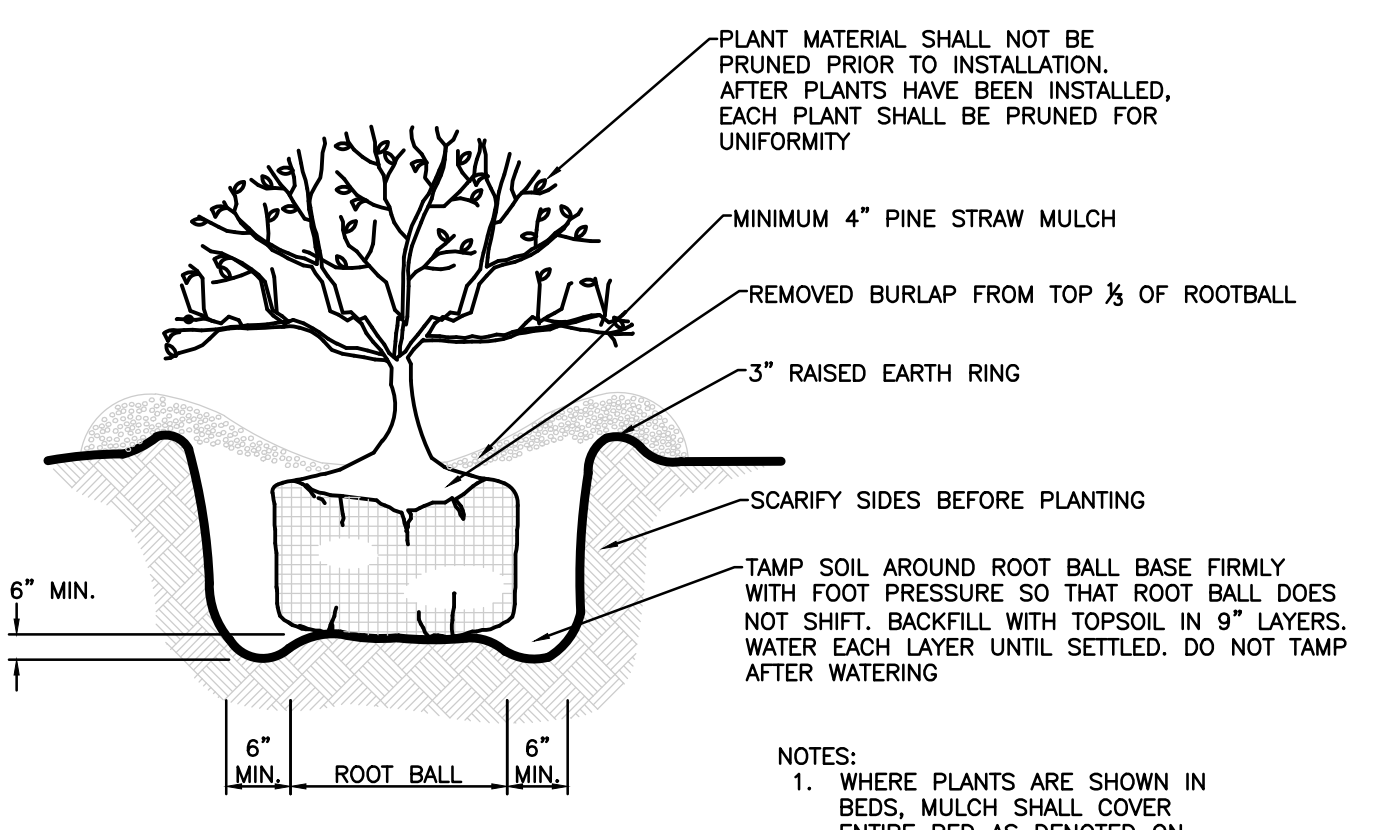
  

SHRUBS	QTY	BOTANICAL NAME / COMMON NAME	TYPE	HEIGHT	SPREAD	SPACING	REMARKS
AC	63	ABELIA X GRANDIFLORA 'CANYON CREEK' / GLOSSY ABELIA	SEMI-EVERGREEN	18" MIN.	-----	48" O.C.	FULL CONTAINERS
ID	26	ILEX CORNUTA 'DWARF BURFORD' / DWARF BURFORD HOLLY	EVERGREEN	18" MIN.	-----	48" O.C.	FULL CONTAINERS
PO	93	PRUNUS LAUROCERASUS 'OTTO LUYKEN' / LUYKENS LAUREL	EVERGREEN	18" MIN.	-----	48" O.C.	FULL CONTAINERS
TD	81	TAXUS X MEDIA 'DENSIFORMIS' / DENSE YEW	EVERGREEN	18" MIN.	-----	48" O.C.	FULL CONTAINERS

NOTE: SEED ALL DISTURBED AREAS NOT OTHERWISE PLANTED.



**TREE PLANTING**  
NOT TO SCALE

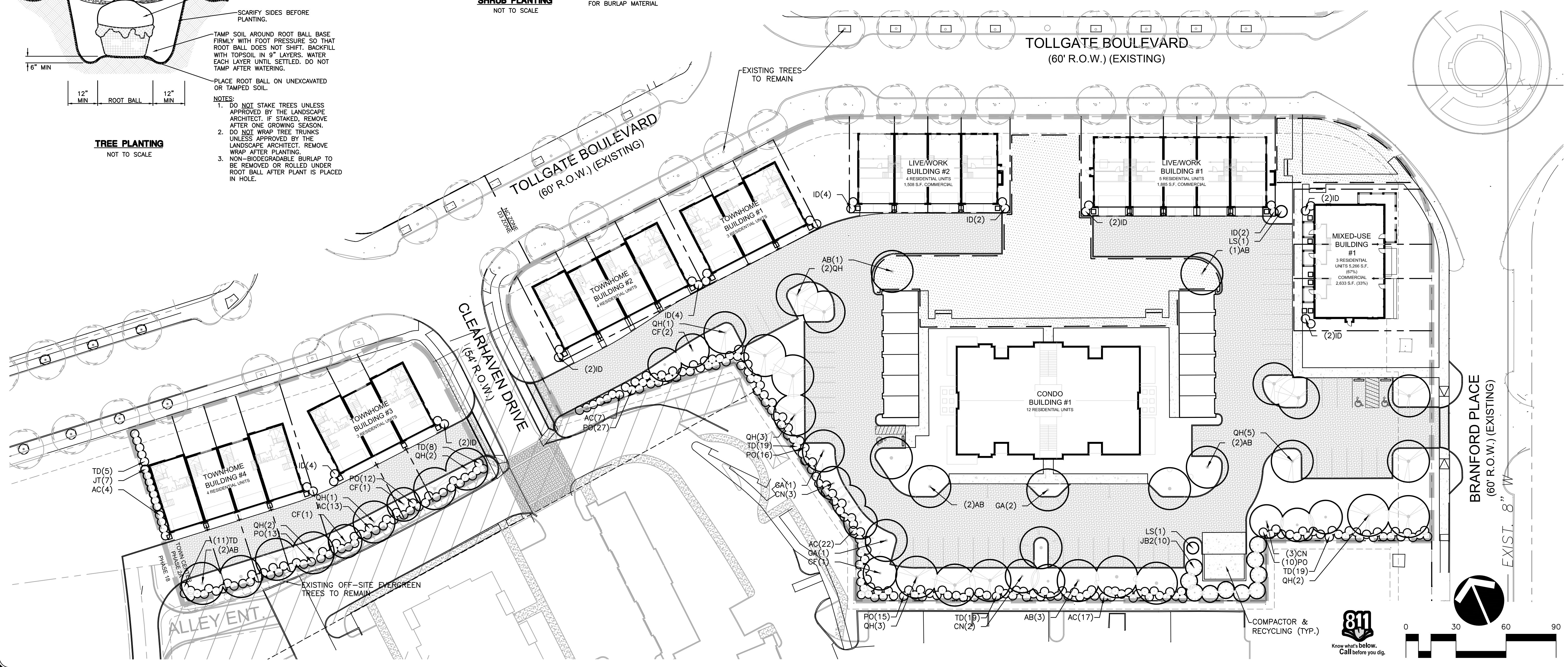


**SHRUB PLANTING**  
NOT TO SCALE

- PLANTING NOTES:**
- ANY SERIES OF TREES TO BE PLACED IN A PARTICULAR ARRANGEMENT WILL BE FIELD CHECKED FOR ACCURACY. ANY PLANTS MISARRANGED WILL BE RELOCATED.
  - SOIL USED IN BACKFILLING PLANTING PITS SHALL BE TOPSOIL AND MIXED WITH 25% PEAT BY VOLUME. EXCEPT FOR ERICACEOUS PLANTS, VERY ACID OR SOUR SOIL (SOIL HAVING A pH LESS THAN 6) SHALL BE MIXED WITH SUFFICIENT LIME TO PRODUCE A SLIGHTLY ACID REACTION (A pH OF 6.0 TO 6.5). ADD 10-10-10 COMMERCIAL FERTILIZER AT THE RATE OF 2 POUNDS PER CUBIC YARD. MIX BOTH FERTILIZER AND PEAT THOROUGHLY BY HAND OR ROTARY TILLER.
  - SOIL USED IN BACKFILLING ERICACEOUS PLANTS SHALL BE TOPSOIL MIXED WITH 50% PEAT BY VOLUME. ADD 5-10-5 COMMERCIAL FERTILIZER AT THE RATE OF 5 POUNDS PER CUBIC YARD. MIX BOTH FERTILIZER AND PEAT THOROUGHLY BY HAND OR ROTARY TILLER.
  - UPON SECURING PLANT MATERIAL AND BEFORE INSTALLATION, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR A PRE-INSTALLATION INSPECTION TO VERIFY ALL PLANT MATERIAL MEETS SPECIFICATION. MATCH TREES OF SAME SPECIES IN GROWTH CHARACTER AND UNIFORMITY.
  - APPLY HERBICIDE (TRIFLORAL OR EQUIVALENT) TO ALL PLANT BEDS PRIOR TO PLANTING FOR NOXIOUS WEED CONTROL AT A RATE OF 2 POUNDS PER 1,000 SQUARE FEET.
  - CONTRACTOR SHALL SUBMIT A 10 OUNCE SAMPLE OF THE TOPSOIL PROPOSED TO A TESTING LABORATORY FOR ANALYSIS. SUBMIT TEST RESULTS WITH RECOMMENDATIONS FOR SUITABILITY TO THE OWNER'S REPRESENTATIVE FOR APPROVAL.
  - PLANTS SHALL BE ORIENTED FOR BEST APPEARANCE AND VERTICAL ALL NON-BIODEGRADABLE ROOT CONTAINERS SHALL BE REMOVED.
  - SELECTIVELY TRIM TREE BRANCHES BY 25%, MAINTAINING NATURAL SHAPE. PRUNE ALL DEAD AND BROKEN BRANCHES IN TREES AND SHRUBS. REMOVE TAGS, TWINE OR OTHER NON-BIODEGRADABLE MATERIAL.
  - SCARIFY SUBSOIL IN PLANTING BEDS TO A DEPTH OF 3 INCHES. ALL PLANTING BEDS SHALL RECEIVE A MINIMUM OF 6 INCHES OF TOPSOIL.
  - CONTRACTOR SHALL PROVIDE SMOOTH, NEATLY TRENCHED (3 INCH DEEP) BED EDGES.
  - ALL PLANTING BEDS TO HAVE A MINIMUM 4 INCH DEEP PINE BARK MULCH, PINE STRAW MULCH OR OTHER MULCH AS SPECIFIED.
  - DIMENSIONS FOR TRUNK CALIPER, HEIGHTS, AND SPREAD SPECIFIED ON THE MATERIAL SCHEDULE ARE A GENERAL GUIDE FOR THE MINIMUM REQUIRED SIZE OF EACH PLANT. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS AND SIZE OF BALLS SHALL BE IN ACCORDANCE WITH A.N.S.I. 260.1 AMERICAN STANDARD FOR NURSERY STOCK (CURRENT EDITION) AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSEYMEN, INC.
  - TREES OF THE SAME SPECIES SHALL HAVE THE FOLLOWING CHARACTERISTICS: MATCHED BY BRANCHING HEIGHT, CALIPER, HEIGHT OF TREE, SPREAD OF BRANCHES AND BRANCHING STRUCTURE, AND OVERALL CANOPY SHAPE.
  - THE QUANTITIES INDICATED ON THE MATERIAL SCHEDULE ARE PROVIDED FOR THE BENEFIT OF THE CONTRACTOR, BUT SHOULD NOT BE ASSUMED TO ALWAYS BE CORRECT. IN THE EVENT OF A DISCREPANCY, THE PLANTING PLAN (PLANT SYMBOLS) WILL TAKE PRECEDENCE OVER THE MATERIAL SCHEDULE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS/HER OWN QUANTITY CALCULATIONS AND THE LIABILITY PERTAINING TO THOSE QUANTITIES AND ANY RELATED CONTRACT DOCUMENTS AND/OR PRICE QUOTATIONS.
  - CONTRACTOR TO WARRANTY ALL MATERIAL FOR ONE YEAR AFTER DATE OF FINAL ACCEPTANCE.

- SEEDING NOTES:**
- SEED ALL DISTURBED AREAS WITH TURF-TYPE TALL FESCUE. THE SEED SHALL BE A BLEND OF 3-5 VARIETIES (ADDRESSING BOTH TALL HARDINESS AND DROUGHT TOLERANCE) FROM THE TOP 10% SELECTIONS IN THE NATIONAL TURFGRASS EVALUATION PROGRAM (N.T.E.P.) TALL FESCUE TRIALS, MOST RECENT EVALUATION YEAR (WWW.NTEP.ORG). THE SEED SHALL BE CROP AND WEED FREE. SEED AT THE RATE OF 5 POUNDS PER 1,000 S.F. ALL SEED TO BE 98% PURE WITH 85% GERMINATION AND CONFORM TO ALL STATE REQUIREMENTS FOR GRASS SEED. THE FERTILIZER TO BE 6-12-12 COMMERCIAL TYPE WITH 50% OF ITS ELEMENTS DERIVED FROM ORGANIC SOURCES.
  - PLACE STRAW MULCH ON SEEDING AREAS. STRAW TO BE OATS OR WHEAT STRAW, FREE FROM WEEDS, FOREIGN MATTER DETRIMENTAL TO PLANT LIFE, AND DRY. HAY OR CHOPPED CORNSTALKS ARE NOT ACCEPTABLE.
  - THE CONTRACTOR SHALL VERIFY THAT THE PREPARED SOIL BASE IS READY TO RECEIVE WORK. CULTIVATE THE TOPSOIL TO A DEPTH OF 4 INCHES WITH A MECHANICAL TILLER AND SUBSEQUENTLY RAKE UNTIL SMOOTH. REMOVE FOREIGN MATERIALS COLLECTED DURING CULTIVATION AND RAKING OPERATIONS.
  - APPLY FERTILIZER ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. LIME/STONELIME MAY BE APPLIED WITH THE FERTILIZER. APPLY FERTILIZER AFTER SMOOTH RAKING AND PRIOR TO ROLLER COMPACTION AND MIX THOROUGHLY IN THE UPPER 2 INCHES OF TOPSOIL.
  - APPLY SEED EVENLY IN TWO INTERSECTING DIRECTIONS AND RAKE IN LIGHTLY. WATER TOPSOIL LIGHTLY PRIOR TO APPLYING SEED. DO NOT SEED AREA IN EXCESS OF THAT WHICH CAN BE MULCHED ON THE SAME DAY.
  - ROLL SEEDING AREA WITH ROLLER NOT EXCEEDING 112 POUNDS.
  - IMMEDIATELY FOLLOWING SEEDING AND COMPACTING, APPLY STRAW MULCH AT THE RATE OF ONE AND ONE HALF BALES PER 1,000 SQUARE FEET. IMMEDIATELY AFTER MULCHING, APPLY WATER WITH A FINE SPRAY AND SATURATE THE GROUND TO A DEPTH OF 4 INCHES.
  - CONTRACTOR IS RESPONSIBLE FOR WATERING SEEDING AREAS TO PREVENT GRASS AND SOIL FROM DRYING OUT UNTIL THE INSTALLATION IS INSPECTED AND ACCEPTED BY THE OWNER'S REPRESENTATIVE.
  - CONTRACTOR IS RESPONSIBLE FOR RESEEDING BARE SPOTS FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF INSTALLATION.

- IRRIGATION NOTES:**
- ALL PROPOSED PLANTED AREAS ARE TO BE IRRIGATED UTILIZING FULL COVERAGE DESIGN.
  - SUBMIT PROPOSED IRRIGATION PLAN TO THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR GENERAL REVIEW AND ACCEPTANCE.
  - PROPOSED IRRIGATION SYSTEM SHOULD UTILIZE ANY RECLAIMED/REUSED/GRAY WATER PUBLIC SYSTEMS IF ACCESSIBLE.
  - SHOULD RECLAIMED/REUSED/GRAY WATER NOT BE AVAILABLE, BELOW GRADE CISTERNS OR ON-SITE RETENTION PONDS SHOULD BE CONSIDERED FOR AN IRRIGATION WATER SOURCE. USE OF PUBLIC POTABLE WATER SOURCE SHOULD BE A LAST CASE RESORT AND DESIGNED AS A TEMPORARY IRRIGATION SYSTEM UTILIZED TO ESTABLISHED PROPOSED PLANT MATERIAL THROUGH ITS FIRST TWO YEARS OF GROWTH.
  - PROPOSED IRRIGATION DESIGN SHOULD UTILIZE WATER EFFICIENT DESIGN TECHNIQUES SUCH AS THE USE OF DRIP IRRIGATION, MOISTURE SENSORS AND RAIN SENSORS TO MAXIMIZE WATER EFFICIENCY.
  - IRRIGATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING AN IRRIGATION SYSTEM THAT FUNCTIONS PROPERLY PER THE INTENT OF THE DESIGN. SHOULD THE IRRIGATION CONTRACTOR SEE A FLAW IN THE PROPOSED DESIGN AND/OR FINDS A PROBLEM IN THE FIELD THAT WILL NEGATIVELY AFFECT THE PERFORMANCE OF THE PROPOSED IRRIGATION SYSTEM, THE SAID CONTRACTOR IS RESPONSIBLE FOR INFORMING THE LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE PRIOR TO INSTALLING OR ORDERING MATERIAL FOR THE PROPOSED IRRIGATION SYSTEM.
  - IRRIGATION PLANS TO BE SUBMITTED TO BRAD BARBEE AS PART OF THE SUBMITTAL, PRIOR TO ISSUANCE OF PERMITS.



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TOWN CENTER SITE PLANS  
PHASE 2A  
**Regent**  
INSTALLMENT

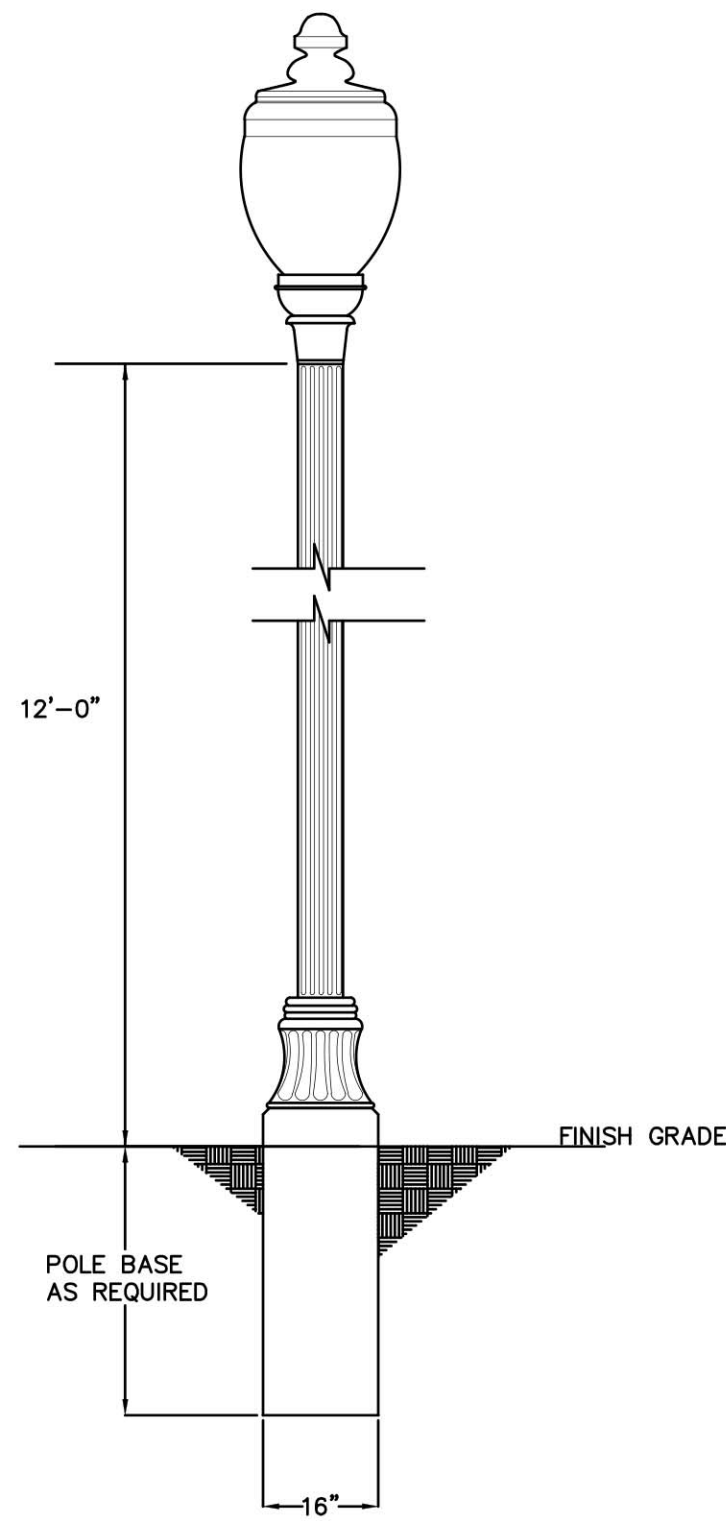
**TOLLGATE Village**

JOB NO.	WK. ORDER	DESIGNED BY	DRAWN BY	SCALE	DATE	REV.	DESCRIPTION
10081	1172	J. BROUGHTON	J. BROUGHTON	1"=50'	AUGUST 28, 2018	1	(TDS) PER TOWN COMMENTS

OVERALL LANDSCAPE PLAN  
**L1.0**

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POLE BASE/PARKING LOT LIGHT FIXTURE DETAIL  
NO SCALE



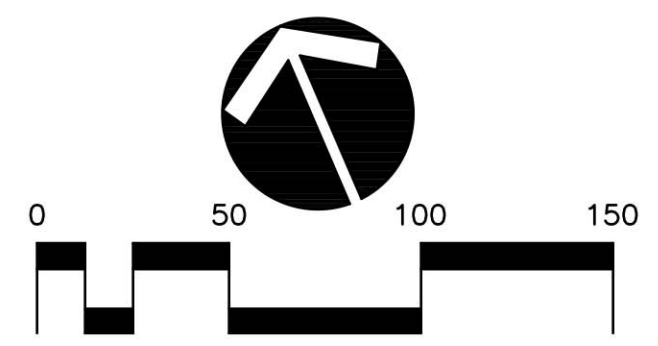
FIXTURE "A" & "B" DETAIL  
NO SCALE



SITE PHOTOMETRIC PLAN  
SCALE: 1"=50'-0"

SITE PHOTOMETRIC NOTES

1. CALCULATIONS SHOWN REPRESENT MAINTAINED LIGHTING LEVELS IN FOOTCANDLES AT GRADE WITH A TOTAL LIGHT LOSS FACTOR OF 0.91. CALCULATIONS DO NOT INCLUDE CONTRIBUTIONS FROM OTHER LIGHT SOURCES.
2. CIVIL BASE PLAN AS PROVIDED TO PARSONS ENGINEERING, INC. SHOWED NO OVERHEAD UTILITIES. THE CIVIL ENGINEER SHALL VERIFY THAT THERE ARE NO CONFLICTS WITH EXISTING OR PROPOSED UTILITY LINES OR EASEMENTS.
3. THESE CALCULATIONS HAVE BEEN GENERATED FROM MANUFACTURER SUPPLIED PHOTOMETRIC FILES. PARSONS ENGINEERING, INC. HAS MADE A REASONABLE ATTEMPT TO OBTAIN THE MOST CURRENT PHOTOMETRIC REPORT. PARSONS ENGINEERING, INC. IS NOT RESPONSIBLE FOR ERRANT RESULTS DUE TO MANUFACTURERS' QUALITY CONTROL OR DESIGN CHANGES.

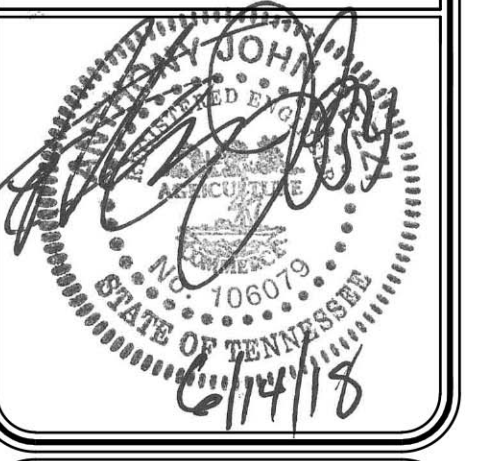


Statistics					
Description	Avg	Max	Min	Max/Min	Avg/Min
Calc Zone #1	0.1 fc	2.4 fc	0.0 fc	N/A	N/A
Parking Lot #1	1.0 fc	2.0 fc	0.2 fc	10.0:1	5.0:1
Parking Lot #2	0.8 fc	2.4 fc	0.2 fc	12.0:1	4.0:1
Parking Lot #3	0.9 fc	2.2 fc	0.2 fc	11.0:1	4.5:1
Parking Lot #4	1.0 fc	1.8 fc	0.4 fc	4.5:1	2.5:1

Schedule												
Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens Per Lamp	Light Loss Factor	Wattage	Mounting Height
○	A	2	Holophane	GVD2 P40 40K AH 5 N	GranVille II LED, LED Package 40, 90W, 4000K, 347-480V, Type 5 distribution, No trim	LED COB	1	GVD2_P40_40K_AH_5_N.lvs	9299	0.91	180	14'-0"
⊖	B	22	Holophane	GVD2 P40 40K AH 3 N GVDHS90	GranVille II LED, LED Package 40, 90W, 4000K, 347-480V, Type 3 distribution, No trim, House Side Shield 90 Degree	LED COB	1	GVD2_P40_40K_AH_3_N_GVDHS90.lvs	8702	0.91	90	14'-0"



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TOWN CENTER SITE PLANS  
PHASE 2A  
*Regent*  
DEVELOPMENT  
THOMPSON'S STATION, WILLIAMSON COUNTY, TENNESSEE

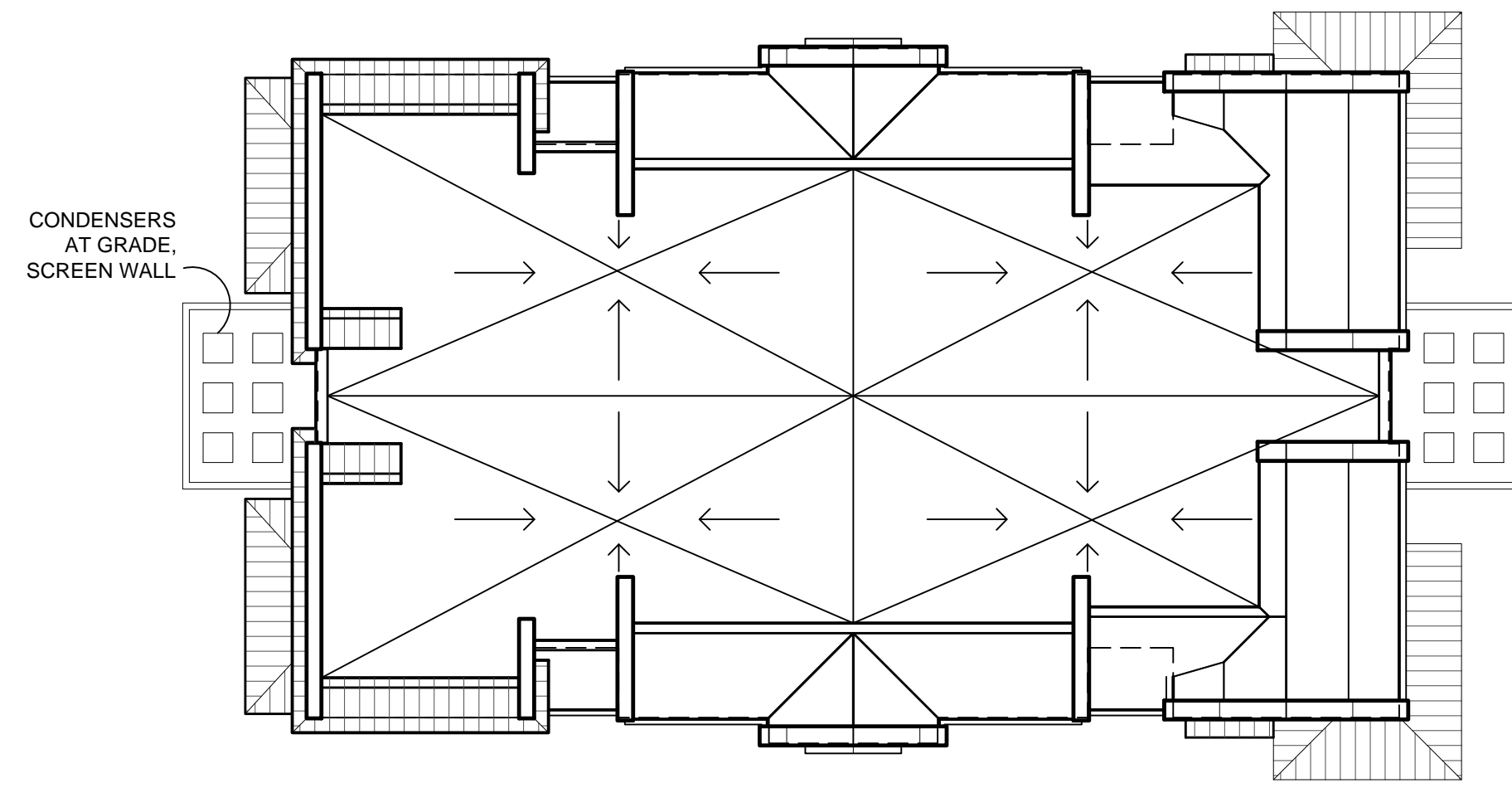


WK. ORDER	1172	DESIGNED	SEJ	DRAWN	AJP	SCALE	1"=50'	DATE	AUGUST 29, 2018	DESCRIPTION
JOB NO.	10081									

SITE PHOTOMETRIC PLAN

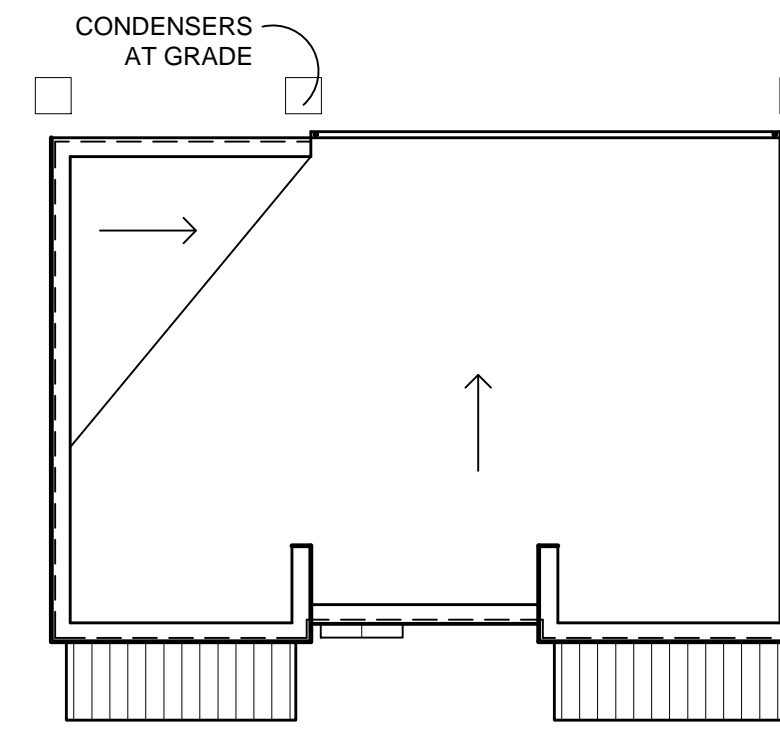
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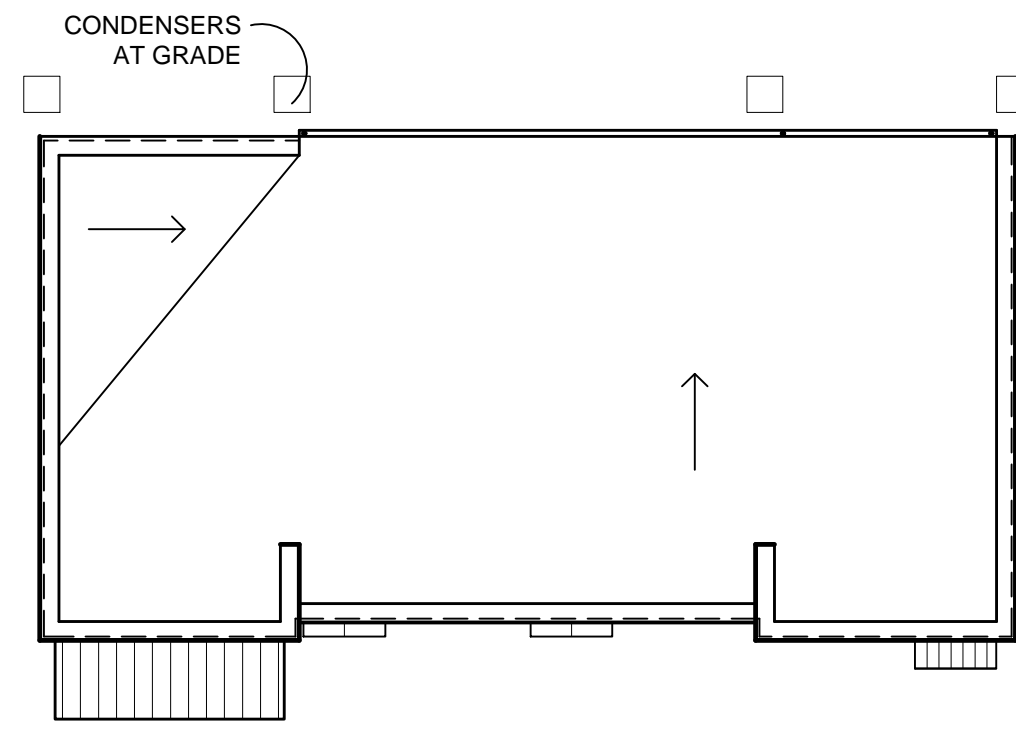
1 Condo 1 - Roof Plan

1/16" = 1'-0"



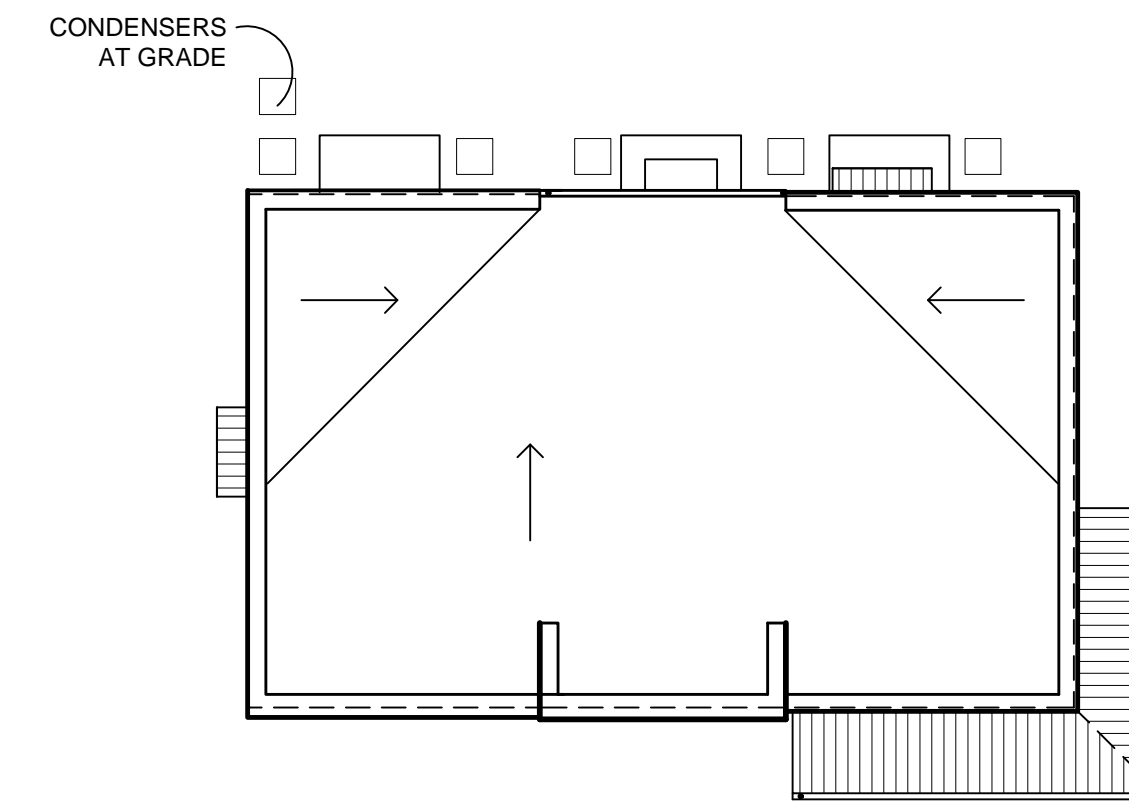
2 Townhome 1 - Roof Plan

1/16" = 1'-0"



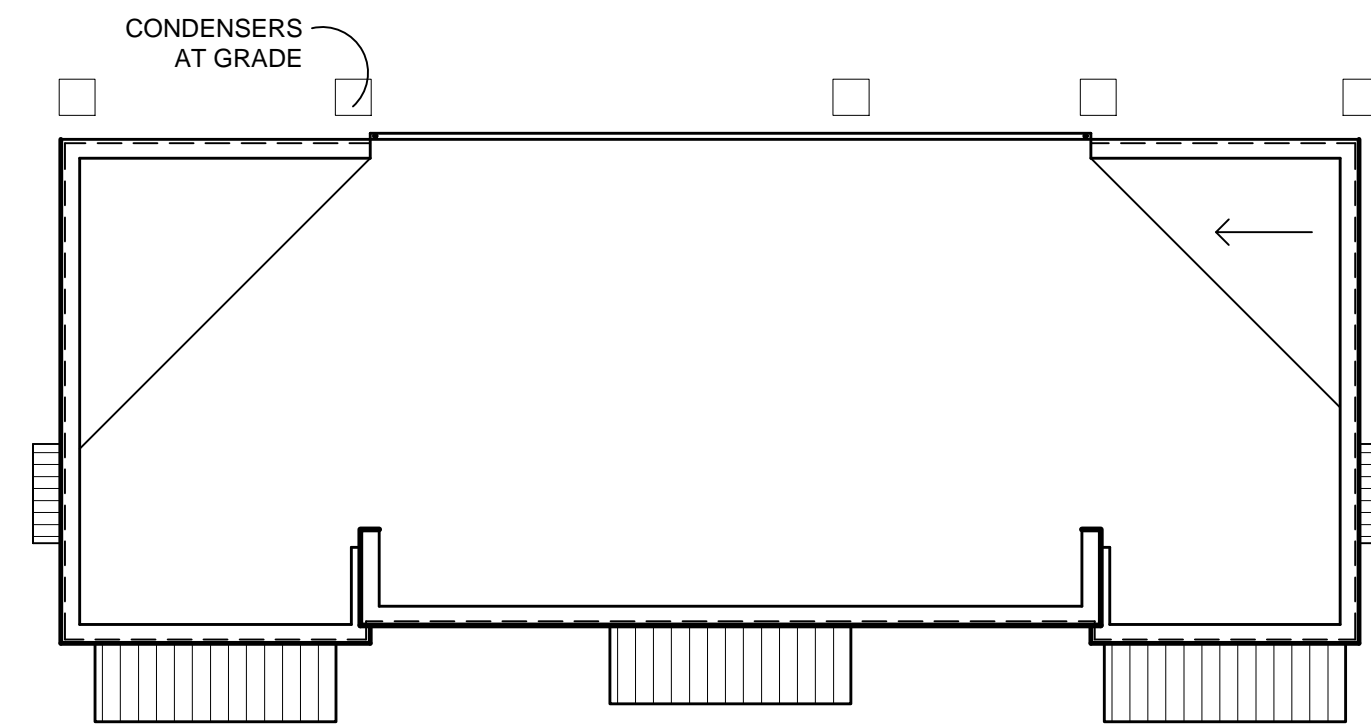
3 Townhome 2 - Roof Plan

1/16" = 1'-0"



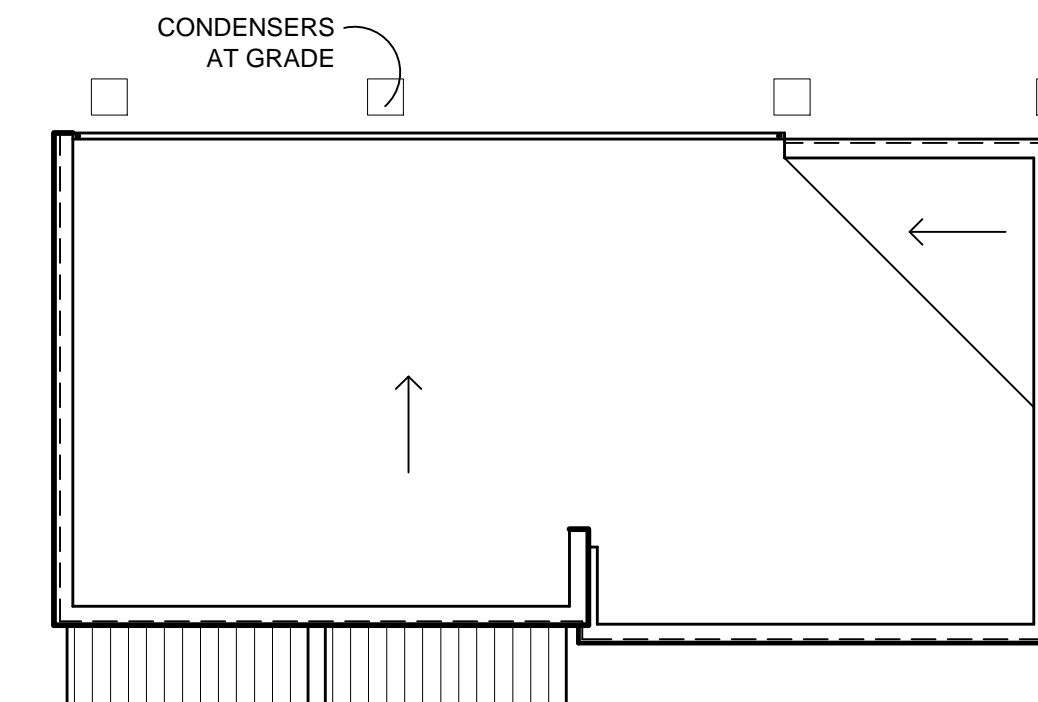
4 Mixed Use Building 1 - Roof Plan

1/16" = 1'-0"



5 Live/work Building 1 - Roof Plan

1/16" = 1'-0"



6 Live/work Building 2 - Roof Plan

1/16" = 1'-0"



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615/739-5555p  
info@smithgeestudio.com

No: Date: Set Type:  
1 10/12/2018 DRC Submittal

Project Contact: Regent Homes  
Phone: 615/333-9000  
SGS Contact: Dallas Caudle  
SGS Project Number: 18045.00

Project Address:  
Tollgate Village  
Thompson's Station, TN 37179

TOLLGATE VILLAGE  
PHASE IIA

Notes:

For Planning  
Commission  
Review Only

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Drawing:

A100



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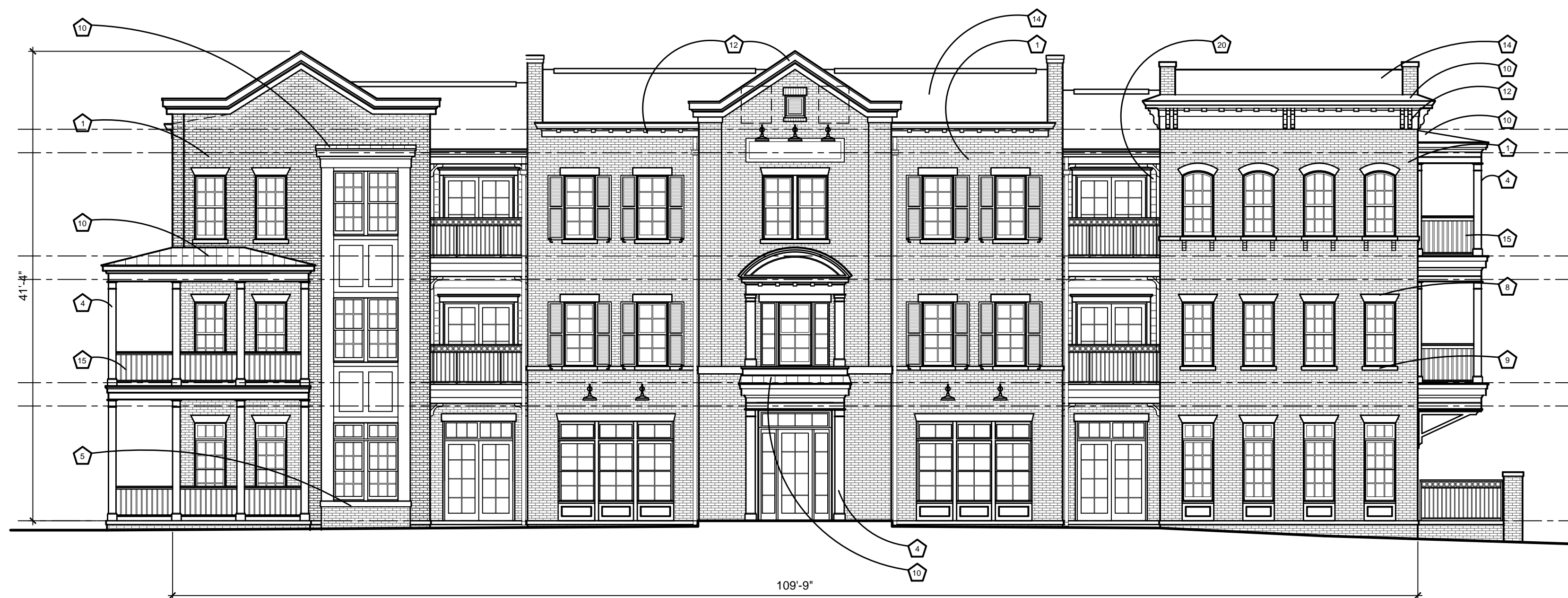
Drawing:

**A300**

**ELEVATION KEYNOTES**

- |  |                                 |  |
|--|---------------------------------|--|
| 1 BRICK VENEER                             | 8 BRICK HEADER                  | 15 WOOD RAILING  |
| 2 BRICK ACCENT                             | 9 BRICK SILL                    | 16 LIMESTONE OR CAST STONE BASE                        |
| 3 LIMESTONE OR CAST STONE ACCENT           | 10 METAL ROOFING                | 17 FABRIC AWNING                                       |
| 4 WOOD OR SYNTHETIC PILASTERS/<br>COLUMNS  | 11 WROUGHT-IRON RAILING         | 18 BRICK CORNICE                                       |
| 5 BRICK BASE                               | 12 FYPON TRIM / CORNICE         | 19 METAL AWNING  |
| 6 LIMESTONE OR CAST STONE LINTEL<br>HEADER | 13 LIMESTONE OR CAST STONE BASE | 20 FIBER CEMENT LAP SIDING WITH 1/4 X 6<br>CORNERBOARD |
| 7 LIMESTONE OR CAST STONE SILL             | 14 ASPHALT SHINGLE ROOFING      | 21 FIBER CEMENT WINDOW SURROUND                        |

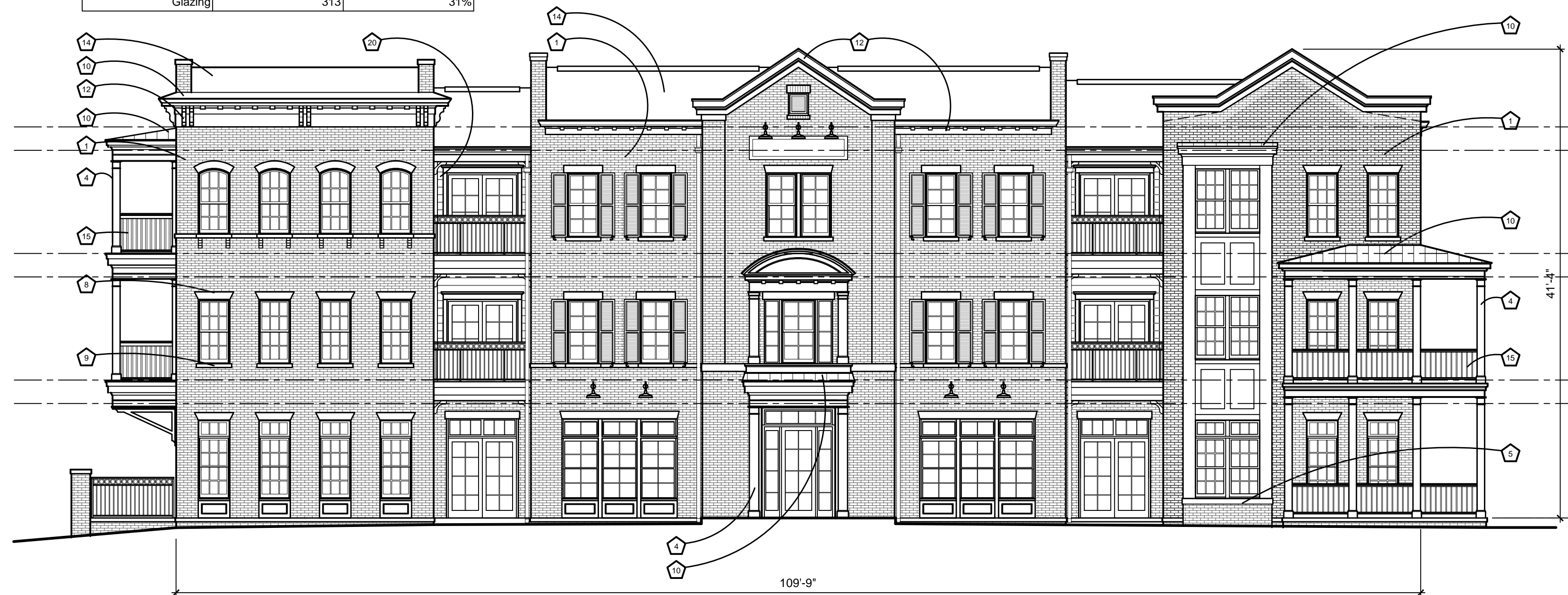
Glazing Percentage		
	Surface Area	Percent of Net*
Ground Floor		
Gross of Wall	1,051	N/A
Glazing	524	50%
Upper Floors		
Gross of Wall	997	N/A
Glazing	313	31%



1 Condo 1 - Street Elevation

1/8" = 1'-0"

Glazing Percentage		
	Surface Area	Percent of Net*
Ground Floor		
Gross of Wall	1,051	N/A
Glazing	524	50%
Upper Floors		
Gross of Wall	997	N/A
Glazing	313	31%



3 Condo 1 - Courtyard Elevation

1/8" = 1'-0"



2 Condo 1 - Street Elevation

1/8" = 1'-0"



4 Condo 1 - Street Elevation

1/8" = 1'-0"



Glazing Percentage		
	Surface Area	Percent of Net*
Ground Floor		
Gross of Wall	911	N/A
Glazing	445	49%
Upper Floors		
Gross of Wall	676	N/A
Glazing	253	37%

ELEVATION KEYNOTES		
1 BRICK VENEER	8 BRICK HEADER	15 WOOD RAILING
2 BRICK ACCENT	9 BRICK SILL	16 LIMESTONE OR CAST STONE BASE
3 LIMESTONE OR CAST STONE ACCENT	10 METAL ROOFING	17 FABRIC AWNING
4 WOOD OR SYNTHETIC PILASTERS/COLUMNS	11 WROUGHT-IRON RAILING	18 BRICK CORNICE
5 BRICK BASE	12 FYPON TRIM / CORNICE	19 METAL AWNING
6 LIMESTONE OR CAST STONE LINTEL HEADER	13 LIMESTONE OR CAST STONE BASE	20 FIBER CEMENT LAP SIDING WITH 1/4 X 6 CORNERBOARD
7 LIMESTONE OR CAST STONE SILL	14 ASPHALT SHINGLE ROOFING	21 FIBER CEMENT WINDOW SURROUND



SMITH  
GEE  
STUDIO

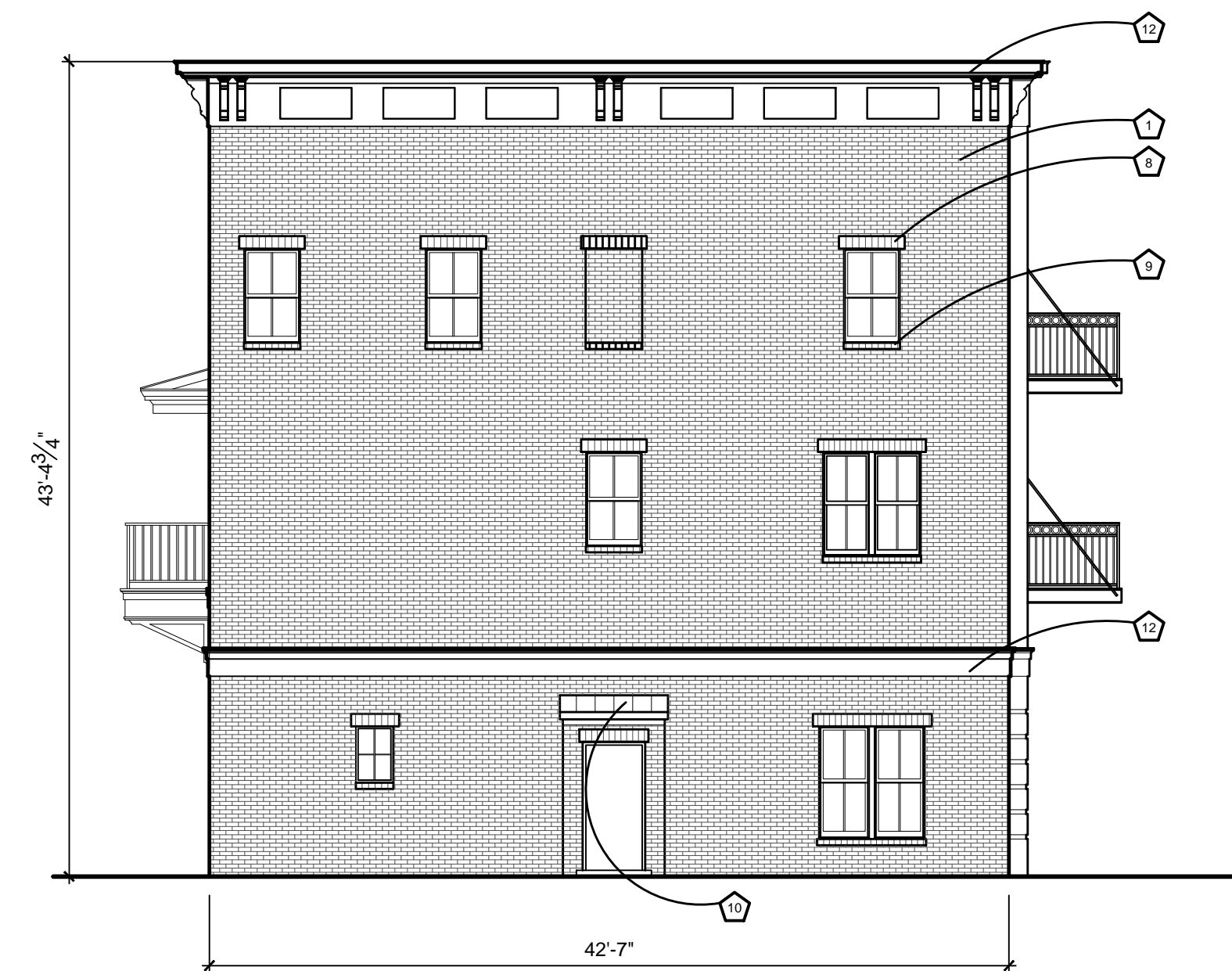
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No: Date: Set Type:  
1 10/12/2018 DRC Submittal



1 Mixed Use #1 - Street Elevation  
1/8" = 1'-0"

2 Mixed Use #1 - Side Elevation  
1/8" = 1'-0"



3 Mixed Use #1 - Rear Elevation  
1/8" = 1'-0"

4 Mixed Use #1 - Side Elevation  
1/8" = 1'-0"

Project Contact: Regent Homes  
Phone: 615/333-9000  
SGS Contact: Dallas Caudle  
SGS Project Number: 18045.00

Project Address:  
Tollgate Village  
Thompson's Station, TN 37179

TOLLGATE VILLAGE  
PHASE IIA

Notes:

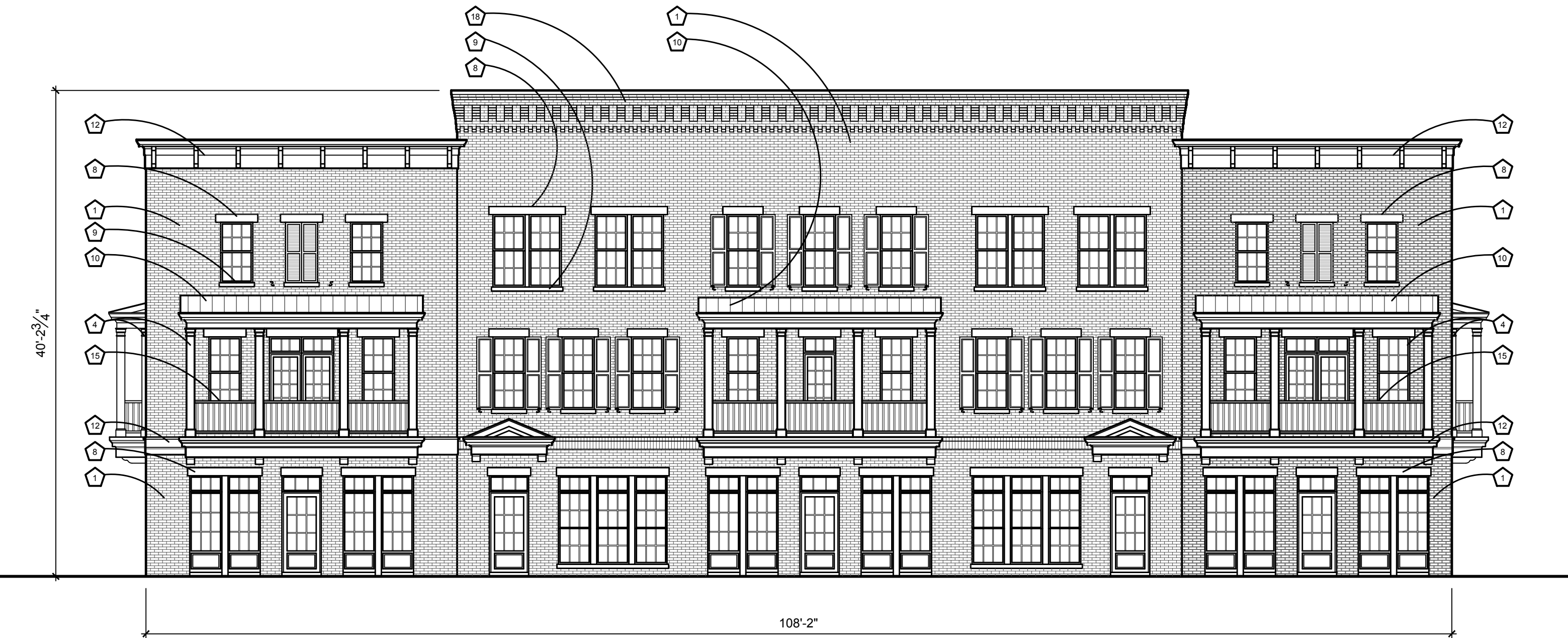
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Review Only

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Drawing:

A301

Glazing Percentage		
	Surface Area	Percent of Net*
Ground Floor		
Gross of Wall	1,091	N/A
Glazing	551	51%
Upper Floors		
Gross of Wall	984	N/A
Glazing	264	27%



1 Live/ Work #1 Street Elevation  
1/8" = 1'-0"



2 Live/ Work #1 Side Elevation  
1/8" = 1'-0"



3 Live/ Work #1 Rear Elevation  
1/8" = 1'-0"



4 Live/ Work #1 Side Elevation  
1/8" = 1'-0"

ELEVATION KEYNOTES		
1 BRICK VENEER	8 BRICK HEADER	15 WOOD RAILING
2 BRICK ACCENT	9 BRICK SILL	16 LIMESTONE OR CAST STONE BASE
3 LIMESTONE OR CAST STONE ACCENT	10 METAL ROOFING	17 FABRIC AWNING
4 WOOD OR SYNTHETIC PILASTERS/ COLUMNS	11 WROUGHT-IRON RAILING	18 BRICK CORNICE
5 BRICK BASE	12 FYPON TRIM / CORNICE	19 METAL AWNING
6 LIMESTONE OR CAST STONE LINTEL HEADER	13 LIMESTONE OR CAST STONE BASE	20 FIBER CEMENT LAP SIDING WITH 1/4" X 6 CORNERBOARD
7 LIMESTONE OR CAST STONE SILL	14 ASPHALT SHINGLE ROOFING	21 FIBER CEMENT WINDOW SURROUND



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Nashville, Tennessee 37203  
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No: Date: Set Type:  
1 10/12/2018 DRC Submittal

Project Contact: Regent Homes  
Phone: 615/333-9000  
SGS Contact: Dallas Caudle  
SGS Project Number: 18045.00

Project Address:  
Tollgate Village  
Thompson's Station, TN 37179

TOLLGATE VILLAGE  
PHASE IIA

Notes:

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Commission  
Review Only

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Drawing:

A302



Glazing Percentage		
	Surface Area	Percent of Net*
Ground Floor		
Gross of Wall	968	N/A
Glazing	492	51%
Upper Floors		
Gross of Wall	1849	N/A
Glazing	502	27%

**ELEVATION KEYNOTES**

- |  |                                 |  |
|--|---------------------------------|--|
| 1 BRICK VENEER                             | 8 BRICK HEADER                  | 15 WOOD RAILING  |
| 2 BRICK ACCENT                             | 9 BRICK SILL                    | 16 LIMESTONE OR CAST STONE BASE                        |
| 3 LIMESTONE OR CAST STONE ACCENT           | 10 METAL ROOFING                | 17 FABRIC AWNING                                       |
| 4 WOOD OR SYNTHETIC PILASTERS/<br>COLUMNS  | 11 WROUGHT-IRON RAILING         | 18 BRICK CORNICE                                       |
| 5 BRICK BASE                               | 12 FYPON TRIM / CORNICE         | 19 METAL AWNING  |
| 6 LIMESTONE OR CAST STONE LINTEL<br>HEADER | 13 LIMESTONE OR CAST STONE BASE | 20 FIBER CEMENT LAP SIDING WITH 1/4 X 6<br>CORNERBOARD |
| 7 LIMESTONE OR CAST STONE SILL             | 14 ASPHALT SHINGLE ROOFING      | 21 FIBER CEMENT WINDOW SURROUND                        |



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 Phone: 615/333-9000  
 SGS Contact: Dallas Caudle  
 SGS Project Number: 18045.00

Project Address:  
 Tollgate Village  
 Thompson's Station, TN 37179

**TOLLGATE VILLAGE  
 PHASE IIA**

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Drawing:

**A303**



1 Live/ Work #2 Street Elevation  
 1/8" = 1'-0"



2 Live/ Work #2 Side Elevation  
 1/8" = 1'-0"



3 Live/ Work #2 Rear Elevation  
 1/8" = 1'-0"



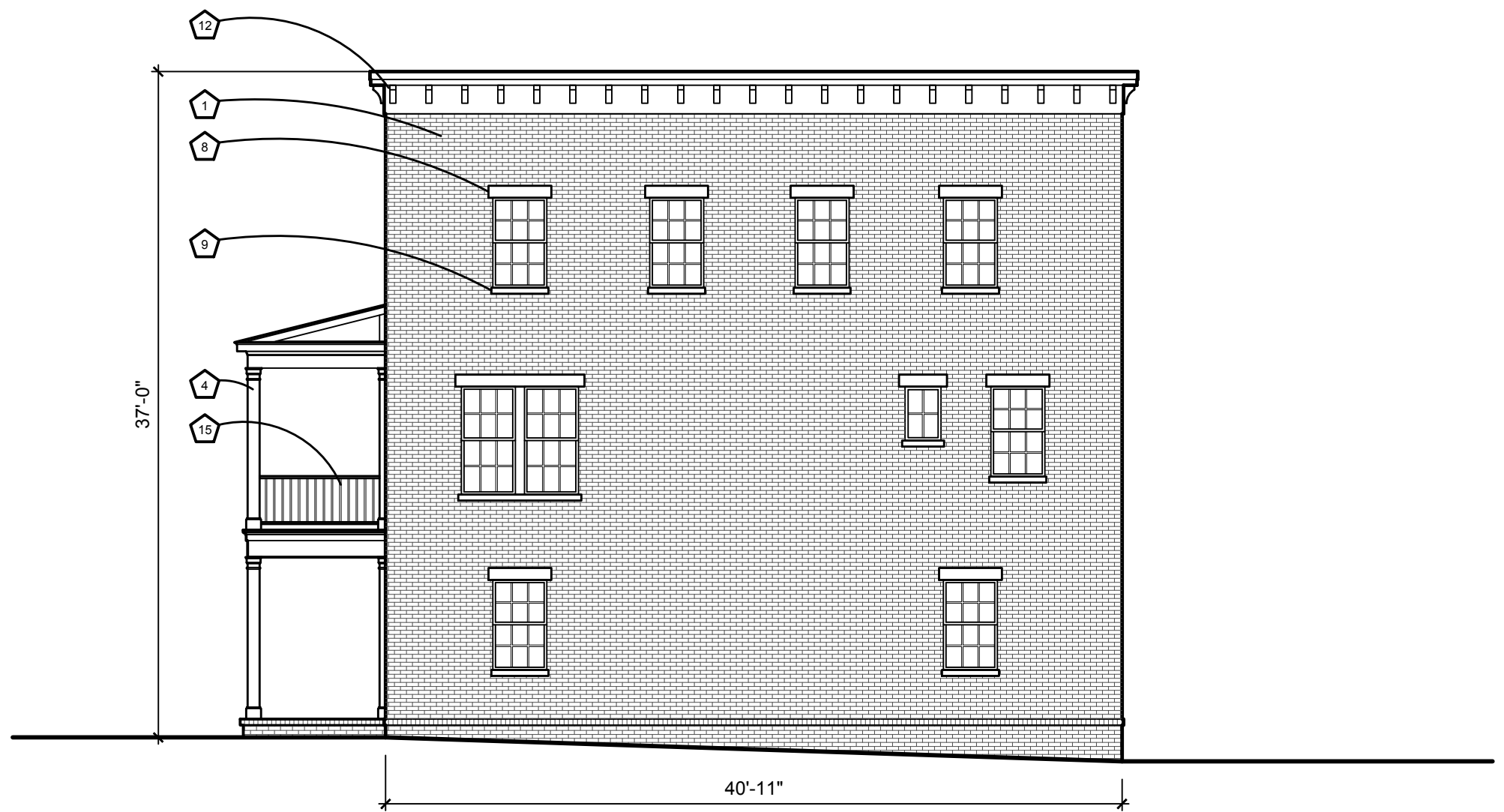
4 Live/ Work #2 Side Elevation  
 1/8" = 1'-0"

ELEVATION KEYNOTES					
1	BRICK VENEER	8	BRICK HEADER	15	WOOD RAILING
2	BRICK ACCENT	9	BRICK SILL	16	LIMESTONE OR CAST STONE BASE
3	LIMESTONE OR CAST STONE ACCENT	10	METAL ROOFING	17	FABRIC AWNING
4	WOOD OR SYNTHETIC PILASTERS/ COLUMNS	11	WROUGHT-IRON RAILING	18	BRICK CORNICE
5	BRICK BASE	12	FYPON TRIM / CORNICE	19	METAL AWNING
6	LIMESTONE OR CAST STONE LINTEL HEADER	13	LIMESTONE OR CAST STONE BASE	20	FIBER CEMENT LAP SIDING WITH 1/4 X 6 CORNERBOARD
7	LIMESTONE OR CAST STONE SILL	14	ASPHALT SHINGLE ROOFING	21	FIBER CEMENT WINDOW SURROUND

No: Date: Set Type:  
1 10/12/2018 DRC Submittal



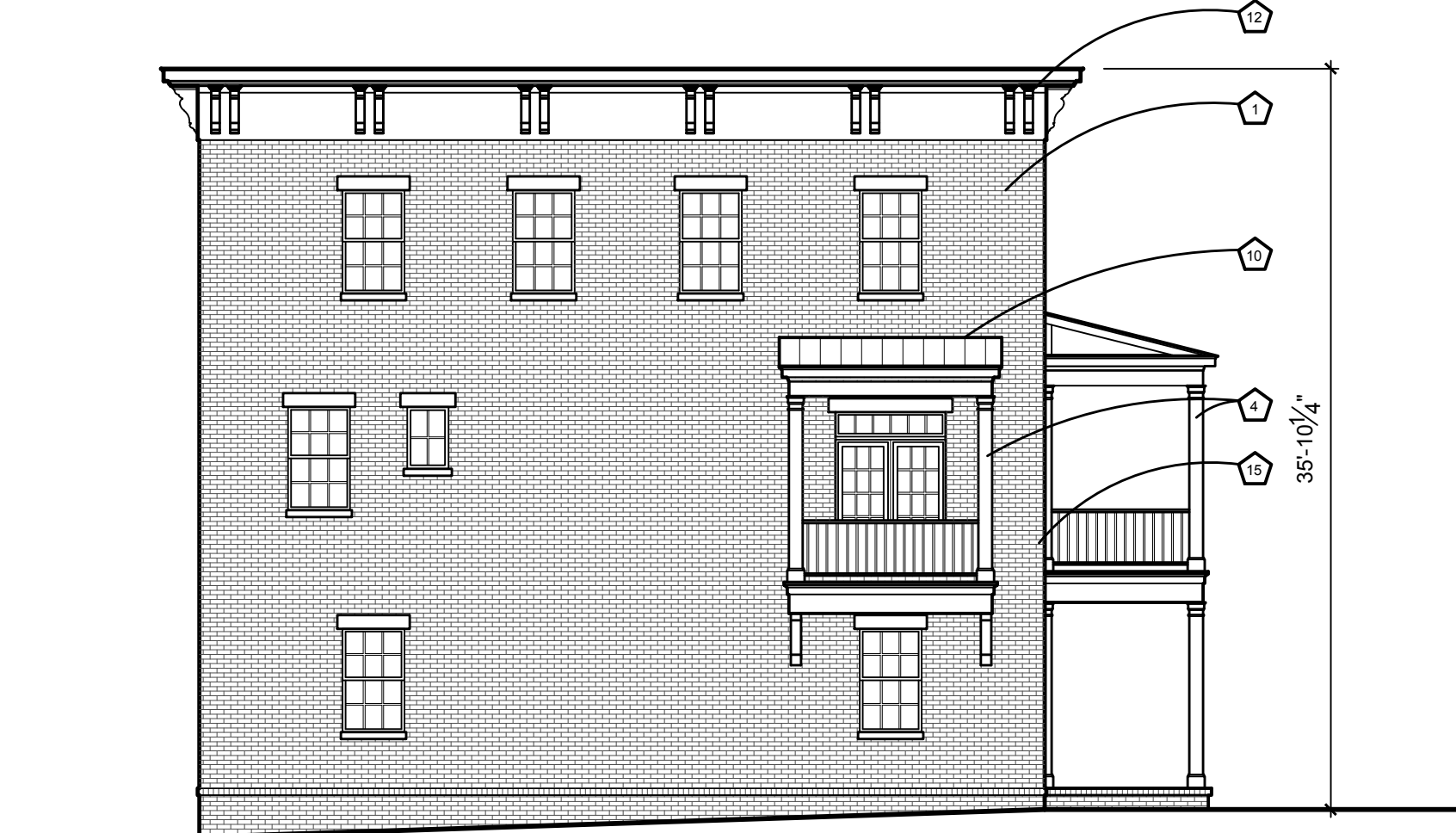
1 Townhouse 1 Street Elevation  
1/8" = 1'-0"



1 Townhouse 1 Street Elevation  
1/8" = 1'-0"



3 Townhouse 1 Rear Elevation  
1/8" = 1'-0"



3 Townhouse 1 Rear Elevation  
1/8" = 1'-0"

Project Contact: Regent Homes  
Phone: 615/333-9000  
SGS Contact: Dallas Caudle  
SGS Project Number: 18045.00

Project Address:  
Tollgate Village  
Thompson's Station, TN 37179

TOLLGATE VILLAGE  
PHASE IIA

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Drawing:



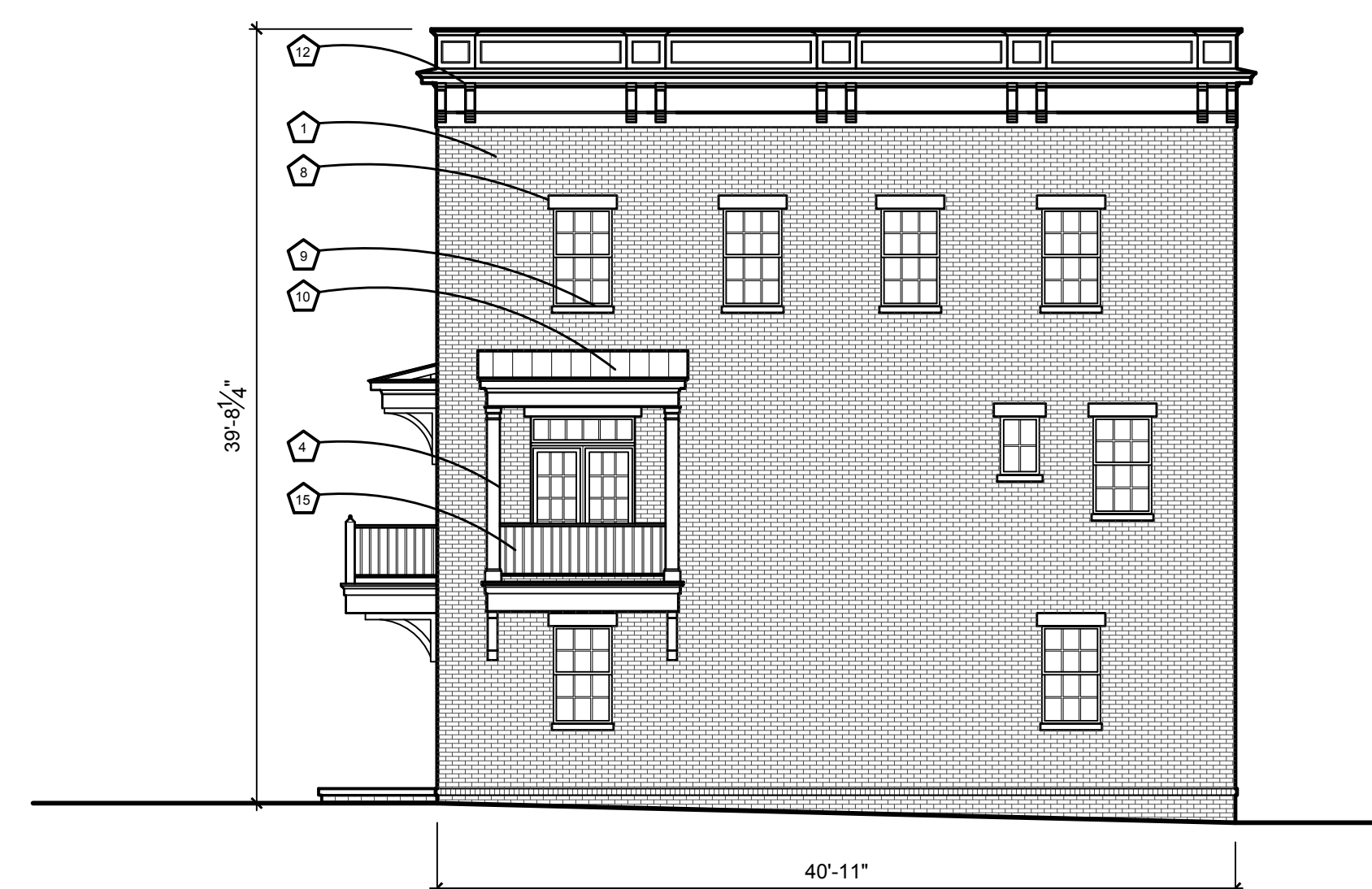
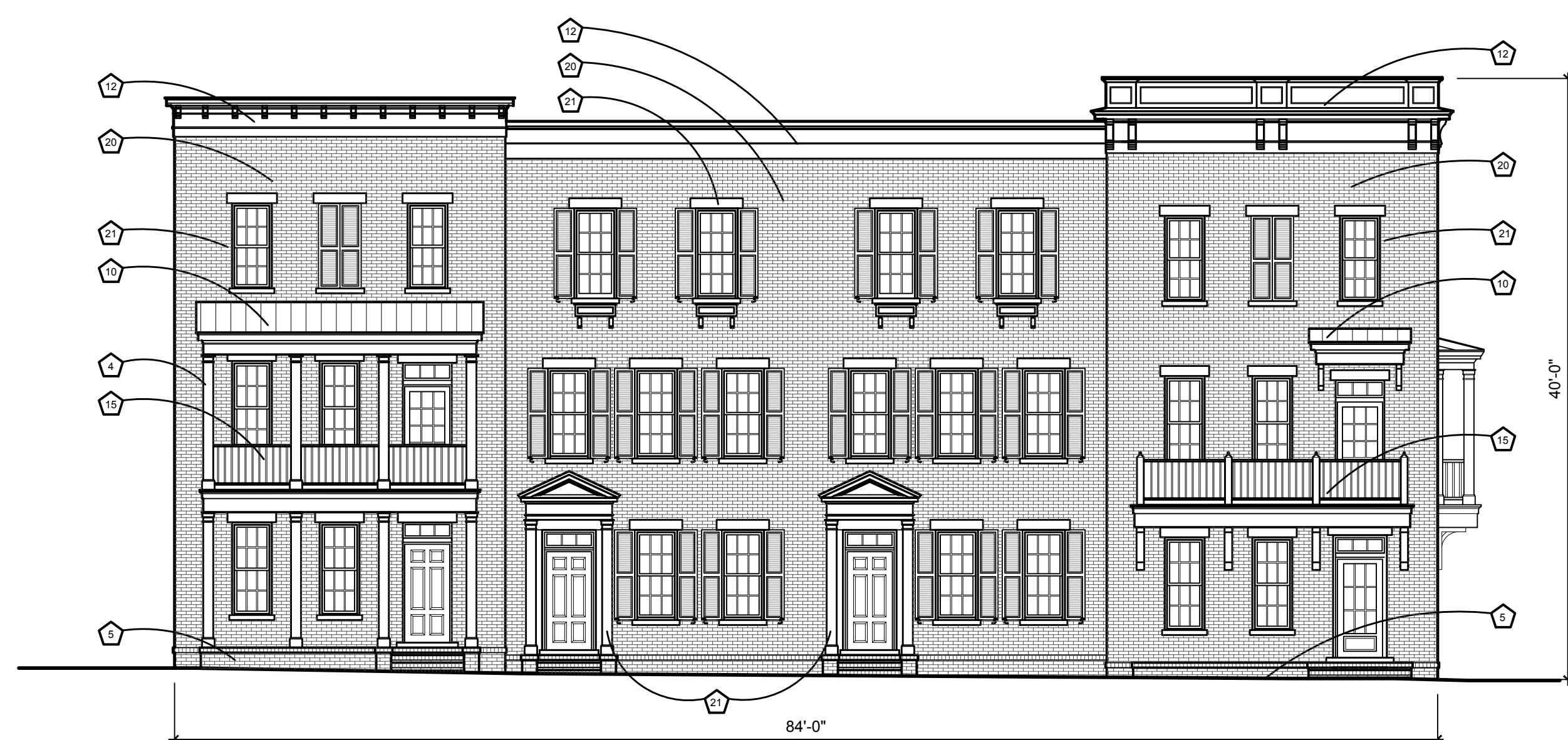


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No: 1 Date: 10/12/2018 Set Type: DRC Submittal

**ELEVATION KEYNOTES**

- |  |                                 |  |
|--|---------------------------------|--|
| 1 BRICK VENEER                             | 8 BRICK HEADER                  | 15 WOOD RAILING  |
| 2 BRICK ACCENT                             | 9 BRICK SILL                    | 16 LIMESTONE OR CAST STONE BASE                        |
| 3 LIMESTONE OR CAST STONE ACCENT           | 10 METAL ROOFING                | 17 FABRIC AWNING                                       |
| 4 WOOD OR SYNTHETIC PILASTERS/<br>COLUMNS  | 11 WROUGHT-IRON RAILING         | 18 BRICK CORNICE                                       |
| 5 BRICK BASE                               | 12 FYPON TRIM / CORNICE         | 19 METAL AWNING  |
| 6 LIMESTONE OR CAST STONE LINTEL<br>HEADER | 13 LIMESTONE OR CAST STONE BASE | 20 FIBER CEMENT LAP SIDING WITH 1/4 X 6<br>CORNERBOARD |
| 7 LIMESTONE OR CAST STONE SILL             | 14 ASPHALT SHINGLE ROOFING      | 21 FIBER CEMENT WINDOW SURROUND                        |



1 Townhouse #2 Street Elevation  
 1/8" = 1'-0"

2 Townhouse #2 Side Elevation  
 1/8" = 1'-0"

Project Contact: Regent Homes  
 Phone: 615/333-9000  
 SGS Contact: Dallas Caudle  
 SGS Project Number: 18045.00

Project Address:  
 Tollgate Village  
 Thompson's Station, TN 37179

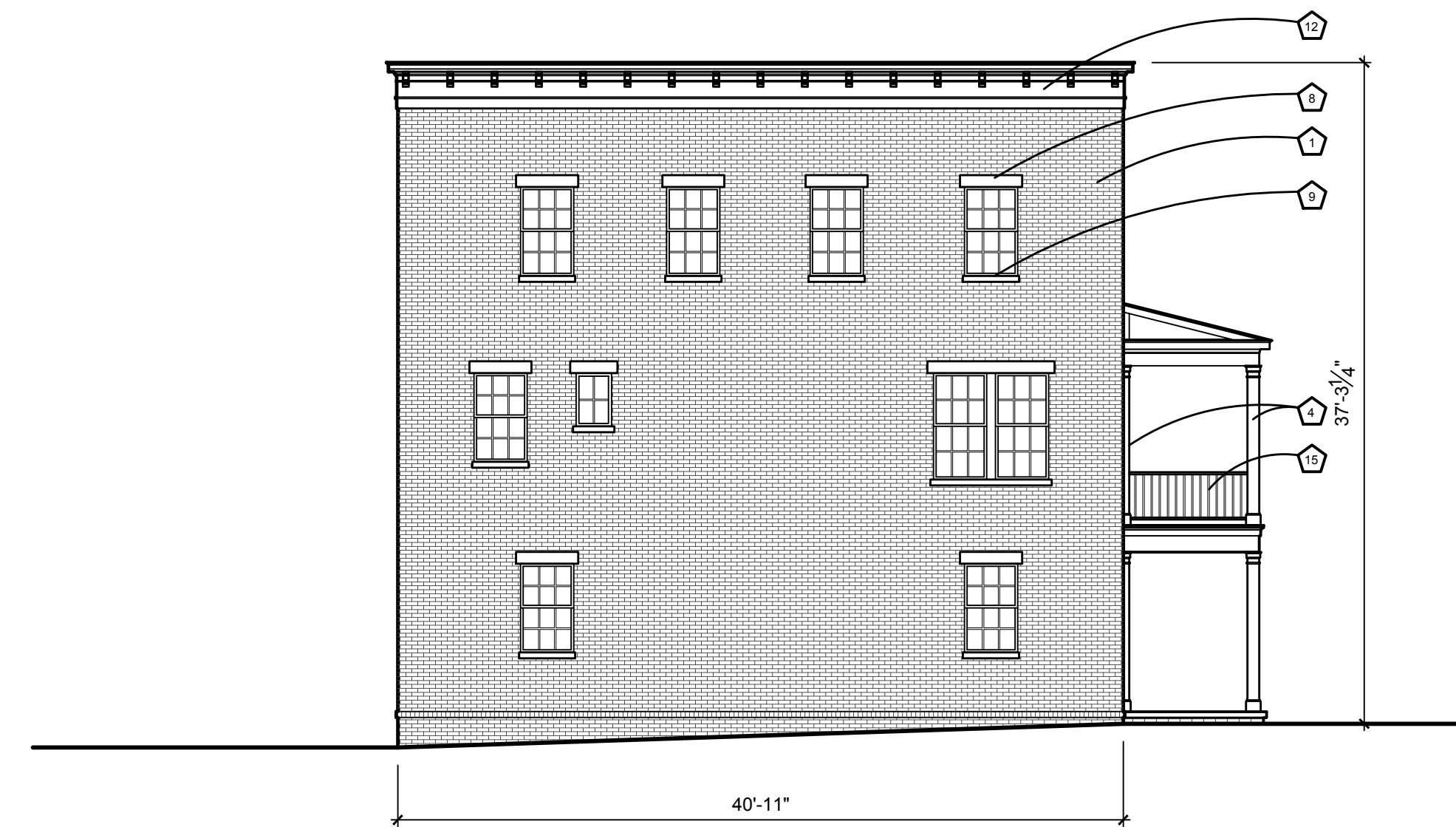
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 PHASE IIA**

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Drawing:



3 Townhouse #2 Rear Elevation  
 1/8" = 1'-0"

4 Townhouse #2 Side Elevation  
 1/8" = 1'-0"

**A305**

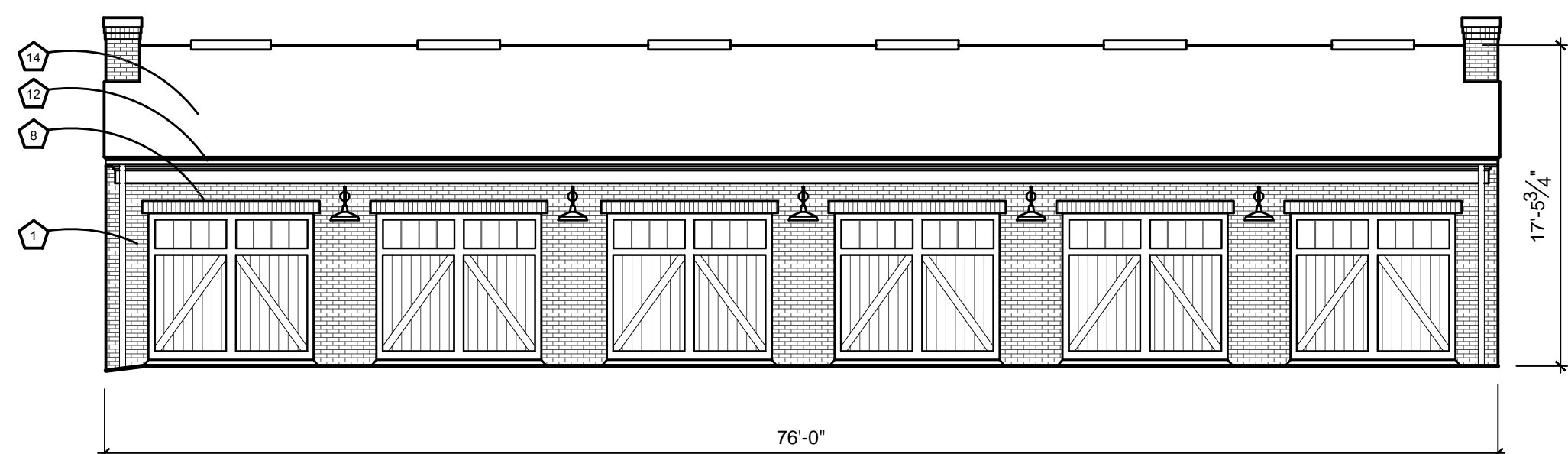
**ELEVATION KEYNOTES**

1 BRICK VENEER	8 BRICK HEADER	15 WOOD RAILING
2 BRICK ACCENT	9 BRICK SILL	16 LIMESTONE OR CAST STONE BASE
3 LIMESTONE OR CAST STONE ACCENT	10 METAL ROOFING	17 FABRIC AWNING
4 WOOD OR SYNTHETIC PILASTERS/ COLUMNS	11 WROUGHT-IRON RAILING	18 BRICK CORNICE
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7 LIMESTONE OR CAST STONE SILL	14 ASPHALT SHINGLE ROOFING	21 FIBER CEMENT WINDOW SURROUND

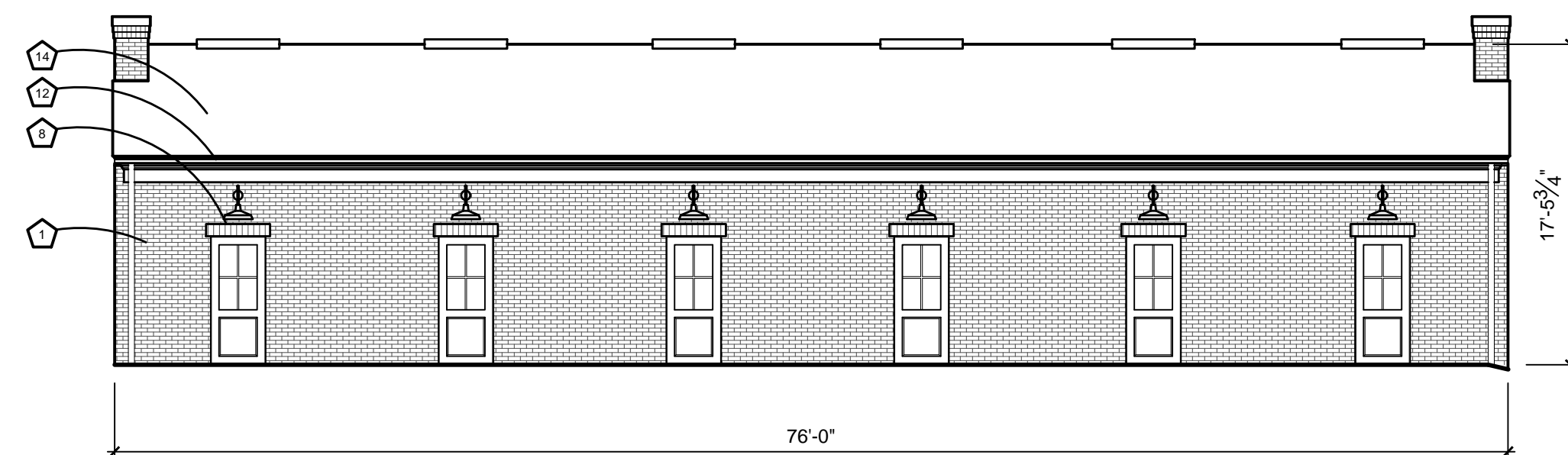


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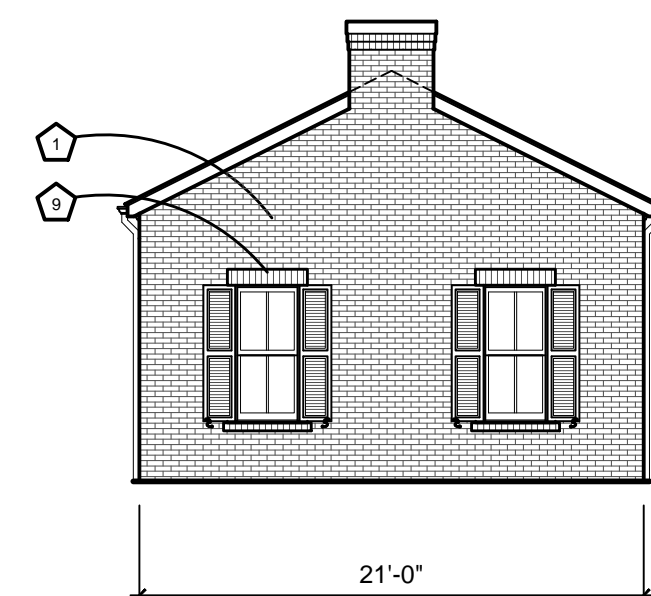
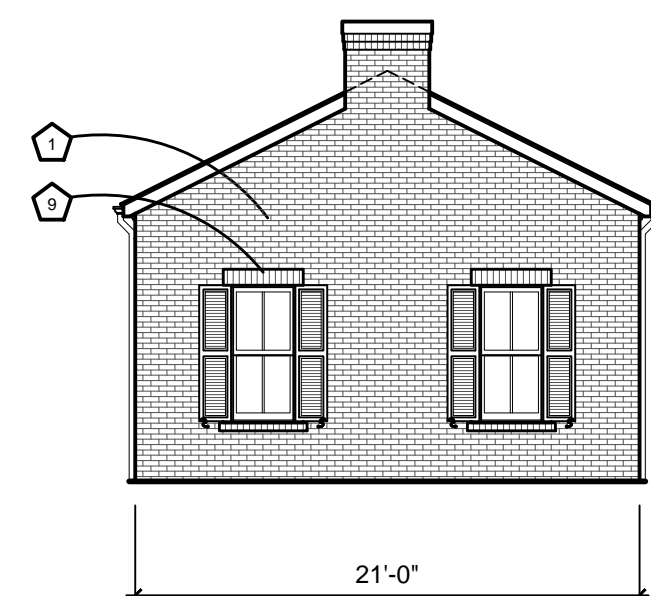
No: Date: Set Type:  
 1 10/12/2018 DRC Submittal



1 Garage Elevation  
 1/8" = 1'-0"



2 Garage Elevation  
 1/8" = 1'-0"



3 Garage Side Elevations  
 1/8" = 1'-0"

Project Contact: Regent Homes  
 Phone: 615/333-9000

SGS Contact: Dallas Caudle  
 SGS Project Number: 18045.00

Project Address:  
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 Thompson's Station, TN 37179

**TOLLGATE VILLAGE  
 PHASE IIA**

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Drawing:





Material Scheme A

Material Scheme B

Material Scheme C

**MATERIAL SCHEME A**

BRICK: BORAL FARMINGTON WITH FLAMINGO BRIXMENT C-247 ACHAMOIS  
 SIDING: SW 0055 LIGHT FRENCH GRAY  
 DOORS & WINDOWS: SW 6076 TURKISH COFFEE  
 BOX BAY & PANEL: SW 6069 FRENCH ROAST  
 PANEL INFILL: SW 2806 ROCKWOOD BROWN  
 PORCH & TRIM: SW 0053 PORCELAIN

**MATERIAL SCHEME B**

BRICK: PALMETTO LOWCOUNTRY BLEND WITH FLAMINGO BRIXMENT C247 ACHAMOIS  
 SHUTTERS: SW 2807 ROCKWOOD MEDIUM BROWN  
 DOORS & WINDOWS: SW 6076 TURKISH COFFEE  
 PANELS: SW 2808 ROCKWOOD DARK BROWN  
 PANEL INFILL: SW 2841 WEATHERED SHINGLE  
 STOOP & TRIM: SW 0053 PORCELAIN

**MATERIAL SCHEME C**

BRICK: PALMETTO KINGSMILL WITH FLAMINGO BRIXMENT C-380 WHITE OAK  
 SIDING: SW 0055 LIGHT FRENCH GRAY  
 DOORS & WINDOWS: SW 6076 TURKISH COFFEE  
 PANELS: SW 6076 TURKISH COFFEE  
 PANEL INFILL: SW 6076 TURKISH COFFEE  
 TRIM: SW 0053 PORCELAIN

FRONT ELEVATION

DRC Review - For Planning Commission Review Only

Tollgate Village Phase 2A  
 Condo 1



October 12, 2018

SGS #18072.07



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Material Scheme A

Material Scheme B

**MATERIAL SCHEME A**

BRICK: BORAL FARMINGTON WITH  
FLAMINGO BRIXMENT C-247 ACHAMOIS  
DOORS: SW 6076 TURKISH COFFEE  
PORCH & TRIM: SW 0053 PORCELAIN

**MATERIAL SCHEME B**

BRICK: PALMETTO KINGSMILL WITH FLAMINGO  
BRIXMENT C-380 WHITE OAK  
DOORS: SW 6076 TURKISH COFFEE  
TRIM: SW 0053 PORCELAIN



October 12, 2018

FRONT ELEVATION  
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Tollgate Village Phase 2A  
Garages

SGS #18072.07



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Material Scheme A

Material Scheme B

Material Scheme C

**MATERIAL SCHEME A**

BRICK:  
WINDOWS:  
DOORS & SHUTTERS:  
DOOR & WINDOW TRIM:  
WINDOW PANEL & INFILL:  
TRIM:  
BALCONIES:  
CORNICE:

SW 2822 DOWNING SAND  
SW 7008 ALABASTER  
SW 2856 FAIRFAX BROWN  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER

**MATERIAL SCHEME B**

BRICK:  
WINDOWS:  
DOORS & SHUTTERS:  
WINDOW TRIM:  
WINDOW PANEL & INFILL:  
BALCONIES:  
METAL ROOF:

GENERAL SHALE ST. LOUIS QUEEN  
WITH COOSA BUFF IVORY MORTAR  
SW 7008 ALABASTER  
SW 9179 ANCHORS AWAY  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
UNACLAD CHARCOAL GRAY

**MATERIAL SCHEME C**

BRICK:  
WINDOWS:  
DOORS & SHUTTERS:  
DOOR & WINDOW TRIM:  
WINDOW PANEL & INFILL:  
TRIM:  
BALCONIES:  
CORNICE:

SW 2850 CHELSEA GRAY  
SW 7008 ALABASTER  
SW 0041 DARD HUNTER GREEN  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER  
SW 7008 ALABASTER

FRONT ELEVATION



October 17, 2018

Tollgate Village Phase 2A  
Live Work 1

SGS #18072.07



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**MATERIAL SCHEME A**

BRICK: GENERAL SHALE DRIFTWOOD QUEEN WITH COOSA SOUTHERN WHITE  
 WINDOWS & DOORS: SW 2851 SAGE GREEN LIGHT  
 WINDOW TRIM: SW 2851 SAGE GREEN LIGHT  
 STOREFRONT: SW 2851 SAGE GREEN LIGHT  
 STOREFRONT PANEL & INFILL: SW 2851 SAGE GREEN LIGHT  
 BALCONIES & COLUMNS: SW 7008 ALABASTER  
 METAL ROOF: UNACLAD CHARCOAL GRAY

**MATERIAL SCHEME B**

BRICK: SW 7005 PURE WHITE  
 WINDOWS & DOORS: LINETEC CHARCOAL GRAY  
 SHUTTERS: SW 2848 ROYCROFT PEWTER  
 STOREFRONT: LINETEC CHARCOAL GRAY  
 STOREFRONT PANEL & INFILL: SW 7005 PURE WHITE  
 METAL ROOF: UNACLAD CHARCOAL GRAY  
 CORNICE: SW 7005 PURE WHITE

FRONT ELEVATION



October 17, 2018

Tollgate Village Phase 2A  
 Live Work 2

SGS #18072.07



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**MATERIAL SCHEME A**

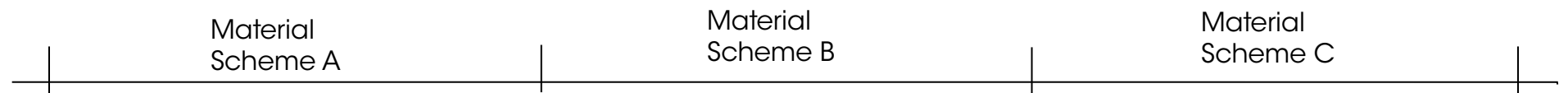
BRICK: BRAMPTON BROWNSTONE QUEEN  
WITH COOSA ANTIQUE BUFF MORTAR  
CAST STONE  
HEADER & SILLS:  
DOORS & STOREFRONT: SW 2936 BLACK EMERALD  
STOREFRONT TRIM: SW 2936 BLACK EMERALD  
DOOR & WINDOW TRIM: SW 2936 BLACK EMERALD  
STOREFRONT PANELS: SW 2936 BLACK EMERALD  
STOREFRONT PANEL INFILL: SW 0023 PEWTER TANKARD  
TRIM: SW 7042 SHOJI WHITE  
BALCONIES: SW 6153 PROTEGE BRONZE  
COPING: BERRIDGE BUCKSKIN

**MATERIAL SCHEME B**

BRICK: BRAMPTON MARSHALL QUEEN  
WITH COOSA IVORY BUFF MORTAR  
DOOR & WINDOW TRIM: SW 7041 VAN DYKE BROWN  
DOORS & WINDOWS: SW 7041 VAN DYKE BROWN  
PANELS: SW 7041 VAN DYKE BROWN  
PANEL INFILL: SW 0024 CURIO GRAY  
BALCONIES: SW 6153 PROTEGE BRONZE  
COPING: BERRIDGE BUCKSKIN

**MATERIAL SCHEME C**

BRICK: CHEROKEE VELOUR DARK GRAY QUEEN  
WITH COOSA FROSTY MORTAR  
WINDOWS: SW 2808 ROCKWOOD DARK BROWN  
STOREFRONT & DOORS: SW 2808 ROCKWOOD DARK BROWN  
STOREFRONT TRIM & PANEL, TRIM: SW 2808 ROCKWOOD DARK BROWN  
BRACKETS, & COLUMNS: SW 7042 SHOJI WHITE  
METAL ROOF: UNACLAD HARTFORD GREEN



October 12, 2018

FRONT ELEVATION  
DRC Review - For Planning Commission Review Only

Tollgate Village Phase 2A  
Mixed-Use 1

SGS #18072.07



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MATERIAL SCHEME A

BRICK: BRAMPTON JASPER WITH  
COOSA IVORY BUFF MORTAR  
DOORS: SW 7059 UNUSUAL GRAY  
TRIM: SW 6995 SUPER WHITE  
CORNICE PANEL: SW 7656 RHINESTONE  
METAL ROOFING: BERRIDGE ZINC GREY:

MATERIAL SCHEME B

BRICK : SW 7066 EXTRA WHITE  
TRIM: SW 7058 MAGNETIC GRAY  
DOORS: SW 7060 ATTITUDE GRAY  
COPING: BERRIDGE ZINC GRAY  
SHUTTERS: SW 6257 GIBALTAR

MATERIAL SCHEME C

BRICK: BRAMPTON GIBSON WITH  
COOSA IVORY BUFF MORTAR  
TRIM: 7657 TINSMITH  
DOORS: SW 7601 DOCKSIDE BLUE  
COPING: BERRIDGE ZINC GREY  
METAL ROOFING: BERRIDGE ZINC GREY



FRONT ELEVATION



October 12, 2018

Tollgate Village Phase 2A  
Townhome 1

SGS #18072.07



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**MATERIAL SCHEME A**

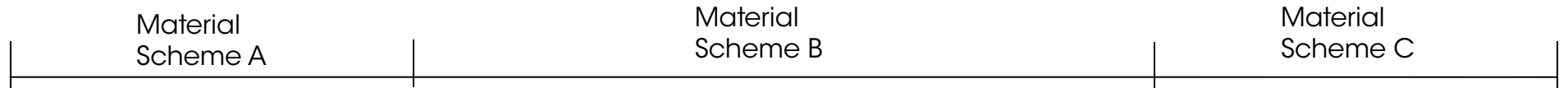
BRICK: BRAMPTON NEWTON WITH  
COOSA IVORY BUFF MORTAR  
ENTRY DOOR: SW 6257 GIBRALTAR  
TRIM: SW 7646 FIRST STAR  
SHUTTER: SW 6257 GIBRALTAR  
METAL ROOFING: BERRIDGE ZINC GREY  
COPING: BERRIDGE MATTE BLACK

**MATERIAL SCHEME B**

BRICK: BRAMPTON CRAWFORD WITH  
COOSA IVORY BUFF MORTAR  
TRIM: SW 7005 PURE WHITE  
ENTRY DOORS: SW 7625 MOUNT ETNA  
COPING: BERRIDGE MATTE BLACK  
SHUTTERS: SW 7625 MOUNT ETNA

**MATERIAL SCHEME C**

BRICK: SW 7658 GRAY CLOUDS  
TRIM: SW 7661 REFLECTION  
DOORS: SW 6258 TRICORN BLACK  
METAL ROOF: BERRIDGE ZINC GREY  
BRICK BASE: BRAMPTON GIBSON WITH  
COOSA IVORY BUFF MORTAR



FRONT ELEVATION



October 12, 2018

Tollgate Village Phase 2A  
Townhome 2

SGS #18072.07



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**Tollgate Town Center Site Plans Phase 2A**

EDU Count

8/30/2018

	EDU Residential Units	EDU Commercial Units
Townhome Buildings		
1	3	0
2	4	0
3	3	0
4	4	0
	<hr/> 14	<hr/> 0
Condo Buildings		
1	12	0
	<hr/> 12	<hr/> 0
Live Work Buildings		
1	5	5
2	4	4
	<hr/> 9	<hr/> 9
Mixed Use Building		
1	3	3
	<hr/> 3	<hr/> 3
Totals	38	12

**Total Number of EDU/Taps**

**50**

**Basis for Residential Unit count**

Ordinance 10-007; 14-001; top of Exhibit A

"Residential uses shall constitute one (1)EDU for each separate living unit or quarters. Accessory living quarters both attached and detached also constitute one (EDU)."

**Basis for Commercial Unit count**

Ordinance 10-007, Section 3. "System Development, Access/Tap and Effluent Disposal Fee"

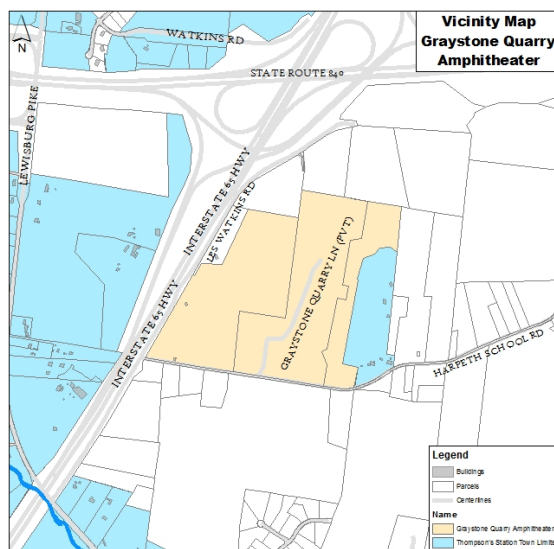
"An equivalent dwelling unit (EDU) is based on an estimated single family dwelling water usage at three hundred fifty (350) gallons per day (GPD). Water usage for the purpose of calculating fees shall deem any usage less than three hundred fifty (350) GPD as one (1) EDU and any usage calculated to exceed three hundred fifty (350) GPD (or multiples thereof) shall be counted as an additional EDU."

**Thompson's Station Planning Commission  
Staff Report - Item 4 (SP 2018-008; DR 2018-005)  
October 25, 2018**

**Request for approval of a revision to the site plan for a Specific Plan. The revision includes the construction of a ticket booth, restrooms, three concession buildings, a first aid building and a storage building located at 4520 Graystone Quarry.**

**REQUEST**

The applicant, Dale & Associates on behalf of Graystone Quarry is requesting approval for the construction of additional buildings to serve the event venue and amphitheater located at 4520 Graystone Quarry Lane.



**BACKGROUND**

The project site is located within Specific Plan zoning district and a site plan was approved for the development of an event venue which would be constructed in two phases. The first phase is complete with a single-family residence, a wedding pavilion and event barn. The next phase consists of a revision to the plan to permit an artist compound and stage for an amphitheater. The request also designated an area for concessions and restrooms however, these were to be temporary or portable structures. The request to amend the plan was submitted and approved by the Board of Mayor and Aldermen on February 13, 2018.

The site plan for Graystone Quarry was approved with the following contingencies:

1. Prior to the issuance of any permits, the amendment to the existing specific plans shall be adopted.
2. Prior to the issuance of a building permit, the applicant shall obtain all necessary approvals from Williamson County Sewage Disposal.
3. The use of current technology that includes but may not be limited to, steerable sound systems or directional loudspeakers be utilized for the amphitheater.
4. Portable restrooms shall be used temporarily on a case by case basis and shall be removed immediately after the event.
5. Prior to the issuance of a grading or building permit, all traffic mitigation shall be completed in accordance with the traffic study dated January 2018.
6. Any change of use or expansion of the project site shall conform to the requirements set forth within the Zoning Ordinance and shall be approved prior to the implementation of any changes to the project.

### Site Plan

A site plan is a plan presenting the general details of the development proposal and review by the Planning Commission is required for all multi-family and non-residential developments to ensure “compliance with the development and design standards” (Section 5.4.4) of the Land Development Ordinance.

The overall project site is approximately 133 acres and is currently developed with the first phase of Graystone Quarry and the owner’s residence. The first phase consists of a 10,426 square foot event center, a 5,090 square foot pavilion and an 8,233 square foot residence. Phase 2 will consist of an 8,100 square foot artist compound and stage which are approved however not constructed at this time. This proposed revision includes the construction of three concession stands for a total of 2,156 square feet, a 3,915 square foot restroom building, an 880 square foot ticket booth, an 864 square foot first aid building and a 5,000 square foot storage barn. The proposed buildings are setback on the site in proximity to the existing buildings with limited visibility from the road. The Specific Plan zoning district did not have any development standards other than the requirement for 40% open space for non-residential projects and 50% open space for residential projects. Approximately 74% of the site will be maintained in a predominantly natural state and no tree removals are proposed as part of these revisions. Access to the site is from Les Watkins Road and all parking is provided on site. No change to access or parking is proposed with the amendment to the site plan.

### Architecture

The proposed buildings are subject to review and approval by the Design Review Commission (DRC). The proposed buildings will be consistent with the colors and materials used for the existing buildings on site. The DRC will meet to review the proposal on November 7, 2018.

### Wastewater Management

The site is currently served by a septic system, however, in order to expand the use, the applicant is proposing a private on-site system. The Board of Mayor and Aldermen reviewed the request for the private system and deferred the request until the November BOMA meeting. Staff does not typically recommend for approval of a project without approval of all utilities, however, the site does have a functioning septic system that is managing all the wastewater at this time. Therefore, Staff recommends a contingency that prior to any permits, the applicant obtain approvals from the Tennessee Department of Environment and Conservation and the Board of Mayor and Aldermen necessary for the expansion of the use.

### RECOMMENDATION

Staff recommends the Planning Commission approve the site plan and recommend to the Board of Mayor and Aldermen to adopt an ordinance amending the specific plan to include these additional buildings for Graystone Quarry with the following contingencies:

1. Prior to the issuance of any permits, the amendment to the specific plan shall be complete.
2. Prior to the issuance of a building permit, the applicant shall obtain approval for the buildings from the DRC.
3. Prior to the issuance of building permits, the applicant shall obtain approval for a new private onsite wastewater treatment system.
4. Any change of use or expansion of the project site shall conform to the requirements set forth within the Land Development Ordinance and shall be approved prior to the implementation of any changes to the project.

### ATTACHMENTS

Site Plan Packet



# Graystone Quarry Amphitheater Commercial Phase II Site Plan

## PROJECT SCOPE

Graystone Quarry is a proposed multi-use event center development on the north side of Harpeth School Road in the southeast quadrant of the intersection of Interstate 65 and 840 in Thompson's Station, TN. The site will be designed using upscale rural architecture, careful landscape features, and will incorporate the unique yet beautiful landscape of the property. The aim is to provide Thompson's Station and the surrounding community with a unique and attractive destination to hold weddings, reunions, concerts, corporate events, or other social gatherings.

The purpose of this plan is to provide an update to the previously approved Graystone Quarry. Graystone Quarry has purchased the adjacent property that was previously approved as Hoodoo. Graystone Quarry will be utilizing this property for general admission parking during amphitheater events. The plans illustrate the updated parking concept. Other updates include expanding the amphitheater seating and stage/buildings, increasing the footprint of the Green Room, and providing ancillary uses. No change of use is being proposed on these plans than what was previously approved.

The development will incorporate three different uses in three separate areas. A summary of each area of the development is as follows:

### Residential

- An approximately 5,000 square foot single family residential house will be constructed in an area along the east side of the property. This will be the residence of the owner/operator of the development.

**Commercial Phase 1 - Event Center & Wedding Chapel/Pavillion**  
- The event center building called the 'Barn' will be constructed overlooking the existing quarry lake. Utility Infrastructure for the 'Barn' will be designed to accommodate a building size of up to 12,000 Sq. Ft. High-end rustic architectural features will be implemented to stylistically enhance and blend the beautiful natural surroundings. Using stone, timber and careful landscaping, the event center will be a beautiful venue for weddings, reunions, corporate gatherings, or community events.

- A courtyard will be constructed out front of the building leading down to an existing lake. The lake will be cleaned up and it sits against existing vertical stone walls providing a striking view from the event center.

- A Chapel/Pavillion will also be constructed near the main building. Utility Infrastructure for this building will be designed to accommodate a building size of up to 5,000 Sq. Ft. This structure will be used for the wedding ceremony or other community event. This pavillion will incorporate similar rustic architecture to match the main building and blend into the surrounding landscape.

- A storage & maintenance building will also be constructed on the premises to house equipment and tools required for maintenance of the property. This building will be tucked into a hidden area that is surrounded by the existing quarry walls, and supplemental landscaping will be installed to hide the building from view.

### Phase 2 - Amphitheater

- A state-of-the-art outdoor amphitheater will be installed in the existing quarry's main area. Approximately 100-foot vertical stone walls provide a stunning backdrop for potential concert or community gatherings or events.

- An approximately 2,500 square foot permanent stage will be installed at the low narrow end of the natural amphitheater. An approximately 4,200 square foot Artist Compound / Green Room will be installed behind the stage for the performers, and will contain permanent restroom facilities with showers.

- Only the minimal amount of disturbance will take place to prepare the amphitheater for events. As much of the natural surroundings will be preserved and it is not anticipated to disturb the quarry walls except for the activity required to ensure stability and safety of the walls.

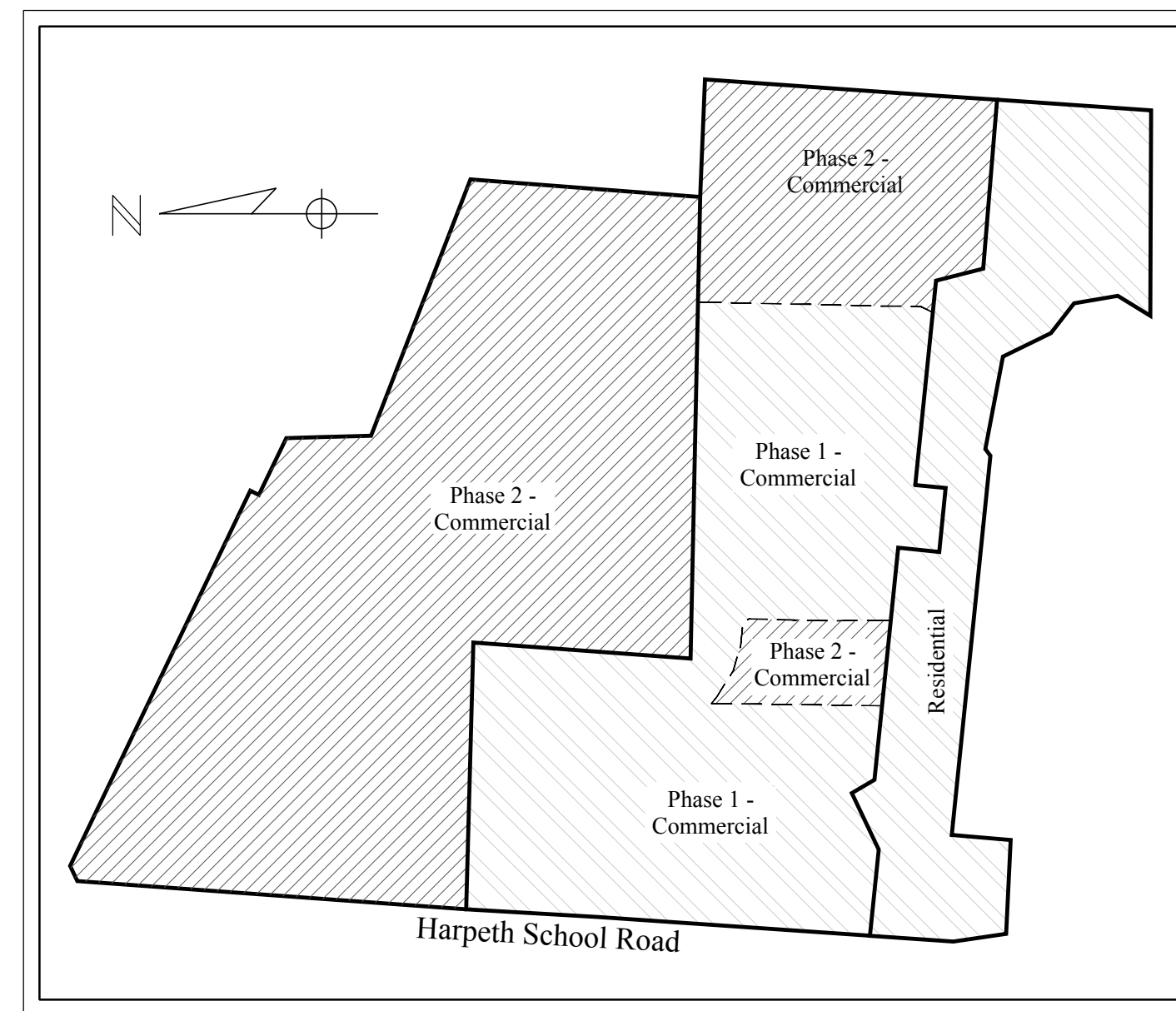
- The lower portion of the quarry will be a gently sloping floor for event seating. There is an approximately 1-acre shelf on the east side of the main seating area that will be an open area for vendors, restrooms, picnic tables, and VIP seating on the western edge.

- Additional accessory buildings will be constructed in the general locations on the plans, as ancillary uses to the amphitheater.

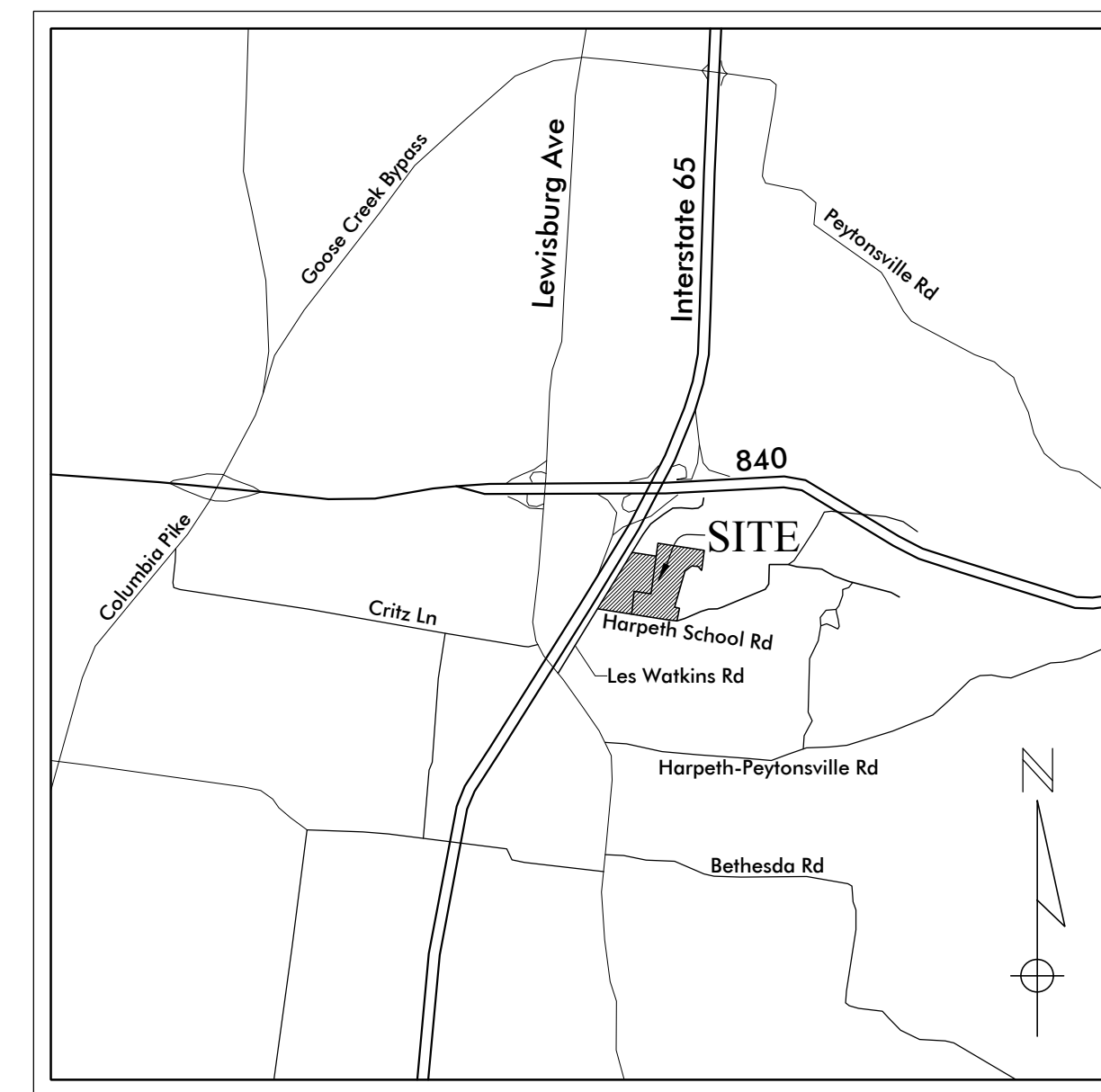
- These include
- Permanent Concession buildings
  - Permanent restroom building
  - Ticket / Entry Building
  - Storage Building
  - First Aid Building

- Increased capacity of the amphitheater from 5000 to up to 7148 fixed seats plus standing room only
- Relocate main access point to the amphitheater from Harpeth School Road to the highway service road facing Highway 65 (on Les Watkins Road)
- Moved planned parking from the front field at Graystone Quarry - facing Harpeth School Road, to the corner property at the intersection of Harpeth School Road and Les Watkins Road where the majority of parking will be out of sight in the upper field
- Added accessory buildings to the accommodate ancillary uses to the amphitheater

Map 144, Parcels 1.02 & 2.02  
4520 Graystone Quarry Lane  
Thompson's Station, Williamson County, Tennessee



PHASE MAP



VICINITY MAP  
N.T.S.

## DEVELOPMENT SUMMARY

<b>Owners / Developer</b> Graystone Quarry Events 4520 Graystone Quarry Lane Franklin TN, 37064 Rick McEachern (408) 621-0746	<b>Property Information</b> Graystone Quarry Events 4520 Graystone Quarry Lane Franklin TN, 37064	<b>Electric Service</b> Middle Tennessee Electric Membership Corporation 2156 Edward Curd Lane Franklin, TN 37067
<b>Civil Engineer and Surveyor</b> Dale & Associates (Adam Seger, PE) 516 Heather Place Nashville, Tennessee 37204 615.297.5166	<b>Floodnote</b> This property does not lie within a Flood Hazard Area as depicted on the current Flood Insurance Rate Map, (FIRM) Numbers 47187C0355F & 47187C0365F. Dated Sept. 29, 2006	<b>Water Service</b> HB & TS 505 Downs Blvd Franklin, TN 37064 615.794-7796
	<b>Benchmark</b> Chiseled Square on SE Corner of Headwall Located near the SW Corner of the Property on the South Side of Harpeth School Access Rd. NGVD Elevation 768.37.	<b>Sewer Service</b> Septic On Site
		<b>Utility Location</b> Tennessee One-Call 800.351.1111

## SITE DATA

Zoning: SP	
Total Property Area	133.1 Ac.
Residential	872672 sq ft or 20.0 Ac.
Phase I	1302055 sq ft or 20.9 Ac.
Phase II	3788025 sq ft or 87.0 Ac.
Drives/ Sidewalks	9.3 Ac.
Building	0.7 Ac.
Parking (Grass)	21.1 Ac.
Septic	4.0 Ac.
Open Space	98.0 Ac.
Impervious Surface Ratio	0.08 Ac.
Floor Area Ratio	0.004 Ac.
Front Setback	20 Ft.
Side Setback	20 Ft.
Rear Setback	20 Ft.
<b>Parking Requirements</b>	
PHASE I	
Pavilion	1 per 6 seats 176 seats = 30 stalls (paved)
Barn	1 per 50 sq ft (5,350 sq ft - assembly area) = 107 stalls (paved)
PHASE II	
Amphitheater	1 per 6 seats (7,148 permanent seating) = 1191 stalls 1 per 50 sq ft (3,580 sq ft, temporary seating) = 72 stalls
Total Required	1,263 stalls
	General Admission - 2,663 Stalls (Grass) Premier Parking - 267 stalls (Grass) Bus Parking - 32 Stalls (Paved) Employee Parking - 88 Stalls (Paved)
Total Provided (Phase I and Phase II)	3,187 Stalls (2,930 grass + 257 paved)
<b>BUILDING AREAS</b>	
Existing Event Center	- less than 12,000 sq ft
Existing Pavillion	- less than 5,000 sq ft
Proposed Artist Compound	- 8,100 sq ft
Proposed Large Concession	- 980 sq ft
Proposed Small Concession	- 336 sq ft
Proposed Ice Room w/ Concessions	- 840 sq ft
Proposed Restroom	3,915 sq ft
Proposed First Aid Building	- 864 sq ft
Proposed Ticket Booth	- 880 sq ft
Proposed Storage Barn	- ~5,000 sq ft

## Sheet Schedule

1	C0.0	Cover Sheet
2	C1.0	Overall Master Plan
3	C2.0	Layout and Utility Plan - Sheet 1
4	C2.1	Layout and Utility Plan - Sheet 2
5	C3.0	Grading and Drainage Plan - Sheet 1
6	C3.1	Grading and Drainage Plan - Sheet 2



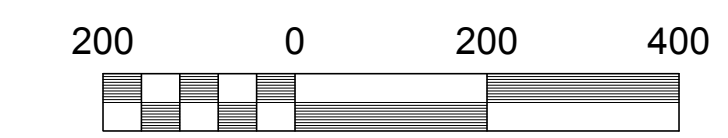
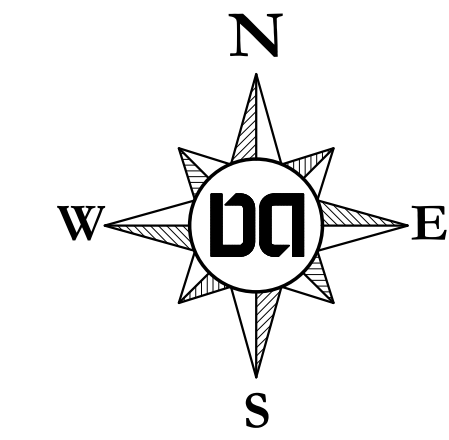
**Dale & Associates**  
Civil Engineering  
Land Planning & Zoning  
Surveying  
516 Heather Place  
Nashville, TN 37204  
(615) 297-5166

D&A Project #14038  
Graystone Quarry  
Amphitheatre  
**C0.0**



Drawing Date:  
December 15, 2017

Revisions  
Revise to add  
accessory building  
9/19/2018



Scale 1" = 200'

**Development Summary**

**Owners / Developer**  
Graystone Quarry Events  
Rick McEachern  
(408) 621-0746

**Civil Engineer and Surveyor**  
Dale & Associates (Adam Seger, PE)  
516 Heather Place  
Nashville, Tennessee 37204  
615.297.5166

**Line Table**

L1	N 20°56'4" W	52.22
L2	S 58°49'2" E	30.00
L3	N 30°49'7" E	197.52
L4	S 86°30'18" E	107.67
L5	N 53°15'49" W	119.85'
L6	S 85°18'09" W	139.11'
L7	S 42°33'44" W	118.32'
L8	S 68°58'42" W	167.31'
L9	S 31°21'02" E	26.28'
L10	S 86°36'50" W	166.59'
L11	N 80°58'30" W	266.98'
L12	N 79°10'55" W	95.81'
L13	N 10°49'05" E	200.65'
L14	S 79°10'55" E	129.03'
L15	S 64°44'58" W	82.09'

**Utility Notes:**

Water - Graystone Quarry will be served by public water through HB & TS Utility Company.

Sewer - Graystone Quarry utilizes septic to treat all sewer in the development. The wedding event facility and associated buildings, the residential house, and the permanent bathrooms at the Amphitheater will all be served through a private septic system that has been reviewed, approved, and installed in accordance with Williamson County. During amphitheater events, portable toilets will be utilized for the general public.

Electric - Graystone Quarry will be served by MTEMC for electric.

**Environmental Resource Notes:**

A full boundary and topographic survey was performed along with a preliminary jurisdictional determination. There is an existing stream running along the frontage of the property near the intersection of Harpeth School Road and Les Watkins Road. The project will implement the required buffers and will not disturb this area. No environmental resources are proposed to be disturbed other than the select clearing of trees.

**Stormwater Notes:**

All stormwater on site has been designed to meet the regulations. A lake is constructed on the south side of the development that captures most of the runoff from the developed portion of the site. This lake treats both the water quantity and water quality for the development. The parking areas shall be seeded with grass, with minimal to no impervious surfaces, these areas are low impact. The main drive will be asphalt as well as the bus and employee parking areas. The pedestrian walkways to be a solid surface.

**Landscape Notes:**

Care shall be taken to minimize tree removal. The areas shown [hatched pattern] shall be the only areas where possibly trees less than 18" may be removed, these areas are approximately 11% of the total treed areas. It is not anticipated that trees 18" and greater will be removed.

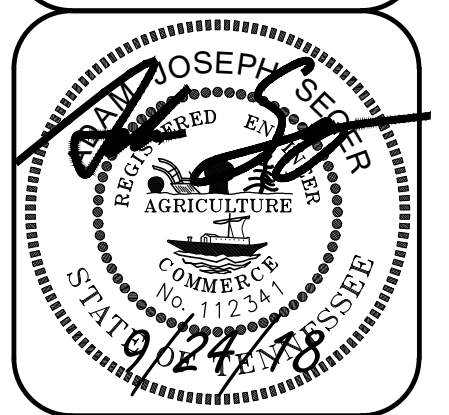
**Legend**

[Dark Gray Box]	Proposed Asphalt
[Light Gray Box]	Proposed Hard Surface
[Hatched Box]	Proposed Open Space



**Site Plan**  
**Graystone Quarry Amphitheater**

Map 144 Parcel 2.02  
Thompson's Station, Williamson County, Tennessee



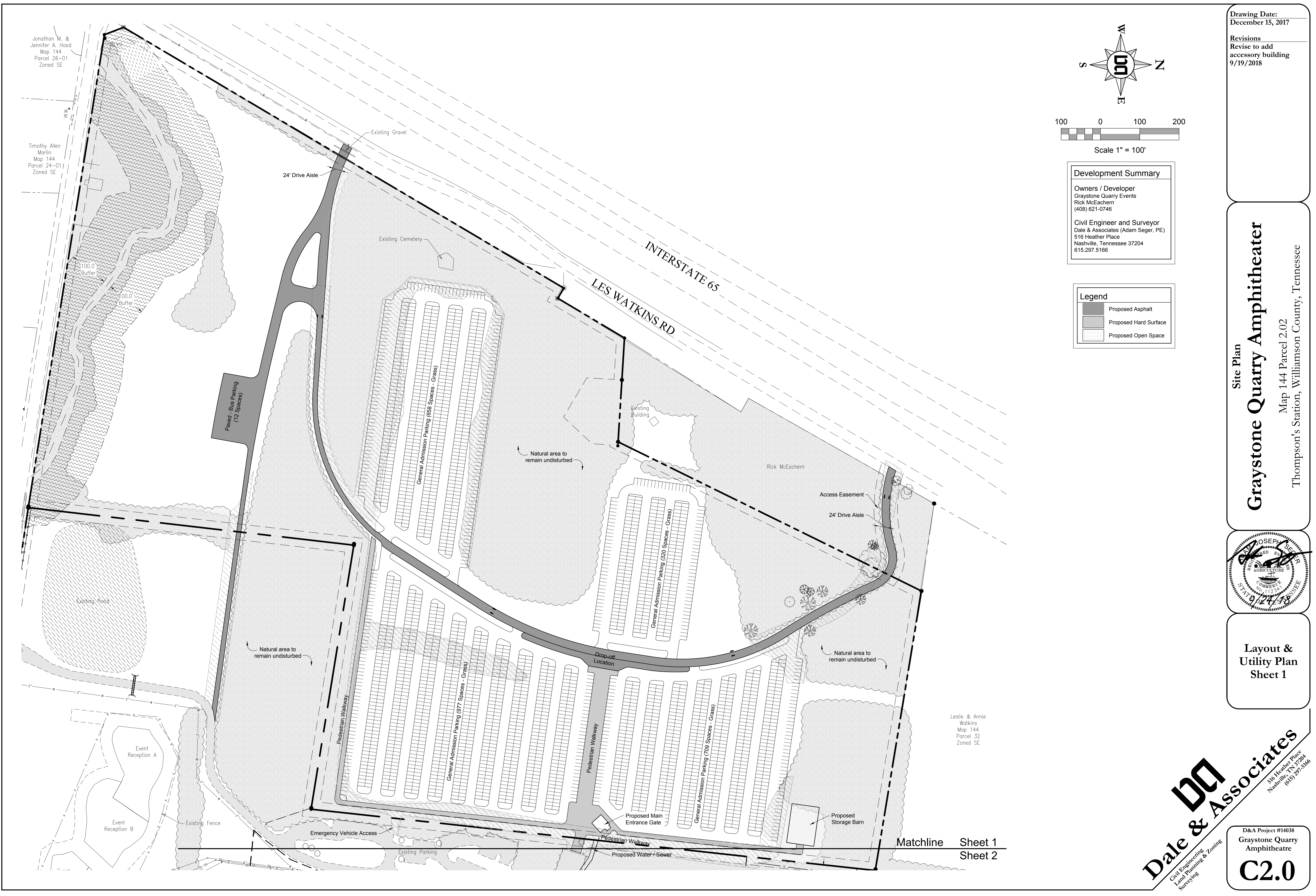
**Overall Master Plan**

**Dale & Associates**  
Civil Engineering  
Land Planning & Zoning  
Surveying

516 Heather Place  
Nashville, TN 37204  
(615) 297-5166

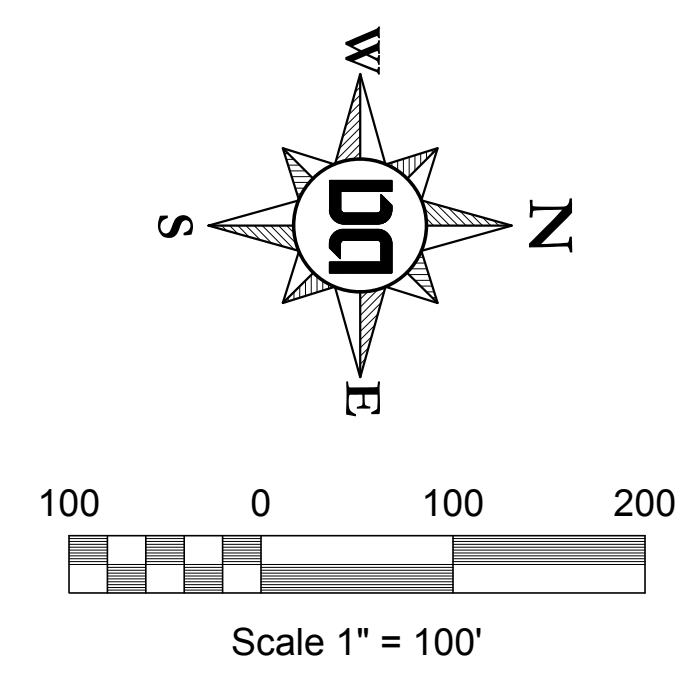
D&A Project #14038  
**Graystone Quarry Amphitheater**  
**C1.0**





Jonathan M. & Jennifer A. Hood  
Map 144  
Parcel 26-01  
Zoned SE

Timothy Allen Morin  
Map 144  
Parcel 24-01  
Zoned SE



**Development Summary**

Owners / Developer  
Graystone Quarry Events  
Rick McEachern  
(408) 621-0746

Civil Engineer and Surveyor  
Dale & Associates (Adam Seger, PE)  
516 Heather Place  
Nashville, Tennessee 37204  
615.297.5166

**Legend**

- Proposed Asphalt
- Proposed Hard Surface
- Proposed Open Space

Drawing Date:  
December 15, 2017

Revisions  
Revise to add  
accessory building  
9/19/2018

**Site Plan**  
**Graystone Quarry Amphitheater**  
Map 144 Parcel 2.02  
Thompson's Station, Williamson County, Tennessee



**Layout & Utility Plan**  
Sheet 1

**Dale & Associates**  
Civil Engineering  
Land Planning & Zoning  
Surveying

516 Heather Place  
Nashville, TN 37204  
(615) 297-5166

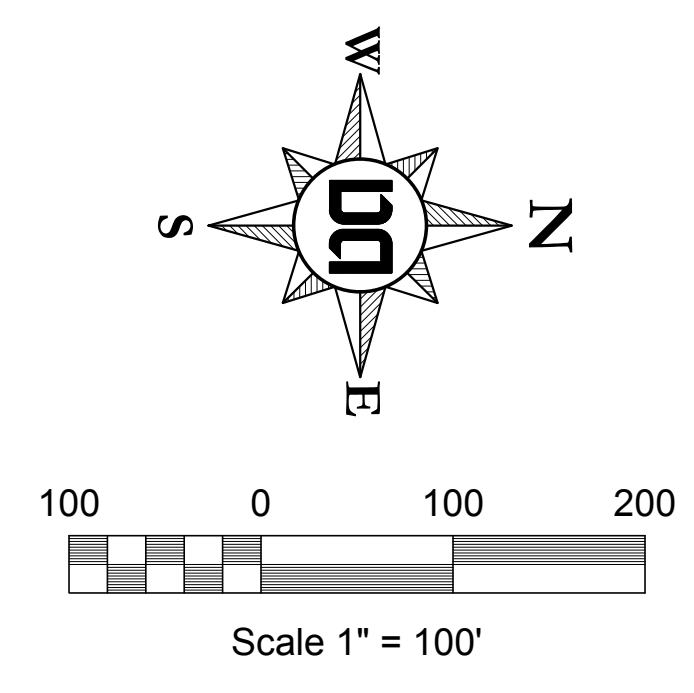
D&A Project #14038  
Graystone Quarry Amphitheater  
**C2.0**

Matchline Sheet 1  
Sheet 2





Leslie & Annie  
Watkins  
Map 144  
Parcel 32  
Zoned SE



**Development Summary**

Owners / Developer  
Graystone Quarry Events  
Rick McEachern  
(408) 621-0746

Civil Engineer and Surveyor  
Dale & Associates (Adam Seger, PE)  
516 Heather Place  
Nashville, Tennessee 37204  
615.297.5166

**Legend**

	Proposed Asphalt
	Proposed Hard Surface
	Proposed Open Space

Matchline Sheet 1  
Matchline Sheet 2

**Drawing Date:**  
December 15, 2017

**Revisions**  
Revise to add  
accessory building  
9/19/2018

**Site Plan**  
**Graystone Quarry Amphitheater**  
Map 144 Parcel 2.02  
Thompson's Station, Williamson County, Tennessee



**Layout & Utility Plan**  
**Sheet 2**

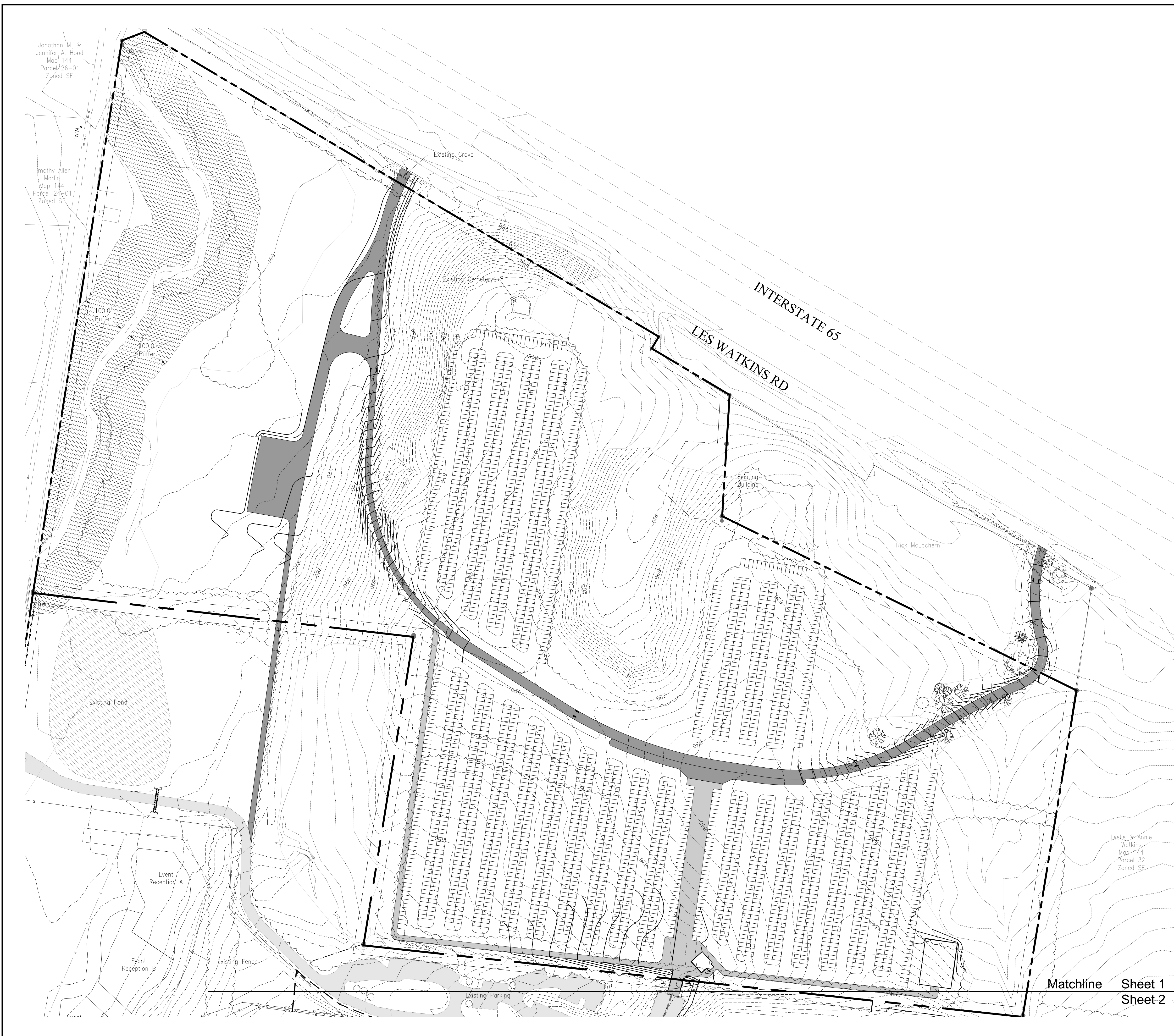
**Dale & Associates**  
Civil Engineering  
Land Planning & Zoning  
Surveying

D&A Project #14038  
Graystone Quarry Amphitheater  
**C2.1**

Charles & Brenda  
Woodsdale  
Deed Bk 3937, Pg 47,  
Map 133 Parcel 33-0  
Zoned SE

516 Heather Place  
Nashville, TN 37204  
(615) 297-5166

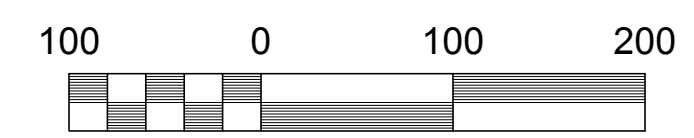
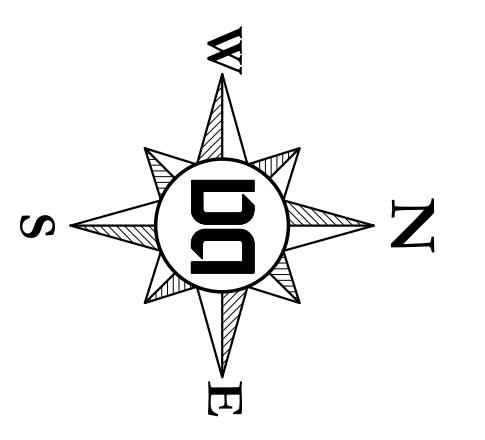




Jonathan M. &  
Jennifer A. Hood  
Map 144  
Parcel 26-01  
Zoned SE

Timothy Allen  
Morin  
Map 144  
Parcel 24-01  
Zoned SE

Leslie & Annie  
Watkins  
Map 144  
Parcel 32  
Zoned SE



Scale 1" = 100'

**Development Summary**

Owners / Developer  
Graystone Quarry Events  
Rick McEachern  
(408) 621-0746

Civil Engineer and Surveyor  
Dale & Associates (Adam Seger, PE)  
516 Heather Place  
Nashville, Tennessee 37204  
615.297.5166

**Legend**

- Proposed Asphalt
- Proposed Hard Surface
- Proposed Open Space

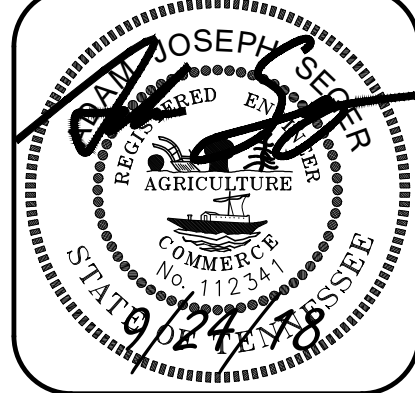
Drawing Date:  
December 15, 2017

Revisions  
Revise to add  
accessory building  
9/19/2018

**Site Plan**

**Graystone Quarry Amphitheater**

Map 144 Parcel 2.02  
Thompson's Station, Williamson County, Tennessee



**Grading and  
Drainage Plan  
Sheet 1**

Dale & Associates

Civil Engineering  
Land Planning & Zoning  
Surveying

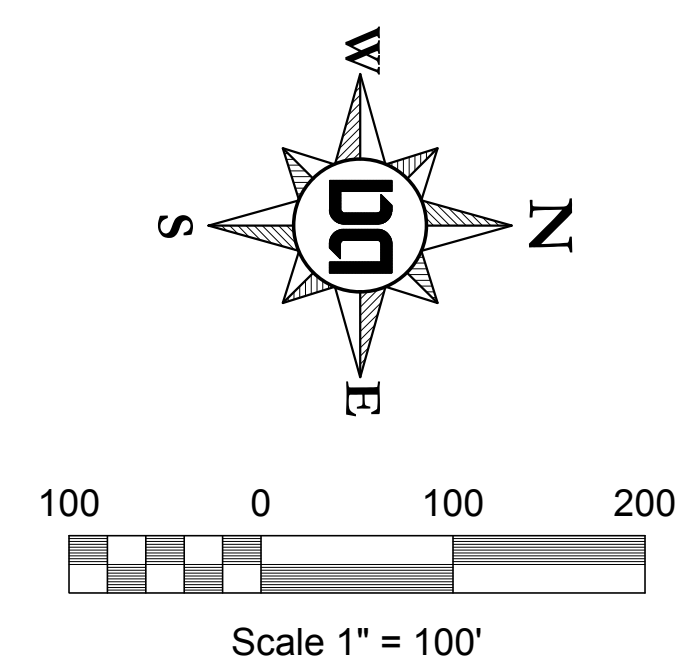
516 Heather Place  
Nashville, TN 37204  
(615) 297-5166

D&A Project #14038  
Graystone Quarry  
Amphitheater

C3.0

Matchline Sheet 1  
Sheet 2





**Development Summary**

Owners / Developer  
 Graystone Quarry Events  
 Rick McEachern  
 (408) 621-0746

Civil Engineer and Surveyor  
 Dale & Associates (Adam Seger, PE)  
 516 Heather Place  
 Nashville, Tennessee 37204  
 615.297.5166

**Legend**

- Proposed Asphalt
- Proposed Hard Surface
- Proposed Open Space

**Drawing Date:**  
 December 15, 2017

**Revisions**  
 Revise to add  
 accessory building  
 9/19/2018

**Site Plan**

## Graystone Quarry Amphitheater

Map 144 Parcel 2.02  
 Thompson's Station, Williamson County, Tennessee



**Grading and  
 Drainage Plan  
 Sheet 2**

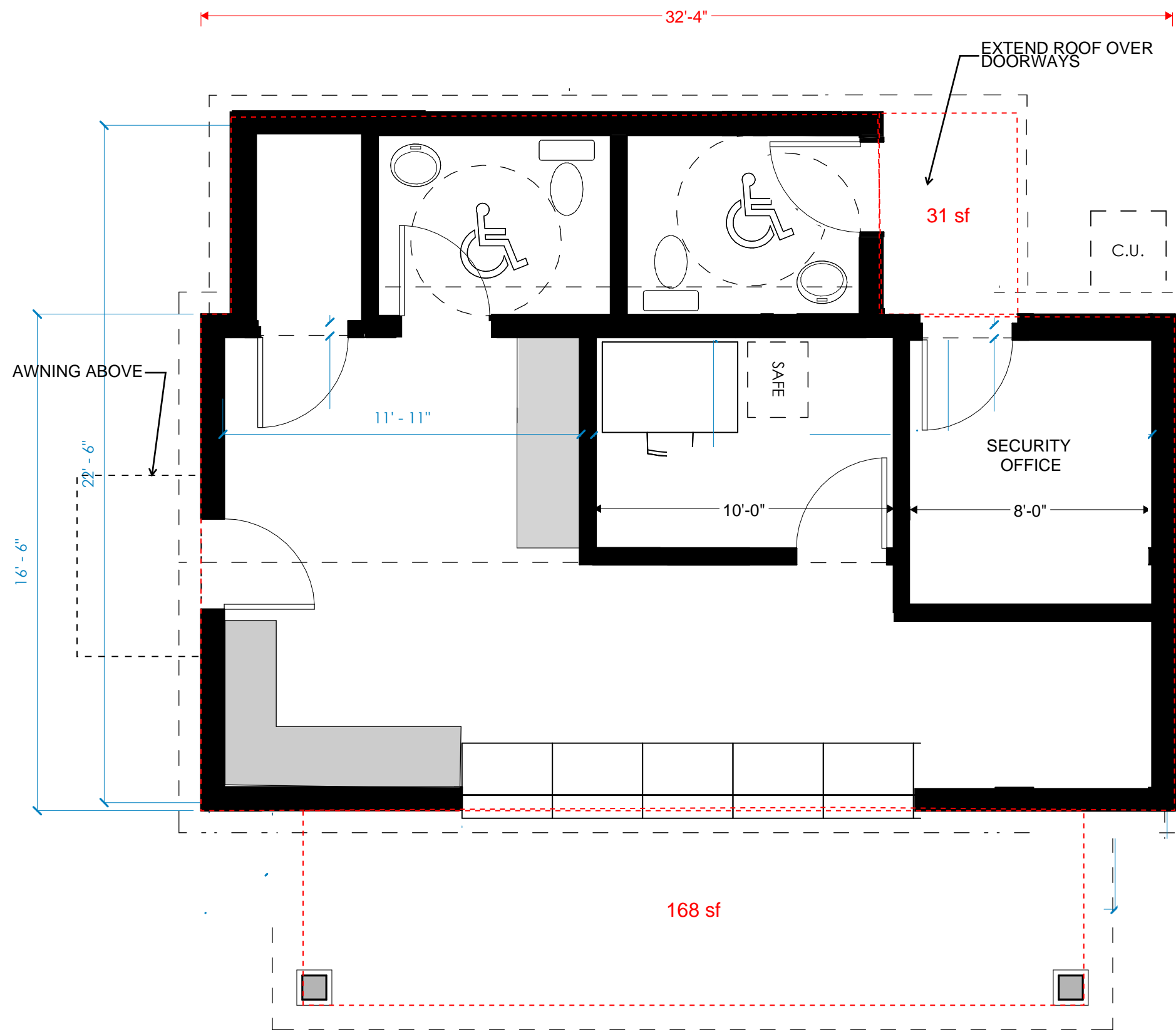
Dale & Associates

Civil Engineering  
 Land Planning & Zoning  
 Surveying

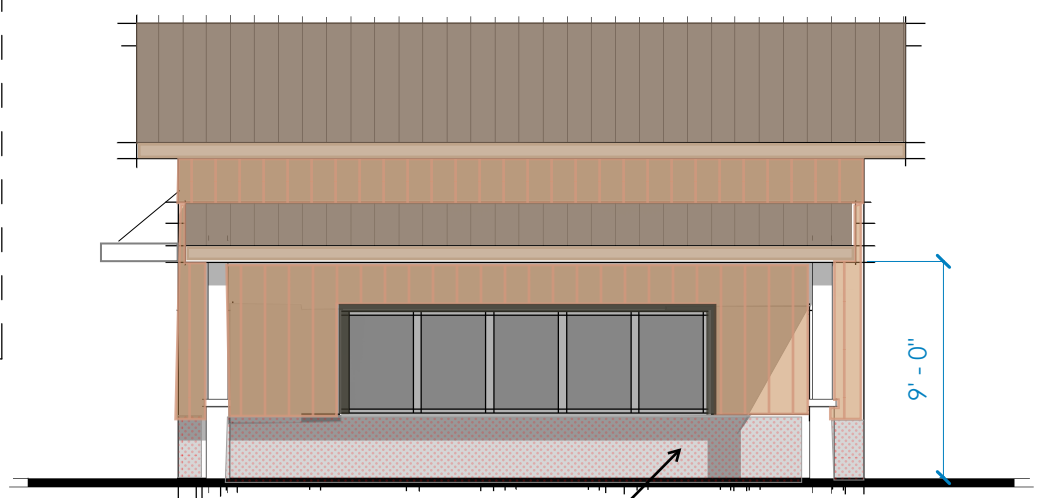
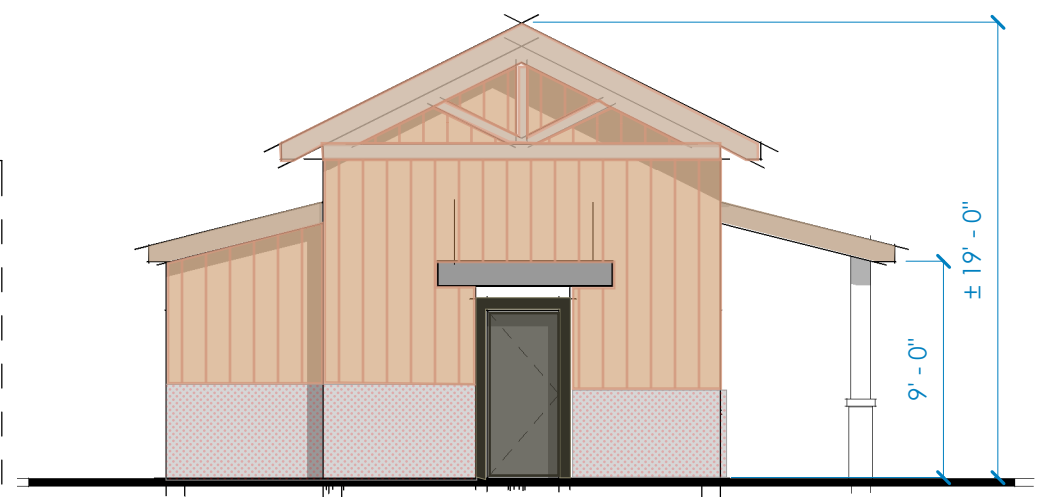
516 Heather Place  
 Nashville, TN 37204  
 (615) 297-5166

C3.1

D&A Project #14038  
 Graystone Quarry  
 Amphitheater



SQUARE FOOTAGES	
HEATED & COOLED (GROSS)	675 sf
EXTERIOR COVERED	205 SF

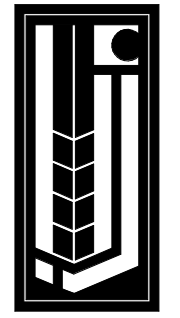


1. ALL MATERIALS SHALL MATCH EXISTING STRUCTURES.
2. OPPOSITE ELEVATIONS SIMILAR.

# GRAYSTONE AMPHITHEATER

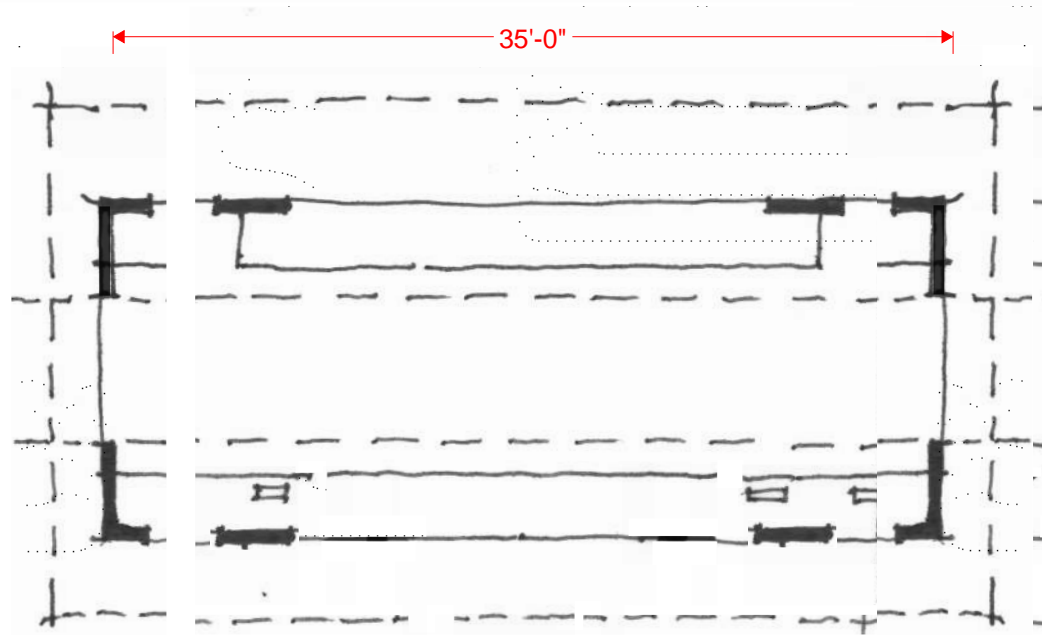
## TICKET BOOTH

REVISED  
8.15.18

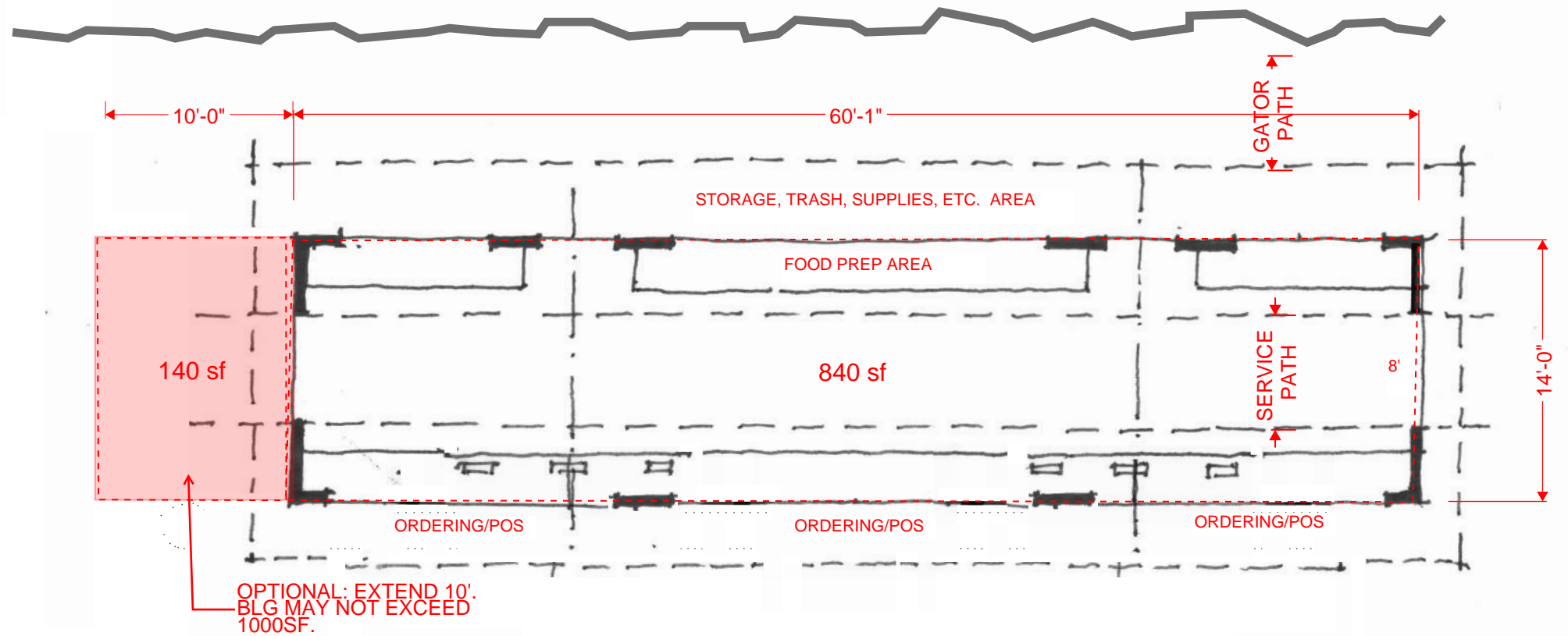


william c  
johnson  
architect

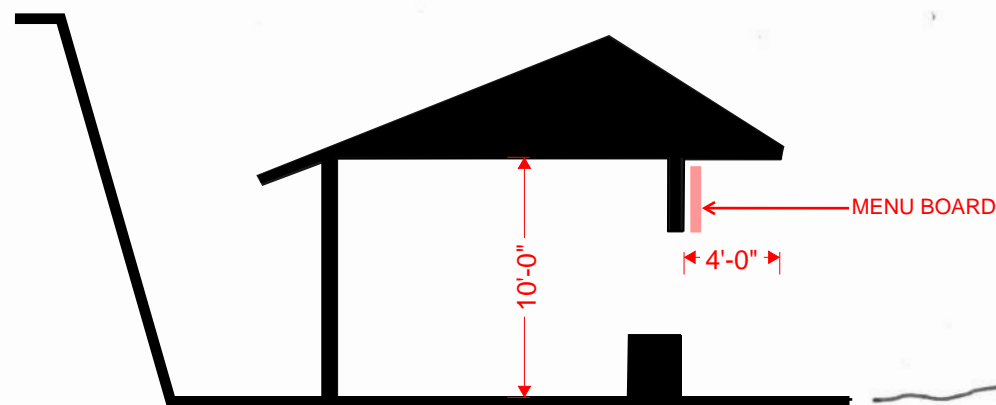




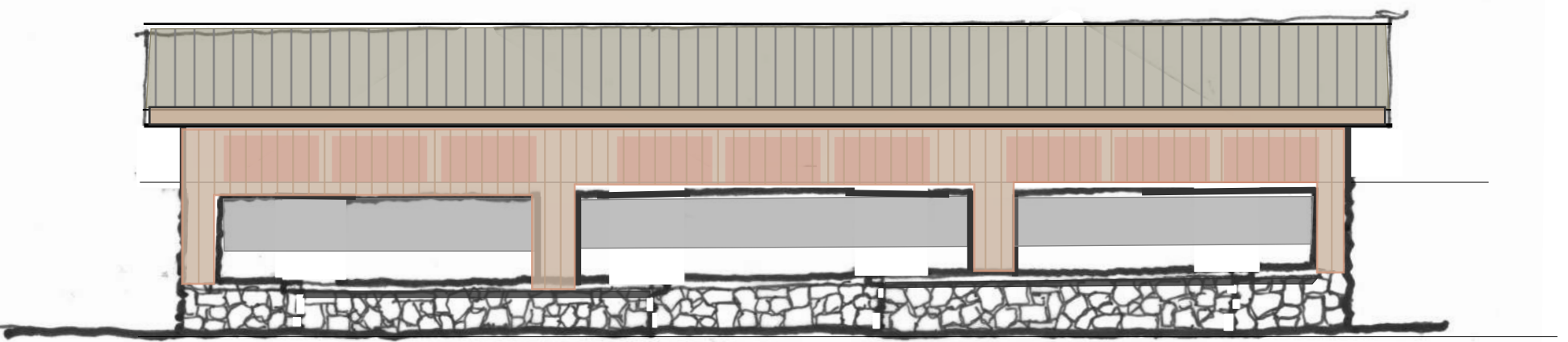
**CONCESSIONS BUILDING BLG. #2, MERCH. BLG.**  
1/8"=1'0"



**CONCESSIONS BUILDING #1**  
1/8"=1'0"

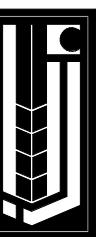


**TYPICAL BUILDING SECTION**  
1/8"=1'0"

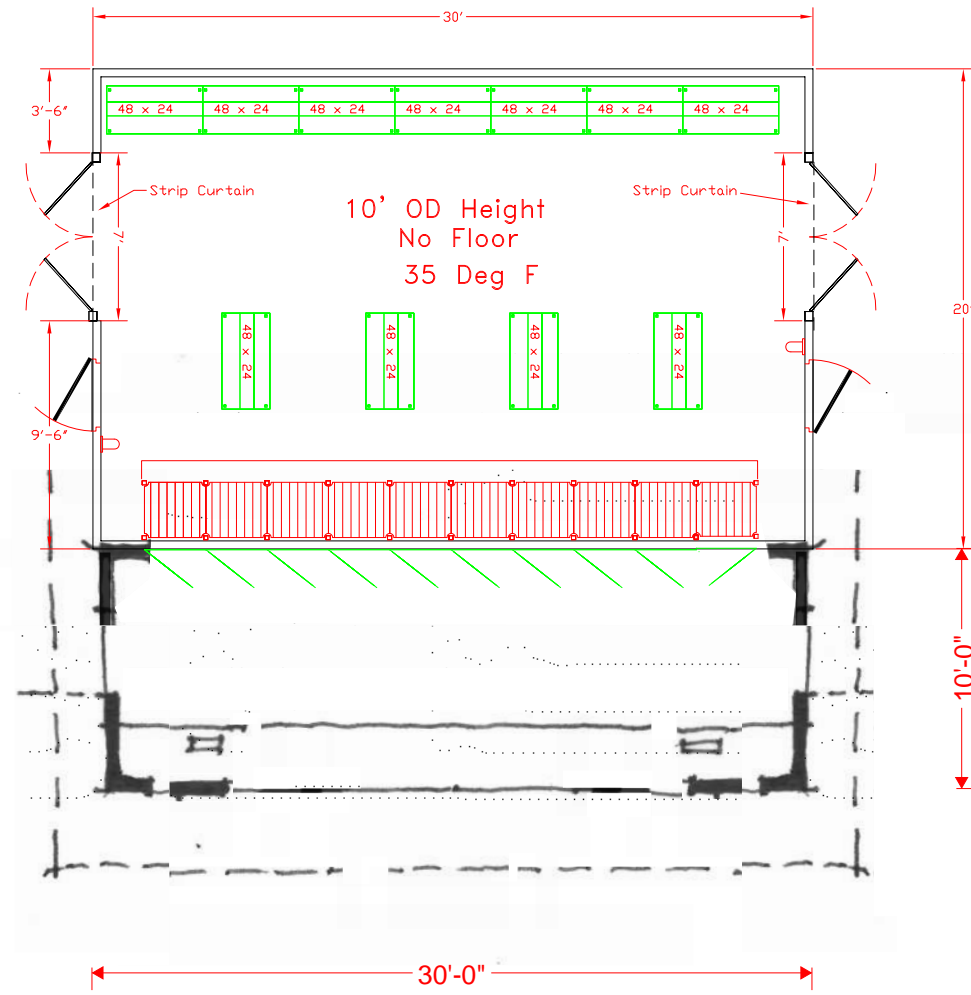


**CONCESSIONS BUILDING CONCEPTUAL STUDY**  
1/8"=1'0"

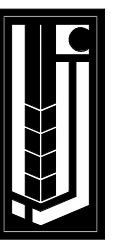
1. ALL MATERIALS SHALL MATCH EXISTING STRUCTURES.
2. OPPOSITE ELEVATIONS SIMILAR.







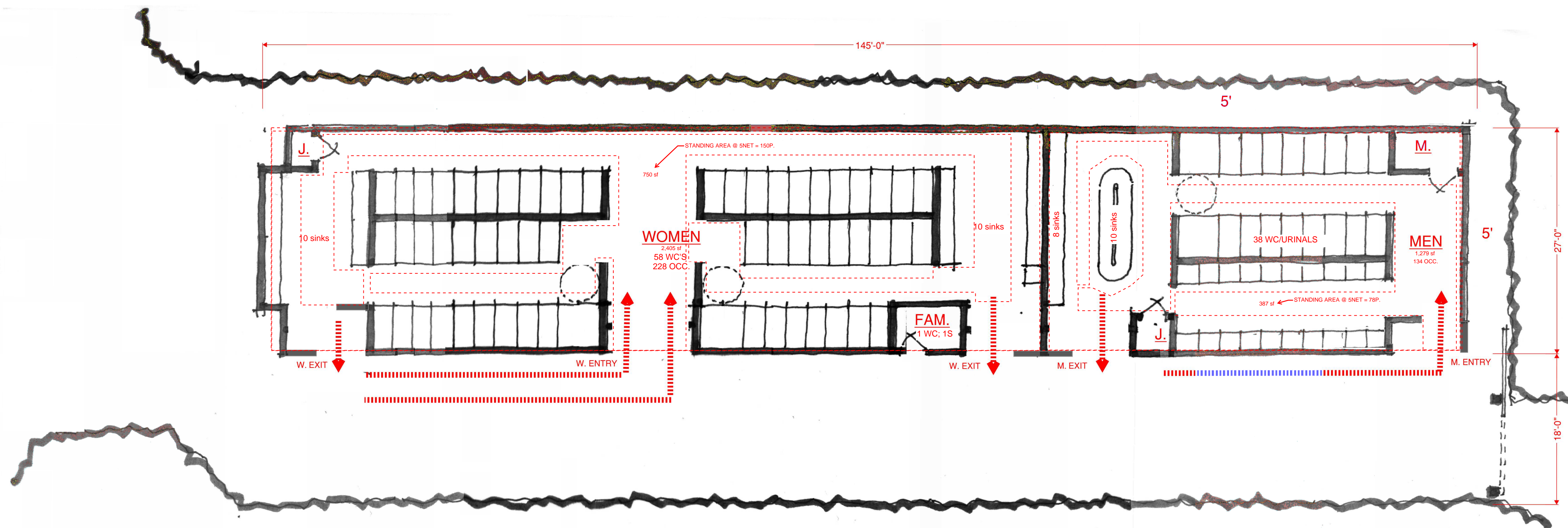
**BEER/COOLER BUILDING**  
 1/8"=1'0"





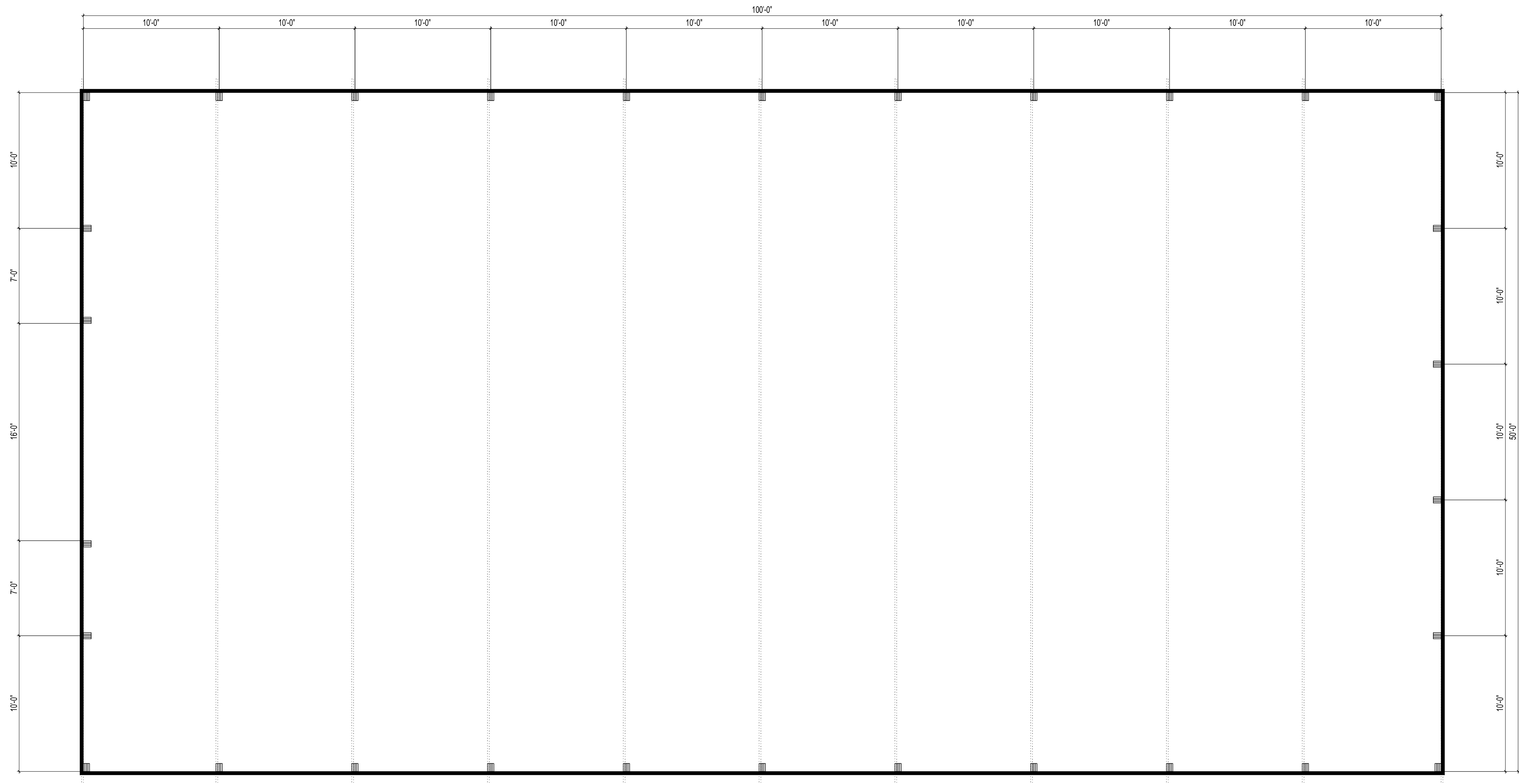


1. ALL MATERIALS SHALL MATCH EXISTING STRUCTURES.
2. OPPOSITE ELEVATIONS SIMILAR.



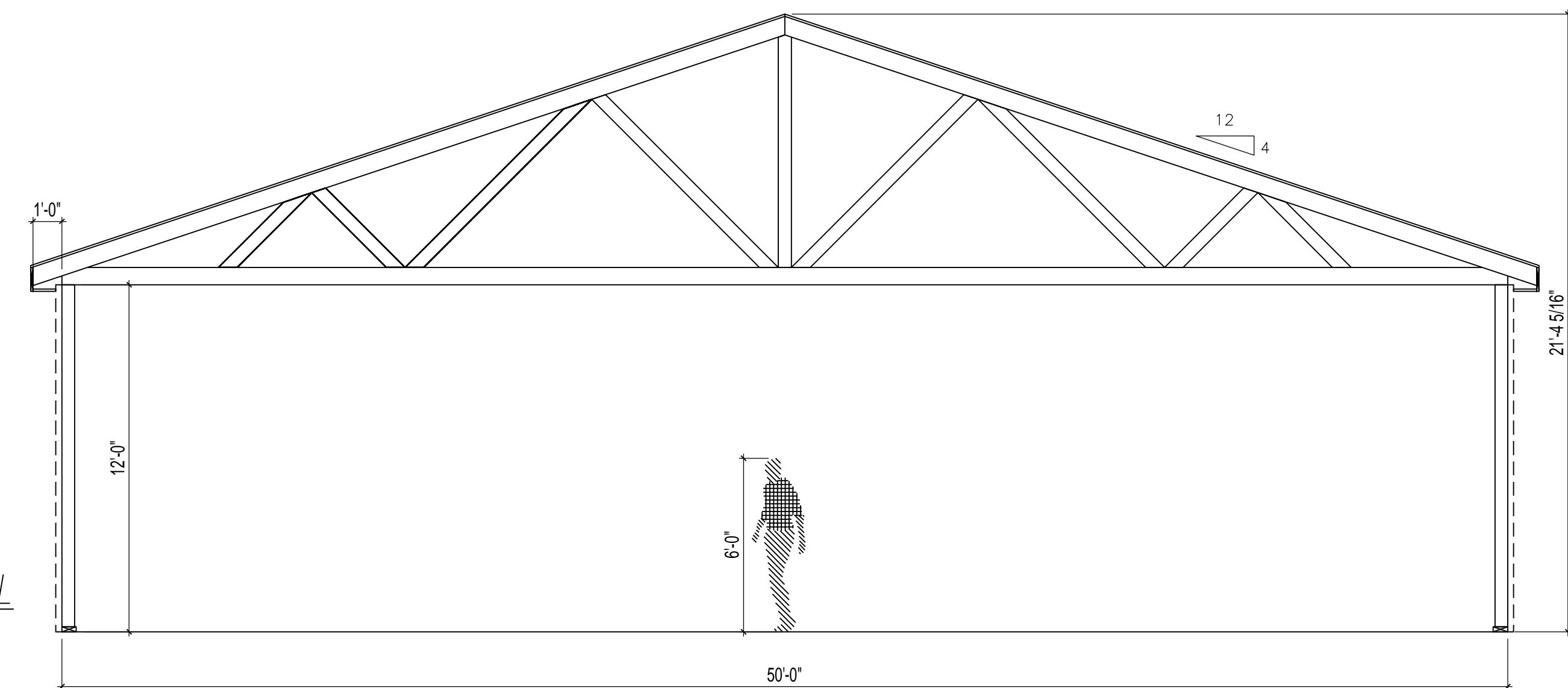
**RESTROOM PLAN STUDY**  
1/8" = 1'-0"  
3,775 sf





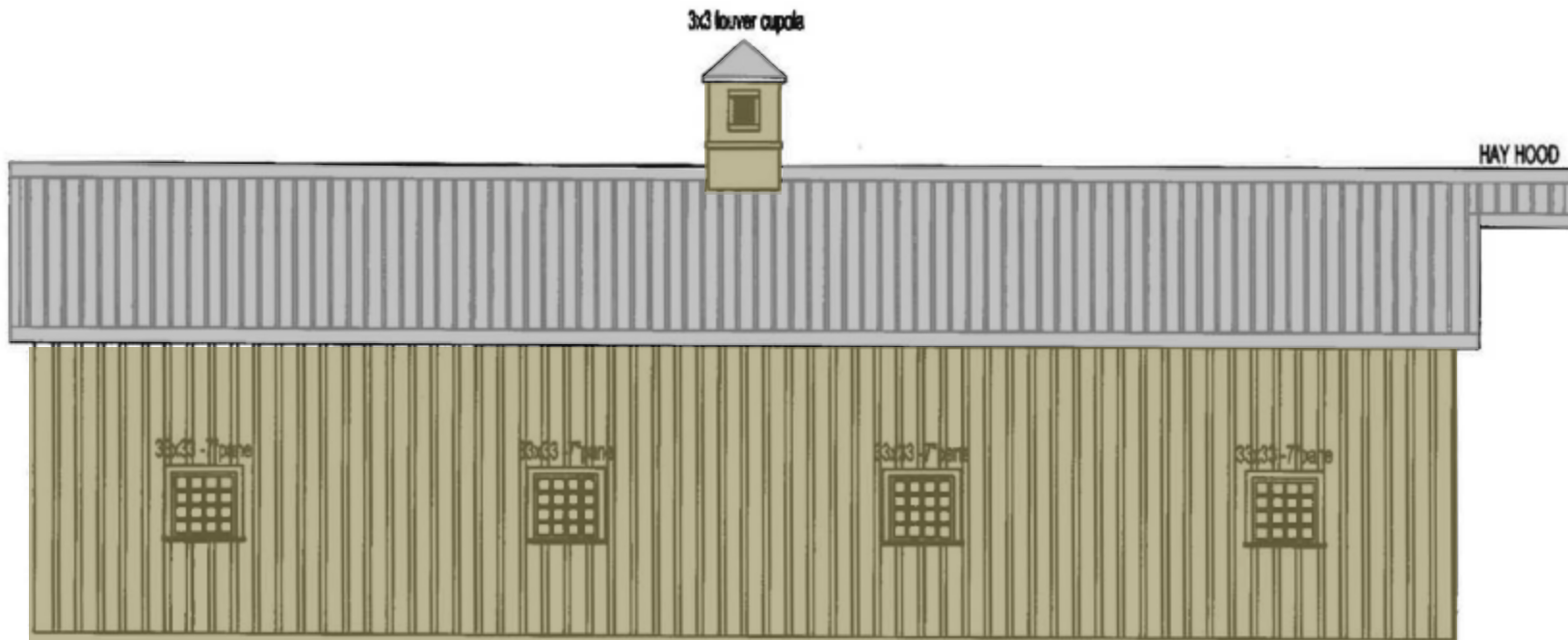
*MAIN FLOOR LAYOUT*

SCALE: 1/4" = 1'



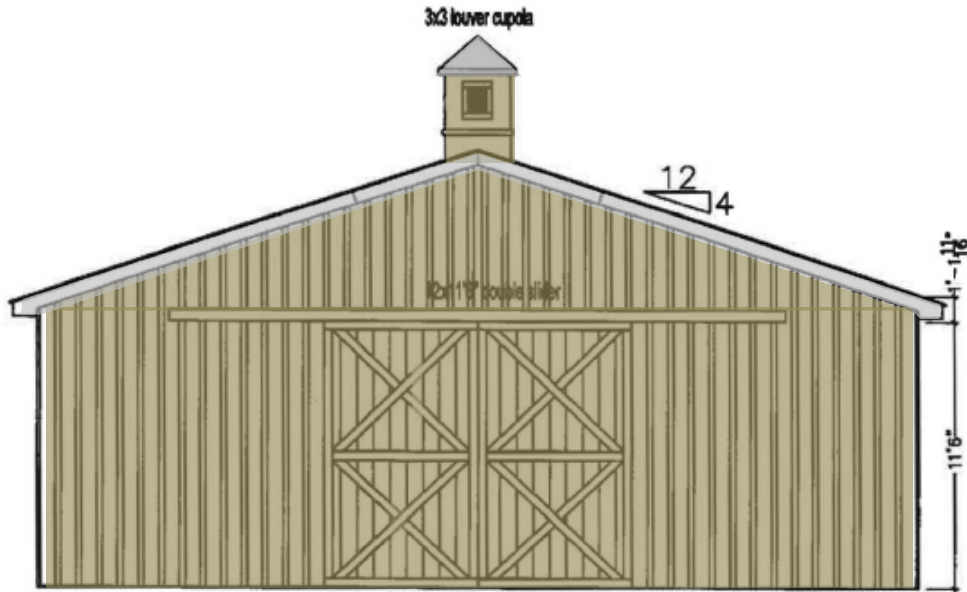
*SECTION DETAIL*

SCALE: 1/4" = 1'



EAST ELEVATION  
SCALE: 1/8" = 1'

BARN KINGS	116 WEST 1ST ST WAYNE, NE 68787	JOHN WORTMAN	DRAWN BY: MIKE MCMANGAL
		NEWCASTLE	DATE:
			REVISION:
			REVISION:

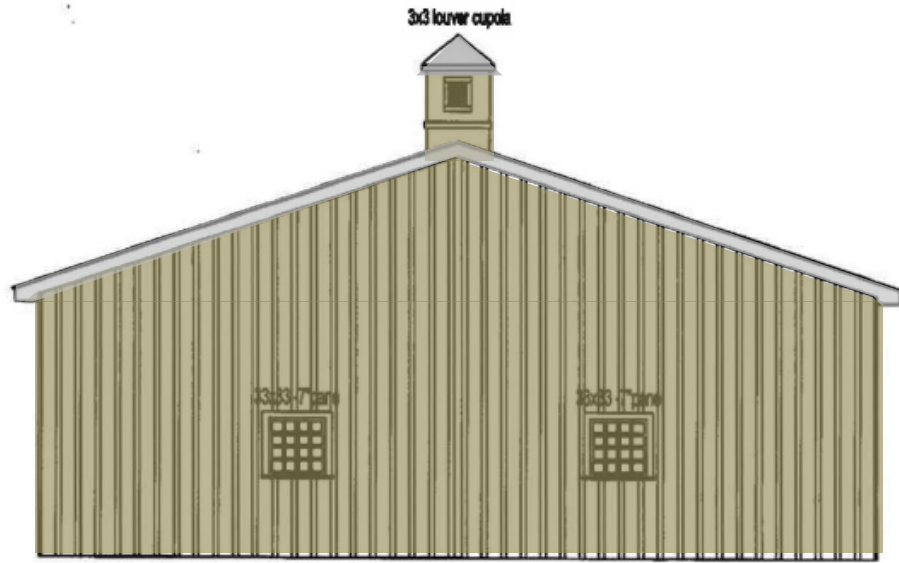


SOUTH ELEVATION  
SCALE: 1/8" = 1'

DRAWN BY: MIKE MCANICAL	DATE:	JOHN WORTMAN	NEWCASTLE
	REVISION:		
	REVISION:		
	REVISION:		
BARN KINGS	116 WEST 1ST ST WAYNE, NE 68787	JOHN WORTMAN	NEWCASTLE
Page 2			

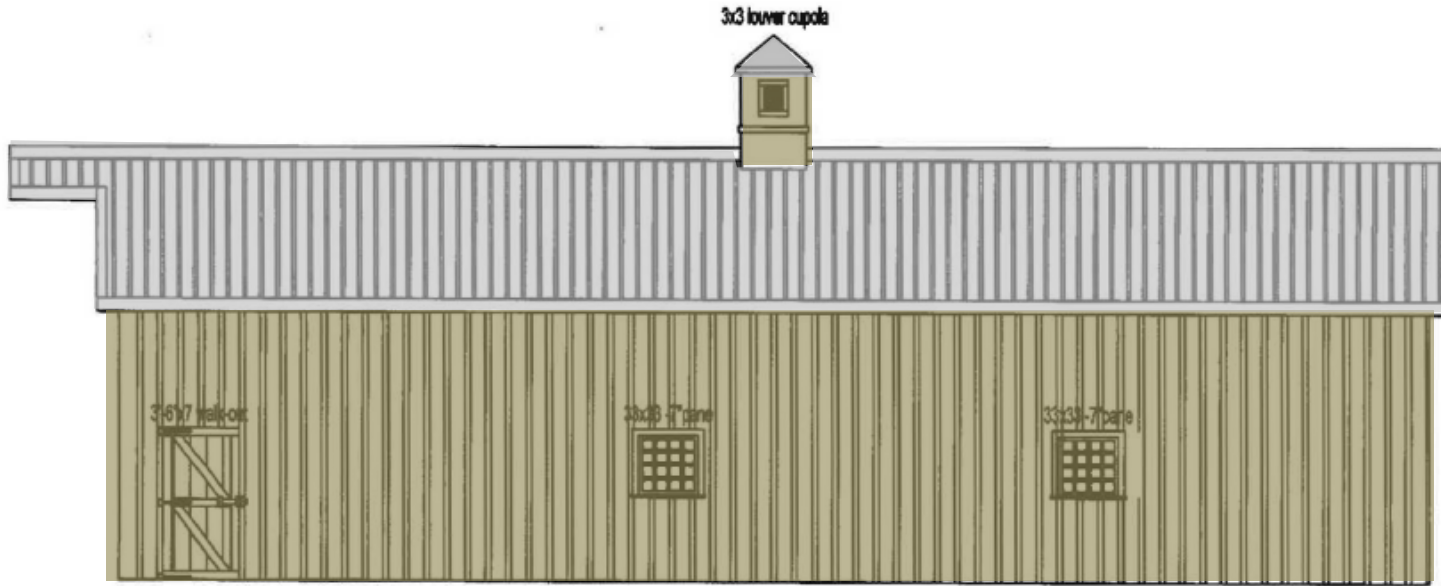
NOTE: THIS BLUEPRINT HAS BEEN DRAFTED FOR MATERIAL ESTIMATE PURPOSES ONLY.





NORTH ELEVATION  
SCALE: 1/8" = 1'

NOTE: THIS BLUEPRINT HAS BEEN DRAFTED FOR MATERIAL ESTIMATE PURPOSES ONLY.



WEST ELEVATION  
SCALE: 1/8" = 1'

DRAWN BY: MIKE MCANIGAL  
DATE:  
REVISION:  
REVISION:  
REVISION:

JOHN WORTMAN  
NEWCASTLE

116 WEST 1ST ST  
WAYNE, NE 68787

BARN  
KINGS

Page  
4

NOTE: THIS BLUEPRINT HAS  
BEEN DRAFTED  
FOR MATERIAL ESTIMATE  
PURPOSES ONLY

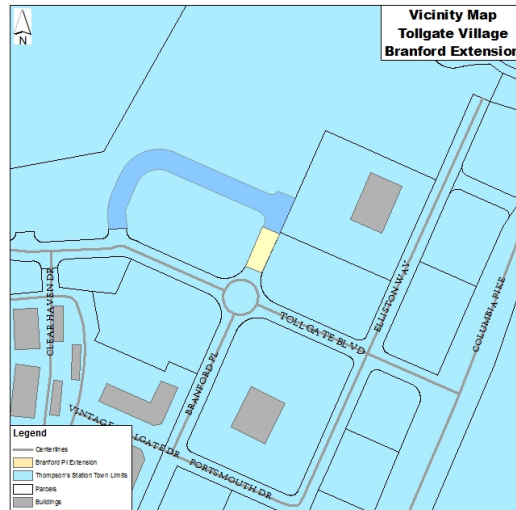
DATE: 08/15/2018  
TIME: 10:58 AM

**Thompson's Station Planning Commission  
Staff Report –Item 5 (FP 2018-019)  
October 25, 2018**

**Final plat for the dedication of an extension of Branford Place.**

**PROJECT DESCRIPTION**

A request to approve the extension of Branford Place within Tollgate Village.



**BACKGROUND**

On January 23, 2018, the Planning Commission approved a site plan for the development of two commercial and one mixed use buildings located at the corner of Tollgate Boulevard and Elliston Place. As a contingency of approval, the project site was to be subdivided and the dedication for the extension of Branford Place be recorded. A plat for the lot was recorded on July 6, 2018 however, this plat did not include the roadway extension of Branford Place.

**ANALYSIS**

**Final Plat**

The purpose of the final plat is to provide a legal instrument where the transfer of ownership of lots is allowed and shall constitute a way where streets and other infrastructure can be accepted (LDO Section 5.2.7).

The project is located within Tollgate Village, is zoned Neighborhood Commercial and consists of the dedication of approximately 143 feet. The proposed road, Branford Place with a 60 foot right-of-way is an extension of an existing roadway which will serve the site and future land uses.

*Open Space*

The open space required for the Tollgate Village subdivision is 120 acres of which all is recorded.

*Sureties*

Sureties are required prior to the recordation of any final plat to ensure that all necessary improvements are guaranteed to be installed per approved construction plans. Construction plans are not submitted on this section of roadway at this time and will be subject to review prior to the issuance of a grading permit for the road. The road is also currently used for construction; therefore the Town Engineer recommends that the roads, drainage and erosion control surety should be set at

\$97,700. In addition there is a future force main and gravity line also within the project area, therefore, the Town Engineer recommends that the sewer surety be set at \$12,000.

**RECOMMENDATION**

Staff recommends approval of the final plat to extend Branford Place with the following contingency:

1. Prior to the approval of construction plans, all applicable codes and regulations shall be addressed to the satisfaction of the Town Engineer. Any corrections or issues with the drawings related to regulations may be subject to further Planning Commission review.
2. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$97,700 for roadways, drainage and erosion control with automatic renewal.
3. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$12,000 for sewer with automatic renewal.

**ATTACHMENT**

Preliminary Plat



**GENERAL NOTES**

1. THE PURPOSE OF THIS PLAT IS TO DEDICATE RIGHT OF WAY.
2. BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE COORDINATE SYSTEM OF 1983. GPS EQUIPMENT WAS USED DURING THE COURSE OF THE SURVEY ON THE SITE TO DETERMINE THE POSITION OF TWO CONTROL POINTS FOR ESTABLISHING THE BEARING BASE. THE EQUIPMENT USED: LEICA, MODEL GX 1230, DUAL FREQUENCY RECEIVER. THE TYPE OF SURVEY: NETWORK ADJUSTED REAL TIME KINEMATIC. CONTROL POINTS FOR BEARING BASE FOR PROJECT AND ROAD LOCATION IMPROVEMENTS.
3. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THE PROPERTY LIES WITHIN FLOOD ZONE "X", AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAPS NO. 47187C0335F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2006, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE ADMINISTRATION REPORT; COMMUNITY NO. 470424, PANEL NO. 0335, SUFFIX F, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PREMISES IS SITUATED. SAID MAP DEFINES ZONE "X" UNDER "OTHER AREAS" AS "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."
4. THIS SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ABOVE GRADE AND UNDERGROUND UTILITIES SHOWN WERE TAKEN FROM VISIBLE APPURTENANCES, PUBLIC RECORDS, AND/OR MAPS PREPARED BY OTHERS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THEREFORE, RELIANCE UPON THE TYPE, SIZE AND LOCATION OF UTILITIES SHOWN SHOULD BE DONE SO WITH THIS CIRCUMSTANCE CONSIDERED. DETAILED VERIFICATION OF EXISTENCE, LOCATION AND DEPTH SHOULD ALSO BE MADE PRIOR TO ANY DECISION RELATIVE THERETO IS MADE. AVAILABILITY AND COST OF SERVICE SHOULD BE CONFIRMED WITH THE APPROPRIATE UTILITY COMPANY. IN TENNESSEE, IT IS A REQUIREMENT, PER "THE UNDERGROUND UTILITY DAMAGE PREVENTION ACT", THAT ANYONE WHO ENGAGES IN EXCAVATION MUST NOTIFY ALL KNOWN UNDERGROUND UTILITY OWNERS NO LESS THAN THREE (3) NOR MORE THAN TEN (10) WORKING DAYS PRIOR TO THE DATE OF THEIR INTENT TO EXCAVATE AND ALSO TO AVOID ANY POSSIBLE HAZARD OR CONFLICT. TENNESSEE ONE CALL, DIAL 811.
5. THE PROPERTY IS CURRENTLY ZONED NC (NEIGHBORHOOD COMMERCIAL). MINIMUM BUILDING SETBACKS PER TOWN OF THOMPSON'S STATION LAND DEVELOPMENT ORDINANCE.
6. I HEREBY STATE THAT THIS SURVEY WAS DONE IN COMPLIANCE WITH THE CURRENT TENNESSEE MINIMUM STANDARDS OF PRACTICE AND THIS IS A CATEGORY I SURVEY AND THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY IS 1:43,595.

BY JOHN T. DARNALL, R.L.S. NO. 1571 DATE: 10/15/18

7. ALL STREETS ARE DESIGNATED PUBLIC AND AS SUCH ARE PUBLIC UTILITY, ACCESS AND DRAINAGE EASEMENTS.
8. ALL PUBLIC STREETS AND DRAINAGE STRUCTURES WITHIN THE RIGHTS-OF-WAY WILL BE MAINTAINED BY THE TOWN OF THOMPSON'S STATION.

**LEGEND**

○ IRON ROD (OLD)	—FM— FORCE MAIN
PK NAIL (OLD)	☐ ELECTRIC BOX
● IRON ROD (NEW)	☐ FO FIBER OPTIC BOX
(1/2" x 18" W/CAP STAMPED "RAGAN SMITH & ASSOCIATES")	⊙ SM STORM MANHOLE
⊙ FIRE HYDRANT	⊙ U UTILITY STUBOUT
⊙ WATER VALVE	⊙ * LIGHT STANDARD
⊙ WATER METER	⊙ -/- YARD LIGHT
☐ CATCH BASIN/CURB INLET	⊙ SIGN
RCP REINFORCED CONCRETE PIPE	⊙ XXX LOT NUMBER
⊙ SANITARY SEWER MANHOLE	P.U.D.E. PUBLIC UTILITY & DRAINAGE EASEMENT
—SA— SANITARY SEWER LINE	R.O.W.C.T. REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN
—W— WATER LINE	

(FUTURE DEVELOPMENT)  
MAP 132, PARCEL 1.10  
**MBSC TN  
HOMEBUILDER, LLC**  
BOOK 6403, PAGE 542,  
R.O.W.C.T.

**TOLLGATE VILLAGE  
SECTION 32  
(REVISION TO LOT 3201)**  
PLAT BOOK P57, PAGE 55,  
R.O.W.C.T.

**TOLLGATE VILLAGE  
SECTION 35**  
PLAT BOOK P69, PAGE 24,  
R.O.W.C.T.

**TOLLGATE VILLAGE  
SECTION 30A**  
PLAT BOOK P50, PAGE 26,  
R.O.W.C.T.

REVISION TO FINAL PLAT  
**TOLLGATE COMMERCIAL  
CENTER  
SECTION 20**  
PLAT BOOK P49, PAGE 80,  
R.O.W.C.T.

**SURVEYOR**  
RAGAN-SMITH ASSOCIATES, INC.  
C/O TOM DARNALL, RLS  
315 WOODLAND STREET  
NASHVILLE, TENNESSEE 37206  
(615) 244-8591  
TDARNALL@RAGANSMITH.COM

**OWNER/DEVELOPER**  
MBSC TN HOMEBUILDER, LLC  
C/O BRIAN ROWE  
312 S. GAY STREET, SUITE 200  
KNOXVILLE, TENNESSEE 37902  
(865) 408-8322

**RECORDER'S INFORMATION**

**PROPERTY MAP REFERENCE**  
BEING A PORTION OF PARCEL 1.10 AS SHOWN ON WILLIAMSON COUNTY PROPERTY MAP 132.

**DEED REFERENCE**  
BEING A PORTION OF THE SAME PROPERTY CONVEYED TO MBSC TN HOMEBUILDER, LLC FROM MBSC TN HOMEBUILDER, LLC BY CORRECTIVE QUITCLAIM DEED OF RECORD IN BOOK 6403, PAGE 542, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

**TOTAL SITE AREA = 8,824 SQUARE FEET OR 0.20 ACRES ±**

**TOLLGATE VILLAGE  
BRANFORD PLACE  
RIGHT OF WAY**  
FOURTH CIVIL DISTRICT OF WILLIAMSON COUNTY, TENNESSEE  
DRAWN BY: AMR DATE: OCTOBER 15, 2018  
JOB NO. 10-081 W.O. 9260

**CERTIFICATE OF APPROVAL OF  
MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION**  
I DO HEREBY CERTIFY THAT THE REQUIREMENTS SET FORTH IN RULES, REGULATIONS, BY-LAWS, POLICY AND OPERATIONAL BULLETINS, PLAT APPROVAL CHECKLIST AND TREE PLANTING GUIDELINES HAVE BEEN MET FOR ITEM C. ANY APPROVAL IS AT ALL TIMES CONTINGENT UPON CONTINUING COMPLIANCE WITH THE AFOREMENTIONED REQUIREMENTS.  
DATE: \_\_\_\_\_, 20\_\_\_\_  
MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION

**CERTIFICATE OF APPROVAL OF  
SUBDIVISION NAME AND STREET NAMES**  
I DO HEREBY CERTIFY THAT THE SUBDIVISION NAME AND STREET NAMES DENOTED ON THIS FINAL PLAT HAVE BEEN APPROVED BY THE WILLIAMSON COUNTY DEPARTMENT OF EMERGENCY COMMUNICATIONS  
DATE: \_\_\_\_\_, 20\_\_\_\_  
WILLIAMSON COUNTY DEPARTMENT OF EMERGENCY COMMUNICATIONS

**CERTIFICATE FOR ADDRESSES**  
I DO HEREBY CERTIFY THAT THE ADDRESSES DENOTED ON THIS FINAL PLAT ARE THOSE ASSIGNED BY DEPARTMENT OF INFORMATION TECHNOLOGY (IT).  
DATE: \_\_\_\_\_, 20\_\_\_\_  
IT DEPT. E-911 ADDRESSING COORDINATOR

**CERTIFICATE OF OWNERSHIP & DEDICATION**  
I (WE) HEREBY CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY SHOWN AND DESCRIBED HEREON AS EVIDENCED IN BOOK 6403, PAGE 542, R.O.W.C.T., AND THAT I (WE) HEREBY ADOPT THIS PLAN OF SUBDIVISION WITH MY (OUR) FREE CONSENT, ESTABLISH THE MINIMUM BUILDING RESTRICTION LINE, AND THAT OFFERS OF IRREVOCABLE DEDICATION FOR ALL PUBLIC STREETS, UTILITIES AND OTHER FACILITIES HAVE BEEN FILED AS REQUIRED BY THESE REGULATIONS.  
DATE: \_\_\_\_\_, 20\_\_\_\_  
MBSC TN HOMEBUILDER, LLC

**CERTIFICATE OF ACCURACY**  
I HEREBY CERTIFY THAT THE PLAN SHOWN AND DESCRIBED HEREON IS A TRUE AND CORRECT SURVEY TO THE ACCURACY REQUIRED BY THE THOMPSON'S STATION, TENNESSEE REGIONAL PLANNING COMMISSION AND THAT THE MONUMENTS HAVE BEEN OR WILL BE PLACED AS SHOWN HEREON TO THE SPECIFICATIONS OF THE SUBDIVISION REGULATIONS, AS APPROVED BY THE TOWN ENGINEER. THIS IS A CATEGORY 1 SURVEY AND THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY IS GREATER THAN 1:10000 AS SHOWN HEREON.  
RAGAN - SMITH - ASSOCIATES, INC.  
OCTOBER 15, 2018  
DATE

**CERTIFICATE OF APPROVAL OF UTILITY SYSTEMS**  
I HEREBY CERTIFY THAT THE FOLLOWING UTILITY SYSTEMS OUTLINED OR INDICATED ON THE PLAN SHOWN HEREON HAVE BEEN INSTALLED IN ACCORDANCE WITH CURRENT LOCAL AND/OR STATE GOVERNMENT REQUIREMENTS OR THAT A SURETY BOND HAS BEEN POSTED WITH THE PLANNING COMMISSION TO ASSURE COMPLETION OF ALL REQUIRED IMPROVEMENTS IN CASE OF DEFAULT. ALSO, I CERTIFY THAT THE HYDRAULIC DESIGN CRITERIA SPECIFIED IN SECTION 3-106 OF THE THOMPSON'S STATION SUBDIVISION REGULATIONS HAVE BEEN MET.  
WATER SYSTEM DATE: \_\_\_\_\_, 20\_\_\_\_ HB&TS UTILITY DISTRICT GENERAL MANAGER  
SEWER SYSTEM DATE: \_\_\_\_\_, 20\_\_\_\_ TOWN ADMINISTRATOR

**CERTIFICATION OF THE APPROVAL OF STREETS**  
I HEREBY CERTIFY: (1) THAT ALL STREETS DESIGNATED ON THIS FINAL SUBDIVISION PLAT HAVE BEEN INSTALLED IN AN ACCEPTABLE MANNER AND ACCORDING TO REGULATIONS FOR THOMPSON'S STATION, TENNESSEE, ROADWAY AND DRAINAGE REGULATIONS, OR (2) THAT A SURETY BOND HAS BEEN POSTED WITH THE PLANNING COMMISSION TO ASSURE COMPLETION OF ALL REQUIRED IMPROVEMENTS IN CASE OF DEFAULT.  
DATE: \_\_\_\_\_, 20\_\_\_\_ TOWN ADMINISTRATOR

**CERTIFICATE OF APPROVAL FOR RECORDING**  
I HEREBY CERTIFY THAT THE SUBDIVISION PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THOMPSON'S STATION SUBDIVISION REGULATIONS WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT IT HAS BEEN APPROVED FOR RECORDING IN THE OFFICE OF THE COUNTY REGISTER.  
DATE: \_\_\_\_\_, 20\_\_\_\_ SECRETARY OF PLANNING COMMISSION

**FINAL PLAT**  
TOWN OF THOMPSON'S STATION  
PLANNING COMMISSION  
NET AREA: 0.20 AC.± TOTAL LOTS: N/A  
ACRES NEW ROAD: 0.20 AC.± CIVIL DISTRICT: 4TH  
MILES NEW ROAD: 0.03± CLOSURE ERROR: 1:43,595  
OWNER: MBSC TN HOMEBUILDER, LLC  
SURVEYOR: RAGAN - SMITH - ASSOCIATES, INC.  
SCALE: 1" = 50' 0' 25' 50' 100'



Phone: (615) 794-4333  
Fax: (615) 794-3313  
www.thompsons-station.com



1550 Thompson's Station Road W.  
P.O. Box 100  
Thompson's Station, TN 37179

**M**  
**DATE:** October 25, 2018  
**TO:** Planning Commission  
**FROM:** Wendy Deats, AICP  
Town Planner  
**SUBJECT:** Item 6 - Request to waive the requirement for a 20-foot easement as required in Section 3.10.1 of Article 3 – Subdivision Regulations within the Land Development Ordinance (FP 2018-018).

**EMO**

---

Request

WES Engineers and Surveyors is requesting permission from the Town of Thompson's Station Planning Commission to waive the standard which requires a 20-foot easement for drainage. The Town's LDO Article 3, Section 3.10.1 states "Each lot shall have necessary drainage easement. Easements at least 20 feet in width shall be required for pipes with diameters of 60 inches or less or as required by the Town Engineer."

Subdivision Regulations

Article 5, Section 5.5.2 permits the Planning Commission to grant a deviation from a subdivision regulation if the Commission finds that "extraordinary hardships or practical difficulties may result from strict compliance with the subdivision regulations." The deviation should not have the "effect of mollifying the general intent and purpose of these regulations" and the Commission concludes that "the purposed of these regulations may be specifically served to an equal or greater extent by an alternative proposal, condition or circumstance." Approval of the deviation may be subject to conditions as the Planning Commission determines appropriate.

Analysis

Willowbranch Partners has started construction of two houses (Lot 1158 and Lot 1159) in The Fields of Canterbury which encroach into the 20-foot drainage easement. The house on lot 1158 encroaches by .08 feet and the house on lot 1159 encroaches by 1.08 feet. WES has provided a letter stating there is an "existing 18-inch reinforced concrete pipe that extends to a catch basin on Cloister Lane between Lots 1158 and 1159" and that the easement of 20 feet in width was "overlooked" on the plat when the house plans were submitted. WES noticed the error while preparing other plans and contacted the developer however the foundations were complete. The builder, Willowbranch Partners reached out to Town staff and we informed them that a request to the Planning Commission would be necessary to deviate from subdivision regulations. WES is requesting to reduce to easement to 17 feet with 8.5 feet on each lot.

Staff Comments

The intent of the code is to establish a minimum easement area to accommodate drainage infrastructure. The encroachment is minimal and doesn't appear to have a negative impact on the intent of the code.

Phone: (615) 794-4333  
Fax: (615) 794-3313  
www.thompsons-station.com



1550 Thompson's Station Road W.  
P.O. Box 100  
Thompson's Station, TN 37179

No encroachment into the required setback or any other easement has or will occur as a result. Therefore, Staff does not have substantial concerns with the request.

**Recommendation**

Staff recommends that Planning Commission to evaluate the information and make a decision approving the revision to the final plat with a request to deviate from the requirement for easement width and permit a 17 foot wide drainage easement.

**Attachments**

Final Plat  
WES Justification Letter



October 12, 2018

Wendy Deats, AICP  
Town Planner  
Town of Thompson's Station Planning Commission  
P.O. Box 100  
Thompson's Station, TN 37179

**RE: Canterbury Lot 1158 and 1159 Revision Plat**

Mrs. Deats and Planning Commission Members:

The proposed plat for the revisions to Lots 1158 and 1159 Canterbury, Section 12B is being submitted for approval of a reduced public utilities and drainage easement on an existing 18" reinforced concrete pipe that extends from a catch basin on Cloister Lane between Lots 1158 & 1159 to the rear of the lots. When preparing the site plan for these lots, the 20-ft public utility and drainage easement that was shown on the final plat was overlooked and the plans were submitted for building permits. While we were preparing site plans (plot plans) for other lots along the road, this error was discovered. We notified the developer but, unfortunately, the foundation and block for 1159 had been completed and remains at that point currently.

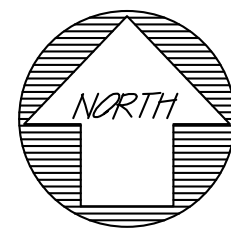
Our request is to reduce the easement to 8.5-ft each side of the shared property line for a symmetrical easement totaling 17-feet wide. The typical side yard setbacks on the lots are 7.5-ft and the building does NOT encroach that setback on any side. All the drainage components are centered on the lot line and will remain within the proposed drainage easement. All other standard public utility and drainage easements on the lot (20-ft on the front, 5-ft on the side yard and rear yard) remain unchanged. With this request there is still 18.9-ft of building separation, which is over the requirement of 15-ft with the typical building setbacks. The builder has located all HVAC equipment on the opposite side of both homes to keep this proposed easement free of obstructions. With the proposed 17-ft easement, the existing drainage structures would be easily accessible by any heavy equipment that might be required for maintenance. Please feel free to contact my office with any questions you may have.

Sincerely,  
**WES Engineers & Surveyors**

A handwritten signature in black ink, appearing to read 'Gerald Vick', is written over a large, light-colored oval scribble.

Gerald Vick, PE  
Principal

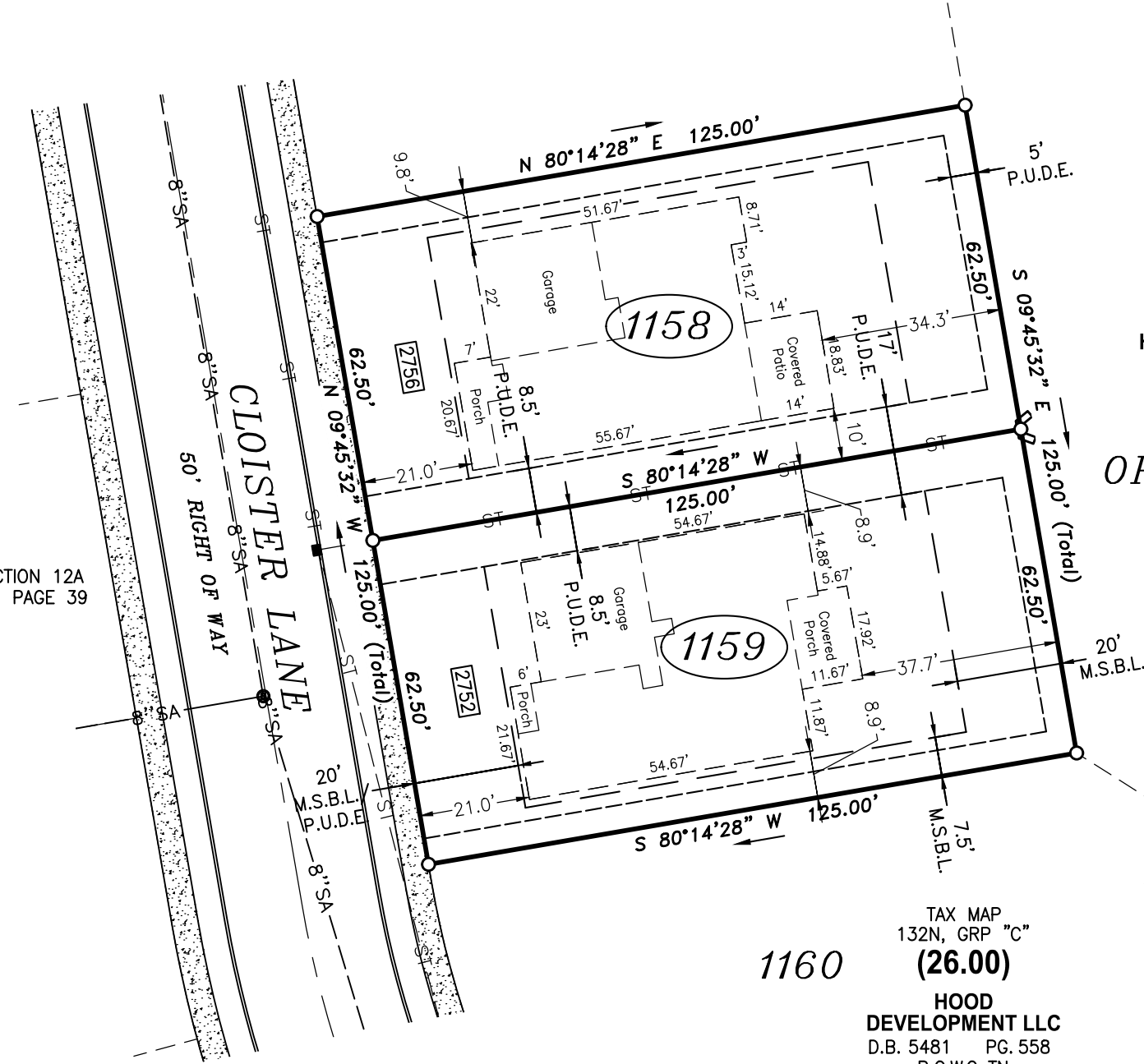
RECEIVED  
OCT 15 2018



TENNESSEE GRID NORTH  
ZONE 4100

TAX MAP  
132N, GRP "C"  
**(23.00)**  
HOOD  
DEVELOPMENT LLC  
D.B. 5481 PG. 558  
R.O.W.C., TN  
CANTERBURY SECTION 12A  
PLAT BOOK: P68, PAGE 39

1157



TAX MAP  
132N, GRP "C"  
**(36.00)**  
HOOD DEVELOPMENT  
LLC  
D.B. 5481 PG. 558  
R.O.W.C., TN

OPEN SPACE

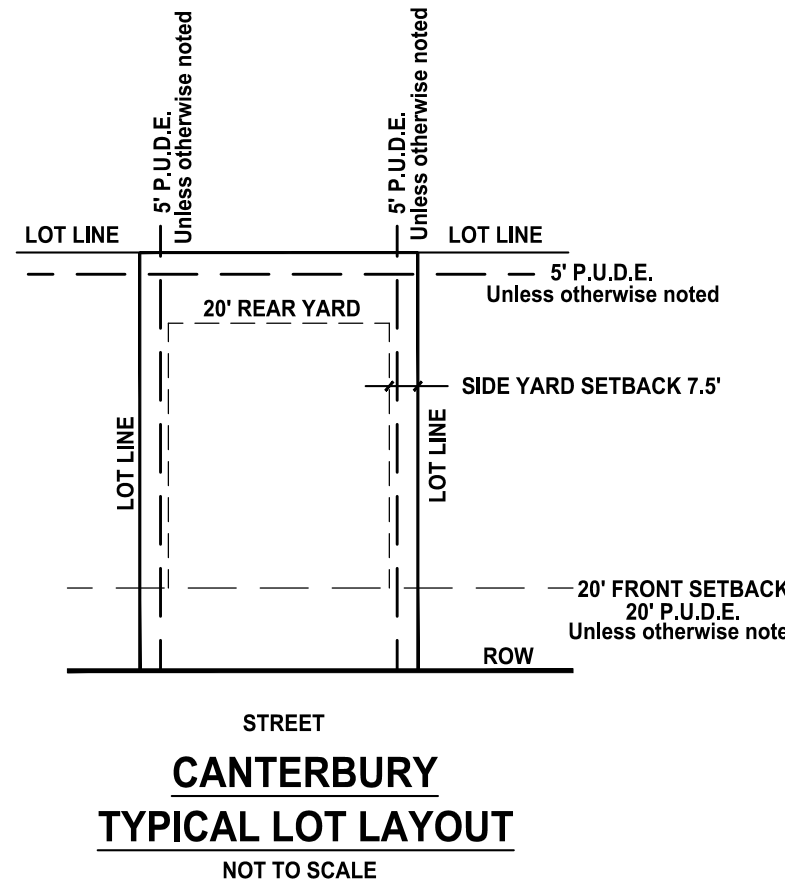
TAX MAP  
132N, GRP "C"  
**(26.00)**  
HOOD  
DEVELOPMENT LLC  
D.B. 5481 PG. 558  
R.O.W.C., TN  
CANTERBURY SECTION 12A  
PLAT BOOK: P68, PAGE 39

Lot Area & Address Table

LOT	SQ. FT.	ACRES	ADDRESS
1158	7,812.5	0.18	2756 CLOISTER LANE
1159	7,812.5	0.18	2752 CLOISTER LANE

Surveyor's Notes

- All distances were measured with E.D.M. equipment and have been adjusted for temperature and pressure.
- The property (Boundary) Line Survey exceeds the minimum requirements of an Urban Land Survey Category 1 as per Standards of Practice adopted by the State Board of Examiners for Land Surveyors for the State of Tennessee, and the precision of the unadjusted survey is greater than 1 foot in 10,000 feet.
- Information concerning site utility services and appurtenances shown hereon is based on visible evidence noted during the survey, information provided by utility representatives or information shown on original construction plans by others. Information and location of service lines on site should be considered approximate and there may be underground utility lines that are not shown on the survey. Owner(s) and contractor(s) should assume responsibility of locating all underground utility service lines prior to any construction, excavation or any disturbance of the existing ground elevation to avoid hazard of unnecessary expense.
- Information concerning major utilities or appurtenances shown hereon are based on visible evidence noted during the survey or information provided by utility representatives. Verification of existence, size location, depth, and availability of service should be confirmed by local utility agencies.
- The property shown hereon is located within in Thompson's Station, Williamson County, TN. All matters pertaining to construction, use, location of improvements, signage, parking, noise, vibration, emissions, fire hazards, radiation, illumination, setback provisions, etc., are subject to the Town of Thompson's Station Zoning Regulations as interpreted and regulated by the Department of Planning.
- The area of the parcel as shown hereon is 0.36 Acres or 15,625 Square feet.
- This property currently identified as Tax Map No. 132N, Group "C", Parcel 24.00 & 25.00. For designation shown thus (#) indicates Parcel Numbers for said map.
- Plat reference: P68, Page 39
- Deed reference: Book 5481, Page 558
- Bearings based on: Tennessee State Plane, zone 4100.
- This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
- This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
- This survey was prepared for the exclusive use of the person, persons, or entity, if any, named on the certification hereon. Said certificate does not extend to any unnamed person without an express recertification by the surveyor naming said person.
- The certification as provided on this survey, is purely a statement of professional opinion based on knowledge, information and belief, based on existing field evidence and documentary evidence provided by others.
- The certification is not an expressed or implied warranty or guarantee.
- This property is not located in a Special Flood Hazard Area as shown on F.E.M.A. Flood Insurance Rate Map, Community Panel No. 47187C0355F, effective September 29, 2006, scaled graphically.
- The recording of this plat voids, vacates, and supercedes previous plats of record for this property.



- Legend
- EIP
  - IPS
  - I.P.F.
  - AXLE
  - F.C.M.
  - P.K.F.
  - P.K.S.
  - R.R.S.F.
  - R.R.S.S.
  - Bench Mark
  - Stake Found
  - Fire Hydrant
  - Water Meter
  - Water Valve
  - Water Reducer
  - Clean Out
  - Sanitary Sewer Manhole
  - Storm Sewer Manhole
  - Catch Basin
  - Curb Inlet
  - Storm Pipe
  - Cable Manhole
  - Electric Manhole
  - Telephone Manhole
  - Water Manhole
  - Electric Meter
  - Cable Riser
  - Electric Riser
  - Telephone Riser
  - Telephone Booth
  - Gas Meter
  - Gas Valve
  - Light Pole
  - Power Pole
  - Telephone Pole
  - Guy Pole
  - Power Pole
  - Flag Pole
  - Guy Wire
  - Mailbox
  - Parking Block
  - Satellite Dish
  - Handicap Parking
  - Water Spigot
  - Bollard
  - \* Evergreen Tree
  - Deciduous Tree
  - Bush
  - Sign

General Notes:

- This purpose of this plat is to modify P.U.D.E. between lots 1158 & 1159 from 10' on each side to 8.5' on each side as shown hereon.
- Zoned: D3 (High Density Residential):  
Maximum Lot Coverage (Single Family) - 55%  
Setback Requirements  
Front - 20 Feet  
Rear - 20 Feet  
Side - 7.5 Feet
- All new utilities shall be located underground. See variance granted by the town of Thompson's Station M.P.C. April 16, 2007 for The Fields of Canterbury regarding M.T.E.M.C. Overhead Power Lines.
- Underground utilities shown are per engineered construction plans. These locations do not represent as built plans. Utilities not visible on the surface must be located by the proper utility authority having jurisdiction or "Tennessee One Call" before excavation.
- There is a 5' public utility and drainage easement on each side and the rear lot lines. A 20' public utility easement adjacent to the front property line.
- All grading, fill storage and ground disturbance shall be strictly confined to the building envelope and the public utility/drainage easement.
- Homeowners Association will maintain all open space, and alleys, including landscape and detention/retention areas. All roadways shall be public streets, constructed to the specifications of Thompson's Station as public right of ways.
- New monuments will be iron pins with plastic caps.
- All open space is a public utility and drainage easement.

CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number 5481, Page 558, County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed as required by these regulations.

Date \_\_\_\_\_, 20\_\_\_\_  
Owner - Hood Development, LLC

Title (if acting for partnership or corporation)

CERTIFICATE OF APPROVAL OF UTILITY SYSTEM

I hereby certify that the following utility system(s) outlined or indicated on the final subdivision plat have been installed in accordance with current local and/or state government requirements, or that a surety bond has been posted with the Planning Commission to assure completion of all required improvements in case of default. Also, I certify that the hydraulic design criteria specified in Section 3-106 of Thompson's Station Subdivision Regulations have been met.

Water System:  
Date \_\_\_\_\_, 20\_\_\_\_  
Name, Title and Agency or Authorized Approving Agent  
Sewer System:  
Date \_\_\_\_\_, 20\_\_\_\_  
Town Engineer



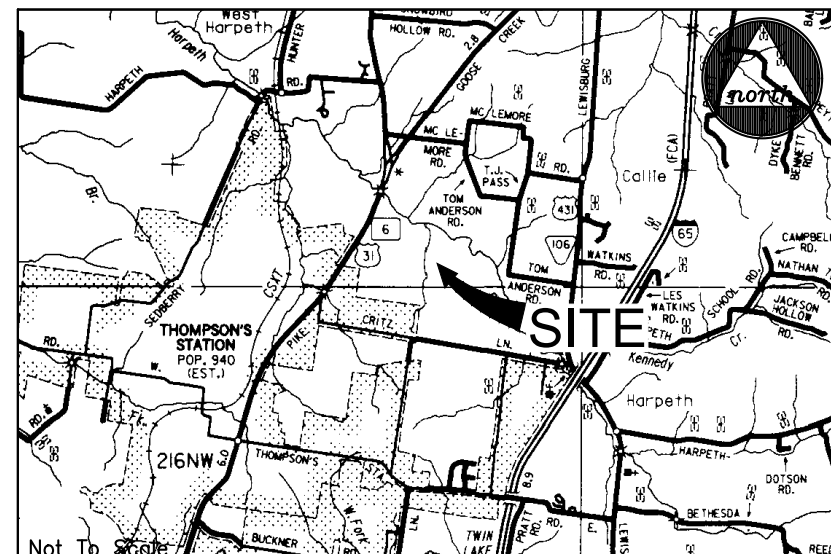
GRAPHIC SCALE



( IN FEET )  
1 inch = 60 ft.

- Adjoining Property Line
- Subject Property Line
- Easement Line
- Building Setback Line
- Centerline
- Edge of Pavement
- Edge of Gravel
- Fence Line
- Landscape
- Woods / Tree line
- Edge of Water
- Ditch / Creek Centerline
- Minor Contour Line
- Index Contour Line
- G --- Gas Line
- SA --- Sanitary Sewer Line
- W --- Water Line
- ST --- Storm Sewer Line
- OH --- Overhead Utility Line
- OHC --- Overhead Cable Line
- OHE --- Overhead Electric Line
- OHT --- Overhead Telephone Line
- UG --- Underground Utility Line
- UGC --- Underground Cable Line
- UGE --- Underground Electric Line
- UGT --- Underground Telephone Line
- FM --- Forced Main Line
- \* --- Critical Lot

Location Map



CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Thompson's Station Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the planning commission, and that it has been approved for recording in the Office of the County Register.

Date \_\_\_\_\_, 20\_\_\_\_  
Secretary, Planning Commission

CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

I do hereby certify that the subdivision name and street names denoted on this final plat have been approved by the Williamson County Emergency Communication Agency.

Date \_\_\_\_\_, 20\_\_\_\_  
Department, Title

CERTIFICATE FOR ADDRESSES

I do hereby certify that the addresses denoted on this final plat are those assigned by Department of Information Technology (IT).

Date \_\_\_\_\_, 20\_\_\_\_  
IT Department, Title

CERTIFICATE OF THE APPROVAL OF STREETS

I hereby certify: (1) that all streets designated on this final subdivision plat have been installed in an acceptable manner and according to Thompson's Station's Subdivision Regulations, or (2) that a surety bond has been posted with the Planning Commission to assure completion of all required improvements in case of default.

Date \_\_\_\_\_, 20\_\_\_\_  
Town Engineer

CERTIFICATE OF APPROVAL OF MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION

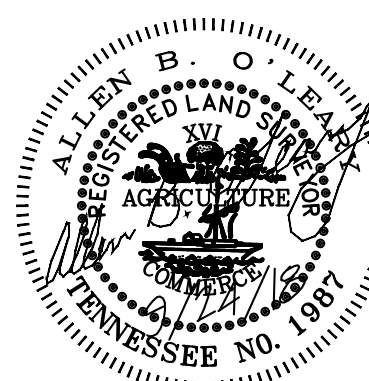
I hereby certify that the requirements set forth in rules, regulations, by-laws, policy and operations bulletins, plat approval checklist and tree planting guidelines have been met for MTEMC. Any approval is at all times contingent upon continuing compliance with the aforementioned requirements.

Date \_\_\_\_\_, 201\_\_\_\_  
Authorizing Signature  
Middle Tennessee Electric Membership Corp.

CERTIFICATE OF SURVEY ACCURACY

I hereby certify that the plan shown and described hereon is a true and correct survey to the accuracy required by Thompson's Station Municipal Planning Commission and that the monuments have been or will be placed as shown hereon to the specifications of the subdivision regulations as approved by the Town Engineer. This is a Category 1 survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon.

Date \_\_\_\_\_, 20\_\_\_\_  
Allen B. O'Leary, RLS TN # 1987



WES E. ENGINEERS & SURVEYORS  
CIVIL ENGINEERS & LAND SURVEYORS  
2688 NASHVILLE HIGHWAY  
FRANKLIN, TN 37064  
PHONE: (615) 988-2828  
www.wesengineers.com

WES ENGINEERS & SURVEYORS

Client: WILLOW BRANCH PARTNERS  
121 1st AVE. & #220  
FRANKLIN, TN 37064  
615-488-9887

FINAL PLAT  
THE FIELDS OF CANTERBURY SECTION 12A - REVISION TO LOTS 1158-1159  
2756-2752 CLOISTER LANE, THOMPSON STATION, TN

DATE

REVISIONS

Drawn: EB  
Checked: JO  
Approved: JO  
Date: 09-11-2018

16507

Scale: Horizontal