Town of Thompson's Station Municipal Planning Commission Meeting Agenda August 24, 2021

Meeting Called To Order - Determination Of Quorum

Minutes-

Consideration Of The Minutes Of The July 27, 2021, Meeting

Documents:

JULY 27 2021 MINUTES.PDF

Public Comments-

Planner Report & Announcements

AGENDA ITEMS

1. Parsons Valley Preliminary Plat – For The Creation Of 349 Residential Lots And 18 Open Space Lots Located At 4738 Columbia Pike.

Documents:

ITEM 1- PARSONS VALLEY PRELIM PLAT PC STAFF REPORT 8-16-21.PDF ITEM 1- PARSONS VALLEY PRELIMINARY PLAT PC REVIEW_RS_OP.PDF ITEM 1- PARSONS VALLEY - TIS_7-16-21.PDF

2. Consideration Of Ordinance 2021-012, An Amendment To The Land Development Ordinance To Clean Up And Clarify Certain Section In Appendix C Related To Plat Certificates.

Documents:

ITEM 2- ORD 2021-012 LDO AMEND MEMO.PDF ITEM 2- ORD 2021-012 LDO PLAT CERTIFICATE REVISED.PDF

3. Land Development Manual - Public Notice For The Community Development Department's Administrative Manual.

BOND ACTIONS/REPORT

- 4. Bond Actions
 - a. Littlebury- Request to reduce and extend the bonds for Section 1 until April 23, 2022
 - b. Update on Long Held Bonds

Documents:

ITEM 4A- LITTLEBURY 1 SEWER BOND PEFORMANCE REDUCTION PC ACTION REQUEST 8-24-21.PDF

This meeting will be held at 6:00 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 July 27, 2021

Call to Order:

The meeting of the Municipal Planning Commission of the Town of Thompson's Station was called to order at 6:00 p.m. on 22nd day of June 2021.

Members and staff present were Alderman Shaun Alexander; Chairman Trent Harris; Commissioner Luis Parra; Commissioner Sheila Shipman; Commissioner Bob Whitmer; Commissioner Kreis White; Planning Director Micah Wood; Planning Technician Jennifer Banaszak and Town Attorney Andrew Mills. Commissioner Tara Rumpler was unable to attend.

Minutes:

The minutes of the June 22, 2021 regular meeting were presented.

Commissioner White made a motion to approve the June 22, 2021 meeting minutes. The motion was seconded and carried by all present.

Public Comment:

None.

Town Planner Report:

Mr. Wood gave an update on the following:

- Our next Growth Plan public meeting will take place on August 17th, from 5 until 7 pm in the Community Center.
- Training options were discussed for upcoming credits.

AGENDA ITEMS:

1. Canterbury Subdivision Final Plat – Section 18 for the creation of 34 single family lots, 34 townhome lots, and 5 open space lots located along Sassafras Lane.

Mr. Wood reviewed his Staff report and recommends that the Planning Commission approve the final plat with the following contingencies:

- 1. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$1,106,000 for roadways, drainage and utilities.
- 2. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$1.650,000 for sewer.
- 3. All tree replacements shall be installed in accordance with the approved replacement plan for phase 14.
- 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 White mated a motion to approve the final plat for Canterbury Section 18, for the creation of 34 single family lots, 34 townhome lots and 5 open space lots located along Sassafras Lane with the Staff recommended contingencies. The motion was seconded and approved by all present.

Page 2

2. Canterbury Subdivision Final Plat – Section 19 for the creation of 44 townhome lots, and 2 open space lots located along Inman Drive and Burgate Trail.

Mr. Wood reviewed his staff report and recommends that the Planning Commission approve the final plat with the following contingencies:

- 1. Prior to recordation of the final plat, a surety shall be submitted to the Town in the amount of \$450,000 for roadways, drainage and utilities.
- 2. All tree replacements shall be installed in accordance with the approved replacement plan for phase 14.
- 3. 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 White made a motion to approve the final plat for Canterbury Section 19, for the creation of 44 townhome lots and 2 open space lots located along Inman Drive and Burgate Trail with the Staff recommended contingencies. The motion was seconded and approved by all present.

3. Consideration of Ordinance 2021-012, an amendment to the Land Development Ordinance to clean up and clarify certain section in Appendix C related to Plat Certificates.

Mr. Wood reviewed his staff report and recommends that the Planning Commission provide a favorable recommendation onto the BOMA for these text amendments.

After discussion, Commissioner White made a motion to defer the Consideration of Ordinance 2021-012, an amendment to the Land Development Ordinance to clean up and clarify certain sections in Appendix C related to Plat Certificates to the August 2021 meeting. The motion was seconded and approved by all present.

BOND ACTIONS/REPORT

- 1. Bond Actions
 - a. Littlebury- Request to reduce and extend the bonds for Section 1 until April 23, 2022

After discussion, Commissioner Whitmer made a motion to approve the bond action for Littlebury with the bond amount to be set by Staff within 30 days in accordance with the LDO. No second – motion fails

After discussion, Alderman Alexander made a motion to defer the bond action until an amount is set by Staff. The motion was seconded and carried by all present.

b. Update on Long Held Bonds

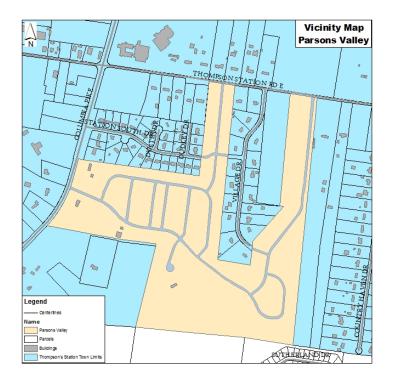
Mr. Wood updated the board about the work in Tollgate Village stating that it will start with sidewalks & drainage, then moving to streets. The Town is currently awaiting contractor dates.

Municipal Planning Commission – Minutes of the Meeting July 27, 2021	
Page 3	
Mr. Wood also stated that there has been a site meetin and that a punch list has been agreed upon.	g with the developer and engineers in Bridgemore Village
There being no further business, the meeting was adjo	urned at 7:03 p.m.
_	
T	rent Harris, Chair
Attest:	
Micah Wood, Secretary	

Thompson's Station Planning Commission Staff Report – Item 1 August 24, 2021

PROJECT DESCRIPTION

The Parsons Valley Preliminary Plat include proposed development of 349 residential lots, with a mixture of lot sizes and types, including single-family and townhomes, on 118.83 acres located along the east side of Columbia Pike at 4737 Columbia Pike, south of Thompson's Station Road East within the D3 zone.



ANALYSIS

Site Design and Layout

The land, consisting of 118.83 acres is located within the D3 zone. The site is located on Columbia Pike with access on Thompson's Station Road East. The subject site is zoned D3 which 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" (Section 1.2.7) and permits a density of three units per acre.

The project proposes 349 residential units which will consist of 226 single-family and 123 townhomes, for a density of 2.95 units an acre. Lot widths vary from 22 feet for townhome lot to 55 feet for garden lots and 57 feet for village and cottage lots. Setbacks are identified as 10 feet for the front yard and secondary frontages, 15 feet for the side yard aggregate with a minimum of five feet and 20 feet for the rear yard, all per the D3 requirements.

The site requires a buffer 3 (semi opaque screen) between the adjacent properties and the project site to a height of at least 20 feet. A Buffer and Open Space Plan was included as an exhibit for the preliminary plat.

Natural Resources

Ridgeline Hilltop Preservation/Slopes

The site does contain land within the Ridgeline Hilltop Preservation Area (RHPA). Development within this area is prohibited unless a permit is obtained from the Board of Zoning Appeals. However, no development is proposed within the RHPA and all of this area will be designated and platted as part of the open space for the project. The site contains slopes between 15% and 25% that will be developed. Eleven lots are located within these slope areas and will be designated as critical lots. These lots will be subject to the requirements for critical lots and reviewed as part of the construction documents for this development.

Roadways

The standard for local roadways is 50 feet. The new streets proposed as part of Parsons Valley will have at least a 50-foot right-of-way and the required sidewalks. The streets meet LDO standards. Additional reviews of the roadways will occur as part of the construction plan process.

Open Space/Amenities

Development of the site includes 53.45 acres set aside for open space, which will comply with the 45% open space requirement. Several civic spaces are proposed as part of the open space. As per the recent LDO amendment, amenities shall require Planning Commission approval once they are finalized by the developer and prior to permitting.

Trees

Development of site, as proposed, will result in the removal of a total of 3,241 inches. The LDO requires the replacement of trees 18 inches and greater at a ratio of one and a half inches for every inch removed. The landscape plans submitted with the construction plans will include detailed landscaping and plating details for each section to account for all replacement requirements.

Traffic Study

A traffic study was submitted and reviewed by Town Staff. All recommended mitigation shall be incorporated into the development agreement and the construction plans for this subdivision. Town Staff did closely review the need to add turn lane to the entrances along Thompson's Station Road East; however, based on the industry standards utilized in the TIS, such turn lanes are not warranted as part of this development.

Sewer

The BOMA approved a Future Capacity of Wastewater Reservation Agreement at the August 2, 2021, BOMA meeting. Payment of the 25% deposit of wastewater taps fees is listed as a contingency to the approval of this preliminary plat.

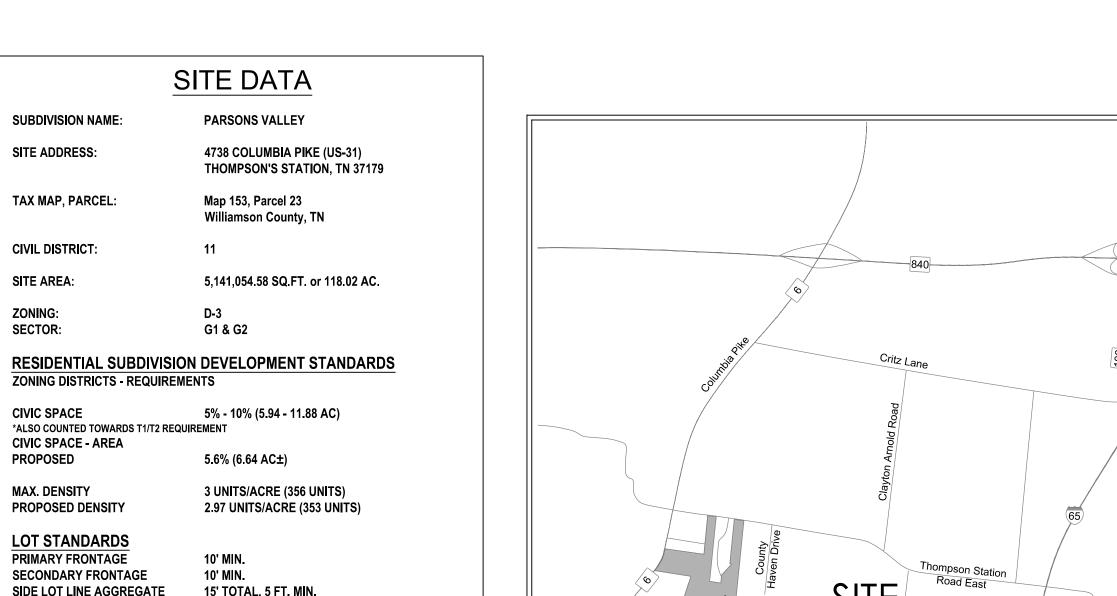
RECOMMENDATION

Staff recommends approval with the following conditions and contingencies:

- 1. The applicant shall pay the 25% deposit of the wastewater treatment tap fees for the project and sign the approved Reservation Agreement within 60 days of the approval of this plat, as required by the Wastewater Capacity Reservation Ordinance (Ordinance 2020-007). Failure to pay the 25% deposit to the Town within 60 days shall render the approval void *ad initio*.
- 2. The applicant shall revise the Site Data Table to update the correct amounts of Open Space and Proposed Density.
- 3. The applicant shall revise the townhome parking exhibit to provide for additional guest parking. It is recommended that Guest/Overflow parking stalls be provided in the open space areas behind lots 1-7 and opposite lot 24. 12 stalls are desired. 6 stalls would be the minimum recommendation.
- 4. The applicant shall set a pre-application meeting with Town Staff prior to the submittal of the constructions plans for this development.
- 5. Prior to the approval of construction plans, the developer shall enter into a development agreement for the project.
- 6. Prior to the approval of construction plans, the developer shall obtain any necessary permits through the Tennessee Department of Environment and Conservation.
- 7. Prior to the approval of construction plans, all applicable codes and regulations shall be addressed to the satisfaction of the Town Engineer.
- 8. Prior to the submittal of the first final plat for this subdivision, a copy of the CCRs shall be submitted for Town review.
- 9. 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.
- 10. Streetlights shall be incorporated in accordance with the Land Development Ordinance and shall be documented on the construction drawings.
- 11. All recommendations within the traffic study shall be completed.
- 12. All open space amenities shall require TSPC approval prior to permitting for each amenity.

ATTACHMENTS

Preliminary Plat and associated exhibits Traffic Impact Study dated July 16, 2021



CIVIC SPACE *ALSO COUNTED TOWARDS T1/T2 REQUIREMENT

MAX. DENSITY PROPOSED DENSITY

SECONDARY FRONTAGE 15' TOTAL, 5 FT. MIN. SIDE LOT LINE AGGREGATE REAR LOT LINE LOT WIDTH TOWNHOME LOT WIDTH 20' MIN.

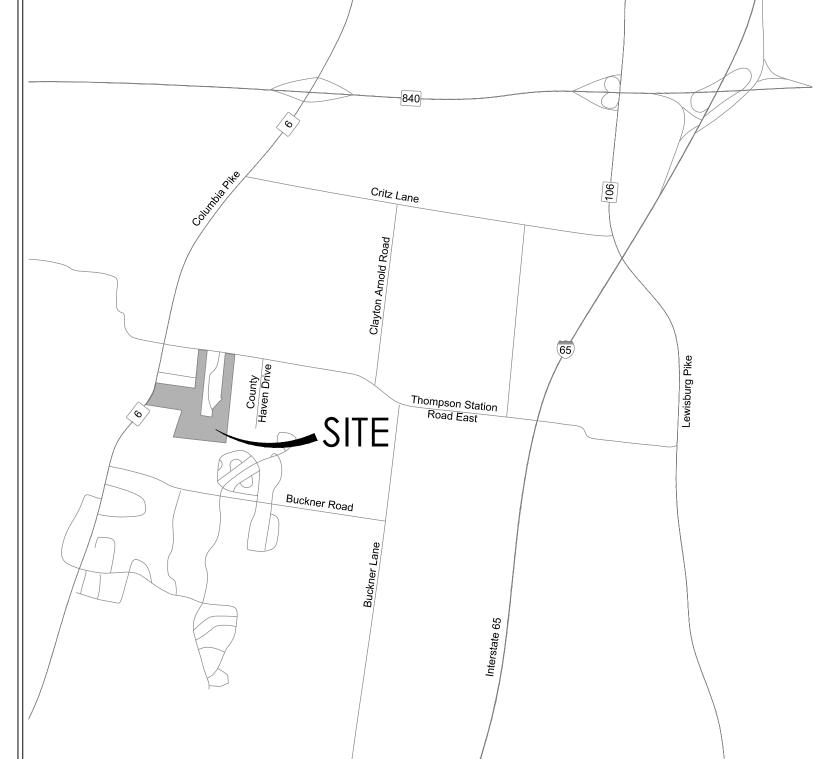
LOT BREAKDOWN

(G) GARDEN (TH) TOWNHOMES (C) COTTAGE (V) VILLAGE 57' x 125' 177 LOTS

TOTAL LOTS

OUTDOOR RECREATION AREA 20,000 SQ.FT. ±

34 PARKING SPACES REQUIRED 34 PARKING SPACES PROVIDED (ON-STREET)



LOCATION MAP

PRELIMINARY PLAT NOTES

- THE PURPOSE OF THIS PRELIMINARY PLAT IS TO ENTITLE 369 LOTS (351 SINGLE FAMILY RESIDENTIAL LOTS, 18 OPEN SPACE LOTS,
- BEARING SYSTEM IS BASED ON TENNESSEE STATE PLANE COORDINATES. PUBLIC UTILITY AND DRAINAGE EASEMENTS WHERE SHOWN HEREON ARE INTENDED TO INDICATE AN EASEMENT FOR CONSTRUCTION, OPERATION, AND MAINTENANCE OF PUBLIC UTILITIES AND DRAINAGE WAYS; INCLUDING, BUT NOT LIMITED TO,
- SANITARY SEWER, FORCEMAINS, WATER LINES, TELEPHONE SIGNAL CONDUITS, ELECTRIC CONDUCTORS, DRAINAGE PIPES, AND NATURAL GAS LINES. PARCELS ARE SUBJECT TO ALL EASEMENTS AS SHOWN AND ANY OTHER EASEMENTS AND/OR RESTRICTIONS BY RECORD OR
- PRESCRIPTION, THAT A COMPLETE TITLE SEARCH MAY REVEAL. ANY STREET IN THIS SUBDIVISION MAY BE EXTENDED INTO ADJOINING PROPERTY AT ANY TIME WITHOUT ADDITIONAL NOTICE OR
- THE STREETS IDENTIFIED ON THE PLAT MAY BE CONSTRUCTED OR RECONSTRUCTED IN THE FUTURE WITHOUT CONSULTATION OR NOTICE TO THE OWNERS OF THE LOTS IN THE SUBDIVISION. EASEMENTS IN THE SUBDIVISION MAY NOT HAVE INFRASTRUCTURE CONSTRUCTED WITHIN THEM UNTIL SOME FUTURE TIME AND
- THERE MAY BE NO NOTICE OR CONSULTATION WITH THE INDIVIDUAL LOT OWNERS OF THIS CONSTRUCTION. ALL OPEN SPACE SHALL BE CONSIDERED A PUBLIC PEDESTRIAN, UTILITY, AND DRAINAGE EASEMENT. MAINTENANCE OF ALL OPEN SPACE, INCLUDING LANDSCAPE AND DETENTION/RETENTION AREAS, SHALL BE THE RESPONSIBILITY OF THE HOMEOWNERS

ANTICIPATED IMPACTS

122,850 GPD ANTICIPATED DEMAND.

ASSOCIATION.

- THE PARSONS VALLEY PROJECT HAS RECEIVED A WASTEWATER DEVELOPMENT AND CAPACITY ASSESSMENT MEMO AND ENGINEER LETTER OF FINDINGS (ELF) AND SHALL ENTER INTO A RESERVATION OF WASTEWATER CAPACITY AGREEMENT WITH THE TOWN OF THOMPSON'S STATION. 122,850 GPD ANTICIPATED DEMAND
- HB&TS HAS PROVIDED A WATER AVAILABILITY LETTER FOR THE PROJECT CONSISTING OF 351 RESIDENTIAL UNITS. THE DEVELOPER WILL BE RESPONSIBLE FOR COORDINATING WITH THE INDIVIDUAL UTILITY DISTRICT / ENTITIES AS THE PROJECT MOVES FORWARD

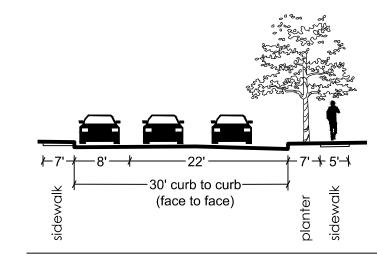
 FLOW TEST HAS BEEN REQUESTED • THE ADDITIONAL IMPERVIOUS AREA ON THIS SITE WILL BE TREATED USING APPROVED BMP'S, INCLUDING DETENTION BASINS. RUNOFF WILL EITHER SHEET FLOW OR BE COLLECTED IN THE

• NO ADVERSE IMPACTS TO COLUMBIA PIKE OR THOMPSON'S STATION ROAD EAST ARE ANTICIPATED. A TIA HAS BEEN COMPLETED AND PROVIDED TO THE TOWN TRAFFIC ENGINEER.

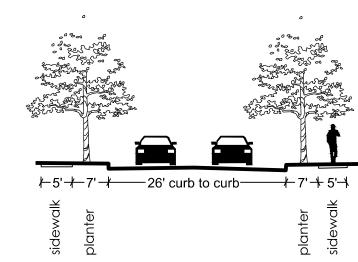
SITE'S SUBSURFACE DRAINAGE NETWORK. POST-DEVELOPMENT PEAK FLOWS WILL MEET THE

POLICE / FIRE WILLIAMSON COUNTY RESCUE SQUAD STATION 23 IS LOCATED APPROXIMATELY 0.5 MILES FROM EACH ENTRANCE TO THE DEVELOPMENT.

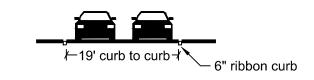
TOWN OF THOMPSON'S STATION STORMWATER MANAGEMENT REQUIREMENTS.



50' R.O.W. (ST 50-26) with parallel parking



50' R.O.W. (ST 50-26) without parallel parking



20' R.O.W. (ALLEY)

GENERAL NOTES

- OPEN SPACE TO BE OWNED, CARED, OPERATION & MAINTENANCE BY H.O.A. THIS PLAT IS CONSISTENT WITH THE APPROVED CONCEPT PLAN.
- 3. SEE LOT DATA TABLES ON LOT DATA TABLE SHEET 4. NO PORTION OF THIS SITE LIES WITHIN 100YR. FLOODPLAIN PER FIRM MAP 47187C0345F REVISED SEPTEMBER 29,2006

Utility Disclaimer

ENERGY, LAND AND INFRASTRUCTURE, LLC (ELI, LLC) HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ABOVE GRADE AND UNDERGROUND UTILITIES SHOWN WERE TAKEN FROM VISIBLE APPURTENANCES AT THE SITE, PUBLIC RECORDS AND/OR MAPS PREPARED BY OTHERS. ELI, LLC MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. ELI, LLC FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES 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 OWNER, 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 811.



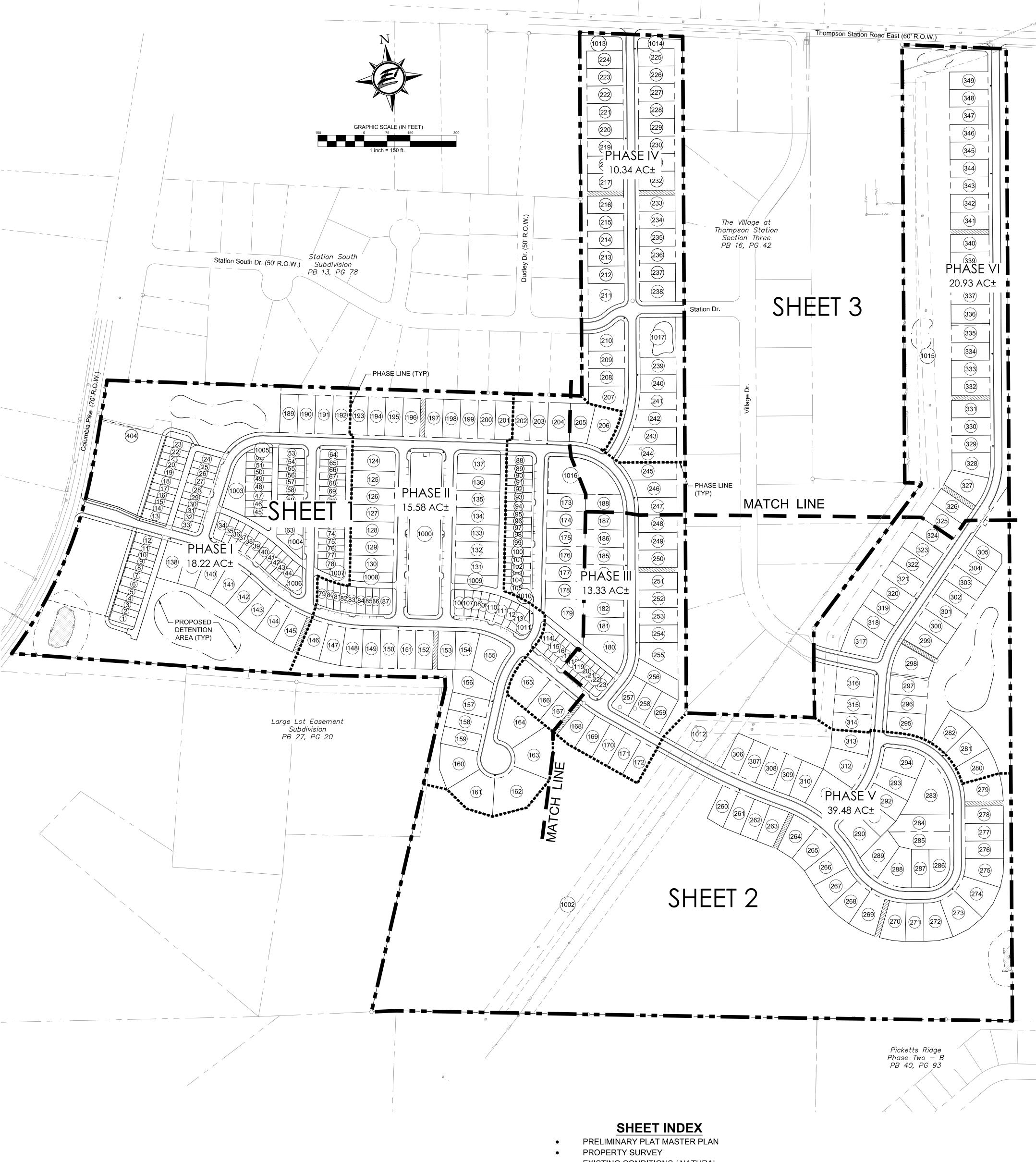
OWNER:

LUTHERAN CHURCH EXTENSION FUND 10733 SUNSET OFFICE DR., SUITE 300 ST. LOUIS, MO 63127

CIVIL ENGINEER: Energy Land & Infrastructure, LLC 1420 Donelson Pike, Suite A-12 Nashville, TN 37217 (615) 383-6300 clay.wallace@eli-llc.com

SURVEY DATA PROVIDED BY: Energy Land & Infrastructure, LLC 1420 Donelson Pike, Suite A-12 Nashville, TN 37217 (615) 383-6300

LANDSCAPE ARCHITECT / PLANNER: Gamble Design Collaborative Greg Gamble, RLA 144 Southeast Parkway, Suite 200 Franklin, TN 37064 (615) 975-5765 greg.gamble@gdc-tn.com



 EXISTING CONDITIONS / NATURAL RESOUCES PLAN PHASING PLAN PRELIMINARY PLAT SHEET 1

PRELIMINARY PLAT SHEET 2 PRELIMINARY PLAT SHEET 3 LOT DATA TABLES

L 2.2 - LANDSCAPE PLAN

L1.0 - TREE MITIGATION AND PRESERVATION L1.1 - TREE MITIGATION AND PRESERVATION L2.0 - LANDSCAPE AND OPEN SPACE PLAN L2.1 - LANDSCAPE PLAN

PRELIMINARY PLAT MASTER PLAN

OF TENNY Issue Date: July 16, 2021 ELI Project No: 18-1-1106.2 Drafted By: Checked By: LCW | Sheet Title:

DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

EY AT

Sheet No.

GAMBLE

DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND

LANDSCAPE ARCHITECTURE

ERGY LAND & INFRASTRUCTURE
ONELSON PIKE, SUITE AIZ • NASHVILLE, TN 378
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENT

ENERG 1420 DONEL 0FFIC ENGINEERS

SON'S VALLEY
IMINARY PLAT

/21 Per Town of Thompson's Station Comments
ate Revision Description

Issue Date: July 16, 2021
ELI Project No: 18-1-1106.2
Drafted By: RDP

LCW

Drafted By:
Checked By:
Sheet Title:

SITE DATA

ZONING: SECTOR:

OWNER NAME: **LUTHERAN CHURCH EXTENSION FUND** 10733 SUNSET OFFICE DR., SUITE 300 ST. LOUIS, MO 63127 SITE ADDRESS: 4630 COLUMBIA PIKE (US-31) **THOMPSON'S STATION, TN 37179** TAX MAP, PARCEL: Map 153, Parcel 23 Williamson County, TN SITE AREA: 118.83 AC.± (5,141,012 SF.±)

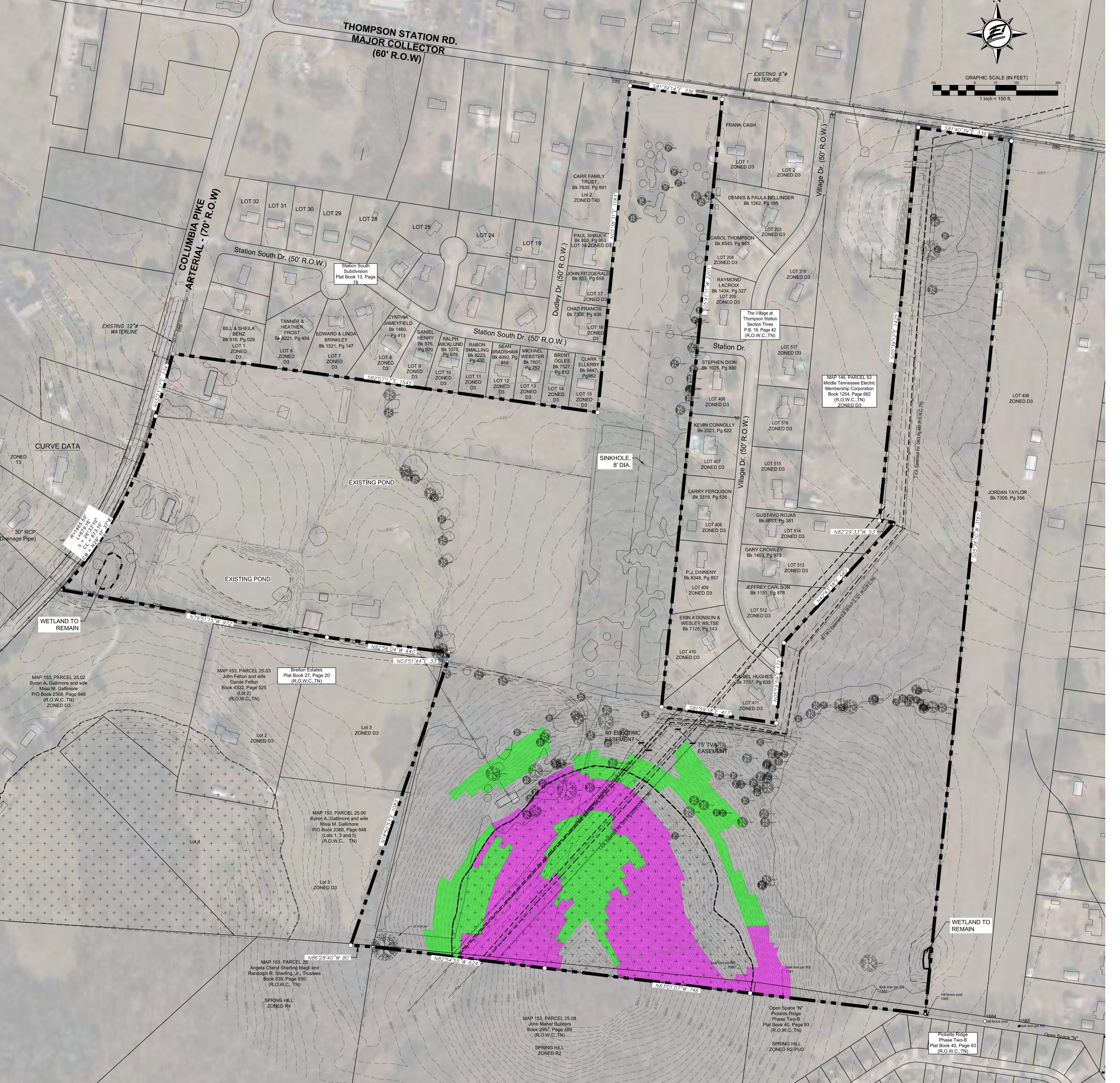
G1 & G2

Property Description (as measured)

Land situated in Williamson County, Tennessee, being shown on Tax Map 153, as a portion of Parcel 23.00, and is currently known as a portion of the lands owned by Lutheran Church Extension Fund, of record in Record book 4849, Pages 576, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

Beginning at an iron rod (old), having coordinates of N: 532840.33, E: 1699692.99, said iron rod found on the northeast margin of a 70' right of way of Columbia Pike (Public), said iron being a westerly property corner of herein described property; thence, with a fence line and along the southerly property line of lots in Station South subdivision as shown in P.B. 13, Pg. 76 (R.O.W.C., TN.), S 82°07'17" E for a distance of 1,545.16' to an iron rod (old); thence, with a fence line for a portion of the way, and the east property line of aforementioned Station South, N 05°38'31" E for a distance of 1,182.68' to an iron rod (old), said iron found in the southerly margin of Thompson Station Road (public) having a 60' right of way; thence, along said right of way, S 81°39'14" E for a distance of 335.59' to an iron rod (old); thence, leaving said margin with fence, also being the west property line of the lots in The Village at Thompson Station subdivision section three as shown in P.B. 16, Page 42 (R.O.W.C., TN.) S 05°41'11" W for a distance of 2,200.65' to an iron rod (old); thence, S 81°59'18" E for a distance of 417.07' to an iron rod (old); thence, N 05°19'59" E for a distance of 171.80' to an iron rod (old), said iron being found in the southwesterly margin of Village Drive (terminating into herein described property line); thence, N 05°37'23" E for a distance of 118.57' to an iron rod (old); thence, along said T.V.A. line, N 42°43'38" E for a distance of 582.02' to an iron rod (old); thence, N 15°00'28" E for a distance of 6.04' to an iron rod (old); thence, N 82°29'33" W for a distance of 52.83' to an iron rod (old), said iron being a southeast corner of Middle Tennessee Electric Membership Corporation as shown in Bk. 1254, Pg. 662 (R.O.W.C., TN.); thence, along the west property line of said M.T.E.M.C., N 05°39'12" E for a distance of 1,424.52' to an iron rod (old), said iron being found in the southerly margin of Thompson Station Road; thence, along said margin, S 81°40'39" E for a distance of 339.10' to an iron rod (new); thence, leaving said margin, with fence line, and the west property line of Jordan Farm Trust property as shown in Bk. 5905, Pg. 95 (R.O.W.C., TN.) S 05°38'10" W for a distance of 3,161.04' to an iron rod (old); thence, along a fence line, and open space "N" of Picketts Ridge subdivision Phase II B, as shown in P.B. 40, Pg. 93 (R.O.W.C., TN.), N 83°16'57" W for a distance of 635.27' to an iron rod (old); thence, along said fence line, and the north property line of the Maher Builders property as shown in Bk. 2957, Pg. 489 (R.O.W.C., TN.), and the south property line of herein described property for the next two calls, N 83°01'07" W for a distance of 745.85' to an iron rod (old); thence, N 82°54'55" W for a distance of 624.07' to an iron rod (old) being the northeast corner of the Sherling property as shown in Bk. 639, Pg. 930 (R.O.W.C.,TN.); thence, N 86°28'40" W for a distance of 80.03'to an iron rod (old) being the southeast corner of the Gallimore property a portion of Bk. 2368, Pg. 648, also referenced in P.B. 27, Pg. 20 (R.O.W.C., TN.), and a southwest corner of herein described property; thence, with a fence line, and the easterly property line of said Gallimore, and a westerly property line of herein described property, N 18°50'53" E for a distance of 1,081.57' to an iron rod (old); thence, N 03°51'44" E for a distance of 32.57' to an iron rod (old); thence, N 82°56'04" W for a distance of 440.33' to an iron rod (old); thence, N 79°51'15" W for a distance of 971.60' to an iron rod (old) in aforementioned east margin of Columbia Pike; thence, along margin, with a curve to the left, having a radius of 1,465.50', an arc length 679.16', a chord bearing of N 29°11'37" E for a distance of 673.10' to an iron rod (new); thence, N 15°55'02" E for a distance of 40.00' to an fence post; thence, N 15°23'37" E, for a distance of 233.50' to an iron rod (old); thence, to the Point of Beginning. Containing 5,141,054.58 Sq. Ft. or 118.02 Ac. According to a field survey made by

Energy Land & Infrastructure, LLC. Dated February, 2015 and updated August 23,



NO PORTION OF THIS SITE LIES WITHIN 100YR. FLOODPLAIN PER FIRM MAP 47187C0345F REVISED SEPTEMBER 29,2006

EXISTING CONDITIONS / NATURAL RESOURCES PLAN

<u>LEGEND</u> EXISTING TREE CANOPY 15% - 25% SLOPES 25% & GREATER SLOPES HILLTOP PROTECTION AREA

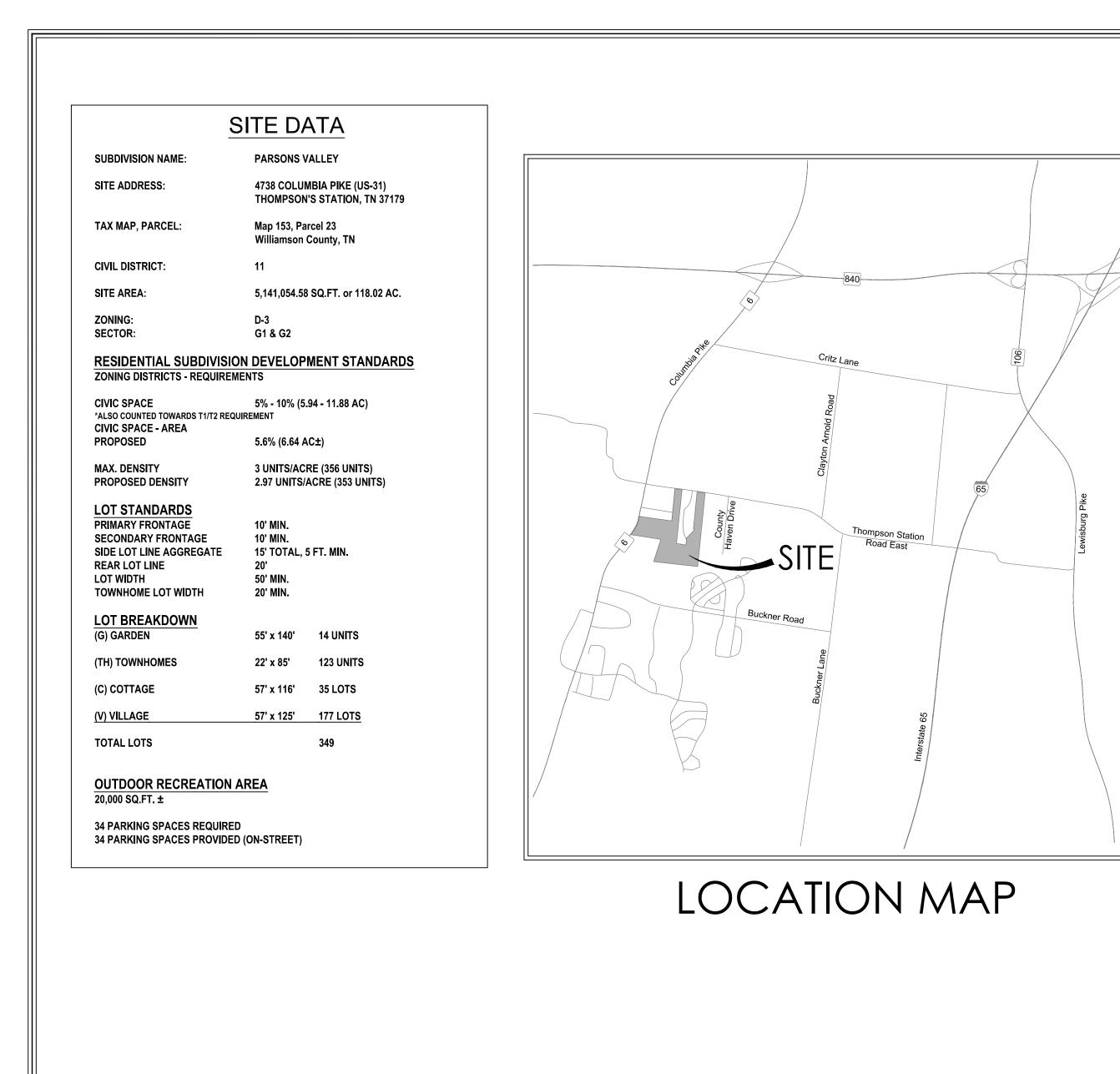
DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

EY AT

Issue Date: ELI Project No: 18-1-1106.2 Drafted By: Checked By: Sheet Title:

Sheet No.



Thompson Station Road East (60' R.O.W.) 10.34 AC± The Village at Thompson Station Section Three PHASE VI Station South Dr. (50' R.O.W.)

Station South
Subdivision 20.93 AC± 🖠 -PHASE LINE (TYP)
 333

 332

 331

 330

 329
 328 Large Lot Easement Subdivision PB 27, PG 20 ~PHASE LINE (TYP) Picketts Ridge Phase Two — B PB 40, PG 93

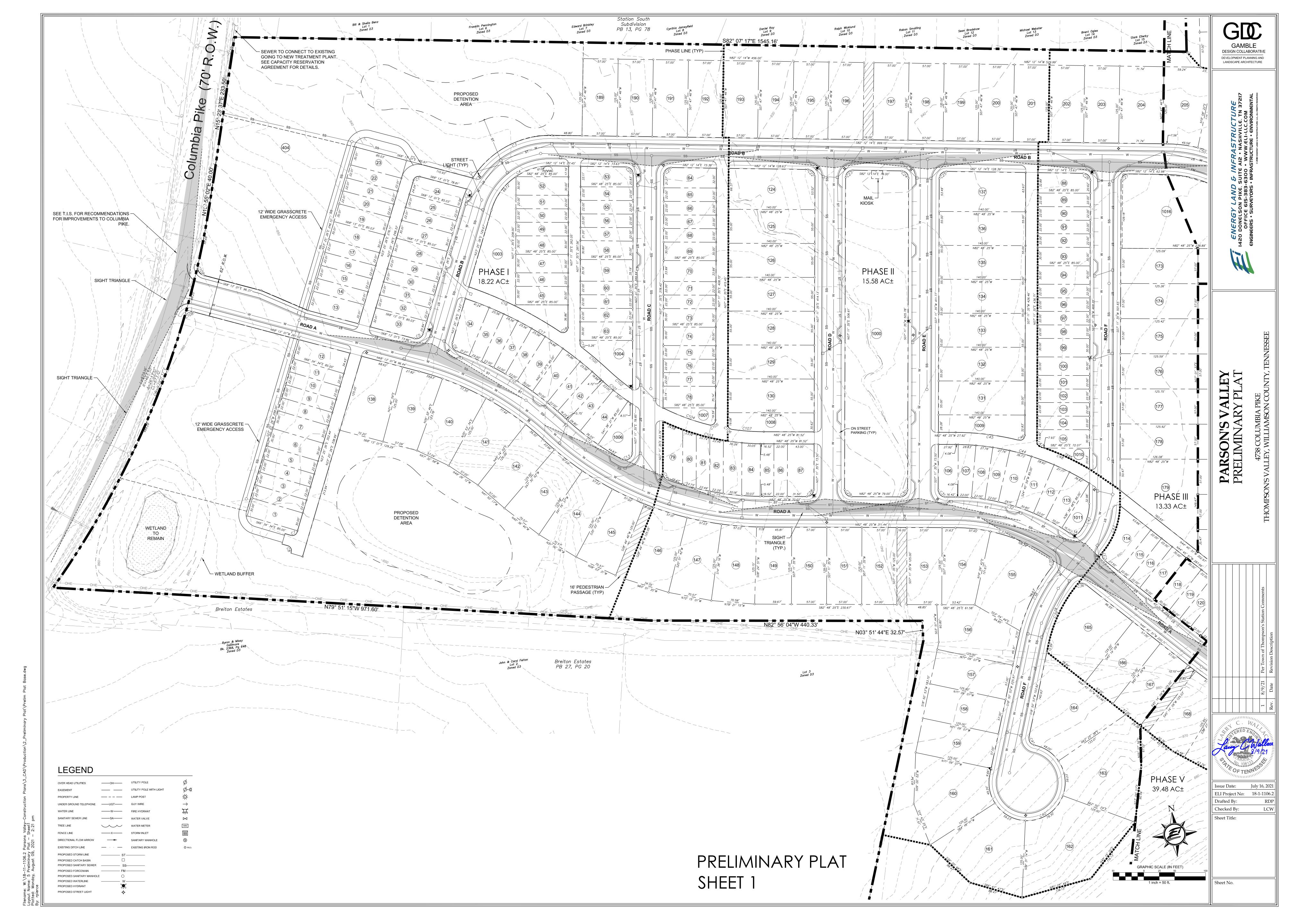
PRELIMINARY PLAT PHASING PLAN

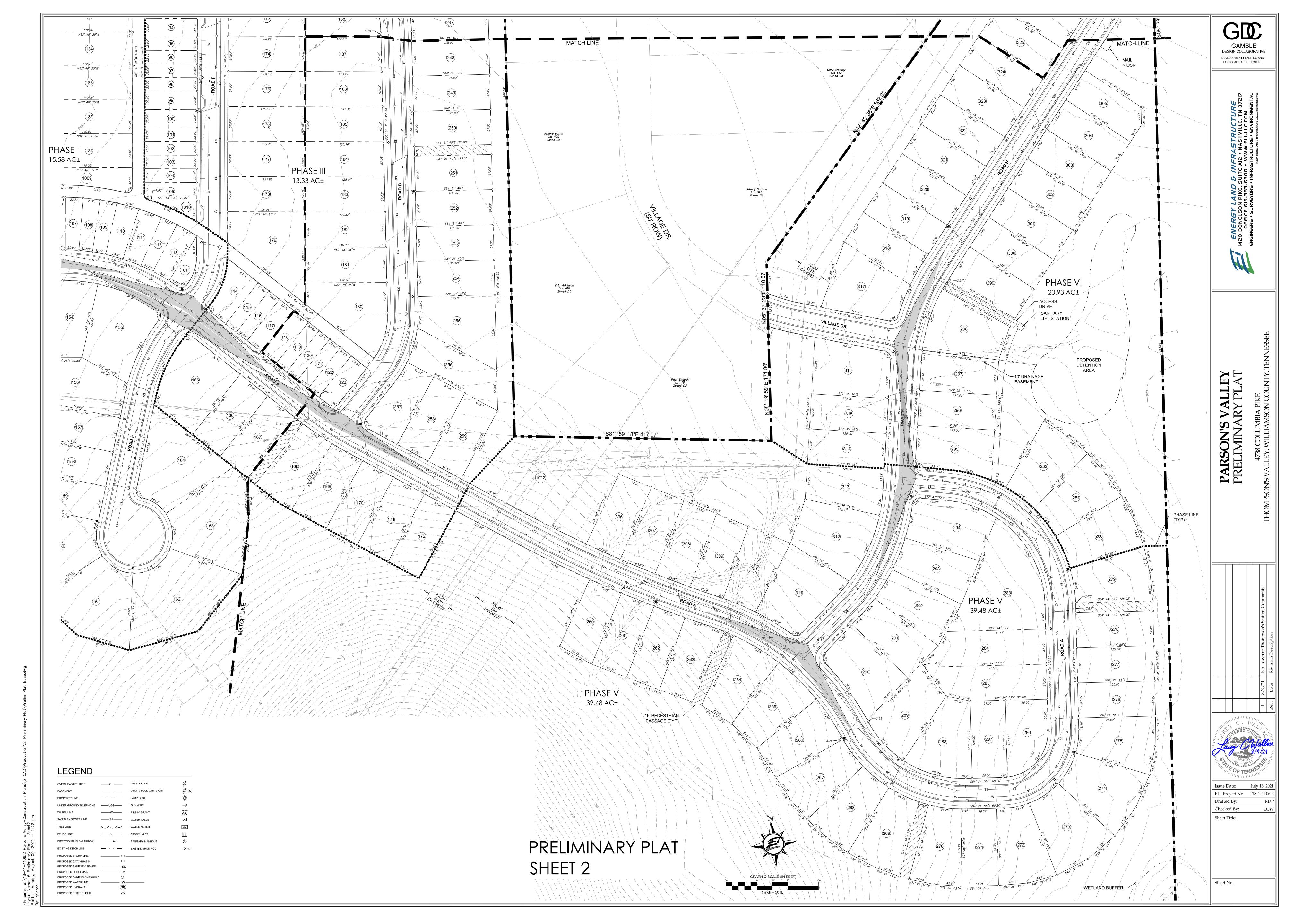
GAMBLE DESIGN COLLABORATIVE

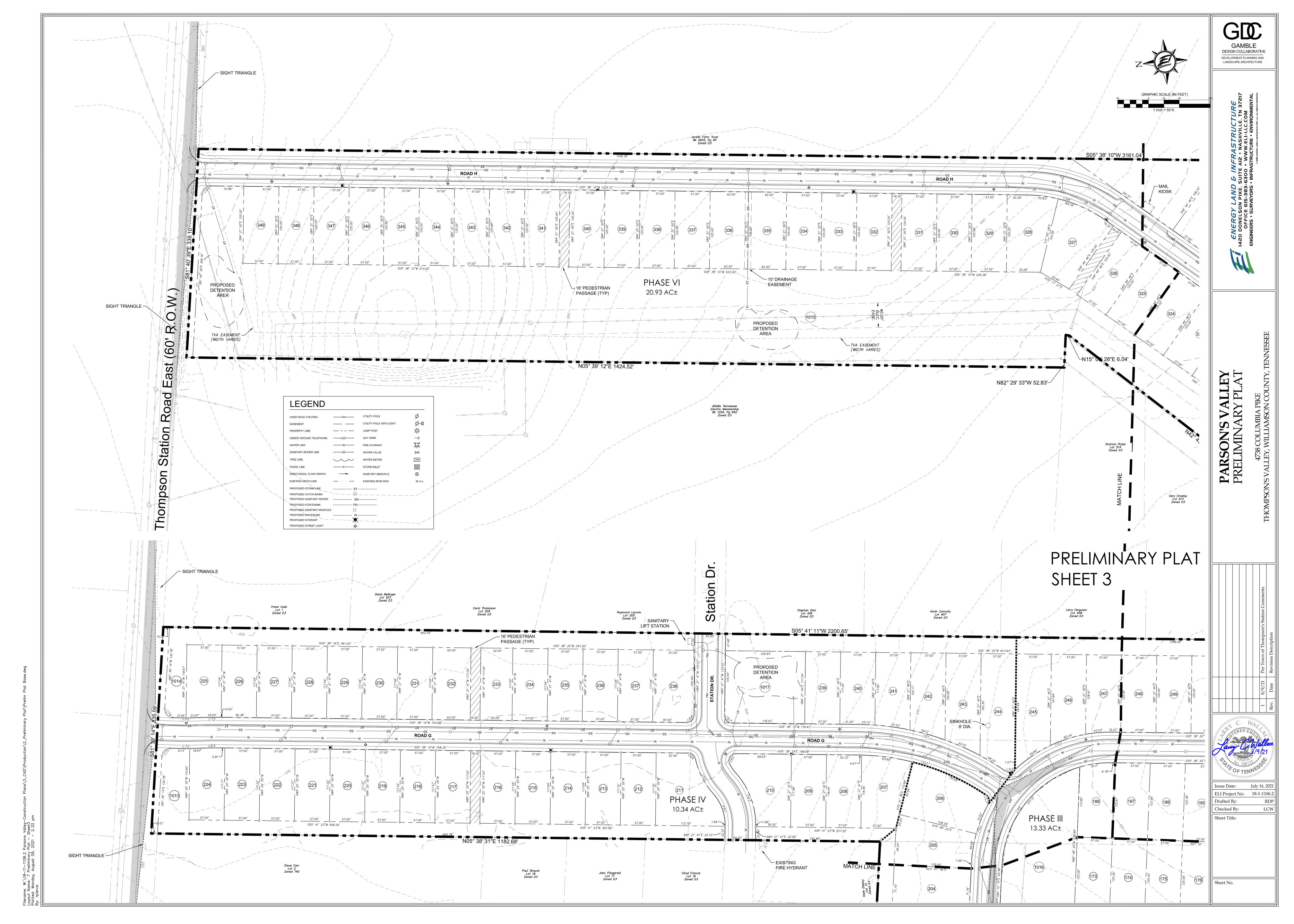
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

EY

Checked By:







Open Space Table

 Open Space Table

 Lot #
 Square Feet
 Acres

 1000
 53865
 1.24

 1002
 1545238
 35.47

 1003
 11736
 0.27

 1004
 3785
 0.09

 1005
 1165
 0.03

 1006
 3028
 0.07

 1007
 1402
 0.03

 1008
 4186
 0.10

 1009
 4486
 0.10

 1010
 1114
 0.03

 1011
 1687
 0.04

 1012
 113574
 2.61

 1013
 27978
 0.64

 1014
 6711
 0.15

 1014
 6711
 0.15

 1015
 280928
 6.45

 1016
 23325
 0.54

 1017
 15179
 0.35

R.O.W. Table

 Lot #
 Square Feet
 Acres

 ROW
 756185
 17.36

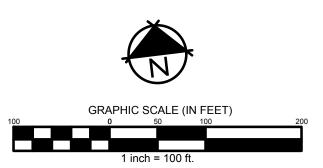
Checked By: Sheet Title:

Lot Table	Lot lable		Lot	lable	Lot	Table	Lot labi	e	Lot la	ole		Lot lable		L	ot lable			Lot lable		L	ot lable		Lot lable		Lot Table	;		Lot Table	
Square Feet Acres	Lot # Square Feet	Acres	Lot # Square	e Feet Acres	Lot # Squa	are Feet Acres	Lot # Square Fe	et Acres	Lot # Square F	eet Acres	Lot #	Square Feet	Acres	Lot # So	quare Feet Ac	cres	Lot#	Square Feet A	Acres	Lot# S	quare Feet Acres	Lot #	Square Feet Acres	Lot #	Square Feet	Acres	Lot#	Square Feet	Acres
2550 0.06	26 1871	0.04	51 18	0.04	76 1	870 0.04	101 1870	0.04	126 7700	0.18	151	7125	0.16	176	7163 0.	.16	201	7125	0.16	227	6672 0.15	252	7125 0.16	277	7125	0.16	302	7125	0.16
1870 0.04	27 2551	0.06	52 25	550 0.06	77 1	870 0.04	102 1870	0.04	127 7700	0.18	152	7125	0.16	177	7173 0.	.16	202	I	0.16	228	6672 0.15	253	7125 0.16	278	7125	0.16	303	7125	0.16
1870 0.04	28 2551	0.06		' 49 0.06		987 0.07		0.04	128 7700	0.18		7125	0.16	178	7182 0.	.16	203	7125			6672 0.15	254	7125 0.16	279	9180	0.21	304	7125	0.16
1870 0.04	29 1871	0.04	54 18	0.04	79 2	2884 0.07	104 1870	0.04	129 7700	0.18	154	8217	0.19	179	12616 0.	.29	204	8968 (0.21	230	6672 0.15	255	10938 0.25	280	9087	0.21	305	6923	0.16
1870 0.04	30 1871	0.04	55 18	0.04	80 1	948 0.04	105 2515	0.06	130 7700	0.18	155	12201	0.28	180	11020 0.	.25	205	8834 (0.20		6672 0.15	256	8811 0.20	281	9087	0.21	306	7439	0.17
2550 0.06	31 1871	0.04	56 18	0.04	81	0.04	106 2692	0.06	131 7700	0.18	156	9643	0.22	181	7501 0.	.17	206	10504	0.24	232	7257 0.17	257	7014 0.16	282	9087	0.21	307	7518	0.17
2550 0.06	32 1871	0.04	57 18	336 0.04	82 1	900 0.04	107 2160	0.05	132 7700	0.18	157	7125	0.16	182	7422 0.	.17	207	8094	0.19	233	6086 0.14	258	7125 0.16	283	17920	0.41	308	7498	0.17
1870 0.04	33 2695	0.06	58 25	0.06	83 2	2568 0.06	108 2115	0.05	133 7700	0.18	158	7125	0.16	183	7343 0.	.17	208	6729	0.15	234	6672 0.15	259	7563 0.17	284	10363	0.24	309	7041	0.16
1870 0.04	34 3088	0.07	59 29	992 0.07	84 2	2553 0.06	109 2115	0.05	134 7700	0.18	159	7125	0.16	184	7265 0.	.17	209	6727	0.15	235	6672 0.15	260	7010 0.16	285	9976	0.23	310	8071	0.19
1870 0.04	35 2022	0.05	60 18	0.04	85 1	870 0.04	110 2798	0.06	135 7700	0.18	160	13021	0.30	185	7186 0.	.16	210	8826	0.20	236	6672 0.15	261	7297 0.17	286	7294	0.17	311	11909	0.27
1870 0.04	36 2022	0.05		0.04		870 0.04	111 2965	0.07	136 7700			14238	0.33	186		.16	211	10400	0.24	237	6671 0.15	262	6845 0.16	287	7124	0.16	312	11730	1 1
2823 0.06	37 2022	0.05		0.04	87 3	6627 0.08	112 2116	0.05	137 8983			18216		187	7028 0.		212	6713		238	7814 0.18	263		288	9990	0.23	313		
2721 0.06	38 2022	0.05	63 25	0.06	88 2	2730 0.06	113 2845	0.07	138 8801	0.20	163	15333	0.35	188	6827 0.	.16	213	6710	0.15	239	6671 0.15	264	8988 0.21	289	9802	0.23	314	7125	0.16
1871 0.04	39 2757	0.06	64 27	729 0.06	89 1	870 0.04	114 3875	0.09	139 7767	0.18	164	14278	0.33	189	7125 0.	.16	214	6707	0.15	240	6678 0.15	265	8988 0.21	290	10228	0.23	315	7125	0.16
1871 0.04	40 2757	0.06	65 18	370 0.04	90 1	870 0.04	115 1870	0.04	140 8406	0.19	165	12408	0.28	190	7125 0.	.16	215	6704	0.15	241	6888 0.16	266	8497 0.20	291	7986	0.18	316	10386	0.24
1871 0.04	41 2022	0.05	66 18	370 0.04	91 1	870 0.04	116 1870	0.04	141 8451	0.19	166	7125	0.16	191	7125 0.	.16	216	6701	0.15	242	7536 0.17	267	8702 0.20	292	8295	0.19	317	10907	0.25
1871 0.04	42 1938	0.04	67 18	370 0.04	92 1	870 0.04	117 2550	0.06	142 7447	0.17	167	7125	0.16	192	7125 0.	.16	217	6697	0.15	243	8673 0.20	268	8702 0.20	293	8168	0.19	341	7125	0.16
2551 0.06	43 2074	0.05	68 18	370 0.04	93 2	2550 0.06	118 2550	0.06	143 7932	0.18	168	8145	0.19	193	7125 0.	.16	218	6694 (0.15	244	10311 0.24	269	9138 0.21	294	10056	0.23	342	7125	0.16
2551 0.06	44 2829	0.06	69 25	550 0.06	94 2	2550 0.06	119 1870	0.04	144 7932	0.18	169	7559	0.17	194	7125 0.	.16	219	6691 (0.15	245	9436 0.22	270	8706 0.20	295	8839	0.20	343	7125	0.16
1871 0.04	45 2550	0.06	70 28	389 0.07	95 1	870 0.04	120 1870	0.04	145 7932	0.18	170	7125	0.16	195	7125 0.	.16	220	6689	0.15	246	7807 0.18	271	7359 0.17	296	7125	0.16	344	7125	0.16
1871 0.04	46 1870	0.04		370 0.04		870 0.04	121 1870	0.04	146 8160	0.19		7125	0.16		7125 0.	.16	221	6686	0.15	247	7179 0.16	272	9327 0.21	297	7648	0.18	345	7125	0.16
1871 0.04	47 2550	0.06		0.04		870 0.04	122 1870	0.04	147 7932		172	7125	0.16	197	7125 0.	.16	222	I	0.15	248	7125 0.16	273	10656 0.24	298	10240	0.24	346	7125	0.16
2551 0.06	48 2550	0.06		0.06	1 1	870 0.04	123 2687	0.06	148 7937			7135			7125 0.		223		0.15	249	7125 0.16	274		299	7673	0.18	347	7125	0.16
2719 0.06	49 1870	0.04	74 25	550 0.06	99 2	2550 0.06	124 9161	0.21	149 7292	0.17	174	7144	0.16	199	7125 0.	.16	224	6646 (0.15	250	7125 0.16	275	9533 0.22	300	7125	0.16	348	7125	0.16
1871 0.04	50 1870	0.04	75 18	370 0.04	100 2	2550 0.06	125 7700	0.18	150 7125	0.16	175	7154	0.16	200	7125 0.	.16	226	6672	0.15	251	7125 0.16	276	7125 0.16	301	7125	0.16	349	7125	0.16

	Curv	e Table						Curv	e Table						Cur	ve Table					Cur	ve Table						Curv	e Table		
Curve #	Length Radius Delta	Chord Direction	Chord Length	Tangent	Curve #	Length	Radius	Delta	Chord Direction	Chord Length	Tangent	Curve #	Length	Radius	Delta	Chord Direction	Chord Length	Tangent	Curve #	Length Radii	ıs Delta	Chord Direction	Chord Length	Tangent	Curve # L	Length	Radius	Delta	Chord Direction	Chord Length	h Tange
C1	12.34 8.00 88°21'33"	S67° 36' 13"W	11.15	7.77	C26	17.94	11.50	89°23'48"	N37° 30' 20"W	16.18	11.38	C51	16.96	11.50	84°29'51	" N81° 23' 43"E	15.46	10.45	C76	351.63 2025	.00 9°56'56"	S59° 41' 37"E	351.19	176.26	C101	65.30	390.00	9°35'36"	S44° 49' 22"E	65.22	32.7
C2	21.55 150.00 8°13'54"	S27° 32' 23"W	21.53	10.79	C27	18.19	11.50	90°36'12"	S52° 29' 40"W	16.35	11.62	C52	15.71	11.50	78°17'14	" S0° 34' 13"W	14.52	9.36	C77	131.81 425.	00 17°46'09	' N55° 47' 01"W	131.28	66.44	C102	48.71	370.00	7°32'36"	S43° 47' 51"E	48.68	24.3
C3	152.54 150.00 58°16'03"	S68° 39' 45"W	146.06	83.60	C28	18.06	11.50	90°00'00"	N52° 11' 35"E	16.26	11.50	C53	173.62	2 225.00	44°12'45	" N16° 28' 02"W	169.35	91.39	C78	283.93 375.	00 43°22'53	' N42° 58' 39"W	277.20	149.16	C103 1	168.69	390.00	24°46'58"	S70° 24' 57"E	167.38	85.6
C4	129.80 100.00 74°22'20"	S60° 36' 36"W	120.88	75.87	C29	18.06	11.50	90°00'00"	S37° 48′ 25"E	16.26	11.50	C54	77.78	125.00	35°39'07	" N23° 27' 54"E	76.53	40.20	C79	16.58 11.5	0 82°36'18	' S88° 12' 05"E	15.18	10.10	C104	80.07	370.00	12°24'00"	S62° 47' 09"E	79.92	40.1
C5	17.73 11.50 88°21'33"	N67° 36' 13"E	16.03	11.18	C30	18.06	11.50	90°00'00"	N52° 11' 35"E	16.26	11.50	C55	120.94	175.00	39°35'49	" N25° 26' 15"E	118.55	63.00	C80	17.62 11.5	60 87°47'31	' S6° 36' 01"W	15.95	11.07	C105	14.50	8.00	103°49'16"	N59° 06' 13"E	12.59	10.2
C6	17.28 11.50 86°05'56"	S19° 37' 32"E	15.70	10.74	C31	18.06	11.50	90°00'00"	S37° 48' 25"E	16.26	11.50	C56	20.30	475.00	2°26'57'	S45° 59' 20"E	20.30	10.15	C81	116.07 425.	00 15°38'53	' N29° 28' 18"W	115.71	58.40	C106	11.45	8.00	81°59'03"	S33° 47' 57"E	10.50	6.9
C7	12.56 8.00 89°56'28"	N68° 23' 40"E	11.31	7.99	C32	130.06	325.00	22°55'44"	N71° 20' 33"W	129.19	65.91	C57	16.81	11.00	87°33'03	" N89° 00' 40"E	15.22	10.54	C82	247.91 225.	00 63°07'43	' S52° 51' 04"E	235.55	138.23	C107	51.76	370.00	8°00'57"	S78° 47' 57"E	51.72	25.9
C8	12.58 8.00 90°05'01"	N21° 35' 36"W	11.32	8.01	C33	163.71	275.00	34°06'41"	N65° 45' 10"W	161.30	84.37	C58	19.19	11.00	99°57'18	" S4° 44' 30"E	16.85	13.10	C83	192.82 175.	00 63°07'43	' S52° 51' 04"E	183.21	107.51	C108	20.84	13.50	88°26'31"	S67° 33' 44"W	18.83	13.1
C9	233.71 475.00 28°11'27"	N54° 07' 17"W	231.36	119.27	C34	17.51	11.50	87°15'23"	N88° 26' 07"E	15.87	10.96	C59	91.22	525.00	9°57'18'	S49° 44' 30"E	91.10	45.72	C84	196.35 125.	00'00°90	' N50° 35' 05"E	176.78	125.00	C109	20.76	13.50	88°06'29"	S24° 09' 43"E	18.77	13.0
C10	207.53 525.00 22°38'57"	N51° 21' 02"W	206.18	105.14	C35	18.10	11.00	94°16'59"	N1° 33' 26"W	16.13	11.85	C60	214.64	375.00	32°47'39	" N22° 44' 58"E	211.72	110.35	C85	110.80 75.0	0 84°38'41	' N47° 54' 25"E	101.00	68.30							
C11	392.00 525.00 42°46'52"	S61° 24' 59"E	382.96	205.65	C36	17.96	11.50	89°30'01"	N89° 30' 52"W	16.19	11.40	C61	252.76	425.00	34°04'30	" N22° 40' 35"E	249.05	130.24	C86	327.44 225.	00 83°22'52	' N36° 06' 21"W	299.30	200.40							
C12	113.93 475.00 13°44'34"	S46° 53' 51"E	113.66	57.24	C37	17.98	11.50	89°35'03"	S0° 01' 40"W	16.20	11.42	C62	23.80	11.50	118°35'16	" N53° 39' 19"W	19.78	19.36	C87	254.67 175.	00 83°22'52	' N36° 06' 21"W	232.79	155.87							
C13	23.89 11.50 119°02'17"	N66° 42' 43"E	19.82	19.54	C38	128.33	275.00	26°44'11"	S32° 12' 58"W	127.16	65.35	C63	92.56	125.00	42°25'41	" N74° 25' 29"E	90.46	48.52	C88	17.67 11.5	60 88°02'29	' S58° 10' 58"W	15.98	11.11							
C14	14.22 11.50 70°51'32"	S28° 14' 11"E	13,33	8.18	C39	105.59	225.00	26°53'15"	S32° 17' 30"W	104.62	53.78	C64	55.54	75.00	42°25'41	" N74° 25' 29"E	54.28	29.11	C89	17.70 11.5	60 88°12'32	' S33° 41' 32"E	16.01	11.15							
C15	158.69 475.00 19°08'28"	S73° 14' 11"E	157.95	80.09	C40	293.95	62.00	271°39'02"	N63° 53' 38"E	86.41	-60.24	C65	64.50	125.00	29°33'58	" S67° 59' 38"W	63.79	32.99	C90	206.10 325.	00 36°20'03	' N32° 19' 45"E	202.66	106.65							
C16	165.57 630.00 15°03'28"	N56° 46' 23"W	165.09	83.26	C41	17.43	11.00	90°46'45"	S26° 32' 30"E	15.66	11.15	C66	15.48	11.50	77°08'17	" N44° 12' 28"E	14.34	9.17	C91	192.39 275.	00 40°05'02	' N30° 27' 15"E	188.49	100.32							
C17	257.66 610.00 24°12'05"	N52° 07' 36"W	255.75	130.78	C42	49.24	75.00	37°36'51"	N26° 00' 00"E	48.36	25.54	C67	18.06	11.50	90°00'00	" S50° 38' 19"W	16.26	11.50	C92	16.49 11.5	60 82°08'30	' N30° 39' 31"W	15.11	10.02							
C18	17.25 8.00 123°33'46"	N68° 58' 28"E	14.10	14.91	C43	78.90	125.00	36°09'46"	N26° 44' 19"E	77.59	40.81	C68	18.06	11.50	90°00'00	" S39° 21' 41"E	16.26	11.50	C93	42.51 325.	00 7°29'39"	S67° 58' 56"E	42.48	21.29							
C19	7.33 8.00 52°27'46"	S19° 02' 18"E	7.07	3.94	C44	228.77	410.00	31°58'11"	N66° 49' 20"W	225,82	117.45	C69	32.28	675.00	2°44'25'	N4° 16' 07"E	32,28	16.14	C94	54.55 275.	00 11°21'58	' S66° 02' 47"E	54.46	27.37							
C20	17.94 11.50 89°23'48"	N37° 30' 20"W	16.18	11.38	C45	103.17	430.00	13°44'49"	N75° 56' 01"W	102.92	51.83	C70	31.13	606.15	2°56'33'	S5° 46' 15"W	31.13	15.57	C95	17.08 11.5	60 85°06'04	' N65° 43' 13"E	15.55	10.56							
C21	18.19 11.50 90°36'12"	S52° 29' 40"W	16.35	11.62	C46	14.49	8.00	103°44'49"	N59° 03' 59"E	12.59	10.19	C71	20.85	13.50	88°30'29	" S37° 24' 00"E	18.84	13.15	C96	142.83 275.	00 29°45'30	' S25° 17' 29"W	141.23	73.06							
C22	17.94 11.50 89°23'48"	N37° 30' 20"W	16.18	11.38	C47	9.96	8.00	71°20'51"	S28° 28′ 51"E	9.33	5.74	C72	34.67	725.00	2°44'25'	N4° 16' 07"E	34.67	17.34	C97	96.44 325.	00 17°00'04	' S31° 40′ 13"W	96.08	48.57							
C23	18.19 11.50 90°36'12"	S52° 29' 40"W	16.35	11.62	C48	87.57	430.00	11°40'07"	N58° 19' 13"W	87.42	43.94	C73	44.56	549.25	4°38'54'	S4° 47' 22"W	44.55	22.29	C98	135.62 225.	00 34°32'04	' N22° 54' 12"E	133.57	69.94							
C24	17.94 11.50 89°23'48"	N37° 30' 20"W	16.18	11.38	C49	268.30	175.00	87°50'34"	N38° 16' 57"W	242.78	168.53	C74	21.60	13.50	91°39'56	" S52° 30' 48"W	19.37	13.90	C99	20.57 13.5	0 87°18'50	' S38° 01' 15"E	18.64	12.88							
C25	18.19 11.50 90°36'12"	S52° 29' 40"W	16.35	11.62	C50	101.50	225.00	25°50'53"	N69° 16' 47"W	100.65	51.63	C75	342.95	1975.00	9°56'56'	S59° 41' 37"E	342.51	171.90	C100	57.66 630.	00 5°14'37"	N42° 38' 52"W	57.64	28.85							

LIGHT BULB COLOR: WHIT POLE AND FIXTURE COLOR: BLACE CONNECT EQUIPMENT GROUNDING CONDUCTOR OF FEED CIRCUIT TO GROUND LUG IN HANDHOLE CONDUCTOR OF POLE PER N.E.	GK — GG — GE — GE — GE — GE — GE — GE —
FINISH GRADE	
LIGHTNING PROTECTION ¾" X 10" ROD WITH #4 AWG GROUND CONDUCTOR	36"
CONCRETE FOOTING DIMENSION: ANDSTEEL REINFORCING BAR: AS DIRECTED BY STRUCTURAL	
<u> </u>	LIGHT FIXTURE DETAIL SCALE=NONE

	N	
	GRAPHIC SCALE (IN FEET)	
100	0 50 100	20
	1 inch = 100 ft.	



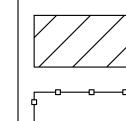
DESIGN COLLABORATIVE DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

Tree #	Size	Species OAK	+	Removed	Tree # 71	Size 24	Species CEDAR	Health Good	Remove X
2	48 18	HACKBERRY	Good	X	72	40	OAK	Good	X
3	18	MAPLE	Good	X	73	24	OSAGE ORANGE	Good	X
4	36	MAPLE	Good	X	74	20	OAK	Good	
5	36	MAPLE	Good		75	36	HACKBERRY	Good	Х
6	18	MAPLE	Good		76	52	POPLAR	Good	Λ
7	18	MAPLE	Good		77	42	HACKBERRY	Good	
8	18	MAPLE	Good		78	24	CEDAR	Poor	Х
9	24	MAPLE	Good		79	21	ELM	Good	X
10	18	MAPLE	Good		80	24	HACKBERRY	Good	X
11	21	CHERRY	Good		81	15	HACKBERRY	Good	
12	21	CHERRY	Good		82	28	ELM	Good	Х
13	21	CHERRY	Good		83	24	HACKBERRY	Poor	Х
14	21	CHERRY	Good		84	24	ELM	Good	Х
15	21	CHERRY	Good		85	18	HACKBERRY	Good	Х
16	18	CHERRY	Good		86	18	HACKBERRY	Good	Х
17	30	MAPLE	Good		87	26	HACKBERRY	Poor	Х
18	30	MAPLE	Good		88	24	HACKBERRY	Good	Х
19	18	MAPLE	Good		89	24	HACKBERRY	Good	Х
20	24	MAPLE	Good		90	20	ELM	Good	Х
21	21	MAPLE	Good		91	28	ELM	Good	Х
22	24	MAPLE	Good		92	24	OAK	Good	Х
23	24	MAPLE	Good		93	18	ASH	Good	Х
24	18	MAPLE	Good		94	21	HACKBERRY	Good	Х
25	24	MAPLE	Good		95	21	OAK	Good	Х
26	18	MAPLE	Good	Х	96	20	HACKBERRY	Good	Х
27	30	OAK	Good	Х	97	18	HACKBERRY	Good	Х
28	30	OAK	Good	Х	98	21	HACKBERRY	Good	Х
29	24	OAK	Good	X	99	24	HACKBERRY	Good	Х
30	30	HACKBERRY	Good	X	100	30	OAK	Good	Х
31	30	HACKBERRY	Good	X	101	24	HACKBERRY	Good	Х
32	24	OAK	Good	X	102	20	ELM	Good	X
33	30	OAK	Good	X	103	20	HACKBERRY	Good	X
34	21	OAK	Good	Х	104	20	ELM	Good	X
35	21	OAK	Good		105	18	HACKBERRY	Good	X
36	24	OAK	Good		106	21	HACKBERRY	Poor	X
37	24	OAK	Good	X	107	21	HACKBERRY	Poor	X
38	24	HACKBERRY	Good	X	108 109	24 18	HACKBERRY ELM	Good	X
39	24	HACKBERRY	Good	Х	110	24	HACKBERRY	Good Good	Х
40	30	HACKBERRY	Good	X	111	18	BOXELDER	Good	
41 42	24 24	HACKBERRY HACKBERRY	Good	X	112	18	OAK	Good	Х
43	36	ELM	Good		113	24	HACKBERRY	Good	X
44	36	SYCAMORE	Dead	X	114	21	OAK	Good	X
45	24	HACKBERRY	Good	X	115	18	OAK	Good	X
46	24	CHERRY	Good	X	116	18	HACKBERRY	Good	X
47	24	HACKBERRY	Good	X	117	36	HACKBERRY	Good	X
48	18	HACKBERRY	Good	X	118	36	CHERRY	Good	X
49	20	ELM	Good	X	119	18	HACKBERRY	Good	X
50	18	HACKBERRY	Good	X	120	26	OAK	Good	X
51	24	CEDAR	Good		121	18	CHERRY	Good	X
52	20	CEDAR	Good		122	18	HACKBERRY	Good	X
53	24	SUMAC	Good		123	18	HACKBERRY	Good	X
54	24	OAK	Good		124	18	OAK	Good	X
55	24	OAK	Good		125	18	HACKBERRY	Good	X
56	36	OAK	Good		126	18	OAK	Good	X
57	20	CEDAR	Good		127	24	HACKBERRY	Good	Х
58	20	HACKBERRY	Good		128	18	HACKBERRY	Good	Х
59	18	CEDAR	Good		129	18	HACKBERRY	Good	Х
60	18	CEDAR	Good		130	30	OAK	Good	Х
61	30	OAK	Good		131	24	HACKBERRY	Good	Х
62	22	CEDAR	Good		132	24	ELM	Good	Х
63	50	OAK	Good		133	24	ELM	Good	
64	24	ELM	Good		134	18	BOXELDER	Good	Х
65	24	OAK	Good	Х	135	24	BOXELDER	Good	Х
66	20	CEDAR	Good	Х	136	24	HACKBERRY	Good	
67	24	CEDAR	Good	Х	137	48	OAK	Good	
68	28	OAK	Good	Х	138	18	HACKBERRY	Good	
69	24	OAK	Good	Х	139	18	HACKBERRY	Good	
70	21	OSAGE ORANGE	Good	Х	140	24	OAK	Good	

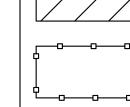
*NOTE: HEALTH OF TREES TO BE FURTHER EVALUATED PRIOR TO SUBMITTAL OF CONSTRUCTION DRAWINGS PER PHASE

TREE CANOPY

EXISTING TREE CANOPY



TREE CANOPY REMOVED



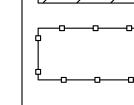
63.56 AC

38.30 AC

25.26 AC

2,161 3,241.5

53%



TREE PROTECTION FENCE

EXISTING TREE COVERAGE:

SITE PERCENTAGE TREE COVERAGE: REMOVED TREE CANOPY:

RETAINED TREE CANOPY: (40% OF EXISTING TREE COVERAGE) SPECIMEN INCHES REMOVED:

MITIGATED INCHES REQUIRED: (2,206 IN * 1.5)

TREE MITIGATION NOTES

THE FOLLOWING TREES WILL ACCOUNT FOR TREE REPLACEMENT IN FUTURE CONSTRUCTION PLANS:

- OPEN SPACE TREES

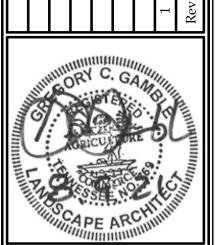
- STREET TREES

- BUFFER CANOPY TREES

- LOT TREES



THOMPSONS STATION RD. E THE VILLAGE MATCHLINE L I.O MATCHLINE LI.I



Issue Date: June 28, 2021

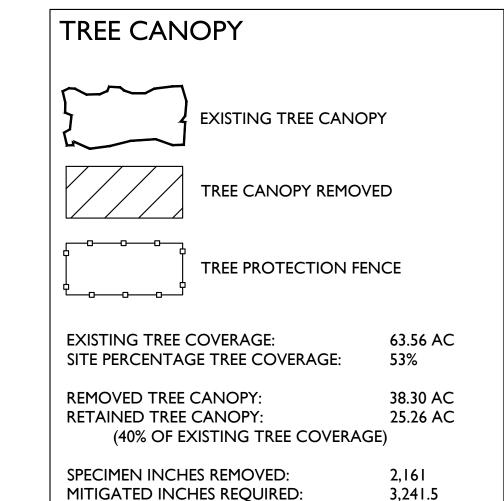
MITIGATION AND PRESERVATION



Tree #	Size	Species		Removed	Tree #	Size	Species		Remove
1	48	OAK	Good		71	24	CEDAR	Good	Х
2	18	HACKBERRY	Good	Х	72	40	OAK	Good	Х
3	18	MAPLE	Good	X	73	24	OSAGE ORANGE	Good	Х
4	36	MAPLE	Good	X	74	20	OAK	Good	.,
5	36	MAPLE	Good		75	36	HACKBERRY	Good	Х
6	18	MAPLE	Good		76	52	POPLAR	Good	
7	18	MAPLE	Good		77	42	HACKBERRY	Good	V
8	18	MAPLE	Good		78	24	CEDAR	Poor	X
9	24	MAPLE	Good		79	21	ELM	Good	X
10	18 21	MAPLE CHERRY	Good		80 81	24 15	HACKBERRY HACKBERRY	Good	Х
12	21	CHERRY	Good		82	28	ELM	Good	Х
13	21	CHERRY	Good		83	24	HACKBERRY	Poor	X
14	21	CHERRY	Good		84	24	ELM	Good	X
15	21	CHERRY	Good		85	18	HACKBERRY	Good	X
16	18	CHERRY	Good		86	18	HACKBERRY	Good	X
17	30	MAPLE	Good		87	26	HACKBERRY	Poor	X
18	30	MAPLE	Good		88	24	HACKBERRY	Good	X
19	18	MAPLE	Good		89	24	HACKBERRY	Good	X
20	24	MAPLE	Good		90	20	ELM	Good	X
21	21	MAPLE	Good		91	28	ELM	Good	X
22	24	MAPLE	Good		92	24	OAK	Good	X
23	24	MAPLE	Good		93	18	ASH	Good	X
24	18	MAPLE	Good		94	21	HACKBERRY	Good	X
25	24	MAPLE	Good		95	21	OAK	Good	X
26	18	MAPLE	Good	Х	96	20	HACKBERRY	Good	X
27	30	OAK	Good	X	97	18	HACKBERRY	Good	Х
28	30	OAK	Good	X	98	21	HACKBERRY	Good	Х
29	24	OAK	Good	X	99	24	HACKBERRY	Good	Х
30	30	HACKBERRY	Good	X	100	30	OAK	Good	Х
31	30	HACKBERRY	Good	X	101	24	HACKBERRY	Good	Х
32	24	OAK	Good	Х	102	20	ELM	Good	Х
33	30	OAK	Good	Х	103	20	HACKBERRY	Good	Х
34	21	OAK	Good	Х	104	20	ELM	Good	Х
35	21	OAK	Good		105	18	HACKBERRY	Good	Х
36	24	OAK	Good		106	21	HACKBERRY	Poor	Х
37	24	OAK	Good	Х	107	21	HACKBERRY	Poor	Х
38	24	HACKBERRY	Good	Х	108	24	HACKBERRY	Good	Х
39	24	HACKBERRY	Good	Х	109	18	ELM	Good	Х
40	30	HACKBERRY	Good		110	24	HACKBERRY	Good	
41	24	HACKBERRY	Good	Х	111	18	BOXELDER	Good	
42	24	HACKBERRY	Good	Х	112	18	OAK	Good	Х
43	36	ELM	Good		113	24	HACKBERRY	Good	Х
44	36	SYCAMORE	Dead	Х	114	21	OAK	Good	Х
45	24	HACKBERRY	Good	Х	115	18	OAK	Good	Х
46	24	CHERRY	Good	Х	116	18	HACKBERRY	Good	Х
47	24	HACKBERRY	Good	Х	117	36	HACKBERRY	Good	Х
48	18	HACKBERRY	Good	Х	118	36	CHERRY	Good	Х
49	20	ELM	Good	Х	119	18	HACKBERRY	Good	Х
50	18	HACKBERRY	Good	Х	120	26	OAK	Good	Х
51	24	CEDAR	Good		121	18	CHERRY	Good	Х
52	20	CEDAR	Good		122	18	HACKBERRY	Good	Х
53	24	SUMAC	Good		123	18	HACKBERRY	Good	Х
54	24	OAK	Good		124	18	OAK	Good	Х
55	24	OAK	Good		125	18	HACKBERRY	Good	Х
56	36	OAK	Good		126	18	OAK	Good	Х
57	20	CEDAR	Good		127	24	HACKBERRY	Good	Х
58	20	HACKBERRY	Good		128	18	HACKBERRY	Good	Х
59	18	CEDAR	Good		129	18	HACKBERRY	Good	Х
60	18	CEDAR	Good		130	30	OAK	Good	Х
61	30	OAK	Good		131	24	HACKBERRY	Good	Х
62	22	CEDAR	Good		132	24	ELM	Good	Х
63	50	OAK	Good		133	24	ELM	Good	
64	24	ELM	Good		134	18	BOXELDER	Good	Х
65	24	OAK	Good	Х	135	24	BOXELDER	Good	Х
66	20	CEDAR	Good	Х	136	24	HACKBERRY	Good	
67	24	CEDAR	Good	Х	137	48	OAK	Good	
68	28	OAK	Good	Х	138	18	HACKBERRY	Good	
69	24	OAK	Good	x	139	18	HACKBERRY	Good	_

Tree #	Size	Species	Health	Removed
141	18	HACKBERRY	Good	
142	24	CEDAR	Good	Х
143	18	CEDAR	Good	
144	21	CEDAR	Good	
145	18	CEDAR	Good	
146	18	CEDAR	Good	
147	21	CEDAR	Good	
148	21	CEDAR	Good	
149	21	CEDAR	Good	Х
150	18	PINE	Good	
151	20	PINE	Good	Х
152	24	CEDAR	Good	Χ
153	18	PINE	Good	Х
154	18	CEDAR	Good	
155	18	CEDAR	Good	
156	18	CEDAR	Good	
157	21	PINE	Good	Х
158	21	PINE	Good	Х
159	21	CEDAR	Good	Х
160	24	CEDAR	Good	Х
161	22	CEDAR	Good	
162	18	PINE	Good	Х
163	18	PINE	Good	Х
164	18	PINE	Good	Х
165	18	PINE	Good	Х

*NOTE: HEALTH OF TREES TO BE FURTHER EVALUATED PRIOR TO SUBMITTAL OF CONSTRUCTION DRAWINGS PER PHASE



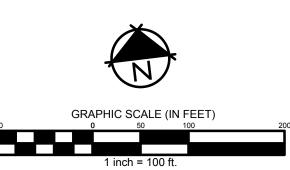
TREE MITIGATION NOTES

(2,206 IN * 1.5)

THE FOLLOWING TREES WILL ACCOUNT FOR TREE REPLACEMENT IN FUTURE CONSTRUCTION PLANS: - OPEN SPACE TREES - STREET TREES - BUFFER CANOPY TREES - LOT TREES



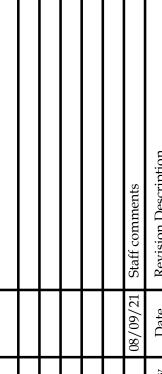
MATCHLINE LI.0

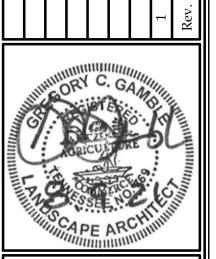






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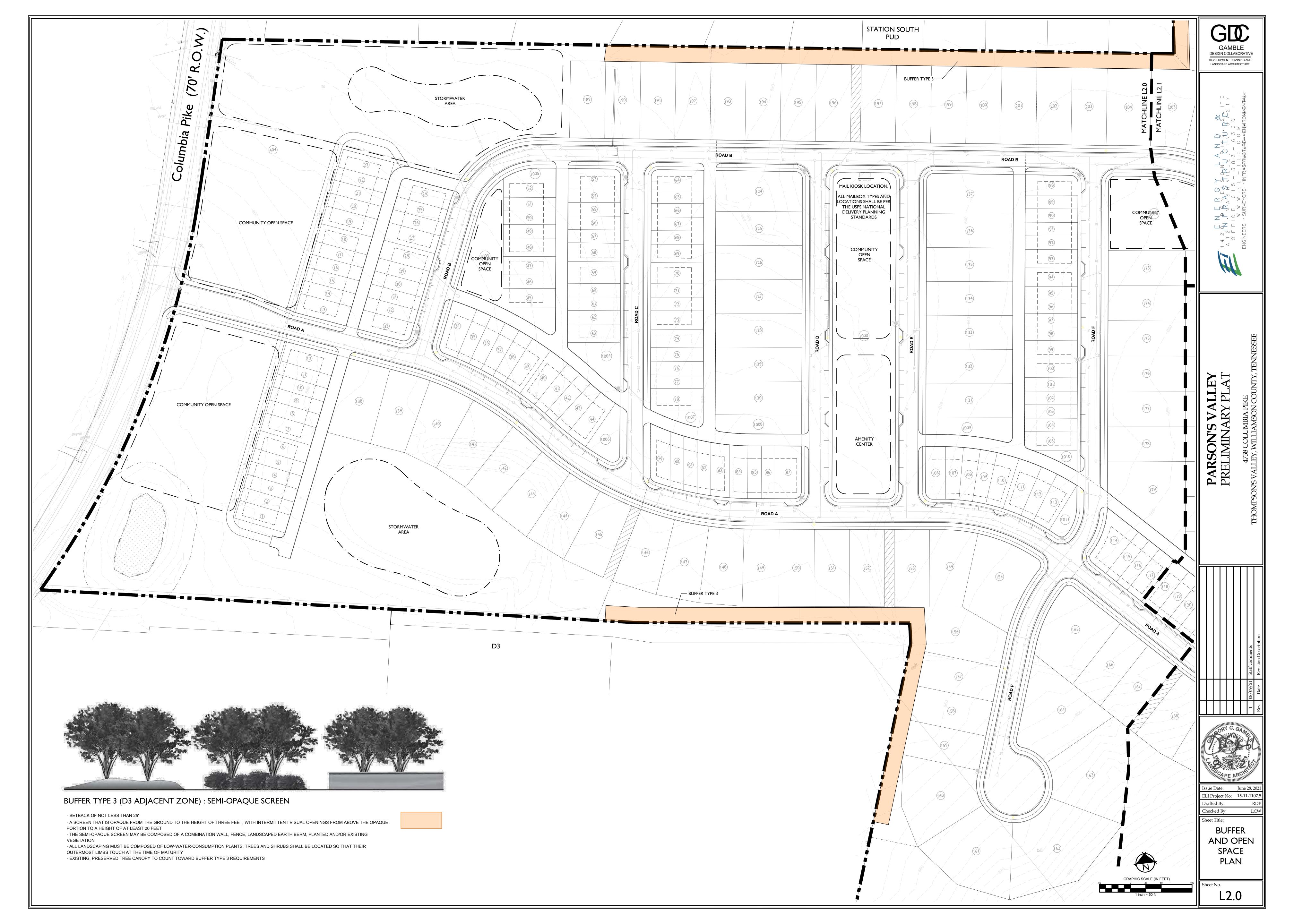


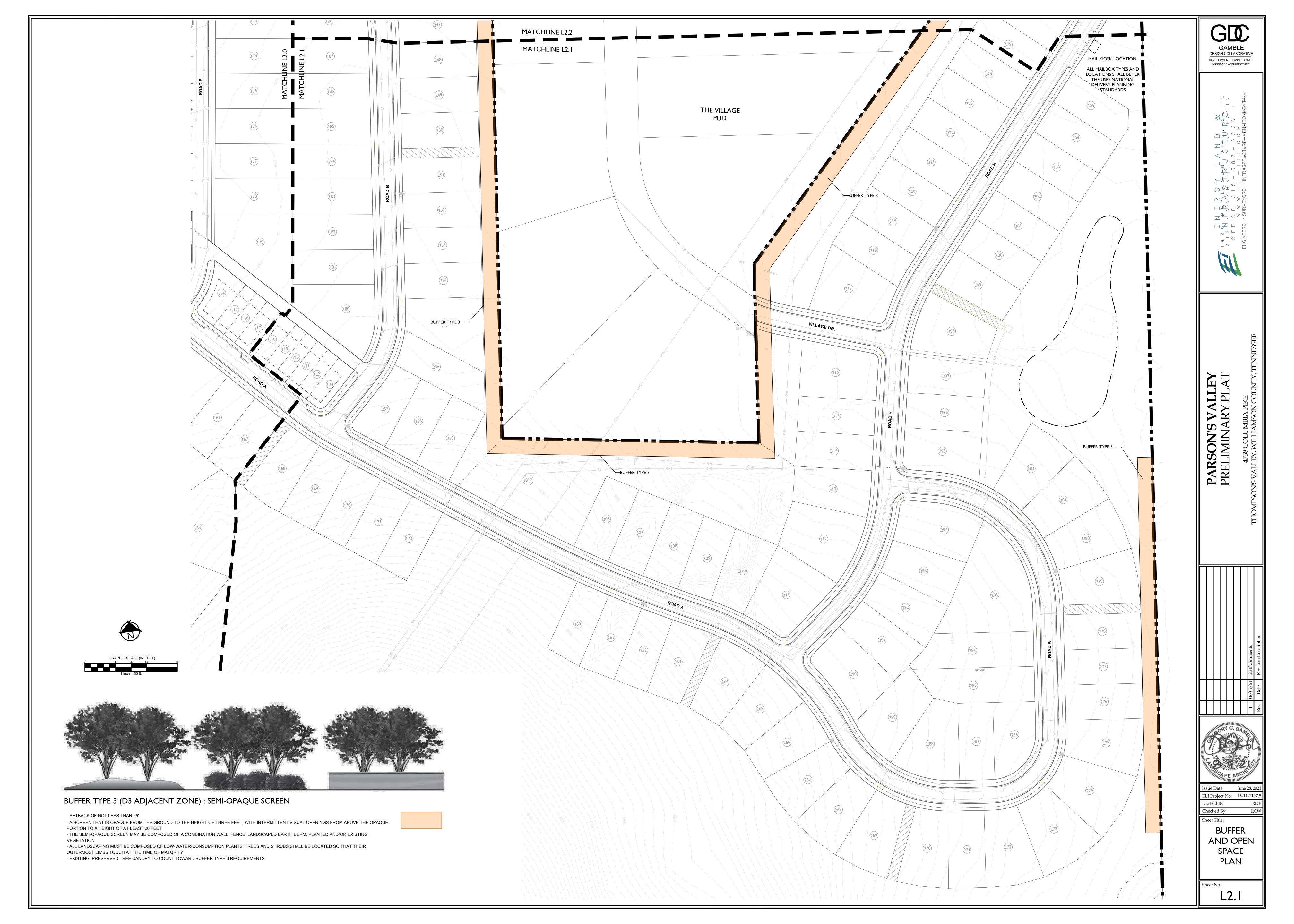


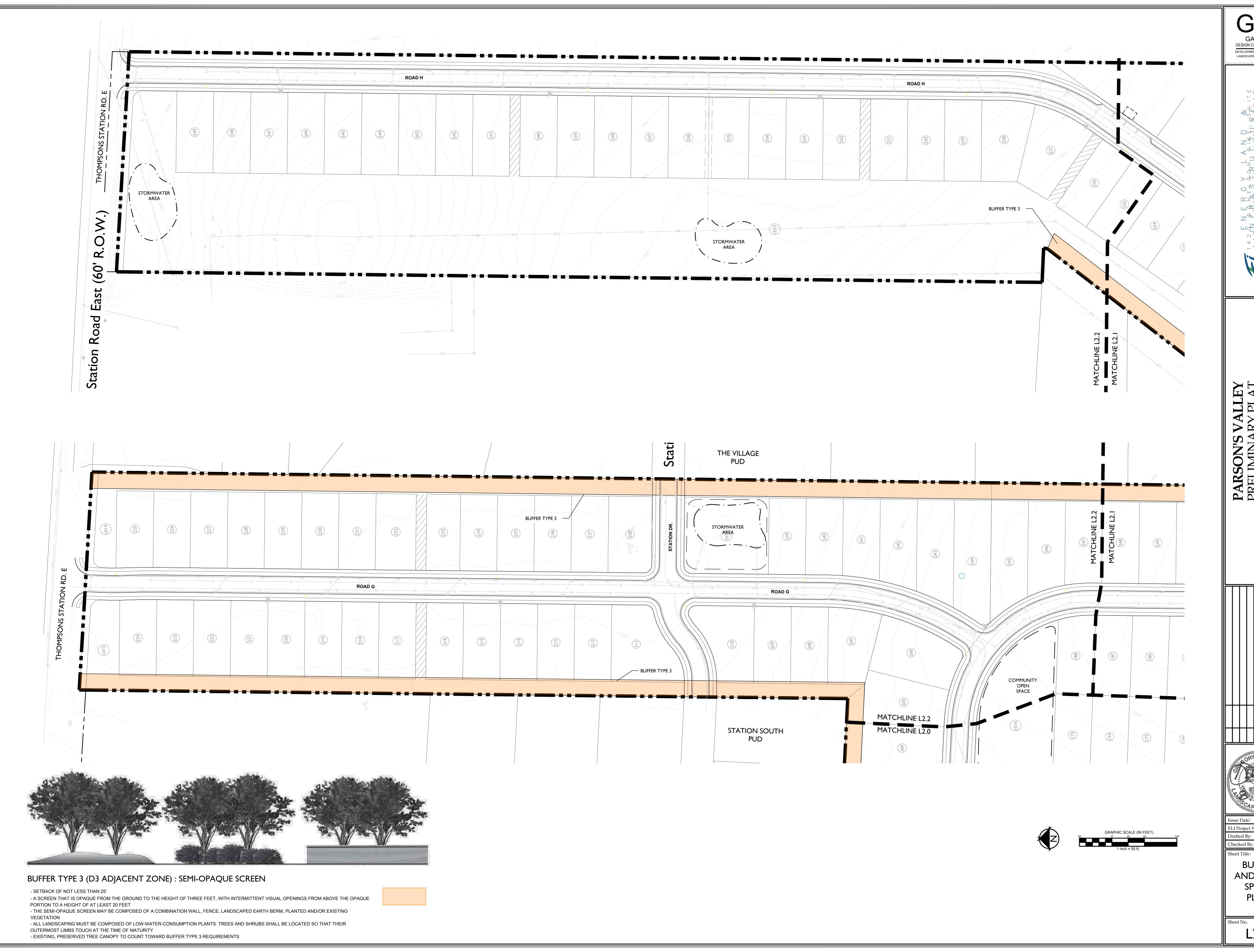
ELI Project No: 15-11-1107.5 Checked By:

MITIGATION AND PRESERVATION

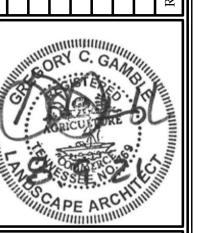
Sheet No.







GAMBLE DESIGN COLLABORATIVE LANDSCAPE ARCHITECTURE



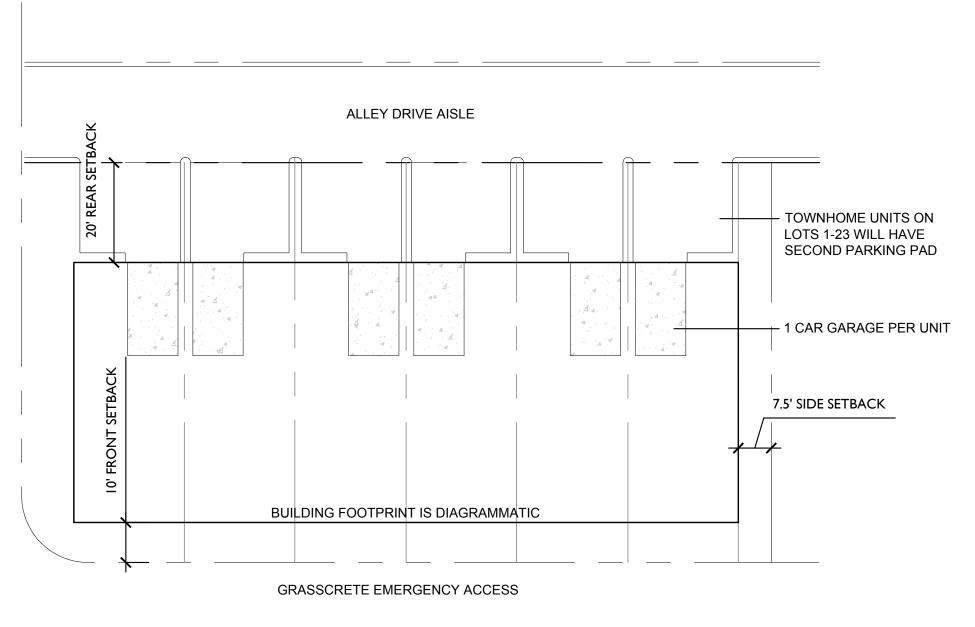
Issue Date: June 28, 2021 ELI Project No: 15-11-1107.5 Drafted By:

BUFFER AND OPEN **SPACE PLAN**

TOWNHOME **PARKING EXHIBIT**

Sheet No.

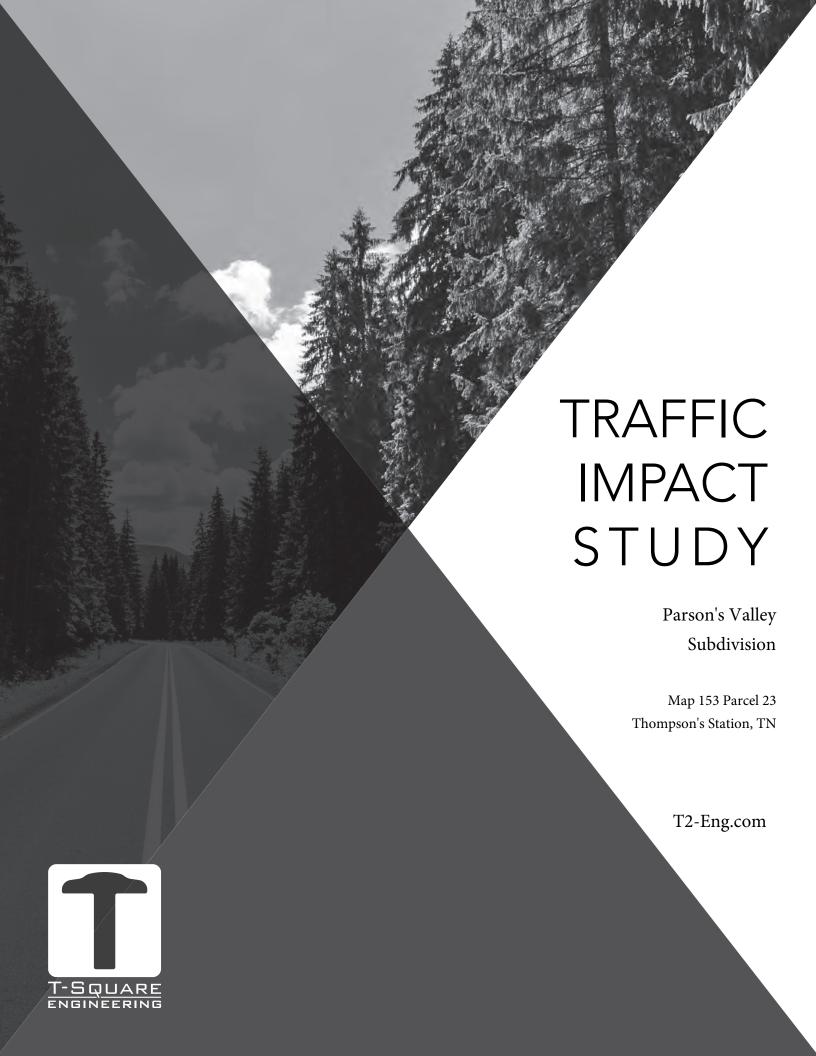
EXI.0



TOWN HOME LOTS 1-23 PARKING DIAGRAM







TRAFFIC IMPACT STUDY

Parson's Valley Subdivision Map 153 Parcel 23 Thompson's Station, TN

Prepared for:



205 Powell Place Brentwood, TN 37027

Prepared by:



701 West Main Street Franklin, TN 37064 615.678.8212 www.T2-eng.com

Certification

I certify that this Traffic Impact Study has been prepared by me and under my immediate supervision and that I have the experience and training in the field of traffic and transportation engineering.



Blake A. Turner, P.E. T-Square Engineering, Inc. Principal – Vice President



TABLE OF CONTENTS

Introduction	
Existing Study Area	
Existing Roadway Network	
Existing Intersections	6
Existing Traffic Volumes	<u>C</u>
Intersection Turning Movement Counts	<u>C</u>
Crash Analysis	
Existing Capacity Analyses	
Intersection Assessments (Existing Conditions)	
Major Road Approach Geometry Warrants - Projected	
Background Traffic Volumes	20
Background Capacity Analyses	23
Impacts	24
Projected Traffic Distribution and Assignments	24
Projected Capacity Analyses	28
Intersection Assessments (Projected Conditions)	30
Major Road Approach Geometry Warrants - Projected	30
Minor Road Approach Geometry Warrants – Projected	36
Traffic Signal Warrants - Projected	40
Sight Distance Analysis	43
Columbia Pike and Site Access 1	43
Thompson's Station Road and Site Access 2	44
Thompson's Station Road and Site Access 3	44
Conclusions	48
Recommendations	51
Improvement Recommendations for the Parson's Valley Subdivision	51



List of Tables

Table 1. Turning Movement Counts, Thompson's Station Road and Columbia Pike	9
Table 2. Turning Movement Counts, Columbia Pike and Station South Drive	9
Table 3. Turning Movement Counts, Thompson's Station Road and Village Drive	9
Table 4. Turning Movement Counts, Thompson's Station Road and Clayton Arnold Road	10
Table 5. Intersection Crash Type Summary	14
Table 6. Segment Crash Type Summary	15
Table 7. Level of Service (LOS) Details	16
Table 8. Existing Capacity Analyses (2021)	17
Table 9. Major-Road Approach Geometry, WBR Thompson's Station Road at Clayton Arnold Road	18
Table 10. Major-Road Approach Geometry, SBL Columbia Pike at Station South Drive	19
Table 11. Background Capacity Analyses (2023)	23
Table 12. Parson's Valley Subdivision Trip Generation	24
Table 13. Projected Capacity Analyses (2023)	28
Table 14. Major-Road Approach Geometry, NBR Columbia Pike at Station South Drive	30
Table 15. Major-Road Approach Geometry, EBR Thompson's Station Road at Village Drive	31
Table 16. Major-Road Approach Geometry, NBR Columbia Pike at Site Access 1	31
Table 17. Major-Road Approach Geometry, EBR Thompson's Station Road at Site Access 2	32
Table 18. Major-Road Approach Geometry, EBR Thompson's Station Road at Site Access 3	32
Table 19. Major-Road Approach Geometry, WBL Thompson's Station Road at Village Drive	33
Table 20. Major-Road Approach Geometry, EBL Thompson's Station Road at Clayton Arnold Road	33
Table 21. Major-Road Approach Geometry, SBL Columbia Pike at Site Access 1	34
Table 22. Major-Road Approach Geometry, WBL Thompson's Station Road at Site Access 2	34
Table 23. Major-Road Approach Geometry, WBL Thompson's Station Road at Site Access 3	35
Table 24. Minor-Road Approach Geometry, WBR Station South Drive at Columbia Pike	36
Table 25. Minor-Road Approach Geometry, NBR Village Drive at Thompson's Station Road	37
Table 26. Minor-Road Approach Geometry, WBR Site Access 1 at Columbia Pike	37
Table 27. Minor-Road Approach Geometry, NBR Site Access 2 at Thompson's Station Road	38
Table 28. Minor-Road Approach Geometry, NB Site Access 3 at Thompson's Station Road	39
Table 29. Signal Warrant Analysis, Columbia Pike and Station South Drive	40
Table 30. Signal Warrant Analysis, Thompson's Station Road and Village Drive	41
Table 31. Signal Warrant Analysis, Thompson's Station Road and Clayton Arnold Road	41
Table 32. Signal Warrant Analysis, Columbia Pike and Site Access 1	42
Table 33. Signal Warrant Analysis, Thompson's Station Road and Site Access 2	42
Table 34. Signal Warrant Analysis, Thompson's Station Road and Site Access 3	43



List of Figures

Figure 1. Location Map	
Figure 2. Preliminary Site Plan	
Figure 3. Existing Lane Geometry	
Figure 4. Existing Traffic Volumes (2021)	11
Figure 5. TDOT Count Locations & Background Traffic Growth Trends	21
Figure 6. Background Peak Hour Traffic Volumes (2023)	22
Figure 7. Distribution of Generated Peak Hour Traffic Volumes (Primary)	25
Figure 8. Assignment of Generated Peak Hour Traffic Volumes (Primary)	26
Figure 9. Projected Traffic Volumes (2023)	27
Figure 10. Sight Distance Analysis (Columbia Pike and Site Access 1)	45
Figure 11. Sight Distance Analysis (Thompson's Station Road and Site Access 2)	46
Figure 12. Sight Distance Analysis (Thompson's Station Road and Site Access 3)	47
Figure 13. Recommended Improvements	5:



Introduction

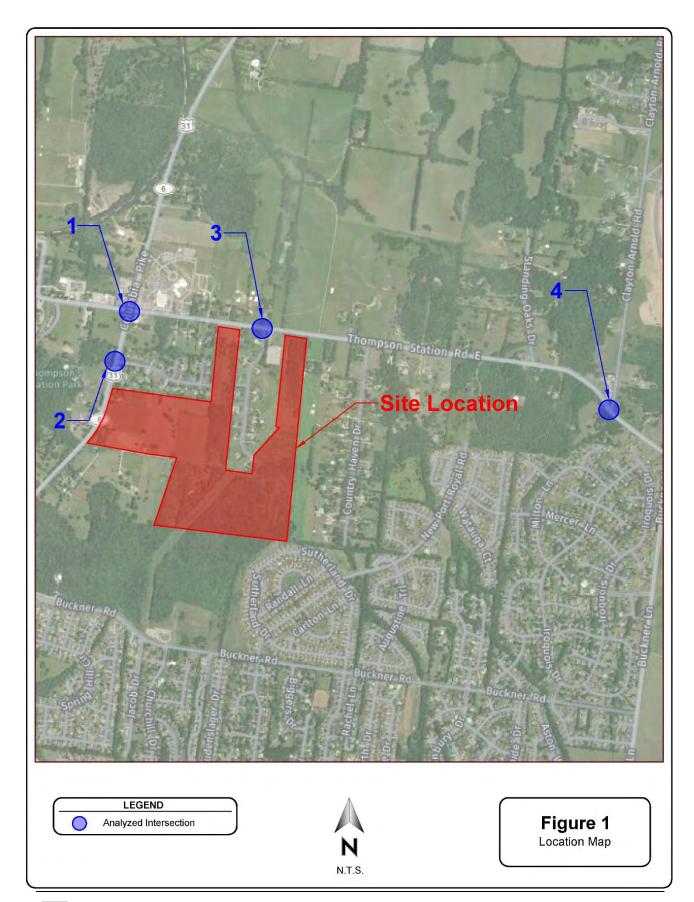
The purpose of this study is to analyze the traffic impacts on the surrounding roadway network associated with the proposed Parson's Valley Subdivision along Thompson's Station Road and Columbia Pike in Thompson's Station, TN. The development will consist of approximately 230 single-family homes and 123 townhomes.

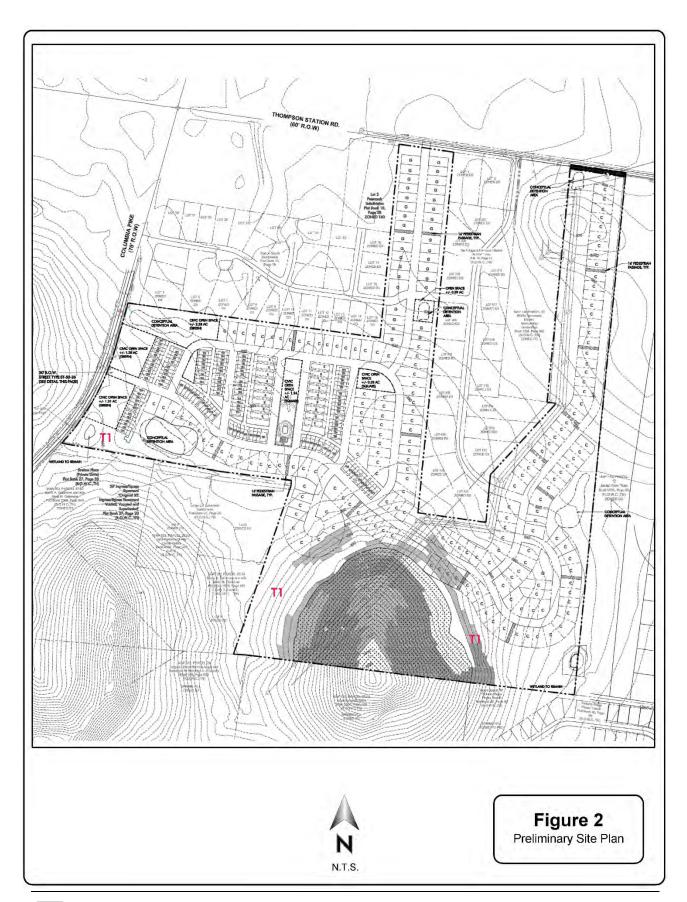
As shown on the Location Map and Preliminary Site Plan on Figures 1 and 2, respectively, the property is located on Thompson's Station Road and Columbia Pike. The development is proposing three (3) site access points; one (1) to be located on the east side of Columbia Pike approximately 850 feet south of the intersection of Columbia Pike and Station South Drive, one (1) to be located on the south side of Thompson's Station Road approximately 550 feet west of the intersection of Thompson's Station Road and Village Drive, and one (1) to be located on the south side of Thompson's Station Road approximately 650 feet east of the intersection of Thompson's Station Road and Village Drive. The development will also utilize the intersections of Columbia Pike and Station South Drive and Thompson's Station Road and Village Drive to provide access to the site. The surrounding area is predominantly residential.

This study analyzes the existing and projected traffic operations of the roadway networks and intersections surrounding the proposed development. To evaluate the projected traffic operations, existing traffic volumes were grown (background traffic volumes) to a 2023 design year based on average traffic growth rates with estimated trips generated from the proposed development added. Lastly, improvement recommendations were presented to alleviate the expected traffic volume's effect on the existing roadway network.



July 2021





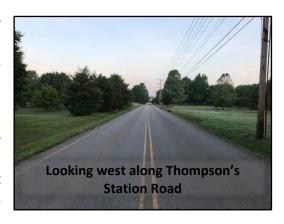
Existing Study Area

Existing Roadway Network

The existing roadway network surrounding the proposed Parson's Valley Subdivision includes Thompson's Station Road, Columbia Pike, Station South Drive, Village Drive, and Clayton Arnold Road. Below is a description of each roadway serving the proposed development:

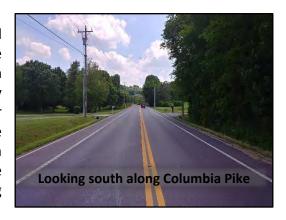
Thompson's Station Road

Thompson's Station Road is functionally classified by the General Plan for Thompson's Station as a Collector. Near the project site, Thompson's Station Road is oriented in an east-west direction and provides a connection between Lewisburg Pike to the east and Carters Creek Pike to the west. Near the project site, Thompson's Station Road is a two (2) lane roadway with one (1) ten (10) foot travel lane in each direction (eastbound and westbound) and one (1) foot shoulders. The posted speed limit along Thompson's Station Road is 45 MPH.



Columbia Pike

Columbia Pike is functionally classified by the General Plan for Thompson's Station as an Arterial. Near the project site, Columbia Pike is oriented in a north-south direction and provides a connection between the City of Franklin to the north and TN-396 to the south. Near the project site, Columbia Pike is a two (2) lane roadway with one (1) twelve (12) foot travel lane in each direction (northbound and southbound) and one (1) foot shoulders. The posted speed limit along Columbia Pike is 45 MPH.



Station South Drive

Station South Drive is functionally classified by the General Plan for Thompson's Station as a Local Road. Near the project site, Station South Drive is oriented in an east-west direction and provides a connection to Columbia Pike to the west and terminates to the east. Near the project site, Station South Drive is a two (2) lane roadway with one (1) twelve (12) foot travel lane in each direction (eastbound and westbound) and two (2) foot shoulders. The posted speed limit along Station South Drive is 25 MPH.



Village Drive

Village Drive is functionally classified by the General Plan for Thompson's Station as a Local Road. Near the project site, Village Drive is oriented in a north-south direction and provides a connection from Thompson's Station Road to the north and terminates to the south. Village Drive is a two (2) lane roadway with one (1) eleven (11) foot travel lane in each direction (northbound and southbound) and two (2) foot shoulders. The posted speed limit along Village Drive is 25 MPH.



Clayton Arnold Road

Clayton Arnold Road is functionally classified by the General Plan for Thompson's Station as a Collector. Near the project site, Clayton Arnold Road is oriented in a north-south direction and provides a connection from Critz Lane to the north and Thompson's Station Road to the south. Clayton Arnold Road is a two (2) lane roadway with one (1) ten (10) foot travel lane in each direction (northbound and southbound) and two (2) foot shoulders. The posted speed limit along Clayton Arnold Road is 45 MPH.

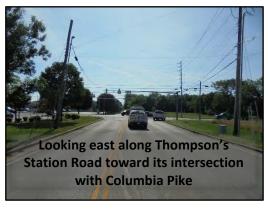


Existing Intersections

This study analyzed four (4) existing intersections within the vicinity of the project site. The intersections analyzed are listed below with a brief description of each, and Figure 3 shows the existing lane geometry at the intersections.

Thompson's Station Road and Columbia Pike

The existing intersection of Thompson's Station Road and Columbia Pike is a signalized intersection with four (4) approaches. The northbound approach of Columbia Pike has one (1) exclusive lane for left-turn movements with approximately 155 feet of storage and one (1) shared lane for through and right-turn movements. The southbound approach of Columbia Pike has one (1) exclusive lane for left-turn movements with approximately 155 feet of storage and one (1) shared lane for through and right-turn movements. The eastbound approach of Thompson's Station Road has



one (1) exclusive lane for left-turn movements with approximately 125 feet of storage and one (1) shared lane for through and right-turn movements. The westbound approach of Thompson's Station Road has one (1) exclusive lane for left-turn movements with approximately 100 feet of storage and one (1) shared lane for through and right-turn movements.

Columbia Pike and Station South Drive

The existing intersection of Columbia Pike and Station South Drive is an unsignalized intersection with three (3) approaches. The northbound approach of Columbia Pike has one (1) shared lane for through and right-turn movements operating under a free-flow condition. The southbound approach of Columbia Pike has one (1) shared lane for left-turn and through movements operating under a free-flow condition. The westbound approach of Station South Drive has one (1) shared lane for left-turn and right-turn movements operating under a stop condition.



July 2021

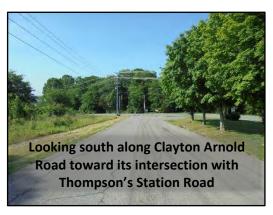
Thompson's Station Road and Village Drive

The existing intersection of Thompson's Station Road and Village Drive is an unsignalized intersection with three (3) approaches. The eastbound approach of Thompson's Station Road has one (1) shared lane for through and right-turn movements operating under a free-flow condition. The westbound approach of Thompson's Station Road has one (1) shared lane for left-turn and through movements operating under a free-flow condition. The northbound approach of Village Drive has one (1) shared lane for left-turn and right-turn movements operating under a stop condition.



Thompson's Station Road and Clayton Arnold Road

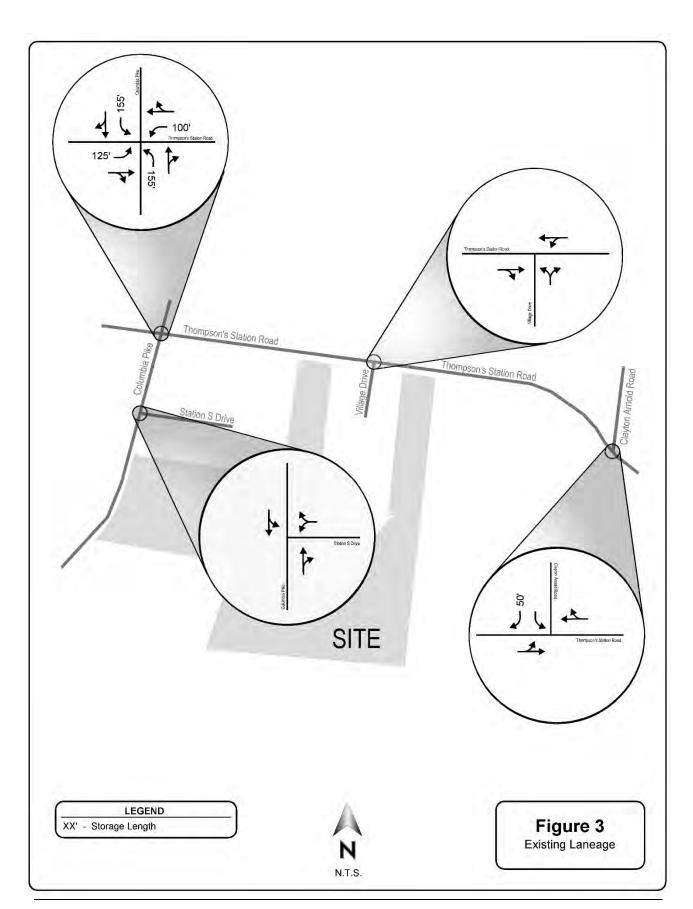
The existing intersection of Thompson's Station Road and Clayton Arnold Road is an unsignalized intersection with three (3) approaches. The eastbound approach of Thompson's Station Road has one (1) shared lane for left-turn and through movements operating under a free-flow condition. The westbound approach of Thompson's Station Road has one (1) shared lane for through and right-turn movements operating under a free-flow condition. The southbound approach of Clayton Arnold Road has one (1) exclusive lane for left-turn movements and one (1) exclusive channelized lane for right-turn movements with



approximately eighty (80) feet of storage operating under a stop condition.



July 2021



Existing Traffic Volumes

Intersection Turning Movement Counts

To establish existing traffic volumes within the study area, T-Square Engineering conducted turning movement counts at the study intersections on a typical weekday in May 2018. The turning movement counts were conducted over a total of six (6) hours from 6:00 AM - 9:00 AM and 3:00 PM - 6:00 PM. From the turning movement counts, the AM and PM peak hour traffic volumes were established and determined to occur between 7:15 AM - 8:15 AM and 4:30 PM - 5:30 PM, respectively.

However, in order to account for the reduction in traffic volumes due to Williamson County Schools not being in session at the time of collection, the collected traffic volumes were grown by approximately four percent (4%). Furthermore, the existing traffic volumes were then grown by +2.00% for three (3) years to represent the 2021 existing traffic volumes. The 2021 existing peak hour totals at the study intersections for the AM and PM peak hour periods are shown on Figure 4. The 2018 existing hourly turning movement counts are shown in the tables below and on Figure D1 in Appendix D. Appendix A contains the detailed 2018 existing turning movement counts at the study intersections. Appendix C contains the detailed turning movement counts at each intersection.

Table 1. Turning Movement Counts, Thompson's Station Road and Columbia Pike

	NC	RTHBO	UND	SO	UTHBOU	ND	W	/ESTBOUN	ID	EASTBOUND		
Time	Co	lumbia	Pike	Col	Columbia Pike		Thompson's Station Road			Thompson's Station Road		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
6:00 – 7:00 AM	35	1,013	16	8	248	10	19	23	31	29	12	25
7:00 – 8:00	56	932	14	11	411	25	48	50	27	41	13	54
8:00 - 9:00	93	839	26	31	555	37	46	37	22	59	27	59
3:00 – 4:00 PM	93	601	55	28	661	43	55	31	12	31	49	99
4:00 - 5:00	63	597	70	27	846	22	64	31	6	43	55	144
5:00 - 6:00	72	638	74	31	831	22	72	37	1	55	37	120
TOTAL	412	4,620	255	136	3,552	159	304	209	99	258	193	501

Table 2. Turning Movement Counts, Columbia Pike and Station South Drive

	NO	ORTHBOU	ND	S	OUTHBOU	ND	WESTBOUND				
Time	Co	Columbia Pike		С	Columbia Pike			Station South Drive			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:00 – 7:00 AM	0	1,060	2	0	293	0	1	0	6		
7:00 – 8:00	0	995	0	2	510	0	0	0	8		
8:00 – 9:00	0	950	0	3	657	0	1	0	7		
3:00 – 4:00 PM	0	744	5	7	806	0	1	0	5		
4:00 - 5:00	0	726	6	9	1,044	0	3	0	2		
5:00 - 6:00	0	777	6	12	1,010	0	4	0	5		
TOTAL	0	5,252	19	33	4,320	0	10	0	33		

Table 3. Turning Movement Counts, Thompson's Station Road and Village Drive

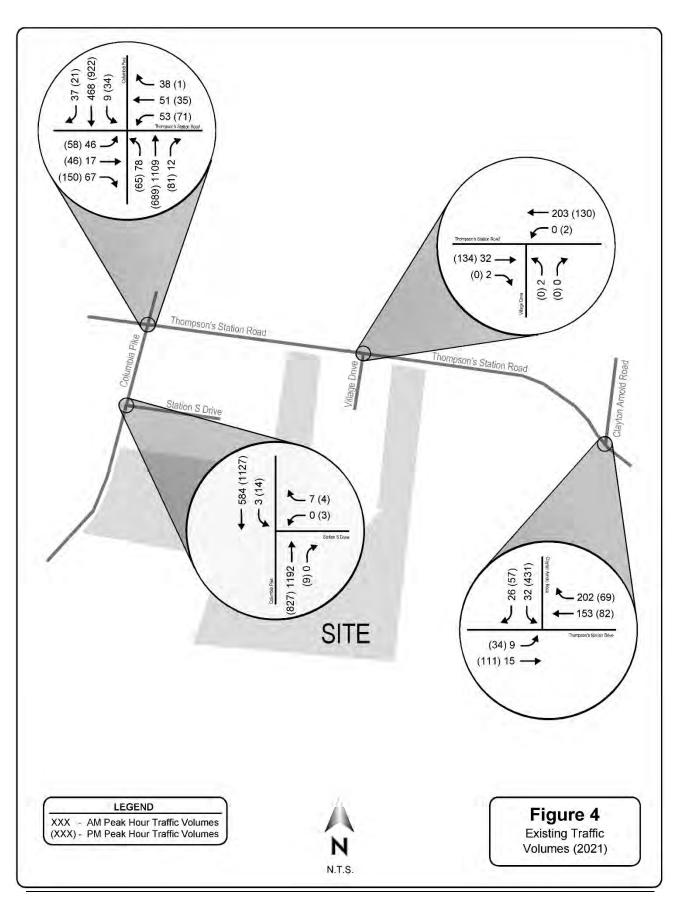
Tubic 3: Turring ivid	rable 3. Farming Movement Counts, Friendpoor 3 Station Roda and Vinage Drive									
Time	NORTHBOUND	WESTBOUND	EASTBOUND							



	Village Drive			Thomp	son's Stat	ion Road	Thompson's Station Road		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
6:00 – 7:00 AM	9	0	1	0	134	0	0	28	2
7:00 – 8:00	0	0	0	0	191	0	0	35	2
8:00 - 9:00	5	0	1	2	151	0	0	66	3
3:00 – 4:00 PM	3	0	0	2	102	0	0	116	5
4:00 - 5:00	3	0	0	3	114	0	0	140	0
5:00 - 6:00	2	0	1	2	128	0	0	136	1
TOTAL	22	0	3	9	820	0	0	521	13

Table 4. Turning Movement Counts, Thompson's Station Road and Clayton Arnold Road

	SC	SOUTHBOUND			VESTBOU	ND	EASTBOUND			
Time	Clayt	Clayton Arnold Road		d Thompson's Station Road				Thompson's Station Road		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:00 – 7:00 AM	13	0	10	0	112	159	12	9	0	
7:00 – 8:00	27	0	22	0	153	200	9	18	0	
8:00 - 9:00	26	0	48	0	108	105	27	40	0	
3:00 – 4:00 PM	147	0	30	0	66	60	21	92	0	
4:00 - 5:00	288	0	53	0	83	58	31	108	0	
5:00 - 6:00	431	0	51	0	76	81	33	110	0	
TOTAL	932	0	214	0	598	663	133	377	0	



Crash Analysis

Crash data over the past six (6) years (2015-2020) was analyzed to determine the types, frequency, and rate of crashes at each of the study intersections and along the roadway segments near the project site. The most recent TDOT Statewide Average Crash Rates for intersections and segments from 2017-2019 were used for this analysis. The crash rate calculations were determined based on the FHWA *Road Safety Information Analysis: A Manual for Local Rural Road Owners (2010)*. The crash rate calculation for intersections is as follows:

$$R = \frac{1,000,000 \, x \, C}{365 \, x \, N \, x \, V}$$

Where:

R = Intersection Crash Rate (crashes/million entering vehicles (MEV))

C = Total intersection crashes

N = Number of Years

V = Daily Intersection Traffic Volumes

The crash rate calculations for road segments are as follows:

$$R = \frac{100,000,000 \, x \, C}{365 \, x \, N \, x \, V \, x \, L}$$

Where:

R = Segment Crash Rate (crashes/million vehicles-miles traveled (MVMT))

C = Total segment crashes

N = Number of Years

V = Total Daily Traffic Volumes (both directions)

L = Roadway Segment Length

Intersection Crash Data

A total of 103 crashes occurred at the intersection of Thompson's Station Road and Columbia Pike over a six (6) year period resulting in a crash frequency of 17.17 crashes/year. The crash types occurring at the intersection are shown in the table below. The total entering volumes for the intersection is approximately 2,173 vehicles/hour based on the PM peak hour existing traffic volumes. The crash rate was determined to be 2.164 crashes/MEV which is greater than the statewide average rate of 0.543 crashes/MEV for rural signalized intersections with turn lanes. The crash rate calculation is shown as follows:

$$R = \frac{1,000,000 \times 103}{365 \times 6 \times 21,730} = 2.164 \ crashes/MEV$$



A total of seven (7) crashes occurred at the intersection of Columbia Pike and Station South Drive over a six (6) year period resulting in a crash frequency of 1.17 crashes/year. The crash types occurring at the intersection are shown in the table below. The total entering volumes for the intersection is approximately 1,984 vehicles/hour based on the PM peak hour existing traffic volumes. The crash rate was determined to be 0.161 crashes/MEV which is greater than the statewide average rate of 0.118 crashes/MEV for rural unsignalized intersections. The crash rate calculation is shown as follows:

$$R = \frac{1,000,000 \times 7}{365 \times 6 \times 19,840} = 0.161 \ crashes/MEV$$

A total of seventeen (17) crashes occurred at the intersection of Thompson's Station Road and Clayton Arnold Road over a six (6) year period resulting in a crash frequency of 2.83 crashes/year. The crash types occurring at the intersection are shown in the table below. The total entering volumes for the intersection is approximately 784 vehicles/hour based on the PM peak hour existing traffic volumes. The crash rate was determined to be 0.990 crashes/MEV which is greater than the statewide average rate of 0.118 crashes/MEV for rural unsignalized intersections. The crash rate calculation is shown as follows:

$$R = \frac{1,000,000 \times 17}{365 \times 6 \times 7,840} = 0.990 \ crashes/MEV$$

No crashes occurred at the intersection of Thompson's Station Road and Village Drive during the six (6) year period.

13

Table 5. Intersection Crash Type Summary

Table 3. Intersec		7,1	1	Crash Type						
Year	Angle	Head-On	Rear-End	Sideswipe	Lane Departure	Other	TOTAL			
		Thompson	's Station Roa	d and Columbia	Pike					
2015	0	0	15	0	2	1	18			
2016	0	0	14	2	0	2	18			
2017	1	1	13	0	1	2	18			
2018	2	0	13	1	0	1	17			
2019	0	0	14	0	1	1	16			
2020	1	1	10	1	2	1	16			
TOTAL	4	2	79	4	6	8	103			
	Columbia Pike and Station South Drive									
2015	0	0	1	0	0	0	1			
2016	0	0	0	0	0	0	0			
2017	0	0	2	0	0	0	2			
2018	0	0	1	0	0	0	1			
2019	0	0	3	0	0	0	3			
2020	0	0	0	0	0	0	0			
TOTAL	0	0	7	0	0	0	7			
		Thompson's S	Station Road a	nd Clayton Arn	old Road					
2015	2	0	0	1	0	0	3			
2016	0	0	2	1	1	0	4			
2017	0	0	0	0	1	0	1			
2018	1	0	1	1	0	0	3			
2019	2	0	1	1	0	0	4			
2020	1	1	0	0	0	0	2			
TOTAL	6	1	4	4	2	0	17			

Segment Crash Data

A total of 119 crashes occurred along Columbia Pike from the proposed southern boundary of the site to the intersection with Thompson's Station Road (0.422 miles) over a six (6) year period resulting in a crash frequency of 19.83 crashes/year. The crash types occurring along this section of Columbia Pike are shown in the table below. The total ADT volumes along this segment is 1,978 vehicle/hour based on the PM peak hour existing traffic volumes. The crash rate was determined to be 2.747 crashes/100 MVMT which is greater than the statewide average rate of 2.556 crashes/100 MVMT for rural sections.

$$R = \frac{100,000,000 \, x \, 119}{365 \, x \, 6 \, x \, 19,780 \, x \, 0.422} = 2.747 \, crashes/100 \, MVMT$$

14



A total of ten (10) crashes occurred along Thompson's Station Road from its intersection with Country Haven Road to its intersection with Columbia Pike (0.710 miles) over a six (6) year period resulting in a crash frequency of 1.67 crashes/year. The crash types occurring along this section of Thompson's Station Road are shown in the table below. The total ADT volumes along this segment is 268 vehicle/hour based on the PM peak hour existing traffic volumes. The crash rate was determined to be 2.400 crashes/100 MVMT which is less than the statewide average rate of 2.556 crashes/100 MVMT for rural sections.

$$R = \frac{100,000,000 \times 10}{365 \times 6 \times 2,680 \times 0.710} = 2.400 \ crashes/100 \ MVMT$$

Table 6. Segment Crash Type Summary

Tuble of Segmen	,,	•		Crash Type			
Year	Angle	Head-On	Rear-End	Sideswipe	Lane Departure	Other	TOTAL
			Columbia	Pike			
2015	0	1	17	1	4	2	25
2016	0	0	15	2	0	2	19
2017	0	0	21	0	4	1	26
2018	1	0	11	1	0	1	14
2019	0	0	16	1	4	2	23
2020	1	1	8	1	1	0	12
TOTAL	2	2	88	6	13	8	119
		7	hompson's St	ation Road			
2015	0	0	0	0	1	0	1
2016	1	0	1	0	1	0	3
2017	0	0	0	0	3	0	3
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	1	0	1	1	3
TOTAL	1	0	2	0	6	1	10

Existing Capacity Analyses

To evaluate the existing traffic operations at the study intersections within the vicinity of the project site, AM and PM peak hour capacity analyses were performed per the calculations outlined in the Highway Capacity Manual¹(HCM). Levels of service (LOS), corresponding average delays, and 95th percentile queues were calculated for each turning movement. An LOS is a qualitative measure or grade used to distinguish how traffic is serviced at an intersection or along a roadway. The range of LOS is A to F, with A being the highest and F the lowest. The 95th percentile queue is the queue length (in vehicles) that has only a five (5) percent probability of being exceeded during the analysis period. The 95th percentile queue is not typical of what an average driver would experience, and driver experiences would be better characterized by the mean queue length. The table below details each LOS for signalized and unsignalized intersections, as specified within the HCM.

Table 7. Level of Service (LOS) Details

Level of Service*	Average Control Delay (seconds per vehicle)								
Level of Service.	Signalized Intersections	Unsignalized Intersections							
Α	≤ 10	≤ 10							
В	> 10 and ≤ 20	> 10 and ≤ 15							
С	> 20 and ≤ 35	> 15 and ≤ 25							
D	> 35 and ≤ 55	> 25 and ≤ 35							
E	> 55 and ≤ 80	> 35 and ≤ 50							
F	> 80	> 50							
Source: HCM 2010, Exhibits 18-	Source: HCM 2010, Exhibits 18-4 and 19-1								
* LOS color coding per Capacity	rigures.								

In order to determine the effectiveness of traffic operations within the study area, a minimum LOS or baseline needs to be established. Any LOS below the established baseline will be considered unsatisfactory. LOS C is generally acceptable for typical roadway function while LOS D is typically considered to be the minimum acceptable LOS. The following conditions shall be considered unsatisfactory for the purposes of this study:

- 1. Overall intersections with an LOS E or F.
- 2. Individual traffic movements with an LOS E or F.

The study intersections within the study area were analyzed with existing traffic volumes under existing roadway conditions/geometries. It should be noted that existing traffic signal timings were utilized at the intersection of Thompson's Station Road and Columbia Pike for this analysis. The existing capacity analyses were conducted using *Synchro/SimTraffic* software by Trafficware for both signalized and unsignalized intersections. Appendix C contains the detailed capacity analyses results.

¹ Transportation Research Board (TRB). <u>Highway Capacity Manual</u>, 5th Edition (2010). Washington, DC: 2010



Table 8. Existing Capacity Analyses (2021)

acity Allaly	363 (2021)							
			2	2021 Existing	g Cond	itions		
Control	Approach		AM Peak	Hour		PM Peak I	lour	
		LOS	Delay (s)	Queue (ft)	LOS	Delay (s)	Queue (ft)	
Signal	NB Left	Α	6.6	238	С	24.8	150	
	NB Thru/Right	С	30.6	507	С	21.2	336	
	SB Left	С	24.7	33	В	14.3	96	
	SB Thru/Right		10.9	204	D	35.8	650	
	EB Left	D	49.2	74	D	40.7	90	
	EB Thru/Right	Е	58.6	83	F	126.8	263	
	WB Left	D	49.3	87	D	42.2	99	
	WB Thru/Right	Е	57.5	128	D	44.1	72	
	Overall	С	28.0		D	38.7		
TWSC	SB Left	В	11.8	0	Α	9.9	25	
	WB Left/Right	С	23.9	25	Ε	45.7	25	
TWSC	NB Left/Right	Α	9.9	0	Α	0.0	0	
	WB Left	Α	0.0	0	Α	7.5	0	
TWSC	SB Left	В	10.6	25	С	23.2	150	
	SB Right	Α	9.9	25	Α	9.2	25	
	EB Left	Α	8.1	0	Α	7.6	25	
	Control Signal TWSC	Signal NB Left NB Thru/Right SB Left SB Thru/Right EB Left EB Thru/Right WB Left WB Thru/Right Overall TWSC SB Left WB Left/Right WB Left SB Left SB Right	Control Approach LOS Signal NB Left NB Thru/Right SB Left CSB Thru/Right EB Left DEB Thru/Right WB Left WB Left Overall CC TWSC SB Left WB Left/Right WB Left/Right CC TWSC SB Left SB Left B WB Left/Right CC TWSC SB Left SB Right A	Control Approach AM Peak LOS Delay (s) Signal NB Left A 6.6 NB Thru/Right C 30.6 SB Left C 24.7 SB Thru/Right B 10.9 EB Left D 49.2 EB Thru/Right E 58.6 WB Left D 49.3 WB Thru/Right E 57.5 Overall C 28.0 TWSC SB Left B 11.8 WB Left/Right C 23.9 TWSC NB Left/Right A 9.9 TWSC SB Left B 10.6 SB Right A 9.9	Control Approach AM Peak Hour	Control Approach EDS Delay (s) Queue (ft) LOS	Control Approach AM Peak Hour PM Peak Form	

The following assessments are based on the results of the Existing Capacity Analyses as shown in the table above:

- At the intersection of Thompson's Station Road and Columbia Pike, the shared eastbound through/right-turn movement currently operates at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement currently operates at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS C and LOS D during the AM and PM peak hours, respectively, with existing traffic volumes and existing signal timings.
- At the intersection of Columbia Pike and South Station Drive, the shared westbound left-turn/right-turn movement currently operates at LOS E during the PM peak hour period.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the existing traffic volumes.

17

Intersection Assessments (Existing Conditions)

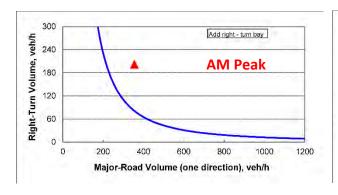
Engineering assessments were performed on the intersections within the study area to identify underlying inefficiencies and solutions to alleviate any concerns associated with the existing geometries and traffic volumes along the roadway network. It should be noted that while all study intersections were analyzed, only intersections or traffic movements with deficiencies are presented within this section of the study.

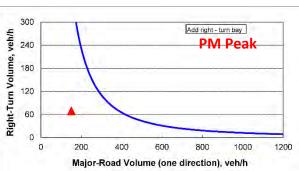
Major Road Approach Geometry Warrants - Projected

Major-road approach geometric warrants were performed based on Figures 2-5 and 2-6, respectively, in the *NCHRP Report 457 – Evaluating Intersection Improvements: An Engineering Study Guide*² and existing traffic volumes.

Table 9. Major-Road Approach Geometry, WBR Thompson's Station Road at Clayton Arnold Road

able 3. major Roda Approach Geometry, West in	iompson s station noda at	cia y con 7 in noia noaa					
Variable	AM Peak	PM Peak					
Major-road speed, mph:	45	45					
Major-road volume (one direction), veh/h:	355	151					
Major-road Right-turn volume, veh/h:	202	69					
Limiting right-turn volume, veh/h:	81	387					
Right-turn Bay warranted: YES NO							
Source: NCHRP Report 457: Evaluating Intersection In	nprovements: An Engineering S	Study Guide					





As shown in Table 9 and the corresponding graphs, it was determined that a westbound right-turn lane is currently warranted along Thompson's Station Road at its intersection with Clayton Arnold Road during the AM peak hour with existing traffic volumes.

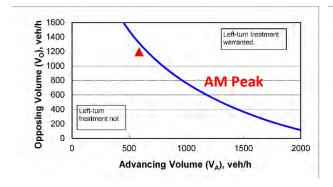
18

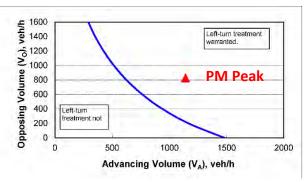


² Transportation Research Board (TRB). <u>Evaluating Intersection Improvements: An Engineering Study Guide</u>. Washington, DC: 2001

Table 10. Major-Road Approach Geometry, SBL Columbia Pike at Station South Drive

Variable	AM Peak	PM Peak					
85 th percentile speed, mph:	45	45					
Percent of left-turns in advancing volume (V _A), %:	1%	1%					
Advancing volume (V _A), veh/h:	587	1,141					
Opposing volume (V ₀), veh/h:	1,192	827					
Limiting advancing volume (V _A), veh/h:	660	608					
Left-turn Bay warranted: NO YES							
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide							





As shown in Table 12 and the corresponding graphs, it was determined that a southbound left-turn lane is currently warranted along Columbia Pike at its intersection with Station South Drive during the PM peak hour with existing traffic volumes.

Background Traffic Volumes

To account for traffic growth within the vicinity of the project site prior to the completion of the proposed Parson's Valley Subdivision, background traffic volumes were established. Average annual daily traffic (AADT) volumes were obtained from Tennessee Department of Transportation (TDOT) count stations, and an average growth trend per year was established. This growth trend was used as a multiplication factor to grow the existing traffic volumes to the 2023 design year (development completion). Figure 5 displays the locations of the TDOT Count Stations within the surrounding area.

As shown in Figure 5, the average yearly percent change in traffic over a six (6) year period from 2011 - 2016 was 0.88%. Therefore, as a conservative estimate, the 2018 existing traffic volumes were grown by +2.00% per year for five (5) years to represent the 2023 background traffic volumes. Figure 6 shows the 2023 background peak hour totals at the study intersections for the AM and PM peak hour periods.





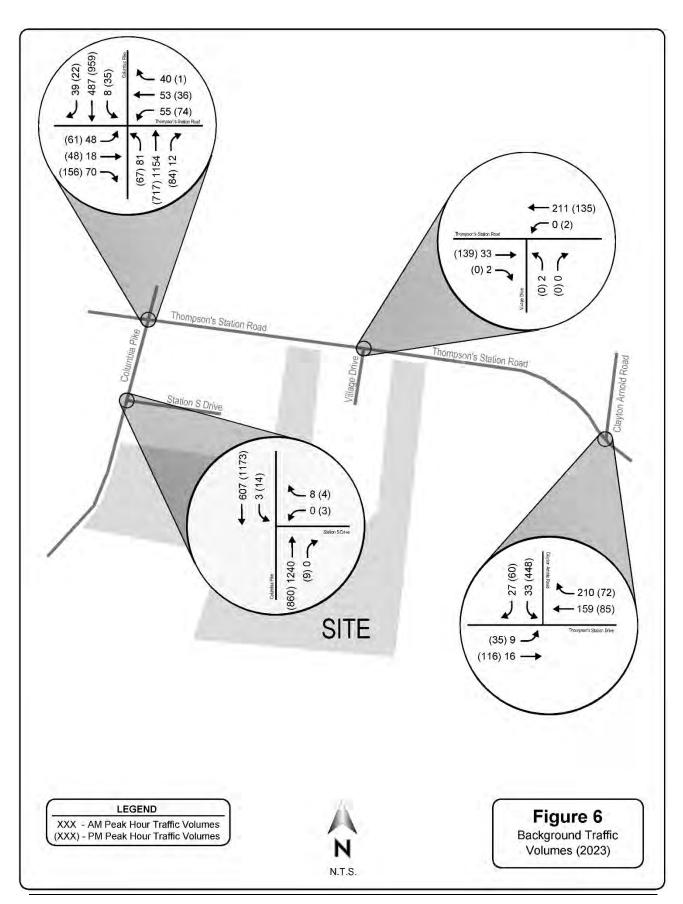
TDOT Count Station:	Williamson 000066		Williams	on 000067	Williams	Average %	
Year	AADT	% Change	AADT	% Change	AADT	% Change	Growth
2016	2,693		19,816		2,800	<u> </u>	
2015	2,666	1.01%	19,620	1.00%	2,617	6.99%	3.00%
2014	2,659	0.64%	21,013	-2.85%	2,952	-2.57%	-1.59%
2013	2,404	4.01%	19,666	0.25%	2,723	0.94%	1.73%
2012	3,019	-2.70%	18,101	2.37%	2,720	0.74%	0.13%
2011	2,634	0.45%	18,685	1.21%	2,585	1.66%	1.11%
Average % Change	().68%	0.4	40%	1.55%		0.88%



Figure 5

TDOT Count Locations & Background Traffic Growth Trends





Background Capacity Analyses

To evaluate the background traffic operations at the study intersections within the vicinity of the project site, the AM and PM peak hour capacity analyses were performed based on calculations outlined in the Highway Capacity Manual (HCM). Levels of service (LOS), corresponding average delays, and 95th percentile queues were calculated for each turning movement.

The study intersections within the study area were analyzed with background traffic volumes under existing roadway conditions/geometries. It should be noted that existing traffic signal timings were utilized at the intersection of Thompson's Station Road and Columbia Pike for this analysis. The background capacity analyses were conducted using *Synchro/SimTraffic* software by Trafficware for both signalized and unsignalized intersections. Appendix C contains the detailed capacity analyses results.

Table 11. Background Capacity Analyses (2023)

Table 11. Dackground	a capacity /	Allalyses (2025)						
Charder Indones at lane	Cambual	A managa ah	2023 Background Conditions					
Study Intersection	Control	Approach		AM Peak	Hour		PM Peak I	lour
			LOS	Delay (s)	Queue (ft)	LOS	Delay (s)	Queue (ft)
1. Thompson's	Signal	NB Left	Α	6.9	224	С	28.2	280
Station Road and		NB Thru/Right	D	38.6	505	С	22.7	570
Columbia Pike		SB Left	С	30.4	90	В	15.5	163
		SB Thru/Right	В	11.4	256	D	42.4	622
		EB Left	D	49.2	67	D	41.1	118
		EB Thru/Right	Е	58.8	87	F	144.0	242
		WB Left	D	49.3	103	D	42.6	90
		WB Thru/Right	Е	57.7	137	D	44.4	71
		Overall	С	32.6		D	43.8	
2. Columbia Pike and	TWSC	SB Left	В	12.1	0	В	10.1	25
Station South		WB Left/Right	D	25.4	25	F	51.5	25
Drive								
3. Thompson's	TWSC	NB Left/Right	В	10.0	0	Α	0.0	0
Station Road and		WB Left	Α	0.0	0	Α	7.5	0
Village Drive								
4. Thompson's	TWSC	SB Left	В	10.7	25	D	25.9	175
Station Road and		SB Right	В	10.0	25	Α	9.2	25
Clayton Arnold		EB Left	Α	8.1	0	Α	7.6	25
Road								

The following assessments are based on the results of the Background Capacity Analyses as shown in the table above:

- At the intersection of Thompson's Station Road and Columbia Pike, the shared eastbound through/right-turn movement will continue to operate at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement will continue to operate at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS C and LOS D during the AM and PM peak hours, respectively, with background traffic volumes and existing signal timings.



- At the intersection of Columbia Pike and South Station Drive, the shared westbound left-turn/right-turn movement will operate at LOS F during the PM peak hour period.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the background traffic volumes.

Impacts

Trips were generated to establish projected traffic volumes for the proposed Parson's Valley Subdivision. Daily and peak hour trips were generated by formulas presented in the <u>Trip Generation Manual</u>³ based on the number of detached single-family homes and townhomes proposed by the development. As previously stated, the proposed Parson's Valley Subdivision is expected to consist of approximately 230 detached single-family homes and 123 townhomes. The Single-Family Detached Housing (210) and the Multi-Family Housing (220) ITE Land Uses were used to estimate the generated traffic volumes. Table 14 provides the new trips generated for the proposed development. Appendix B contains detailed trip generation calculations.

Table 12. Parson's Valley Subdivision Trip Generation

		Generated Traffic Volumes				
ITE Land Use (Code)	Units	Dailu	AM Peak		PM P	eak
	Daily		Enter	Exit	Enter	Exit
Single-Family Detached Housing (210)	230 Dwelling Units	2,237	42	126	142	84
Multi-Family Housing (220)	123 Dwelling Units	889	13	45	45	26
TOTAL		3,126	55	171	187	110

Projected Traffic Distribution and Assignments

For the purposes of this study, estimated directional distributions shown on Figure 7 were made for the proposed development's generated traffic volumes. The development of these directional distributions was established based on the following:

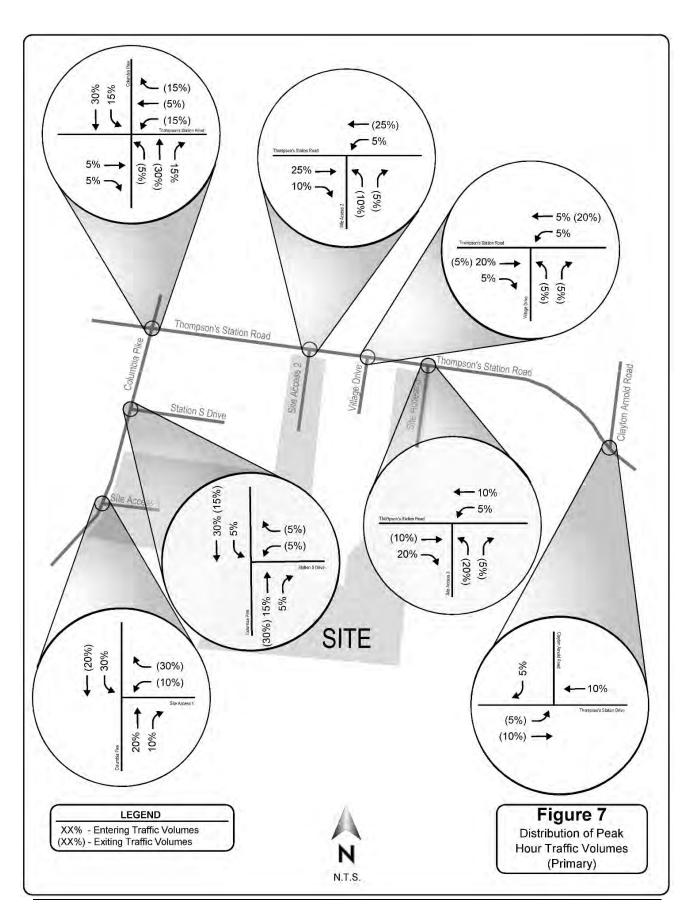
- Conducted hourly turning movement counts
- Existing land use characteristics
- Existing roadway network
- Existing lane geometry of surrounding intersections
- The development's proposed access locations
- Locations of populations centers within the surrounding area

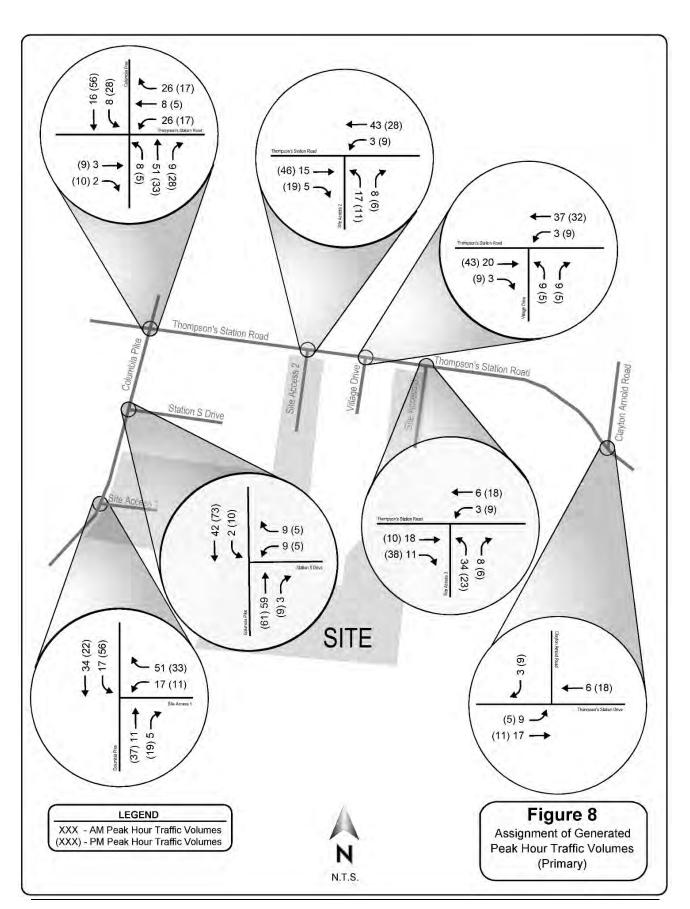
The generated trips were assigned to the existing roadway network per the distributions shown on Figure 7, resulting in the generated peak hour traffic volumes shown on Figure 8. The generated peak hour traffic volumes were added to the background peak hour traffic volumes resulting in the 2023 projected peak hour traffic volumes shown on Figure 9.

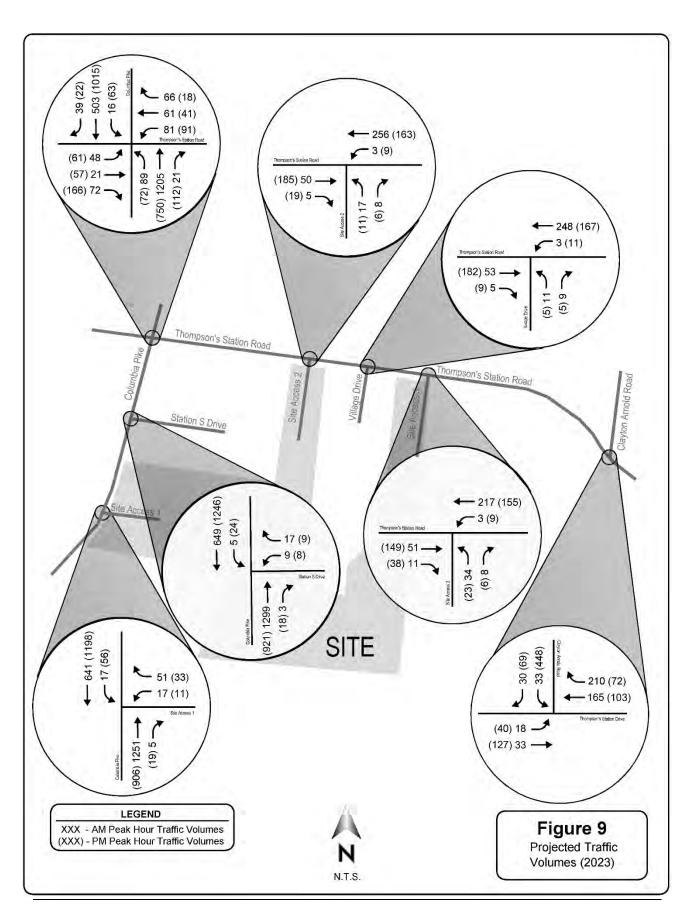
³ Institute of Transportation Engineers (ITE). <u>Trip Generation Manual</u>, 10th Edition. Washington, DC: ITE, 2020



E 24 July 2021







Projected Capacity Analyses

To evaluate the projected traffic operations at the study intersections within the vicinity of the project site, AM and PM peak hour capacity analyses were performed. The capacity analyses include the total projected traffic volumes generated from the proposed development in addition to background traffic volumes. Levels-of-service (LOS), corresponding average delays, and 95th percentile queues were calculated for each turning movement. The intersections were analyzed based on existing and proposed roadway conditions and lane geometries with projected traffic volumes.

The study intersections within the study area were analyzed with projected traffic volumes under existing roadway conditions/geometries at the existing intersections and proposed roadway conditions/geometries at the proposed site accesses. It should be noted that existing traffic signal timings were utilized at the intersection of Thompson's Station Road and Columbia Pike for this analysis. The projected capacity analyses were conducted using <code>Synchro/SimTraffic</code> software by Trafficware for both signalized and unsignalized intersections. Appendix C contains the detailed capacity analyses results.

Table 13. Projected Capacity Analyses (2023)

			2023 Projected Conditions					
Study Intersection	Control	Approach		AM Peak	Hour		PM Peak I	lour
			LOS	Delay (s)	Queue (ft)	LOS	Delay (s)	Queue (ft)
1. Thompson's	Signal	NB Left	Α	8.1	222	С	30.3	195
Station Road and		NB Thru/Right	F	65.6	764	С	30.1	469
Columbia Pike		SB Left	С	33.7	42	С	20.9	208
		SB Thru/Right	В	12.8	255	F	60.4	914
		EB Left	D	50.6	96	D	41.9	263
		EB Thru/Right	Е	60.2	106	F	184.9	404
		WB Left	D	49.8	114	D	42.8	93
		WB Thru/Right	Е	62.2	158	D	44.9	100
		Overall	D	48.9		E	57.7	
2. Columbia Pike and	TWSC	SB Left	В	12.6	0	В	10.5	25
Station South		WB Left/Right	F	56.7	50	F	95.9	50
Drive								
3. Thompson's	TWSC	NB Left/Right	Α	9.8	25	В	10.3	0
Station Road and		WB Left	Α	7.3	0	Α	7.7	0
Village Drive								
4. Thompson's	TWSC	SB Left	В	11.2	25	D	30.9	200
Station Road and		SB Right	В	10.0	25	Α	9.4	25
Clayton Arnold		EB Left	Α	8.2	25	Α	7.7	25
Road								
5. Columbia Pike and	TWSC	SB Left	В	12.4	25	В	10.7	25
Site Access 1		WB Left/Right	F	81.9	100	F	109.1	75
6. Columbia Pike and	TWSC	NB Left/Right	В	10.1	25	В	10.6	25
Site Access 2		WB Left	Α	7.3	0	Α	7.7	0
7. Columbia Pike and	TWSC	NB Left/Right	В	10.2	25	В	10.7	25
Site Access 3		WB Left	Α	7.3	0	Α	7.6	0



The following assessments are based on the results of the Projected Capacity Analyses as shown in the table above:

- At the intersection of Thompson's Station Road and Columbia Pike, the shared northbound through/right-turn movement will operate at LOS F during the AM peak hour period. The shared southbound through/right-turn movement will operate at LOS F during the PM peak hour period. The shared eastbound through/right-turn movement will continue to operate at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement will continue to operate at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS D and LOS E during the AM and PM peak hours, respectively, with projected traffic volumes and existing signal timings.
- At the intersection of Columbia Pike and South Station Drive, the shared westbound leftturn/right-turn movement will operate at LOS F during both the AM and PM peak hour periods.
- At the intersection of Columbia Pike and Site Access 1, the shared westbound leftturn/right-turn movement will operate at LOS F during both the AM and PM peak hour periods.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the background traffic volumes.



Intersection Assessments (Projected Conditions)

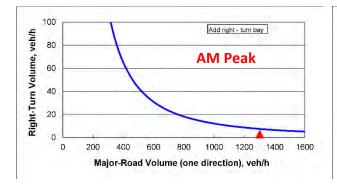
Engineering assessments were performed on the intersections within the study area to identify underlying inefficiencies and solutions to alleviate any concerns associated with existing and proposed geometries and traffic volumes along the roadway network.

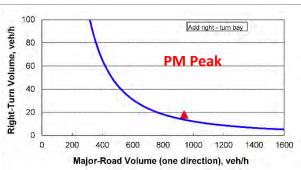
Major Road Approach Geometry Warrants - Projected

Major-road approach geometric warrants were performed based on Figures 2-5 and 2-6, respectively, in the *NCHRP Report 457 – Evaluating Intersection Improvements: An Engineering Study Guide*⁴ and projected traffic volumes.

Table 14. Major-Road Approach Geometry, NBR Columbia Pike at Station South Drive

Variable	AM Peak	PM Peak		
Major-road speed, mph:	45	45		
Major-road volume (one direction), veh/h:	1,302	939		
Major-road right-turn volume, veh/h:	3	18		
Limiting right-turn volume, veh/h:	7	14		
Right-turn Bay warranted: NO YES				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				





As shown in Table 14 and the corresponding graphs, it was determined that a northbound right-turn lane is warranted along Columbia Pike at its intersection with Station South Drive during the PM peak hour with projected traffic volumes. However, due to the limited turning volumes and projected capacity operating at acceptable levels, a northbound right-turn lane is not recommended as part of this study.

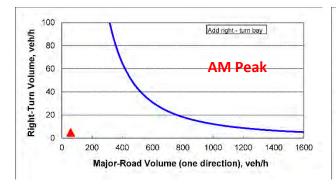
30

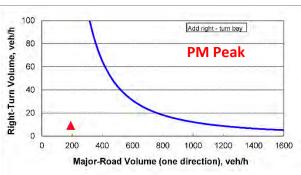


⁴ Transportation Research Board (TRB). <u>Evaluating Intersection Improvements: An Engineering Study Guide</u>. Washington, DC: 2001

Table 15. Major-Road Approach Geometry, EBR Thompson's Station Road at Village Drive

Variable	AM Peak	PM Peak		
Major-road speed, mph:	45	45		
Major-road volume (one direction), veh/h:	58	191		
Major-road right-turn volume, veh/h:	5	9		
Limiting right-turn volume, veh/h:	1000+	252		
Right-turn Bay warranted: NO NO				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				

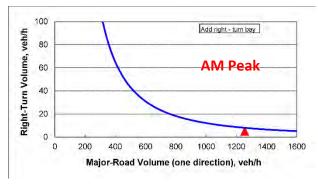


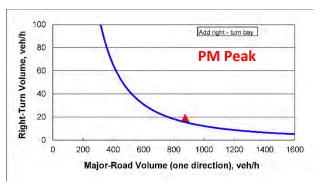


As shown in Table 15 and the corresponding graphs, it was determined that an eastbound right-turn lane is not warranted along Thompson's Station Road at its intersection with Village Drive during either peak hour period with projected traffic volumes.

Table 16. Major-Road Approach Geometry, NBR Columbia Pike at Site Access 1

Variable	AM Peak	PM Peak		
Major-road speed, mph:	45	45		
Major-road volume (one direction), veh/h:	1256	875		
Major-road right-turn volume, veh/h:	5	19		
Limiting right-turn volume, veh/h:	8	15		
Right-turn Bay warranted: NO YES				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				



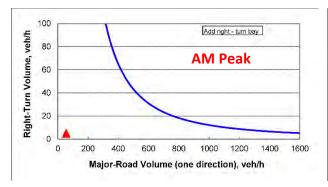


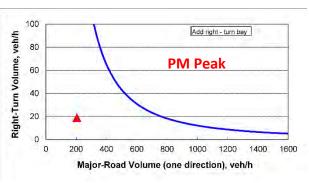
As shown in Table 16 and the corresponding graphs, it was determined that a northbound right-turn lane is warranted along Columbia Pike at its intersection with Site Access 1 during the PM peak hour period with projected traffic volumes.



Table 17. Major-Road Approach Geometry, EBR Thompson's Station Road at Site Access 2

Variable	AM Peak	PM Peak			
Major-road speed, mph:	45	45			
Major-road volume (one direction), veh/h:	55	204			
Major-road right-turn volume, veh/h:	5	19			
Limiting right-turn volume, veh/h:	1000+	223			
Right-turn Bay warranted: NO NO					
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					

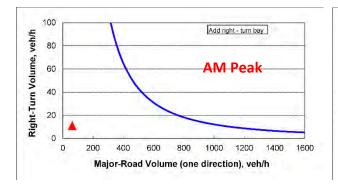


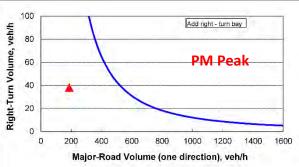


As shown in Table 17 and the corresponding graphs, it was determined that an eastbound right-turn lane is not warranted along Thompson's Station Road at its intersection with Site Access 2 during either peak hour period with projected traffic volumes.

Table 18. Major-Road Approach Geometry, EBR Thompson's Station Road at Site Access 3

Variable	AM Peak	PM Peak			
Major-road speed, mph:	45	45			
Major-road volume (one direction), veh/h:	62	187			
Major-road right-turn volume, veh/h:	11	38			
Limiting right-turn volume, veh/h:	1000+	262			
Right-turn Bay warranted: NO NO					
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					



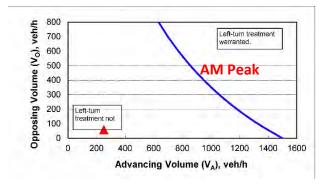


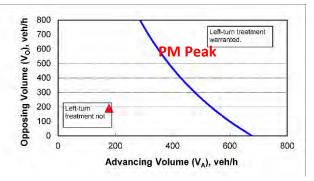
As shown in Table 18 and the corresponding graphs, it was determined that an eastbound right-turn lane is not warranted along Thompson's Station Road at its intersection with Site Access 3 during either peak hour period with projected traffic volumes.



Table 19. Major-Road Approach Geometry, WBL Thompson's Station Road at Village Drive

Variable	AM Peak	PM Peak		
85 th percentile speed, mph:	45	45		
Percent of left-turns in advancing volume (V _A), %:	1%	6%		
Advancing volume (V _A), veh/h:	251	178		
Opposing volume (V ₀), veh/h:	58	191		
Limiting advancing volume (V _A), veh/h:	1000+	539		
Left-turn Bay warranted: NO NO				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				

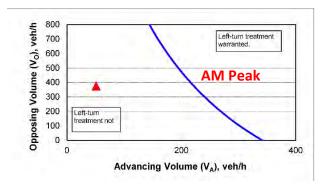


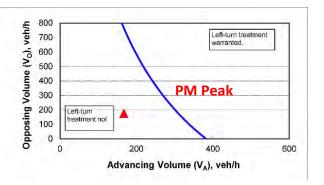


As shown in Table 19 and the corresponding graphs, it was determined that a westbound left-turn lane is not warranted along Thompson's Station Road at its intersection with Village Drive during either peak hour period with projected traffic volumes.

Table 20. Major-Road Approach Geometry, EBL Thompson's Station Road at Clayton Arnold Road

Variable	AM Peak	PM Peak		
85 th percentile speed, mph:	45	45		
Percent of left-turns in advancing volume (V _A), %:	35%	24%		
Advancing volume (V _A), veh/h:	51	167		
Opposing volume (V ₀), veh/h:	375	175		
Limiting advancing volume (V _A), veh/h:	222	310		
Left-turn Bay warranted: NO NO				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				



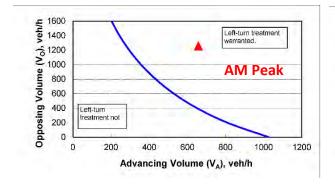


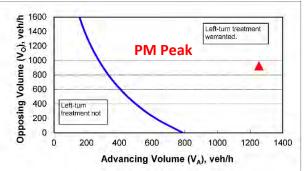


As shown in Table 20 and the corresponding graphs, it was determined that an eastbound left-turn lane is not warranted along Thompson's Station Road at its intersection with Clayton Arnold Road during either peak hour period with projected traffic volumes.

Table 21. Major-Road Approach Geometry, SBL Columbia Pike at Site Access 1

Variable	AM Peak	PM Peak		
85 th percentile speed, mph:	45	45		
Percent of left-turns in advancing volume (V _A), %:	3%	4%		
Advancing volume (V _A), veh/h:	658	1254		
Opposing volume (V ₀), veh/h:	1256	925		
Limiting advancing volume (V _A), veh/h:	279	295		
Left-turn Bay warranted: YES YES				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				





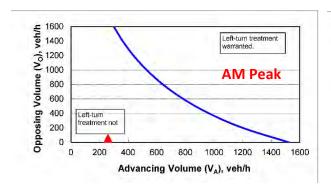
As shown in Table 21 and the corresponding graphs, it was determined that a southbound left-turn lane is warranted along Columbia Pike at its intersection with Site Access 1 during both AM and PM peak hours with projected traffic volumes.

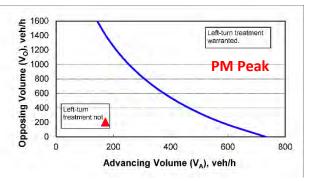
Table 22. Major-Road Approach Geometry, WBL Thompson's Station Road at Site Access 2

Variable	AM Peak	PM Peak		
85 th percentile speed, mph:	45	45		
Percent of left-turns in advancing volume (V _A), %:	1%	5%		
Advancing volume (V _A), veh/h:	259	172		
Opposing volume (V ₀), veh/h:	55	204		
Limiting advancing volume (V _A), veh/h:	1000+	574		
Left-turn Bay warranted: NO NO				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide				

34



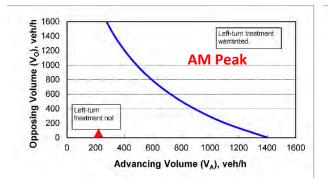


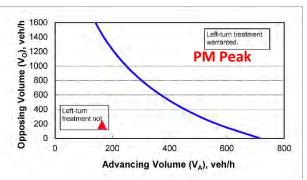


As shown in Table 22 and the corresponding graphs, it was determined that a westbound left-turn lane is not warranted along Thompson's Station Road at its intersection with Site Access 2 during either peak hour period with projected traffic volumes.

Table 23. Major-Road Approach Geometry, WBL Thompson's Station Road at Site Access 3

Variable	AM Peak	PM Peak			
85 th percentile speed, mph:	45	45			
Percent of left-turns in advancing volume (V _A), %:	1%	5%			
Advancing volume (V _A), veh/h:	220	164			
Opposing volume (V ₀), veh/h:	62	187			
Limiting advancing volume (V _A), veh/h:	1000+	572			
Left-turn Bay warranted:	NO	NO			
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					





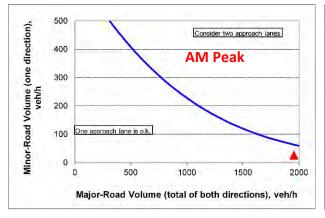
As shown in Table 23 and the corresponding graphs, it was determined that a westbound left-turn lane is not warranted along Thompson's Station Road at its intersection with Site Access 3 during either peak hour period with projected traffic volumes.

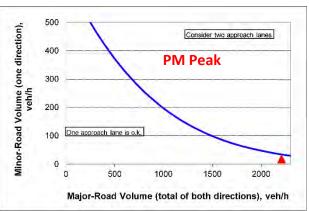
Minor Road Approach Geometry Warrants – Projected

Minor-road approach geometric warrants were performed based on Figure 2-4 in the *NCHRP* Report 457 – Evaluating Intersection Improvements: An Engineering Study Guide⁵ and projected traffic volumes.

Table 24. Minor-Road Approach Geometry, WBR Station South Drive at Columbia Pike

Variable	AM Peak	PM Peak			
Major-road volume (total both directions), veh/h:	1,956	2,209			
Percentage of right-turns on minor road, %:	65%	53%			
Minor-road volume (one direction), veh/h:	26	17			
Limiting minor-road volume (one direction), veh/h:	63	34			
Right-turn Bay warranted:	One (1) approach lane is sufficient	One (1) approach lane is sufficient			
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					





As shown in Table 24 and the corresponding graphs, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along the westbound approach of Station South Drive at its intersection with Columbia Pike during the peak hour periods with projected traffic volumes.

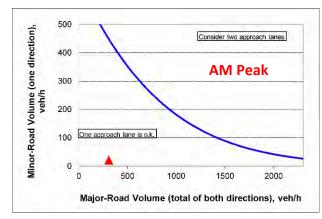
⁵ Transportation Research Board (TRB). <u>Evaluating Intersection Improvements: An Engineering Study Guide</u>. Washington, DC: 2001

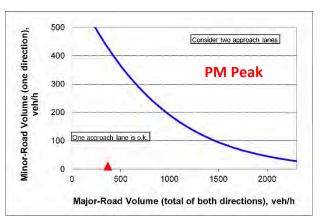


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Table 25. Minor-Road Approach Geometry, NBR Village Drive at Thompson's Station Road

Variable	AM Peak	PM Peak				
Major-road volume (total both directions), veh/h:	309	369				
Percentage of right-turns on minor road, %:	45%	50%				
Minor-road volume (one direction), veh/h:	20	10				
Limiting minor-road volume (one direction), veh/h:	448	428				
Right-turn Bay warranted:	One (1) approach lane is sufficient	One (1) approach lane is sufficient				
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide						

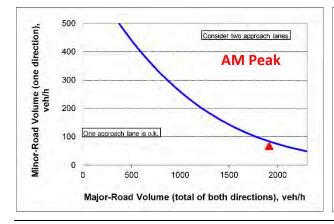


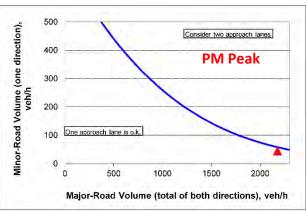


As shown in Table 25 and the corresponding graphs, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along Village Drive at its intersection with Thompson's Station Road during the peak hour periods with projected traffic volumes.

Table 26. Minor-Road Approach Geometry, WBR Site Access 1 at Columbia Pike

Variable	AM Peak	PM Peak			
Major-road volume (total both directions), veh/h:	1914	2179			
Percentage of right-turns on minor road, %:	75%	75%			
Minor-road volume (one direction), veh/h:	68	44			
Limiting minor-road volume (one direction), veh/h:	83	58			
Right-turn Bay warranted:	One (1) approach lane is sufficient	One (1) approach lane is sufficient			
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					



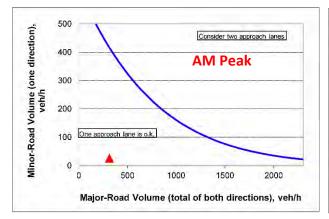


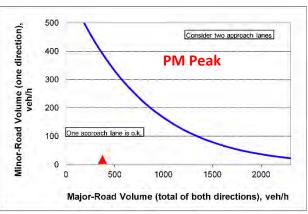


As shown in Table 26 and the corresponding graphs, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along Site Access 1 at its intersection with Columbia Pike during the peak hour periods with projected traffic volumes.

Table 27. Minor-Road Approach Geometry, NBR Site Access 2 at Thompson's Station Road

Variable	AM Peak	PM Peak			
Major-road volume (total both directions), veh/h:	314	376			
Percentage of right-turns on minor road, %:	32%	35%			
Minor-road volume (one direction), veh/h:	25	17			
Limiting minor-road volume (one direction), veh/h:	416	390			
Right-turn Bay warranted:	One (1) approach lane is sufficient	One (1) approach lane is sufficient			
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					



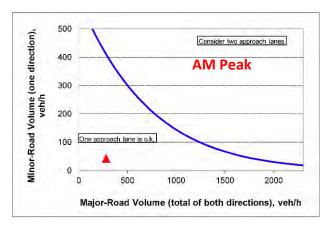


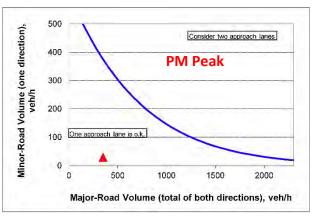
As shown in Table 27 and the corresponding graphs, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along Site Access 2 at its intersection with Thompson's Station Road during the peak hour periods with projected traffic volumes.

38

Table 28. Minor-Road Approach Geometry, NB Site Access 3 at Thompson's Station Road

Variable	AM Peak	PM Peak			
Major-road volume (total both directions), veh/h:	282	351			
Percentage of right-turns on minor road, %:	19%	21%			
Minor-road volume (one direction), veh/h:	42	29			
Limiting minor-road volume (one direction), veh/h:	409	375			
Right-turn Bay warranted:	One (1) approach lane is sufficient	One (1) approach lane is sufficient			
Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide					





As shown in Table 28 and the corresponding graphs, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along Site Access 3 at its intersection with Thompson's Station Road during the peak hour periods with projected traffic volumes.

Traffic Signal Warrants - Projected

The Manual on Uniform Traffic Control Devices (MUTCD) includes nine (9) separate traffic signal warrants. The *TDOT Traffic Design Manual* subsection <u>4.1.2 – Traffic Signal Warrants</u> states "Even though these nine warrants can justify a traffic signal installation, TDOT considers Warrant 1 (Eight Hour Vehicular Volume) and Warrant 7 (Crash Experience) as the primary warrants that should be utilized for traffic signal installation approval." Therefore, this study assumed that a traffic signal would not be warranted unless one (1) of the three (3) Eight Hour Vehicular Volume Warrants was met (Warrants 1A, 1B, and 1C).

Traffic volume related signal warrants were performed based on projected traffic volumes and 70 percent minimum vehicular volumes provided in Section 4C of the Manual on Uniform Traffic Control Device (MUTCD). As directed within the MUTCD, traffic volumes within the 70 percent columns were used due to the statutory speed limit exceeding 40 MPH. The results of the signal analyses are provided in the table below. It should be noted that the midday hours between $9:00 \, \text{AM} - 2:00 \, \text{PM}$ were interpolated and are considered to be a conservative estimate.

Table 29. Signal Warrant Analysis, Columbia Pike and Station South Drive

Table 25. Signal Warrant Analysis, Columbia Pike and Station South Drive								
	Traffic V	'olumes	Warrants Fulfilled					
Hour	Major	Minor	1A	1B	1C	2	3	
	Both Directions	Highest Approach	IA	10	10	2	3	
6:00-7:00 AM	1621	23		-		-		
7:00-8:00	1766	20		-		-		
8:00-9:00	1866	17						
9:00-10:00*	1853	17						
10:00-11:00*	1847	14						
11:00 AM-12:00 PM*	1832	13						
12:00-1:00*	1830	14						
1:00-2:00*	1846	16						
2:00-3:00*	1840	15						
3:00-4:00*	1843	15						
4:00-5:00	2114	13						
5:00-6:00	2119	18						
	Total Hours Warranted 0 0 0 0 0					0		
*Existing traffic volumes	were interpolated and a	re considered to be a co	onservativ	e estimate				

As shown in Table 29, none of the five (5) traffic volume related signal warrants were fulfilled for the required number of hours at the intersection of Columbia Pike and Station South Drive with projected traffic volumes.

40

Table 30. Signal Warrant Analysis, Thompson's Station Road and Village Drive

	Traffic V	olumes	Warrants ⁵ Fulfilled				
Hour	Major	Minor	1A	1B	1C	2	3
	Both Directions	Highest Approach	IA	10	10	2	3
6:00-7:00 AM	253	31		-	-	1	
7:00-8:00	310	14		-	-	1	
8:00-9:00	296	17		-	-	1	
9:00-10:00*	292	17					
10:00-11:00*	294	13					
11:00 AM-12:00 PM*	290	11		-	-	-	
12:00-1:00*	295	12		-	-	1	
1:00-2:00*	308	14		-	-	1	
2:00-3:00*	310	13		-	-	1	
3:00-4:00*	318	13		-	-	1	
4:00-5:00	367	13					
5:00-6:00	367	13					
	Total Hours Warranted 0 0 0 0 0						0
*Existing traffic volumes	were interpolated and a	re considered to be a co	onservativ	e estimate			

As shown in Table 30, none of the five (5) traffic volume related signal warrants were fulfilled for the required number of hours at the intersection of Thompson's Station Road and Village Drive with projected traffic volumes.

Table 31. Signal Warrant Analysis, Thompson's Station Road and Clayton Arnold Road

	Traffic V	olumes	Warrants ⁵ Fulfilled				
Hour	Major	Minor	1A	1B	1C	2	3
	Both Directions	Highest Approach	14	ID	10	2	3
6:00-7:00 AM	359	29	1		-		
7:00-8:00	448	58	1		-		
8:00-9:00	333	86	1		-		
9:00-10:00*	324	101					
10:00-11:00*	318	118	-				
11:00 AM-12:00 PM*	306	134	1		1		
12:00-1:00*	304	151	-				
1:00-2:00*	303	169	1		-		
2:00-3:00*	296	186	1		-		
3:00-4:00*	292	202	1		-		
4:00-5:00	341	386	1		-	Yes	Yes
5:00-6:00	359	540	Yes			Yes	Yes
	Total Hours Warranted				0	2	2
*Existing traffic volumes	*Existing traffic volumes were interpolated and are considered to be a conservative estimate.						

As shown in Table 31, one (1) of the five (5) traffic volume related signal warrants was fulfilled for the required number of hours at the intersection of Thompson's Station Road and Clayton Arnold Road with projected traffic volumes. Specifically, Warrant 3 (Peak Hour) was fulfilled. However, since Warrant 1 (Eight-Hour Vehicular Volume) was not fulfilled as required by TDOT, this intersection does not warrant a traffic signal.

Table 32. Signal Warrant Analysis, Columbia Pike and Site Access 1

	Traffic V	Traffic Volumes		Warrants ⁵ Fulfilled			
Hour	Major	Minor	1A	1B	1C	2	3
	Both Directions	Highest Approach	IA	10	10	2	3
6:00-7:00 AM	1579	48		-			
7:00-8:00	1731	35		-			
8:00-9:00	1842	27		-			
9:00-10:00*	1830	23					
10:00-11:00*	1826	22					
11:00 AM-12:00 PM*	1814	17		-			
12:00-1:00*	1810	20		-			
1:00-2:00*	1821	25					
2:00-3:00*	1818	23					
3:00-4:00*	1820	23					
4:00-5:00	2093	23		-			
5:00-6:00	2093	23					
	Tot	al Hours Warranted	0	0	0	0	0
*Existing traffic volumes	were interpolated and a	re considered to be a co	onservativ	e estimate			

As shown in Table 32, none of the five (5) traffic volume related signal warrants were fulfilled for the required number of hours at the intersection of Columbia Pike and Site Access 1 with projected traffic volumes.

Table 33. Signal Warrant Analysis, Thompson's Station Road and Site Access 2

	Traffic V	'olumes	Warrants ⁵ Fulfilled				
Hour	Major	Minor	1A	1B	10	2	3
	Both Directions	Highest Approach	IA	ID	1C	2	3
6:00-7:00 AM	265	29	-		-		
7:00-8:00	312	21	-		-		
8:00-9:00	302	16	-		-		
9:00-10:00*	299	14					
10:00-11:00*	300	13					
11:00 AM-12:00 PM*	294	10	1		-		
12:00-1:00*	300	12	1		1		
1:00-2:00*	314	15	-		-		
2:00-3:00*	316	14	-		-		
3:00-4:00*	322	14	-		-		
4:00-5:00	371	14	-				
5:00-6:00	372	14					
	Total Hours Warranted				0	0	0
*Existing traffic volumes	were interpolated and a	re considered to be a c	onservativ	e estimate			

As shown in Table 33, none of the five (5) traffic volume related signal warrants were fulfilled for the required number of hours at the intersection of Thompson's Station Road and Site Access 2 with projected traffic volumes.

Table 34. Signal Warrant Analysis, Thompson's Station Road and Site Access 3

	Traffic V	olumes	Warrants ⁵ Fulfilled				
Hour	Major	Minor	4.4	10	10	2	3
	Both Directions	Highest Approach	1A	1B	1C	2	3
6:00-7:00 AM	217	49				-	
7:00-8:00	282	34					
8:00-9:00	273	26					
9:00-10:00*	272	24					
10:00-11:00*	272	21					
11:00 AM-12:00 PM*	271	16					
12:00-1:00*	273	20					
1:00-2:00*	281	25					
2:00-3:00*	284	23					
3:00-4:00*	287	23					
4:00-5:00	340	24					
5:00-6:00	342	24					
Total Hours Warranted 0 0 0					0	0	
*Existing traffic volumes	were interpolated and a	re considered to be a co	onservativ	e estimate			

As shown in Table 34, none of the five (5) traffic volume related signal warrants were fulfilled for the required number of hours at the intersection of Thompson's Station Road and Site Access 3 with projected traffic volumes.

Sight Distance Analysis

Sight distance analyses was conducted to determine if the proposed site accesses along Columbia Pike and Thompson's Station Road meet the sight distance criteria set forth by TDOT and the guidelines within *A Policy on Geometric Design of Highways and Streets* (Green Book). Per the Green Book, the procedures used to determine the sight distance for left-turning and right-turning vehicles from stop at the proposed site accesses is based on *Case B1 - Left turn from stop at minor street* and *Case B2 - Right turn from stop at minor street*, respectively. The intersection sight distance along the major road is determined from Equation 9-1 in the Green Book and is based on the posted speed of the major road, the time gap for the minor road vehicle to enter the major road, and the grade of the roadway.

Columbia Pike and Site Access 1

The required sight distance for a vehicle making a left-turn from stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 497 feet. The measured sight distance for a vehicle making a left-turn from stop onto Columbia Pike from Site Access 1 is more than 497 feet, and therefore satisfies the required criteria. The required sight distance for a vehicle making a right-turn from the stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 430 feet. However, due the approach along the Columbia Pike being -3.69%, the time gap for the minor road vehicle to enter the road is increased, resulting in a required sight distance of 435 feet. The measured sight distance for a vehicle making a right-turn from stop onto Columbia Pike from Site Access 1 is more than 435 feet, and therefore satisfies the required criteria. The required horizontal sight distance is met for both Case B1 and Case B2. The required vertical sight distance (as shown on



Figure 10) is met for both approaches to the intersection of Site Access 1 based on the elevation profile along Columbia Pike.

Thompson's Station Road and Site Access 2

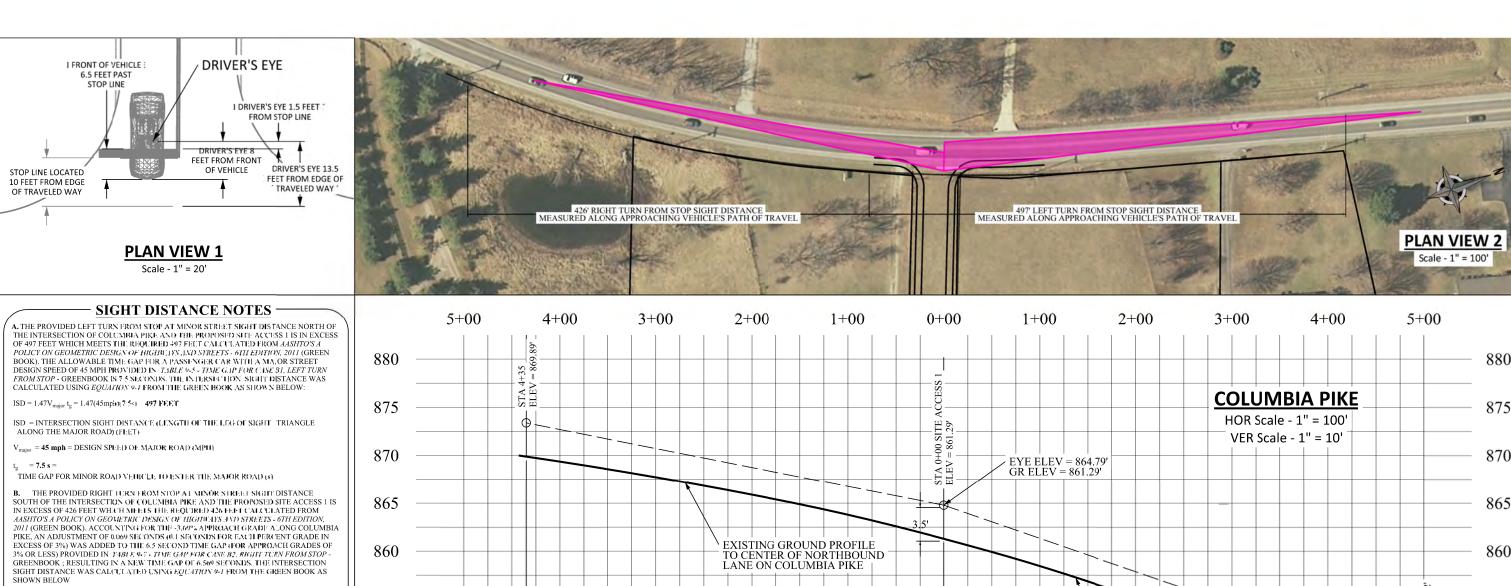
The required sight distance for a vehicle making a left-turn from stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 497 feet. The measured sight distance for a vehicle making a left-turn from stop onto Thompson's Station Road from Site Access 2 is more than 497 feet, and therefore satisfies the required criteria. The required sight distance for a vehicle making a right-turn from the stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 430 feet. The measured sight distance for a vehicle making a right-turn from stop onto Thompson's Station Road from Site Access 2 is more than 430 feet, and therefore satisfies the required criteria. The required horizontal sight distance is met for both Case B1 and Case B2. The required vertical sight distance (as shown on Figure 11) is met for both approaches to the intersection of Site Access 2 based on the elevation profile along Thompson's Station Road.

Thompson's Station Road and Site Access 3

The required sight distance for a vehicle making a left-turn from stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 497 feet. The measured sight distance for a vehicle making a left-turn from stop onto Thompson's Station Road from Site Access 3 is more than 497 feet, and therefore satisfies the required criteria. The required sight distance for a vehicle making a right-turn from the stop onto a major road from a minor road based on a 45 MPH speed limit as calculated from the Green Book is 430 feet. The measured sight distance for a vehicle making a right-turn from stop onto Thompson's Station Road from Site Access 3 is more than 430 feet, and therefore satisfies the required criteria. The required horizontal sight distance is met for both Case B1 and Case B2. The required vertical sight distance (as shown on Figure 12) is met for both approaches to the intersection of Site Access 3 based on the elevation profile along Thompson's Station Road.

44





 $ISD = 1.47 V_{major} \, t_g = 1.47 (45 mpin) (6.5698) \quad \textbf{435 FEET} \label{eq:isomega}$

ISD = INTERSECTION SIGHT DISTANCE (LENGTH OF THE LEG OF SIGHT TRIANGLE ALONG THE MAJOR ROAD) (FEET)

 $V_{major} = 45 \text{ mph} = \text{DESIGN SPEED OF MAJOR ROAD (MPH)}$

a. AS DESCRIBED IN AASHTO'S A POLICY ON GEOMETRIC DESIGN OF

- <u>SIGHT DISTANCE NOTES</u>

HIGHWAYS AND STREETS,
FIELD OBSERVATIONS OF VEHICLE STOPPING POSITIONS FOUND
THAT, WHERE NEEDED, DRIVERS WILL STOP WITH THE FRONT OF
THEIR VEHICLE 6.5 TELT OR LESS IN FRONT OF THE DESIRED
STOPPING POSITION AT A STOP LINE, WEASUREAR INTS OF
PASSENGER CARS INDICATE THAT THE DISTANCE FROM THE FRONT
OF THE VEHICLE 10 THE DRIVERS BYE FOR THE CURRENT U.S.
PASSENGER CAR POPULATION IS NEARLY ALWAYS EIGHT (8) FEET
OR LESS.

THEREFORE, IN ORDER TO ACCOUNT FOR VEHICLES STOPPING PAST THE STOP LINE, THE DECISION POINT (DRIVER'S EYE) WAS PLACED 1.5 FEET BEFORE THE STOP LINE AS OPPOSED TO EIGHT (8) FEET. THIS CALCULATION IS DETAILED BELOW: DP = AVG. VEHICLE LENGTH - STOPPING POSITION = 8' - 6.5' = 1.5'

DP = AVG. VEHICLE LENGTH - STOPPING POSITION = 8' - 6.5' = 1.5'

DP = DECISION POINT (DRIVER'S EYE) AVG. VEHICLE LENGTH = 8 FEET STOPPING POSITION = 6.5 FEET

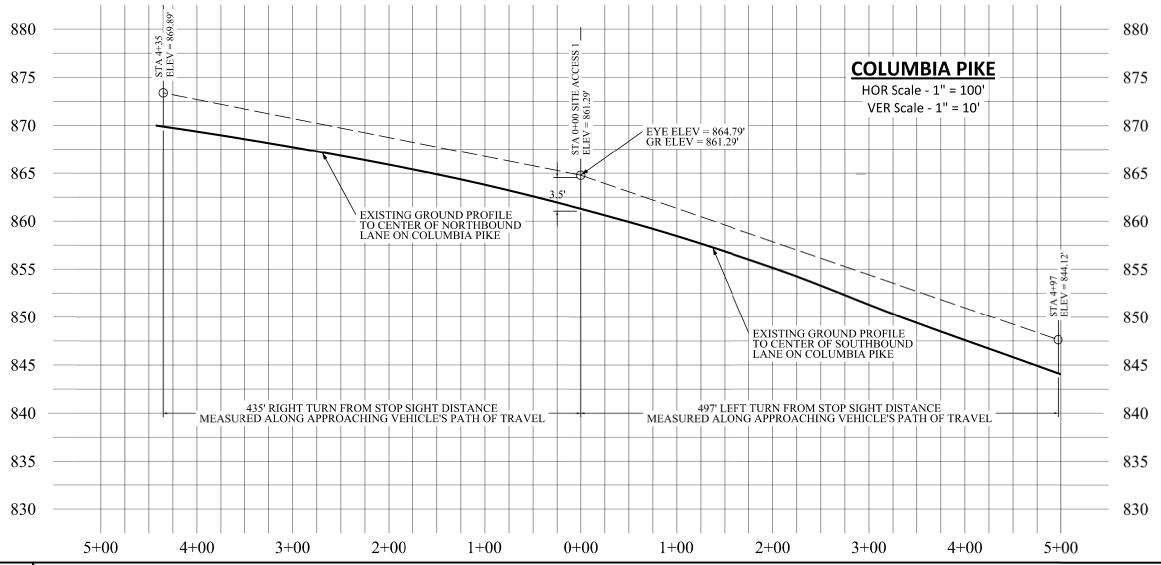
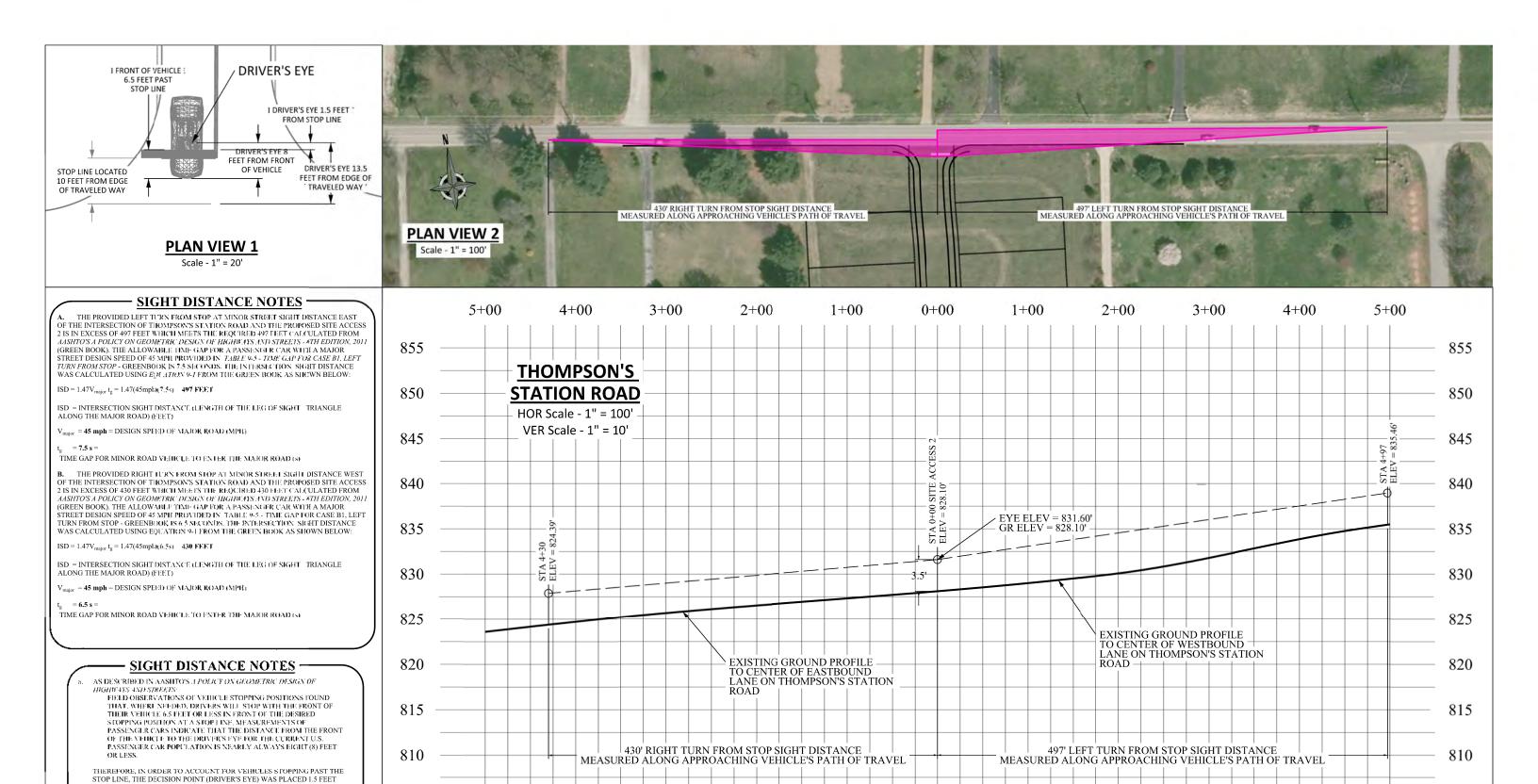




Figure 10 - Sight Distance Analysis (Columbia Pike and Site Access 1)

Thompson's Station, TN (Williamson County) • Approximate Scale: Varies

Prepared by T-Square Engineering, Inc.





BEFORE THE STOP LINE AS OPPOSED TO EIGHT (8) FEET. THIS CALCULATION IS DETAILED BELOW:
DP = AVG. VEHICLE LENGTH - STOPPING POSITION = 8' - 6.5' = 1.5'

DP = DECISION POINT (DRIVER'S EYE) AVG. VEHICLE LENGTH = 8 FEET STOPPING POSITION = 6.5 FEET

Figure 11 - Sight Distance Analysis (Columbia Pike and Site Access 2)

1+00

2+00

805

5+00

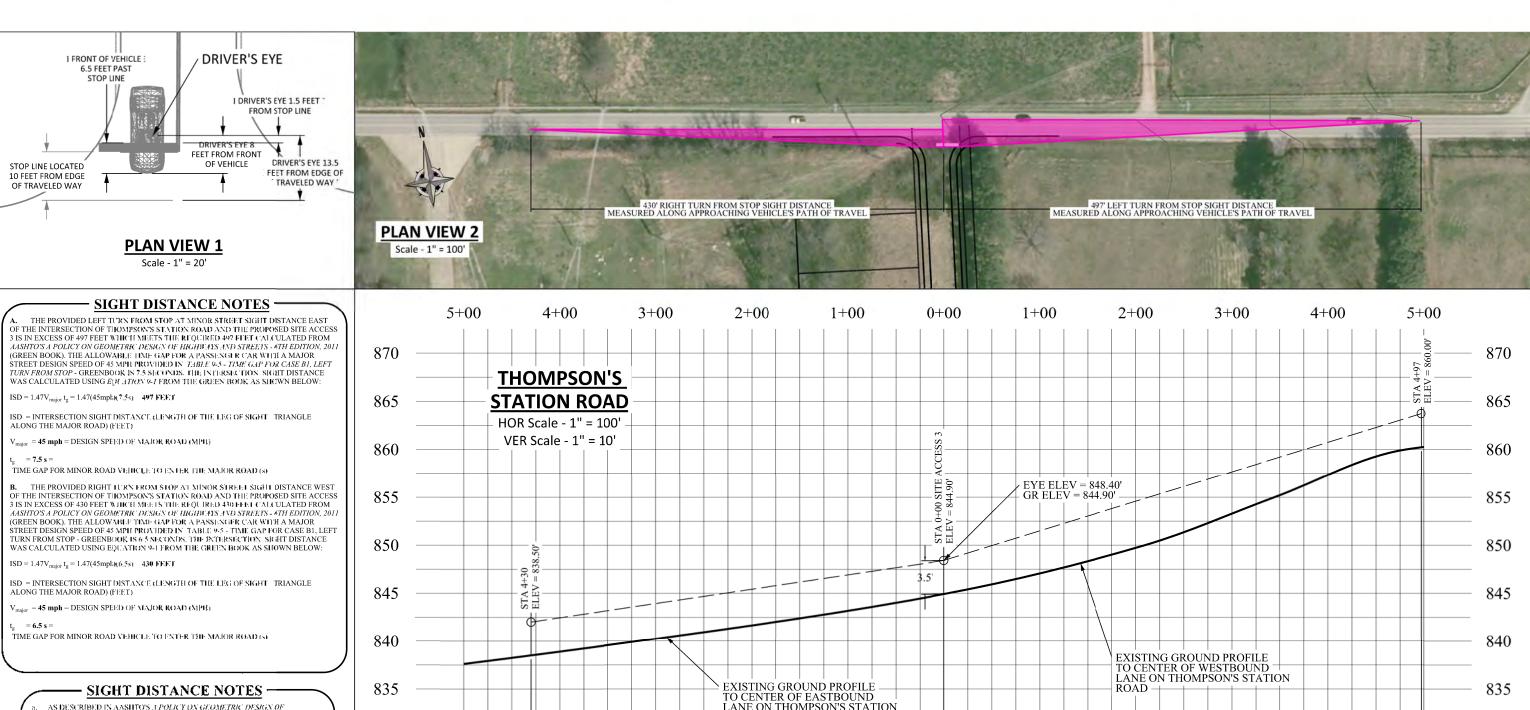
4+00

Thompson's Station, TN (Williamson County) • Approximate Scale: Varies

Prepared by T-Square Engineering, Inc.

805

5+00



HIGHB'4YS 4XD STREETS: FIELD OBSERVATIONS OF VEHICLE STOPPING POSITIONS FOUND

THAT, WHERE NEEDED, DRIVERS WILL STOP WITH THE FRONT OF THEIR VEHICLE 6.5 FEET OR LESS IN FRONT OF THE DESIRED STOPPING POSITION AT A STOP LINE, MEASUREMENTS OF PASSENGER CARS INDICATE THAT THE DISTANCE FROM THE FRONT OF THE VI-LICUE TO THE DRIVER'S EYE FOR THE CURRENT U.S. PASSENGER CAR POPULATION IS NEARLY ALWAYS EIGHT (8) FEET

THEREFORE, IN ORDER TO ACCOUNT FOR VEHICLES STOPPING PAST THE STOP LINE, THE DECISION POINT (DRIVER'S EYE) WAS PLACED 1.5 FEET BEFORE THE STOP LINE AS OPPOSED TO EIGHT (8) FEET. THIS CALCULATION IS DETAILED BELOW: DP = AVG, VEHICLE LENGTH - STOPPING POSITION = 8' - 6.5' = 1.5'

DP = DECISION POINT (DRIVER'S EYE) AVG. VEHICLE LENGTH = 8 FEET STOPPING POSITION = 6.5 FEET

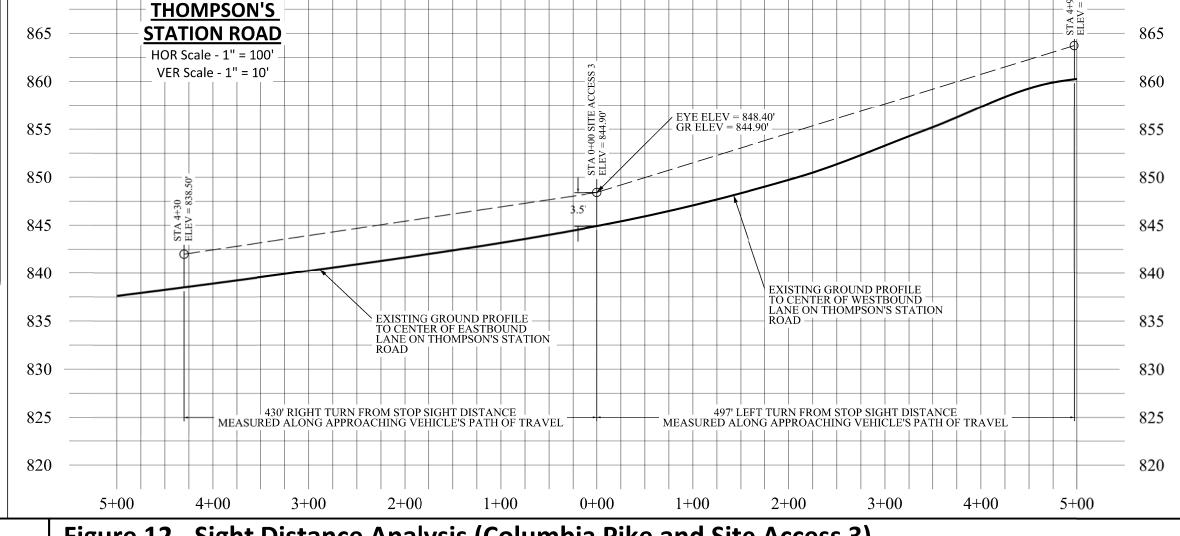




Figure 12 - Sight Distance Analysis (Columbia Pike and Site Access 3)

Thompson's Station, TN (Williamson County) • Approximate Scale: Varies

Prepared by T-Square Engineering, Inc.

Conclusions

Existing Conditions

Intersection Capacity Analyses

- At the intersection of Thompson's Station Road and Columbia Pike, the shared eastbound through/right-turn movement currently operates at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement currently operates at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS C and LOS D during the AM and PM peak hours, respectively, with existing traffic volumes and existing signal timings.
- At the intersection of Columbia Pike and South Station Drive, the shared westbound left-turn/right-turn movement currently operates at LOS E during the PM peak hour period.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the existing traffic volumes.

Turn Lane Analyses

It was determined that the southbound approach of Columbia Pike at its intersection with Station South Drive presently warrants one (1) exclusive lane for left-turning movements with existing traffic volumes. The installation of the southbound left-turn lane along Columbia Pike at its intersection with Station South Drive will reflect a positive impact on the frequency and number of rear-end related crashes for vehicles traveling southbound on Columbia Pike. With vehicles utilizing the southbound left-turn lane at this intersection, vehicles traveling in the though lane can progress through the intersection without being impeded by left-turning vehicles. Thus, improving the safety and overall operation of the intersection. It is important to note that this improvement is necessary regardless of the proposed Parson's Valley Subdivision Development and should not be the responsibility of the development as they are warranted based on existing deficiencies.

It was determined that the westbound approach of Thompson's Station Road at its intersection with Clayton Arnold Road presently warrants one (1) exclusive lane for right-turning movements with existing traffic volumes. The installation of a westbound right-turn lane along Thompson's Station Road at its intersection with Clayton Arnold Road will reflect a positive impact on the frequency of angle and rear-end related crashes for vehicles traveling westbound on Thompson's Station Road. This right-turn lane will allow vehicles traveling westbound in the through lane to progress through the intersection without being impeded by right-turning vehicles. It is important to note that this improvement is necessary regardless of the proposed Parson's Valley Subdivision Development and should not be the responsibility of the development as they are warranted based on existing deficiencies.



Background Conditions

Intersection Capacity Analyses

- At the intersection of Thompson's Station Road and Columbia Pike, the shared eastbound through/right-turn movement will continue to operate at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement will continue to operate at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS C and LOS D during the AM and PM peak hours, respectively, with background traffic volumes and existing signal timings.
- At the intersection of Columbia Pike and South Station Drive, the shared westbound leftturn/right-turn movement will operate at LOS F during the PM peak hour period.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the background traffic volumes.

Projected Conditions

Intersection Capacity Analyses

- At the intersection of Thompson's Station Road and Columbia Pike, the shared northbound through/right-turn movement will operate at LOS F during the AM peak hour period. The shared southbound through/right-turn movement will operate at LOS F during the PM peak hour period. The shared eastbound through/right-turn movement will continue to operate at LOS E and LOS F during the AM and PM peak hour periods, respectively. The shared westbound through/right-turn movement will continue to operate at LOS E during the AM peak hour period.
 - However, the overall intersection will operate at LOS D and LOS E during the AM and PM peak hours, respectively, with projected traffic volumes and existing signal timings.
 - Mitigation improvements for this intersection include the optimization of the existing signal timings. Optimizing the signal timings should allow the overall intersection to operate at a minimum acceptable LOS D. An Intersection Feasibility Study will need to be conducted to determine if any additional turn lanes can be installed at this intersection to the improve the LOS of each movement.
- At the intersection of Columbia Pike and South Station Drive, the shared westbound leftturn/right-turn movement will operate at LOS F during both the AM and PM peak hour periods.
 - o Increased delays will occur along this movement due to the higher northbound and southbound through volumes along Columbia Pike. Mitigation improvements for this intersection include the installation of a traffic signal. However, a traffic signal can only be installed if warranted by meeting the criteria set forth by TDOT and the MUTCD.



- At the intersection of Columbia Pike and Site Access 1, the shared westbound leftturn/right-turn movement will operate at LOS F during both the AM and PM peak hour periods.
 - Increased delays will occur along this movement due to the higher northbound and southbound through volumes along Columbia Pike. Mitigation improvements for this intersection include the installation of a traffic signal. However, a traffic signal can only be installed if warranted by meeting the criteria set forth by TDOT and the MUTCD.
- All other critical movements to the study intersections near the proposed Parson's Valley Subdivision will operate at an acceptable minimum LOS D during the AM and PM peak hours with the background traffic volumes.

Turn Lane Analyses

It was determined that the northbound approach of Columbia Pike at its intersection with Station South Drive will warrant one (1) exclusive lane for right-turning movements with projected traffic volumes. However, due to the limited turning volumes and projected capacity operating at acceptable levels, a northbound right-turn lane is not recommended as part of this study.

It was determined that the southbound approach of Columbia Pike at its intersection with the proposed Site Access 1 will warrant one (1) exclusive lane for left-turning movements with projected traffic volumes. Furthermore, it was determined that the northbound approach of Columbia Pike at its intersection with the proposed Site Access 1 will warrant one (1) exclusive lane for right-turning movements with projected traffic volumes. Lastly, it was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along the westbound approach of the proposed Site Access 1 at its intersection with Columbia Pike with projected traffic volumes.

It was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along the northbound approach of the proposed Site Access 2 at its intersection with Columbia Pike with projected traffic volumes.

It was determined that one (1) shared lane for left-turning and right-turning movements is sufficient along the northbound approach of the proposed Site Access 2 at its intersection with Columbia Pike with projected traffic volumes.

Site Access Analysis

- Site Access 1 will be located along the east side of Columbia Pike and will be constructed with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Columbia Pike.
- Site Access 2 will be located along the south side of Thompson's Station Road and will be constructed with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road.



• Site Access 3 will be located along the south side of Thompson's Station Road and will be constructed with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road.

Recommendations

Based on the analyses within this study, and a review of the proposed development's site access plan, the recommendations below (and on Figure 13) are presented to be implemented as part of the proposed Parson's Valley Subdivision in Thompson's Station, TN:

Improvement Recommendations for the Parson's Valley Subdivision

Thompson's Station Road and Columbia Pike

- Optimize the signal timings at the intersection of Thompson's Station Road and Columbia
 Pike to accommodate for the increase due to projected traffic volumes.
 - An Intersection Feasibility Study should be performed at this intersection to determine if any additional turn lanes can be installed.

Columbia Pike and Station South Drive

 No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Thompson's Station Road and Village Drive

 No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Thompson's Station Road and Clayton Arnold Road

 No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Columbia Pike and Site Access 1

- Construct Site Access 1 along Columbia Pike with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Columbia Pike according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- Construct one (1) exclusive left-turn lane along the southbound approach of Columbia Pike at its intersection with the proposed Site Access 1. The left-turn lane shall provide fifty (50) feet of storage and taper lengths according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- Construct one (1) exclusive right-turn lane on the northbound approach of Columbia Pike at its intersection with the proposed Site Access 1. The right-turn lane shall provide fifty (50) feet of storage and taper lengths according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the



- development according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

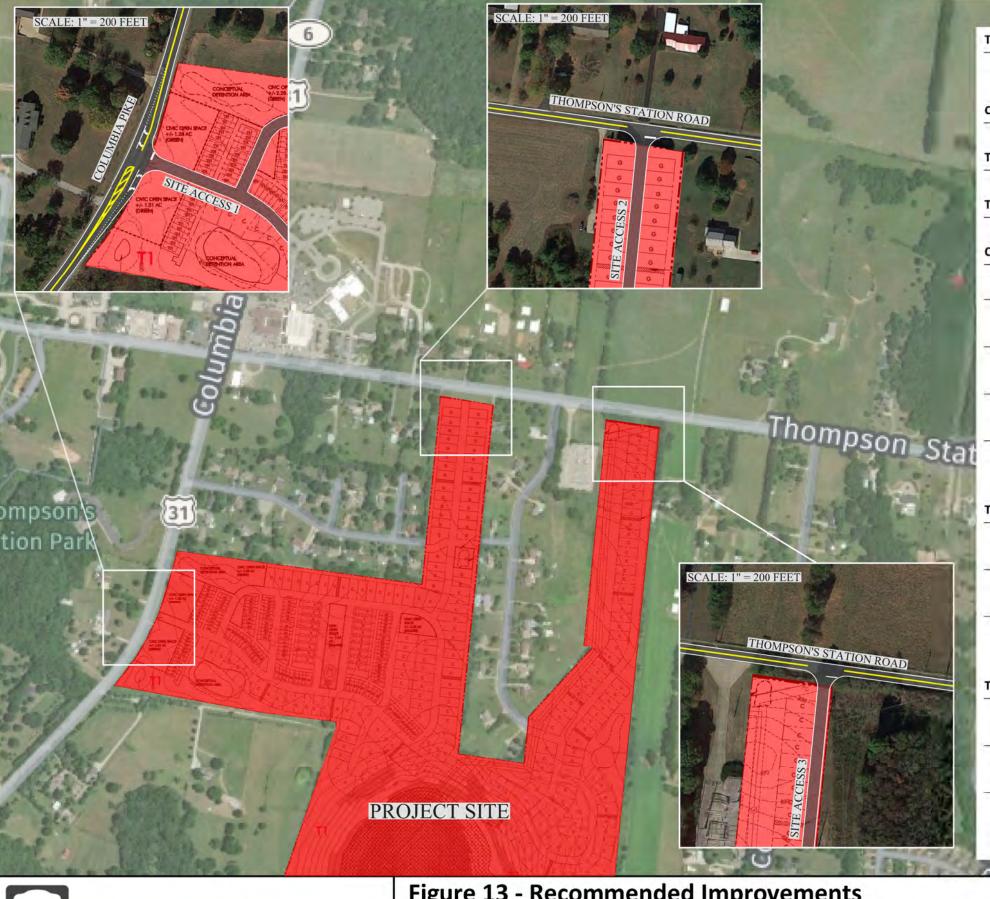
Thompson's Station Road and Site Access 2

- Construct Site Access 2 along Thompson's Station Road with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the development according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Thompson's Station Road and Site Access 3

- Construct Site Access 3 along Thompson's Station Road with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the development according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.
- Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.





Thompson's Station Road and Columbia Pike

 Optimize the signal timings at the intersection of Thompson's Station Road and Columbia Pike to accommodate for the increase due to projected traffic volumes. An Intersection Feasibility Study should be performed at this intersection to determine if any additional turn lanes can be installed.

Columbia Pike and Station South Drive

 No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Thompson's Station Road and Village Drive

No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Thompson's Station Road and Clayton Arnold Road

No improvements are recommended for this intersection as part of the construction of the Parson's Valley Subdivision.

Columbia Pike and Site Access 1

Construct Site Access 1 along Columbia Pike with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Columbia Pike according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Construct one (1) exclusive left-turn lane along the southbound approach of Columbia Pike at its intersection with the proposed Site Access 1. The left-turn lane shall provide fifty (50) feet of storage and taper lengths according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Construct one (1) exclusive right-turn lane on the northbound approach of Columbia Pike at its intersection with the proposed Site Access 1. The right-turn lane shall provide fifty (50) feet of storage and taper lengths according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the development according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Thompson's Station standards.

Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Thompson's Station Road and Site Access 2

- Construct Site Access 2 along Thompson's Station Road with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station

All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the development according to MUTCD, AASHTO, TDOT, and Town of

Thompson's Station standards.

Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.

Thompson's Station Road and Site Access 3

Construct Site Access 3 along Thompson's Station Road with one (1) inbound lane and one (1) outbound lane operating under a stop condition for Thompson's Station Road according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station

All radii for the proposed access shall be designed via coordination with the City of Columbia to accommodate the largest turning vehicle requirements that will service the development according to MUTCD, AASHTO, TDOT, and Town of

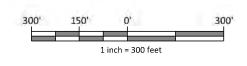
Thompson's Station standards.

Ensure the departure sight distance triangles for all driveways, internal intersections, and site access intersections are designed to be clear of all sight obstructions (including vegetation) as specified by AASHTO. The design of proposed internal roadway system should be completed according to MUTCD, AASHTO, TDOT, and Town of Thompson's Station standards.



Figure 13 - Recommended Improvements

Thompson's Station Road Subdivision ● Thompson's Station, TN ● Approximate Scale: 1" = 300' Prepared by T-Square Engineering, Inc.





APPENDIX



Appendix

APPENDIX A – DETAILED TURNING MOVEMENT COUNTS AND SIGNAL TIMINGS



Appendix July 2021

Count Sites: 4
Intersection #: 1

Eastbound:

Intersection: Thompson's Station Road and Columbia Pike

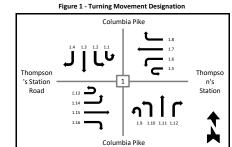
Southbound: Columbia Pike
Westbound: Thompson's Station Road
Northbound: Columbia Pike

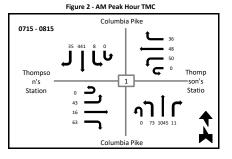
Lat/Long: 35.7969821751068, -86.90545529389411

Thompson's Station Road

Count Date: 5/24/2018

Time Period: 0600 - 0900 (Weekday AM Peak)







			Southbo	und					Westb	ound					Northb	ound					Eastbo	ound		
			Columbia						nompson's !	Station Road	ı				Columbi	a Pike					hompson's S	tation Road		
	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	Арр
Time	1.1	1.2	1.3	1.4	X-Walk	Total	1.5	1.6	1.7	1.8	X-Walk	Total	1.9	1.10	1.11	1.12	X-Walk	Total	1.13	1.14	1.15	1.16	X-Walk	Total
0600 - 0615	0	0	27	0	0	27	0	4	3	16	0	23	0	9	278	2	0	289	0	9	2	5	0	16
0615 - 0630	0	4	67	3	0	74	0	4	3	3	0	10	0	12	270	3	0	285	0	7	1	4	0	12
0630 - 0645	0	2	68	2	0	72	0	5	9	9	0	23	0	4	215	5	0	224	0	7	3	9	0	19
0645 - 0700	0	2	86	5	0	93	0	6	8	3	0	17	0	10	250	6	0	266	0	6	6	7	0	19
0700 - 0715	0	5	97	0	0	102	0	9	17	5	0	31	0	18	220	7	0	245	0	12	2	17	0	31
0715 - 0730	0	0	95	8	0	103	0	10	9	3	0	22	0	11	270	4	0	285	0	10	2	5	0	17
0730 - 0745	0	3	111	6	0	120	0	11	16	10	0	37	0	11	234	2	0	247	0	7	2	15	0	24
0745 - 0800	0	3	108	11	0	122	0	18	8	9	0	35	0	16	208	1	0	225	0	12	7	17	0	36
0800 - 0815	0	2	127	10	0	139	0	11	15	14	0	40	0	35	333	4	0	372	0	14	5	26	0	45
0815 - 0830	0	5	53	9	0	67	0	9	8	1	0	18	0	14	147	4	0	165	0	15	7	11	0	33
0830 - 0845	0	4	92	9	0	105	0	6	3	4	0	13	0	25	212	6	0	243	0	20	10	16	0	46
0845 - 0900	0	20	283	9	0	312	0	20	11	3	0	34	0	19	147	12	0	178	0	10	5	6	0	21
																								igsquare
Grand Total	0	50	1214	72	0	1336	0	113	110	80	0	303	0	184	2784	56	0	3024	0	129	52	138	0	319
																								igwdown
Peak Hour Total																								
0715 - 0815	0	8	441	35	0	484	0	50	48	36	0	134	0	73	1045	11	0	1129	0	43	16	63	0	122
	0.000/	2.740/	00.070/	5.200/			0.000/	27.200/	26.200/	26 400/			0.000/	C 000/	02.000/	4.050/			0.000/	40.440/	46.200/	42.250/		$\vdash \vdash \vdash$
App % Int %	0.00%	3.74% 1.00%	90.87%	5.39% 1.45%		26.82%	0.00%	37.29% 2.27%	36.30%	26.40%		6.08%	0.00%	6.08%	92.06%	1.85%		60.70%	0.00%	40.44%	16.30%	43.26%		6.40%
int %	0.00%	1.00%	24.37%	1.45%		20.82%	0.00%	2.27%	2.21%	1.61%		6.08%	0.00%	3.69%	55.88%	1.12%		60.70%	0.00%	2.59%	1.04%	2.77%		6.40%
Com Total	0		1214	72	<u> </u>		0	113	110	00			0	104	2784	- FC			0	120	F2	138		\vdash
Cars Total	·	50	1214	72	l		_	113	110	80			•	184		56			U	129	52			\vdash
Heavy Total	0	0	0	0			0	0	0	U			0	0	0	0			0 000/	0	0	0		
% Cars	0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		

Count Sites: 4
Intersection #: 1

Intersection: Thompson's Station Road and Columbia Pike

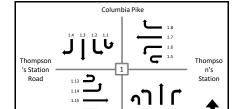
Southbound: Columbia Pike
Westbound: Thompson's Station Road

Northbound: Columbia Pike
Eastbound: Thompson's Station Road

Lat/Long: 35.7969821751068, -86.90545529389411

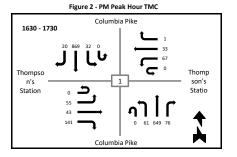
Count Date: 5/24/2018

Time Period: 1500 - 1800 (Weekday PM Peak)



Columbia Pike

Figure 1 - Turning Movement Designation





			Southb	ound					Westk	ound					Northb	ound					Eastbo	ound		
			Columb	ia Pike				Th	nompson's	Station Road	d				Columb	ia Pike				Ţ	'hompson's S	tation Road		
	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	Арр
Time	1.1	1.2	1.3	1.4	X-Walk	Total	1.5	1.6	1.7	1.8	X-Walk	Total	1.9	1.10	1.11	1.12	X-Walk	Total	1.13	1.14	1.15	1.16	X-Walk	Total
1500 - 1515	0	15	173	16	0	204	0	17	9	3	0	29	0	31	181	12	0	224	0	7	14	33	0	54
1515 - 1530	0	1	243	16	0	260	0	15	10	4	0	29	0	25	186	20	0	231	0	6	14	25	0	45
1530 - 1545	0	7	122	5	0	134	0	14	10	3	0	27	0	20	115	8	0	143	0	10	7	20	0	37
1545 - 1600	0	5	123	6	0	134	0	9	2	2	0	13	0	17	119	15	0	151	0	8	14	21	0	43
1600 - 1615	0	5	211	7	0	223	0	18	8	4	0	30	0	24	145	22	0	191	0	12	17	30	0	59
1615 - 1630	0	5	200	7	0	212	0	18	7	1	0	26	0	12	163	16	0	191	0	5	14	33	0	52
1630 - 1645	0	9	228	5	0	242	0	12	8	0	0	20	0	16	154	16	0	186	0	10	6	41	0	57
1645 - 1700	0	8	207	3	0	218	0	16	8	1	0	25	0	11	135	16	0	162	0	16	18	40	0	74
1700 - 1715	0	9	208	3	0	220	0	19	8	0	0	27	0	20	178	24	0	222	0	15	11	34	0	60
1715 - 1730	0	6	226	9	0	241	0	20	9	0	0	29	0	14	182	20	0	216	0	14	8	26	0	48
1730 - 1745	0	11	196	5	0	212	0	8	12	1	0	21	0	20	130	25	0	175	0	15	10	30	0	55
1745 - 1800	0	5	201	5	0	211	0	25	8	0	0	33	0	18	148	5	0	171	0	11	8	30	0	49
Grand Total	0	86	2338	87	0	2511	0	191	99	19	0	309	0	228	1836	199	0	2263	0	129	141	363	0	633
Peak Hour Total																								
1630 - 1730	0	32	869	20	0	921	0	67	33	1	0	101	0	61	649	76	0	786	0	55	43	141	0	239
App %	0.00%	3.42%	93.11%	3.46%			0.00%	61.81%	32.04%	6.15%			0.00%	10.08%	81.13%	8.79%			0.00%	20.38%	22.27%	57.35%		
Int %	0.00%	1.50%	40.90%	1.52%		43.93%	0.00%	3.34%	1.73%	0.33%		5.41%	0.00%	3.99%	32.12%	3.48%		39.59%	0.00%	2.26%	2.47%	6.35%		11.07%
Cars Total	0	86	2338	87			0	191	99	19			0	228	1836	199			0	129	141	363		
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		
% Cars	0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%			0.00%	100.00%	100.00%	100.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		

Count Sites: 4 Intersection #: 2

Intersection: Columbia Pike and Station S Drive

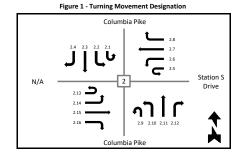
Southbound: Columbia Pike
Westbound: Station S Drive
Northbound: Columbia Pike

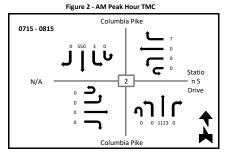
Eastbound: N/A

Lat/Long: 35.79486578460827, -86.90615304671026

Count Date: 5/24/2018

Time Period: 0600 - 0900 (Weekday AM Peak)







			Southbo	und					Westk	oound					Northb	ound					Eastb	ound		
			Columbia	Pike					Station	S Drive					Columbi	ia Pike					N/	A		
	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	Арр
Time	2.1	2.2	2.3	2.4	X-Walk	Total	2.5	2.6	2.7	2.8	X-Walk	Total	2.9	2.10	2.11	2.12	X-Walk	Total	2.13	2.14	2.15	2.16	X-Walk	Total
0600 - 0615	0	0	36	0	0	36	0	0	0	0	0	0	0	0	289	0	0	289	0	0	0	0	0	0
0615 - 0630	0	0	75	0	0	75	0	0	0	1	0	1	0	0	285	0	0	285	0	0	0	0	0	0
0630 - 0645	0	0	82	0	0	82	0	0	0	2	0	2	0	0	223	2	0	225	0	0	0	0	0	0
0645 - 0700	0	0	100	0	0	100	0	1	0	3	0	4	0	0	263	0	0	263	0	0	0	0	0	0
0700 - 0715	0	0	123	0	0	123	0	0	0	3	0	3	0	0	242	0	0	242	0	0	0	0	0	0
0715 - 0730	0	1	109	0	0	110	0	0	0	0	0	0	0	0	286	0	0	286	0	0	0	0	0	0
0730 - 0745	0	0	137	0	0	137	0	0	0	3	0	3	0	0	244	0	0	244	0	0	0	0	0	0
0745 - 0800	0	1	141	0	0	142	0	0	0	2	0	2	0	0	223	0	0	223	0	0	0	0	0	0
0800 - 0815	0	1	163	0	0	164	0	0	0	2	0	2	0	0	370	0	0	370	0	0	0	0	0	0
0815 - 0830	0	2	72	0	0	74	0	0	0	1	0	1	0	0	163	0	0	163	0	0	0	0	0	0
0830 - 0845	0	0	113	0	0	113	0	1	0	2	0	3	0	0	241	0	0	241	0	0	0	0	0	0
0845 - 0900	0	0	309	0	0	309	0	0	0	2	0	2	0	0	176	0	0	176	0	0	0	0	0	0
								_																
Grand Total	0	5	1460	0	0	1465	0	2	0	21	0	23	0	0	3005	2	0	3007	0	0	0	0	0	0
- 1																								
Peak Hour Total 0715 - 0815	0	3	550	0	0	553	0	0	0	7	0	7	0	0	1123	0	0	1123	0	0	0	0	0	0
0/13-0013	-	3	330	- 0	U	333	- 0	0	0		0	,	U	U	1123		U	1123	-	U	- 0	0	U	
App %	0.00%	0.34%	99.66%	0.00%			0.00%	8.70%	0.00%	91.30%			0.00%	0.00%	99.93%	0.07%			0.00%	0.00%	0.00%	0.00%		
Int %	0.00%	0.11%	32.48%	0.00%		32.59%	0.00%	0.04%	0.00%	0.47%		0.51%	0.00%	0.00%	66.85%	0.04%		66.90%	0.00%	0.00%	0.00%	0.00%		0.00%
			,.			. ,,,,,								. ,,,,,		. , , , , ,								
Cars Total	0	5	1460	0			0	2	0	21			0	0	3005	2			0	0	0	0		
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		
% Cars	0.00%	100.00%	100.00%	0.00%			0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%			0.00%	0.00%	0.00%	0.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		
											•	•												
	•																		•					

Count Sites: 4
Intersection #: 2

Intersection: Columbia Pike and Station S Drive

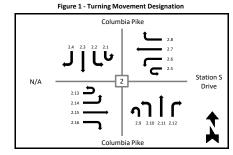
Southbound: Columbia Pike
Westbound: Station S Drive
Northbound: Columbia Pike

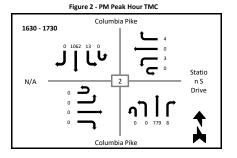
Eastbound: N/A

Lat/Long: 35.79486578460827, -86.90615304671026

Count Date: 5/24/2018

Time Period: 1500 - 1800 (Weekday PM Peak)







			South	ound					West	oound					Northb	ound					Eastb	ound		
			Columb	ia Pike					Station	S Drive					Columb	ia Pike					N/	'A		
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	Арр
Time	2.1	2.2	2.3	2.4	X-Walk	Total	2.5	2.6	2.7	2.8	X-Walk	Total	2.9	2.10	2.11	2.12	X-Walk	Total	2.13	2.14	2.15	2.16	X-Walk	Total
1500 - 1515	0	2	220	0	0	222	0	0	0	1	0	1	0	0	224	0	0	224	0	0	0	0	0	0
1515 - 1530	0	3	280	0	0	283	0	0	0	3	0	3	0	0	228	1	0	229	0	0	0	0	0	0
1530 - 1545	0	1	154	0	0	155	0	1	0	1	0	2	0	0	142	3	0	145	0	0	0	0	0	0
1545 - 1600	0	1	152	0	0	153	0	0	0	0	0	0	0	0	150	1	0	151	0	0	0	0	0	0
1600 - 1615	0	1	258	0	0	259	0	0	0	1	0	1	0	0	189	1	0	190	0	0	0	0	0	0
1615 - 1630	0	0	251	0	0	251	0	1	0	1	0	2	0	0	190	1	0	191	0	0	0	0	0	0
1630 - 1645	0	6	275	0	0	281	0	1	0	0	0	1	0	0	185	1	0	186	0	0	0	0	0	0
1645 - 1700	0	2	260	0	0	262	0	1	0	0	0	1	0	0	162	3	0	165	0	0	0	0	0	0
1700 - 1715	0	1	260	0	0	261	0	1	0	1	0	2	0	0	220	4	0	224	0	0	0	0	0	0
1715 - 1730	0	4	267	0	0	271	0	0	0	3	0	3	0	0	212	0	0	212	0	0	0	0	0	0
1730 - 1745	0	4	230	0	0	234	0	3	0	1	0	4	0	0	174	1	0	175	0	0	0	0	0	0
1745 - 1800	0	3	253	0	0	256	0	0	0	0	0	0	0	0	171	1	0	172	0	0	0	0	0	0
																								ldot
Grand Total	0	28	2860	0	0	2888	0	8	0	12	0	20	0	0	2247	17	0	2264	0	0	0	0	0	0
Peak Hour Total																								$\overline{}$
1630 - 1730	0	13	1062	0	0	1075	0	3	0	4	0	7	0	0	779	8	0	787	0	0	0	0	0	0
						1																		
App %	0.00%	0.97%	99.03%	0.00%			0.00%	40.00%	0.00%	60.00%		0.000/	0.00%	0.00%	99.25%	0.75%			0.00%	0.00%	0.00%	0.00%		
Int %	0.00%	0.54%	55.30%	0.00%		55.84%	0.00%	0.15%	0.00%	0.23%		0.39%	0.00%	0.00%	43.45%	0.33%		43.77%	0.00%	0.00%	0.00%	0.00%		0.00%
	_	20	2000				_	_	_	42			_	•	2247	47				_	_	_		
Cars Total	0	28	2860	0			0	8	0	12			0	0	2247	17			0	0	0	0		
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		\vdash
% Cars	0.00%	100.00%	100.00%	0.00%			0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%			0.00%	0.00%	0.00%	0.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		

Count Sites: 4 Intersection #: 3

Intersection: Thompson's Station Road and Village Drive

Southbound: N/A

Westbound: Thompson's Station Road

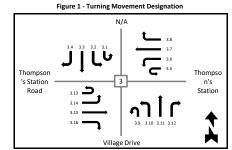
Northbound: Village Drive

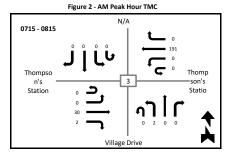
Eastbound: Thompson's Station Road

Lat/Long: 35.796247475856, -86.8984938878601

Count Date: 5/24/2018

Time Period: 0600 - 0900 (Weekday AM Peak)







			Southbo	ound					Westb	ound					Northb	ound					Eastbo	ound		
			N/A						nompson's !	Station Roa	d				Village	Drive					hompson's S	tation Road		
	U-Turn	Left	Thru	Right	Peds	Арр	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	Арр
Time	3.1	3.2	3.3	3.4	X-Walk	Total	3.5	3.6	3.7	3.8	X-Walk	Total	3.9	3.10	3.11	3.12	X-Walk	Total	3.13	3.14	3.15	3.16	X-Walk	Total
0600 - 0615	0	0	0	0	0	0	0	0	25	0	0	25	0	1	0	1	0	2	0	0	2	0	0	2
0615 - 0630	0	0	0	0	0	0	0	0	30	0	0	30	0	3	0	0	0	3	0	0	6	1	0	7
0630 - 0645	0	0	0	0	0	0	0	0	51	0	0	51	0	1	0	0	0	1	0	0	8	1	0	9
0645 - 0700	0	0	0	0	0	0	0	0	28	0	0	28	0	4	0	0	0	4	0	0	12	0	0	12
0700 - 0715	0	0	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	0	0	0	14	0	0	14
0715 - 0730	0	0	0	0	0	0	0	0	48	0	0	48	0	0	0	0	0	0	0	0	4	0	0	4
0730 - 0745	0	0	0	0	0	0	0	0	56	0	0	56	0	0	0	0	0	0	0	0	7	1	0	8
0745 - 0800	0	0	0	0	0	0	0	0	45	0	0	45	0	0	0	0	0	0	0	0	10	1	0	11
0800 - 0815	0	0	0	0	0	0	0	0	42	0	0	42	0	2	0	0	0	2	0	0	9	0	0	9
0815 - 0830	0	0	0	0	0	0	0	0	35	0	0	35	0	2	0	1	0	3	0	0	18	2	0	20
0830 - 0845	0	0	0	0	0	0	0	2	33	0	0	35	0	1	0	0	0	1	0	0	22	0	0	22
0845 - 0900	0	0	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	0	0	0	17	1	0	18
																								ш
Grand Total	0	0	0	0	0	0	0	2	476	0	0	478	0	14	0	2	0	16	0	0	129	7	0	136
Peak Hour Total																								igsquare
0715 - 0815	0	0	0	0	0	0	0	0	191	0	0	191	0	2	0	0	0	2	0	0	30	2	0	32
																								igwdown
App %	0.00%	0.00%	0.00%	0.00%			0.00%	0.42%	99.58%	0.00%			0.00%	87.50%	0.00%	12.50%			0.00%	0.00%	94.85%	5.15%		21.50
Int %	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.32%	75.56%	0.00%		75.87%	0.00%	2.22%	0.00%	0.32%		2.54%	0.00%	0.00%	20.48%	1.11%		21.59%
																ļ								
Cars Total	0	0	0	0			0	2	476	0			0	14	0	2			0	0	129	7		igwdown
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		\blacksquare
% Cars	0.00%	0.00%	0.00%	0.00%			0.00%	100.00%	100.00%	0.00%			0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		

Count Sites: 4 Intersection #: 3

Intersection: Thompson's Station Road and Village Drive

Southbound: N/A

Westbound: Thompson's Station Road

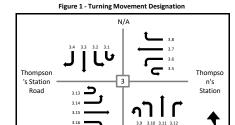
Northbound: Village Drive

Eastbound: Thompson's Station Road

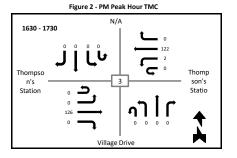
Lat/Long: 35.796247475856, -86.8984938878601

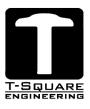
Count Date: 5/24/2018

Time Period: 1500 - 1800 (Weekday PM Peak)



Village Drive





			Southl	oound					Westb	ound					Northb	ound					Eastbo	ound		
			N/	Ά.				TI	hompson's S	Station Road	d				Village	Drive				T	Thompson's S	Station Road		
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App
Time	3.1	3.2	3.3	3.4	X-Walk	Total	3.5	3.6	3.7	3.8	X-Walk	Total	3.9	3.10	3.11	3.12	X-Walk	Total	3.13	3.14	3.15	3.16	X-Walk	Total
1500 - 1515	0	0	0	0	0	0	0	0	27	0	0	27	0	0	0	0	0	0	0	0	36	0	0	36
1515 - 1530	0	0	0	0	0	0	0	0	27	0	0	27	0	1	0	0	0	1	0	0	23	2	0	25
1530 - 1545	0	0	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	0	0	0	26	3	0	29
1545 - 1600	0	0	0	0	0	0	0	2	22	0	0	24	0	2	0	0	0	2	0	0	31	0	0	31
1600 - 1615	0	0	0	0	0	0	0	1	34	0	0	35	0	1	0	0	0	1	0	0	50	0	0	50
1615 - 1630	0	0	0	0	0	0	0	1	25	0	0	26	0	2	0	0	0	2	0	0	35	0	0	35
1630 - 1645	0	0	0	0	0	0	0	1	27	0	0	28	0	0	0	0	0	0	0	0	22	0	0	22
1645 - 1700	0	0	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	0	0	0	33	0	0	33
1700 - 1715	0	0	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	0	0	42	0	0	42
1715 - 1730	0	0	0	0	0	0	0	1	36	0	0	37	0	0	0	0	0	0	0	0	29	0	0	29
1730 - 1745	0	0	0	0	0	0	0	0	27	0	0	27	0	0	0	0	0	0	0	0	38	0	0	38
1745 - 1800	0	0	0	0	0	0	0	1	34	0	0	35	0	2	0	1	0	3	0	0	27	1	0	28
							_										_						_	
Grand Total	0	0	0	0	0	0	0	7	344	0	0	351	0	8	0	1	0	9	0	0	392	6	0	398
Peak Hour Total																								
1630 - 1730	0	0	0	n	0	0	0	2	122	0	0	124	n	0	0	0	0	0	0	0	126	0	0	126
1030 - 1730									122			124					•	, ,	•		120		•	120
App %	0.00%	0.00%	0.00%	0.00%			0.00%	1.99%	98.01%	0.00%			0.00%	88.89%	0.00%	11.11%			0.00%	0.00%	98.49%	1.51%		
Int %	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.92%	45.38%	0.00%		46.31%	0.00%	1.06%	0.00%	0.13%		1.19%	0.00%	0.00%	51.72%	0.79%		52.51%
Cars Total	0	0	0	0			0	7	344	0			0	8	0	1			0	0	392	6		
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		
% Cars	0.00%	0.00%	0.00%	0.00%			0.00%	100.00%	100.00%	0.00%			0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		
		-							-					-									-	

Location: Williamson County (Thompson's Station) Classified Turning Movement Count (TMC) Count Type:

Count Sites: Intersection #:

Intersection: Thompson's Station Road and Clayton Arnold Road

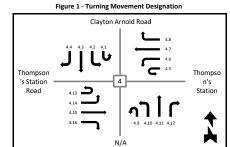
Southbound: Clayton Arnold Road Westbound: Thompson's Station Road Northbound: N/A

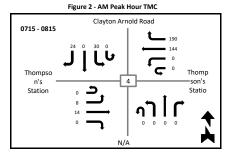
Thompson's Station Road Eastbound:

35.7927127654388, -86.88052076707136 Lat/Long:

5/24/2018 Count Date:

0600 - 0900 (Weekday AM Peak) Time Period:







			Southbo	ound					Westb	ound					Northb	ound					Eastbo	ound		
		(Clayton Arn	old Road				TI	hompson's !	Station Road	d				N/	A				T	hompson's S	tation Road		
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App
Time	4.1	4.2	4.3	4.4	X-Walk	Total	4.5	4.6	4.7	4.8	X-Walk	Total	4.9	4.10	4.11	4.12	X-Walk	Total	4.13	4.14	4.15	4.16	X-Walk	Total
0600 - 0615	0	1	0	2	0	3	0	0	27	22	0	49	0	0	0	0	0	0	0	2	0	0	0	2
0615 - 0630	0	4	0	1	0	5	0	0	25	32	0	57	0	0	0	0	0	0	0	1	2	0	0	3
0630 - 0645	0	3	0	4	0	7	0	0	37	55	0	92	0	0	0	0	0	0	0	3	4	0	0	7
0645 - 0700	0	5	0	3	0	8	0	0	23	50	0	73	0	0	0	0	0	0	0	6	3	0	0	9
0700 - 0715	0	6	0	4	0	10	0	0	33	34	0	67	0	0	0	0	0	0	0	4	8	0	0	12
0715 - 0730	0	4	0	3	0	7	0	0	42	54	0	96	0	0	0	0	0	0	0	0	1	0	0	1
0730 - 0745	0	10	0	4	0	14	0	0	46	66	0	112	0	0	0	0	0	0	0	0	5	0	0	5
0745 - 0800	0	7	0	11	0	18	0	0	32	46	0	78	0	0	0	0	0	0	0	5	4	0	0	9
0800 - 0815	0	9	0	6	0	15	0	0	24	24	0	48	0	0	0	0	0	0	0	3	4	0	0	7
0815 - 0830	0	9	0	14	0	23	0	0	27	26	0	53	0	0	0	0	0	0	0	6	14	0	0	20
0830 - 0845	0	3	0	5	0	8	0	0	31	31	0	62	0	0	0	0	0	0	0	9	14	0	0	23
0845 - 0900	0	5	0	23	0	28	0	0	26	24	0	50	0	0	0	0	0	0	0	9	8	0	0	17
																								\blacksquare
Grand Total	0	66	0	80	0	146	0	0	373	464	0	837	0	0	0	0	0	0	0	48	67	0	0	115
Peak Hour Total					_		_						-		_	-	_		_			-		
0715 - 0815	0	30	0	24	0	54	0	0	144	190	0	334	0	0	0	0	0	0	0	8	14	0	0	22
App %	0.00%	45.21%	0.00%	54.79%			0.00%	0.00%	44.56%	55.44%			0.00%	0.00%	0.00%	0.00%			0.00%	41.74%	58.26%	0.00%		-
Int %	0.00%	6.01%	0.00%	7.29%		13.30%	0.00%	0.00%	33.97%	42.26%		76.23%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	4.37%	6.10%	0.00%		10.47%
111, 70	0.0078	0.01/0	0.0076	7.2370		13.30/6	0.0076	0.0076	33.3770	72.20/0		70.23/0	0.0076	0.0076	0.0076	0.0076		0.0078	0.0076	7.3770	0.10/0	0.00%		10.47/0
Cars Total	0	66	0	80			0	0	373	464			0	0	0	0	 		n	48	67	0		\vdash
Heavy Total	0	0	0	0			0	0	0	0			0	0	0	0			0	0	0	0		-
% Cars	0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%			0.00%	0.00%	0.00%	0.00%			0.00%	100.00%	100.00%	0.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		
,cuvy	0.00/0	0.0070	3.30/0	0.0070			3.3070	0.0070	0.00/0	0.0070			0.00/0	5.5070	0.0070	0.3070			0.0070	0.0070	0.00/0	3.5070		

Count Sites: 4
Intersection #: 4

Intersection: Thompson's Station Road and Clayton Arnold Road

Southbound: Clayton Arnold Road Westbound: Thompson's Station Road

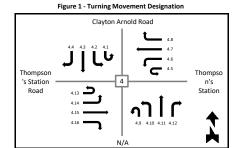
Northbound: N/A

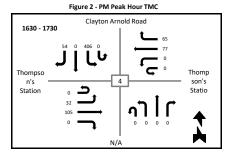
Eastbound: Thompson's Station Road

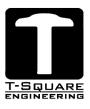
Lat/Long: 35.7927127654388, -86.88052076707136

Count Date: 5/24/2018

Time Period: 1500 - 1800 (Weekday PM Peak)







			South	bound					Westb	ound					Northb	ound					Eastbo	ound		
			Clayton Ar	nold Road				Ti	hompson's:	Station Road	i				N/	A				T	'hompson's S	tation Road		
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	Арр
Time	4.1	4.2	4.3	4.4	X-Walk	Total	4.5	4.6	4.7	4.8	X-Walk	Total	4.9	4.10	4.11	4.12	X-Walk	Total	4.13	4.14	4.15	4.16	X-Walk	Total
1500 - 1515	0	30	0	7	0	37	0	0	12	12	0	24	0	0	0	0	0	0	0	3	28	0	0	31
1515 - 1530	0	42	0	10	0	52	0	0	18	17	0	35	0	0	0	0	0	0	0	7	20	0	0	27
1530 - 1545	0	30	0	8	0	38	0	0	20	19	0	39	0	0	0	0	0	0	0	4	19	0	0	23
1545 - 1600	0	45	0	5	0	50	0	0	16	12	0	28	0	0	0	0	0	0	0	7	25	0	0	32
1600 - 1615	0	43	0	11	0	54	0	0	28	14	0	42	0	0	0	0	0	0	0	9	31	0	0	40
1615 - 1630	0	55	0	10	0	65	0	0	18	18	0	36	0	0	0	0	0	0	0	6	29	0	0	35
1630 - 1645	0	82	0	15	0	97	0	0	17	12	0	29	0	0	0	0	0	0	0	5	18	0	0	23
1645 - 1700	0	108	0	17	0	125	0	0	20	14	0	34	0	0	0	0	0	0	0	11	30	0	0	41
1700 - 1715	0	105	0	7	0	112	0	0	18	17	0	35	0	0	0	0	0	0	0	8	36	0	0	44
1715 - 1730	0	111	0	15	0	126	0	0	22	22	0	44	0	0	0	0	0	0	0	8	21	0	0	29
1730 - 1745	0	118	0	14	0	132	0	0	20	19	0	39	0	0	0	0	0	0	0	12	31	0	0	43
1745 - 1800	0	97	0	15	0	112	0	0	16	23	0	39	0	0	0	0	0	0	0	5	22	0	0	27
Grand Total	0	866	0	134	0	1000	0	0	225	199	0	424	0	0	0	0	0	0	0	85	310	0	0	395
Peak Hour Total																								
1630 - 1730	0	406	0	54	0	460	0	0	77	65	0	142	0	0	0	0	0	0	0	32	105	0	0	137
A 0/	0.00%	86,60%	0.00%	13.40%			0.00%	0.00%	53.07%	46.93%			0.00%	0.00%	0.00%	0.00%			0.00%	21.52%	78.48%	0.00%		
App % Int %	0.00%	47.61%	0.00%	7.37%		54.98%	0.00%	0.00%	12.37%	10.94%		23.31%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	4.67%	17.04%	0.00%		21.72%
IIIL 76	0.00%	47.01%	0.00%	7.5770		34.96%	0.00%	0.00%	12.5770	10.94%		23.31%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	4.0776	17.04%	0.00%		21.7270
Cars Total	0	866	0	134			0	0	225	199			0	0	0	0			0	85	310	0		
Heavy Total	0	000	0	0			0	0	0	199			0	0	0	0			0	0.5	0	0		
% Cars	0.00%	100.00%	0.00%	100.00%			0.00%	0.00%	100.00%	100.00%			0.00%	0.00%	0.00%	0.00%			0.00%	100.00%	100.00%	0.00%		
% Heavy	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%		
70 fileavy	0.3076	0.0078	0.00/8	0.0076			0.0076	0.0076	0.0076	0.0078			0.0078	0.0078	0.0076	0.0076			0.0076	0.0076	0.0076	0.00/8		
	L																							

Basic p	hase timing							
Phase	1	2	3	4	5	6	7	8
Initial Green	6	25	6	6	6	25	6	6
Passage	2.5	8	2	2	2.5	8	2	2
Yellow	3	4.5	3	4.5	3	4.5	3	4.5
Red	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Timing Pla	n 1							
Phase	1	2	3	4	5	6	7	8
Max 1 Time	20	90	15	20	15	67	13	25
Timing Pla	n 2							
Phase	1	2	3	4	5	6	7	8
Max 1 Time	12	50	15	20	15	50	15	20
Timing Pla	n 3							
Phase	1	2	3	4	5	6	7	8
Max 1 Time	12	74	14	20	12	74	14	20
Timing Pla	n 4							
Phase	1	2	3	4	5	6	7	8
Max 1 Time	12	74	14	20	12	74	14	20

Day Plan 1 (Mond	ay - Friday		
12:00	6:00	Free	
6:00	11:00	Timing Pla	n 1
11:00	14:00	Timing Pla	n 2
14:00	21:00	Timing Pla	n 3
21:00	24:00:00	Free	

Day Plan 2 (Saturo	lay & Sunda	ay)										
12:00												
8:00												
11:00	19:00	Timing Pla	n4									
19:00	21:00	Timing Pla	n 3									
21:00	24:00:00	Free										

Phase	1	2	3	4	5	6	7	8
Movement	SBLT	NBT	WBLT	EBT	NBLT	SBT	EBLT	WBT

APPENDIX B – DETAILED TRIP GENERATION CALCULATIONS



Appendix July 2021

TRIP GENERATION

Project: Thompson's Station Road Subdivision

ITE Land Use: Single-Family Detached Housing

ITE Code: 210

Trip Ends vs: 230 Dwelling Units

Daily Equation: Weekday – Fitted Curve Equation

AM Equation: AM Peak Hour of Adjacent Street Traffic One-Hour Between 7 and 9 AM – Fitted Curve

Equation

PM Peak Hour of Adjacent Street Traffic One-Hour Between 4 and 6 PM – Fitted Curve

Equation

Time Period	Formula ¹	Calculation ¹	Trips
Daily	Ln(T) = 0.92Ln(X) + 2.71	Ln(T) = 0.92Ln(230) + 2.71	2,237
AM Peak (Total)	T = 0.71(X) + 4.80	T = 0.71(230) + 4.80	168
AM Peak (Entering)	$T = 0.25(Total\ AM\ Trips)$	T = 0.25(168)	42
AM Peak (Exiting)	$T = 0.75(Total\ AM\ Trips)$	T = 0.75(168)	126
PM Peak (Total)	Ln(T) = 0.96Ln(X) + 0.20	Ln(T) = 0.96Ln(230) + 0.20	226
PM Peak (Entering)	$T = 0.63(Total\ PM\ Trips)$	T = 0.63(226)	142
PM Peak (Exiting)	$T = 0.37(Total\ PM\ Trips)$	T = 0.37(226)	84

Parson's Valley Subdivision – Traffic Impact Study

¹ Institute of Transportation Engineers (ITE). <u>Trip Generation Manual</u>, 10th Edition. Washington, DC: ITE, 2020

Single-Family Detached Housing

(210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.

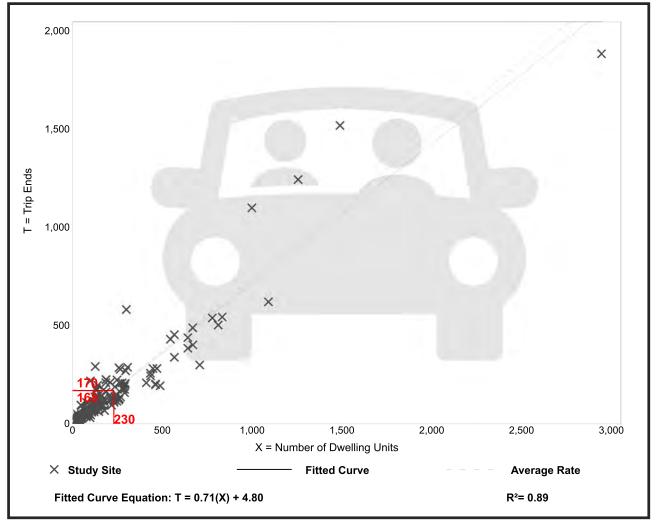
Setting/Location: General Urban/Suburban

Number of Studies: 173 Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

Single-Family Detached Housing

(210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.

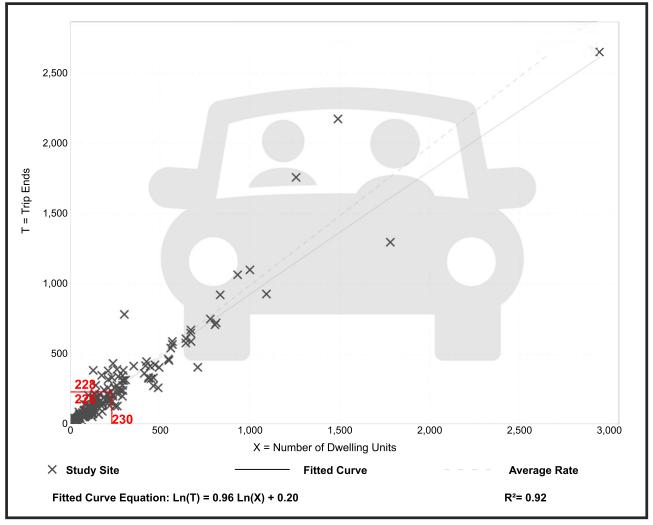
Setting/Location: General Urban/Suburban

Number of Studies: 190 Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31



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Single-Family Detached Housing

(210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday

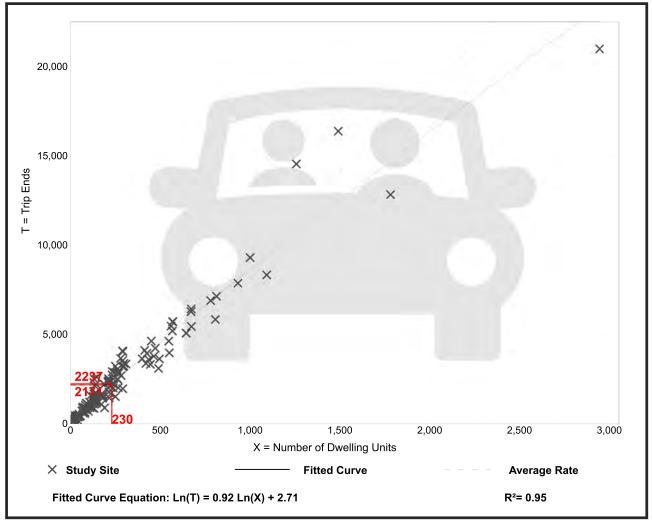
Setting/Location: General Urban/Suburban

Number of Studies: 159 Avg. Num. of Dwelling Units: 264

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation	
9.44	4.81 - 19.39	2.10	



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

TRIP GENERATION

Project: Thompson's Station Road Subdivision

ITE Land Use: Multi-Family Housing

ITE Code: 220

Trip Ends vs: 123 Dwelling Units

Daily Equation: Weekday – Fitted Curve Equation

AM Equation: AM Peak Hour of Adjacent Street Traffic One-Hour Between 7 and 9 AM – Fitted Curve

Equation

PM Peak Hour of Adjacent Street Traffic One-Hour Between 4 and 6 PM – Fitted Curve

Equation

Time Period	Formula ¹	Calculation ¹	Trips
Daily	T = 7.56(X) - 40.86	T = 7.56(123) - 40.86	889
AM Peak (Total)	Ln(T) = 0.95Ln(X) - 0.51	Ln(T) = 0.95Ln(123) - 0.51	58
AM Peak (Entering)	$T = 0.23(Total\ AM\ Trips)$	T = 0.23(58)	13
AM Peak (Exiting)	$T = 0.77(Total\ AM\ Trips)$	T = 0.77(58)	45
PM Peak (Total)	Ln(T) = 0.89Ln(X) - 0.02	Ln(T) = 0.89Ln(123) - 0.02	71
PM Peak (Entering)	$T = 0.63(Total\ PM\ Trips)$	T = 0.63(71)	45
PM Peak (Exiting)	$T = 0.37(Total\ PM\ Trips)$	T = 0.37(71)	26

¹ Institute of Transportation Engineers (ITE). <u>Trip Generation Manual</u>, 10th Edition. Washington, DC: ITE, 2020

Multifamily Housing (Low-Rise)

(220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

> Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.

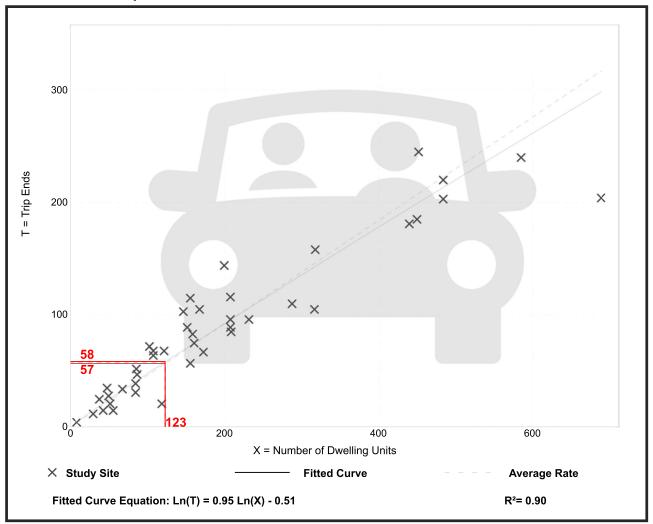
Setting/Location: General Urban/Suburban

Number of Studies: 42 Avg. Num. of Dwelling Units: 199

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12



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Multifamily Housing (Low-Rise)

(220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.

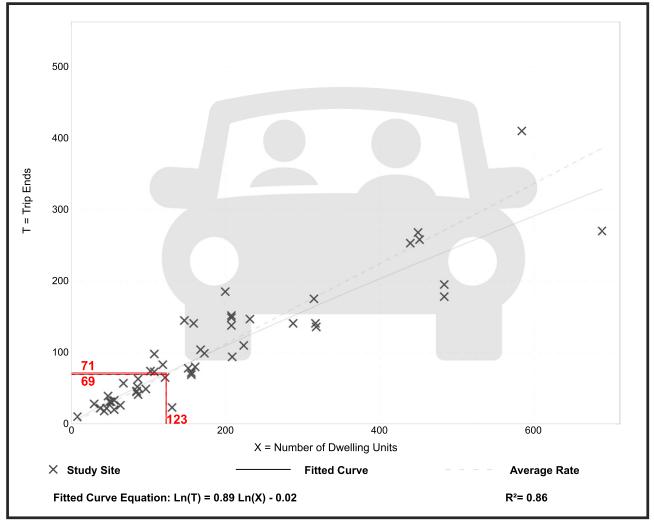
Setting/Location: General Urban/Suburban

Number of Studies: 50 Avg. Num. of Dwelling Units: 187

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16



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Multifamily Housing (Low-Rise)

(220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

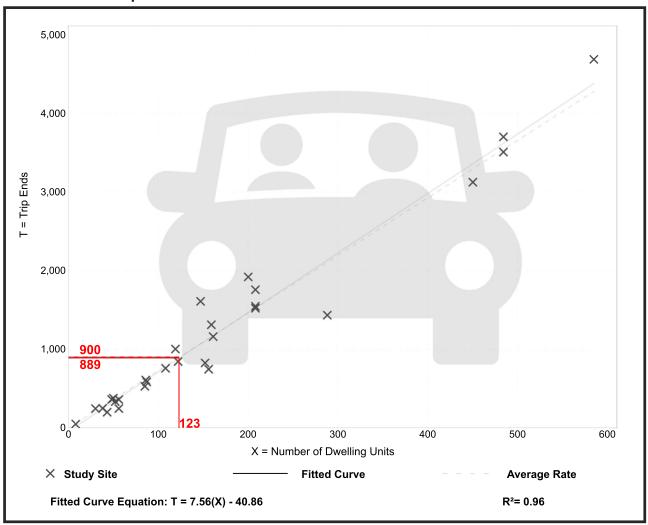
Setting/Location: General Urban/Suburban

Number of Studies: 29 Avg. Num. of Dwelling Units: 168

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.32	4.45 - 10.97	1.31



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APPENDIX C – CAPACITY ANALYSES



Appendix July 2021

EXISTING CAPACITY ANALYSES



Appendix July 2021

	•	→	•	•	←	•	•	†	~	/	+	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	î»		ň	f)		7	î»		7	ĵ.	
Traffic Volume (veh/h)	46	17	67	53	51	38	78	1109	12	9	468	37
Future Volume (veh/h)	46	17	67	53	51	38	78	1109	12	9	468	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	50	18	73	58	55	41	85	1205	13	10	509	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	23	95	159	74	55	587	1279	14	139	1130	89
Arrive On Green	0.04	0.07	0.07	0.04	0.07	0.07	0.05	0.70	0.70	0.01	0.66	0.66
Sat Flow, veh/h	1774	323	1309	1774	992	740	1774	1839	20	1774	1705	134
Grp Volume(v), veh/h	50	0	91	58	0	96	85	0	1218	10	0	549
Grp Sat Flow(s), veh/h/ln	1774	0	1632	1774	0	1732	1774	0	1859	1774	0	1839
Q Serve(g_s), s	3.1	0.0	6.6	3.6	0.0	6.5	1.7	0.0	69.5	0.2	0.0	17.2
Cycle Q Clear(g_c), s	3.1	0.0	6.6	3.6	0.0	6.5	1.7	0.0	69.5	0.2	0.0	17.2
Prop In Lane	1.00		0.80	1.00		0.43	1.00		0.01	1.00	0	0.07
Lane Grp Cap(c), veh/h	159	0	119	159	0	130	587	0	1293	139	0	1219
V/C Ratio(X)	0.32	0.00	0.77	0.36	0.00	0.74	0.14	0.00	0.94	0.07	0.00	0.45
Avail Cap(c_a), veh/h	242	0	258	238	1.00	274	733	0	1300	342	1.00	1286
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	0.0	54.7 3.9	48.8	0.0	54.4	6.5	0.0	16.1	24.6	0.0	9.7 1.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.0	3.1 0.0	0.1	0.0	14.5 0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh %ile BackOfQ(50%),veh/ln	1.5	0.0	3.1	1.8	0.0	3.2	0.0	0.0	40.4	0.0	0.0	9.1
LnGrp Delay(d),s/veh	49.2	0.0	58.6	49.3	0.0	57.5	6.6	0.0	30.6	24.7	0.0	10.9
LnGrp LOS	47.2 D	0.0	50.0 E	47.3 D	0.0	57.5 E	Α	0.0	C	24.7 C	0.0	В
Approach Vol, veh/h	U	141	<u> </u>	U	154	<u> </u>		1303		C	559	Б
Approach Delay, s/veh		55.2			54.4			29.1			11.2	
Approach LOS		55.2 E			D D			29.1 C			11.2 B	
•											ь	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	89.5	9.6	14.7	10.1	85.6	9.4	15.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	15.5	84.0	10.5	19.0	15.5	84.0	10.5	19.0				
Max Q Clear Time (g_c+l1), s	2.2	71.5	5.6	8.6	3.7	19.2	5.1	8.5				
Green Ext Time (p_c), s	0.0	12.1	0.0	0.2	0.1	18.2	0.0	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			28.0									
HCM 2010 LOS			С									

Existing - AM Peak

Intersection: 1: Columbia Pike & Thompson's Station Road

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	111	94	95	151	255	616	51	274	
Average Queue (ft)	32	43	42	74	77	280	10	100	
95th Queue (ft)	74	83	87	128	238	507	33	204	
Link Distance (ft)		1341		1494		744		7279	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)	0		2	8		15		2	
Queuing Penalty (veh)	0		2	4		12		0	

1: Columbia Pike & Thompson's Station Road

	•	-	•	←	1	†	-	↓	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	ሻ	₽	ሻ	f)	ሻ	₽	7	₽	
Traffic Volume (vph)	46	17	53	51	78	1109	9	468	
Future Volume (vph)	46	17	53	51	78	1109	9	468	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		
Detector Phase	7	4	3	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0	
Minimum Split (s)	11.0	12.0	11.0	12.0	10.5	31.5	11.0	31.5	
Total Split (s)	15.0	25.0	15.0	25.0	20.0	90.0	20.0	90.0	
Total Split (%)	10.0%	16.7%	10.0%	16.7%	13.3%	60.0%	13.3%	60.0%	
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	None	Min	
Act Effct Green (s)	17.3	9.6	17.7	9.8	87.8	84.8	82.7	75.2	
Actuated g/C Ratio	0.15	0.08	0.15	0.08	0.74	0.72	0.70	0.64	
v/c Ratio	0.23	0.46	0.26	0.59	0.15	0.91	0.07	0.47	
Control Delay	43.0	25.0	43.5	57.7	5.8	28.3	6.6	14.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	43.0	25.0	43.5	57.7	5.8	28.3	6.6	14.0	
LOS	D	С	D	Е	А	С	Α	В	
Approach Delay		31.4		52.4		26.8		13.9	
Approach LOS		С		D		С		В	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 118.2

Natural Cycle: 110

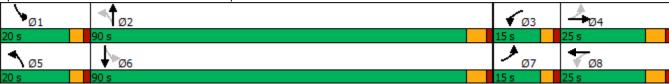
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 25.6 Intersection Capacity Utilization 84.4% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Columbia Pike & Thompson's Station Road



Intersection						
Int Delay, s/veh	0.1					
		WED	NET	NDD	CDI	CDT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥	_	₽			4
Traffic Vol, veh/h	0	7	1192	0	3	584
Future Vol, veh/h	0	7	1192	0	3	584
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	e,# 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	8	1296	0	3	635
N.A. 1. /N.A.	N 41				4 1 2	
	Minor1		/lajor1		Major2	
Conflicting Flow All	1937	1296	0	0	1296	0
Stage 1	1296	-	-	-	-	-
Stage 2	641	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy		3.318	-	-	2.218	-
Pot Cap-1 Maneuver	72	198	-	-	535	-
Stage 1	256	-	_	_	-	-
Stage 2	525	-	-	-	-	-
Platoon blocked, %	320		_	_		_
Mov Cap-1 Maneuver	71	198	-	-	535	_
Mov Cap-1 Maneuver	71	170			-	
Stage 1	256	-	-	-	-	-
	520	-	-	-	-	•
Stage 2	520	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	23.9		0		0.1	
HCM LOS	С					
, = = =						
Minor Lane/Major Mvn	nt	NBT	NBRV	VBLn1	SBL	SBT
Capacity (veh/h)		-	-	.,.	535	-
HCM Lane V/C Ratio		-	-	0.038	0.006	-
HCM Control Delay (s)	-	-	23.9	11.8	0
HCM Lane LOS		-	-	С	В	Α
HCM 95th %tile Q(veh	1)	-	-	0.4	0	-

Intersection						
Int Delay, s/veh	0.1					
		EDD	WDI	WDT	NDI	NDD
	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	\$	_		4	¥	
Traffic Vol, veh/h	32	2	0	203	2	0
Future Vol, veh/h	32	2	0	203	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
	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	35	2	0	221	2	0
Major/Minor M	olor1	N	Majora	N	Minor1	
	ajor1		Major2			0.4
Conflicting Flow All	0	0	37	0	257	36
Stage 1	-	-	-	-	36	-
Stage 2	-	-	-	-	221	-
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	-	-	1574	-	732	1037
Stage 1	-	-	-	-	986	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1574	-	732	1037
Mov Cap-2 Maneuver	_	_	-	-	732	-
Stage 1	-	-	-	-	986	-
Stage 2	_	_	_	_	816	_
Jugo Z					510	
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9.9	
HCM LOS					Α	
Minor Lang/Major Marest		IDI ~1	EDT	CDD.	WDI	WDT
Minor Lane/Major Mvmt	ľ	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		732	-		1574	-
HCM Lane V/C Ratio		0.003	-	-	-	-
HCM Control Delay (s)		9.9	-	-	0	-
HCM Lane LOS		Α	-	-	Α	-
HCM 95th %tile Q(veh)		0	-	-	0	-

1.5						
SBL	SBR	SEI	SET	NWT	NWR	
		9			202	
-		-		-		
0		-	-	-	-	
	-	_	0	0	_	
0	-	-	0	0	-	
92	92	92	92	92	92	
2	2	2	2	2	2	
35	28	10	16	166	220	
Minora		Majort	n	Majora		
		-	-	-	-	
		- 4.40	-	-	-	
		4.12	-		-	
		-	-		-	
		-	-		-	
			-		-	
		11/2	-	-	-	
		-	-	-	-	
986	-	-	-	-	-	
(75	7.0	4470	-	-	-	
		11/2	-	-	-	
	-	-	-	-	-	
	-	-	-	-	-	
986	-	-	-	-	-	
SB		SF		NW		
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	-					763
	-	-		-		
	-	-	8.1	0	10.6	9.9
	-	-	Α	Α	В	Α
)	-	-	0	-	0.2	0.1
	SBL 32 32 0 Stop 0 92 2 35 Minor2 312 276 36 6.42 5.42 5.42 5.42 3.518 681 771 986 675 764 986 SB 10.3 B	SBL SBR 32 26 32 26 0 0 0 Stop Stop - Stop 0 50 - Stop 2 # 0 - 92 92 2 2 35 28 Minor2 Minor2 312 276 276 - 36 - 6.42 6.22 5.42 - 5.42 - 3.518 3.318 681 763 771 - 986 - 675 763 675 - 764 - 986 - SB 10.3 B at NWT	SBL SBR SEL 32 26 9 32 26 9 0 0 0 Stop Stop Free - Stop - 0 50 - 92 92 92 2 2 2 35 28 10 Minor2 Major1 312 276 386 276 - - 36 - - 6.42 6.22 4.12 5.42 - - 3.518 3.318 2.218 681 763 1172 771 - - 986 - - 675 763 1172 675 - - 764 - - 986 - - 8B SE 10.3 3 8 </td <td>SBL SBR SEL SET 32 26 9 15 32 26 9 15 0 0 0 0 Stop Stop Free Free - Stop - None 0 50 - - 0 0 - 0 0 92 92 92 92 92 2 2 2 2 2 2 35 28 10 16 16 Minor2 Major1 Major1 Major1 Major1 Major1 Major1 Major2 Major3 Major3</td> <td>SBL SBR SEL SET NWT 32 26 9 15 153 32 26 9 15 153 0 0 0 0 0 Stop Stop Free Free Free - Stop - None - 0 50 - - - 2, # 0 - - 0 0 92 92 92 92 92 22 2 2 2 2 2 35 28 10 16 166 Minor2 Major1 Major2 Major2 312 276 386 0 - 276 - - - - 36 - - - - 5.42 - - - - 5.42 - - - -</td> <td> SBL SBR SEL SET NWT NWR 32 26 9 15 153 202 32 26 9 15 153 202 32 26 9 15 153 202 0 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 0 0 0 0 0 0 0 0</td>	SBL SBR SEL SET 32 26 9 15 32 26 9 15 0 0 0 0 Stop Stop Free Free - Stop - None 0 50 - - 0 0 - 0 0 92 92 92 92 92 2 2 2 2 2 2 35 28 10 16 16 Minor2 Major1 Major1 Major1 Major1 Major1 Major1 Major2 Major3 Major3	SBL SBR SEL SET NWT 32 26 9 15 153 32 26 9 15 153 0 0 0 0 0 Stop Stop Free Free Free - Stop - None - 0 50 - - - 2, # 0 - - 0 0 92 92 92 92 92 22 2 2 2 2 2 35 28 10 16 166 Minor2 Major1 Major2 Major2 312 276 386 0 - 276 - - - - 36 - - - - 5.42 - - - - 5.42 - - - -	SBL SBR SEL SET NWT NWR 32 26 9 15 153 202 32 26 9 15 153 202 32 26 9 15 153 202 0 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - - 0 0 - 0 - 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 - 0 0 0 - 0 0 0 0 0 0 0 0 0

	۶	-	•	•	←	•	•	†	~	/		4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	₽		ሻ	₽		7	₽		ሻ	1>	
Traffic Volume (veh/h)	58	46	150	71	35	1	65	689	81	34	922	21
Future Volume (veh/h)	58	46	150	71	35	1	65	689	81	34	922	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	63	50	163	77	38	1	71	749	88	37	1002	23
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	48	155	153	232	6	198	989	116	305	1076	25
Arrive On Green	0.05	0.12	0.12	0.05	0.13	0.13	0.05	0.60	0.60	0.04	0.59	0.59
Sat Flow, veh/h	1774	385	1256	1774	1807	48	1774	1637	192	1774	1814	42
Grp Volume(v), veh/h	63	0	213	77	0	39	71	0	837	37	0	1025
Grp Sat Flow(s), veh/h/ln	1774	0	1641	1774	0	1854	1774	0	1829	1774	0	1855
Q Serve(g_s), s	3.5	0.0	14.0	4.2	0.0	2.1	1.7	0.0	37.8	0.9	0.0	56.9
Cycle Q Clear(g_c), s	3.5	0.0	14.0	4.2	0.0	2.1	1.7	0.0	37.8	0.9	0.0	56.9
Prop In Lane	1.00	0.0	0.77	1.00	0.0	0.03	1.00	0.0	0.11	1.00	0.0	0.02
Lane Grp Cap(c), veh/h	294	0	203	153	0	238	198	0	1105	305	0	1101
V/C Ratio(X)	0.21	0.00	1.05	0.50	0.00	0.16	0.36	0.00	0.76	0.12	0.00	0.93
Avail Cap(c_a), veh/h	362	0	203	212	0	238	231	0	1105	358	0	1113
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.6	0.0	49.7	41.3	0.0	44.0	24.0	0.0	16.4	14.2	0.0	20.9
Incr Delay (d2), s/veh	0.1	0.0	77.1	1.0	0.0	0.1	0.8	0.0	4.9	0.1	0.0	14.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	10.7	2.1	0.0	1.1	1.3	0.0	20.3	0.4	0.0	33.3
LnGrp Delay(d),s/veh	40.7	0.0	126.8	42.2	0.0	44.1	24.8	0.0	21.2	14.3	0.0	35.8
LnGrp LOS	D	0.0	F	D	0.0	D	С	0.0	С	В	0.0	D
Approach Vol, veh/h		276	•		116			908			1062	
Approach Delay, s/veh		107.1			42.9			21.5			35.1	
Approach LOS		F			72.7 D			C C			D	
	1		2	4		/	7					
Timer	1	2	3	4	5	6	/	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	74.5	10.2	20.0	9.9	73.2	9.7	20.5				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	7.5	68.0	9.5	14.0	7.5	68.0	9.5	14.0				
Max Q Clear Time (g_c+l1), s	2.9	39.8	6.2	16.0	3.7	58.9	5.5	4.1				
Green Ext Time (p_c), s	0.0	20.1	0.0	0.0	0.0	8.4	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			38.7									
HCM 2010 LOS			D									

Existing - PM Peak

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	109	326	145	105	254	373	254	718	
Average Queue (ft)	44	171	50	37	57	203	21	350	
95th Queue (ft)	90	263	99	72	150	336	96	650	
Link Distance (ft)		1341		1494		744		7279	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)	0	32	4	0		12		25	
Queuing Penalty (veh)	0	19	2	0		8		8	

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	7	f)	7	f)	7	f)	7	f)	
Traffic Volume (vph)	58	46	71	35	65	689	34	922	
Future Volume (vph)	58	46	71	35	65	689	34	922	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		
Detector Phase	7	4	3	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0	
Minimum Split (s)	11.0	12.0	11.0	12.0	11.0	31.5	11.0	31.5	
Total Split (s)	14.0	20.0	14.0	20.0	12.0	74.0	12.0	74.0	
Total Split (%)	11.7%	16.7%	11.7%	16.7%	10.0%	61.7%	10.0%	61.7%	
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	None	Min	
Act Effct Green (s)	19.6	11.0	17.1	10.5	73.9	68.4	72.0	65.9	
Actuated g/C Ratio	0.18	0.10	0.16	0.10	0.69	0.64	0.67	0.61	
v/c Ratio	0.24	0.80	0.38	0.21	0.39	0.72	0.11	0.90	
Control Delay	38.3	47.1	43.9	50.1	16.4	20.5	6.9	33.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.3	47.1	43.9	50.1	16.4	20.5	6.9	33.7	
LOS	D	D	D	D	В	С	Α	С	
Approach Delay		45.1		46.0		20.1		32.8	
Approach LOS		D		D		С		С	
Intersection Cummery									

Cycle Length: 120

Actuated Cycle Length: 107.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 30.0 Intersection LOS: C
Intersection Capacity Utilization 84.4% ICU Level of Service E

Analysis Period (min) 15



Existing - PM Peak	
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Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
	₩.	VVDIX		NUN	JUL	
Lane Configurations		4	}	0	11	1127
Traffic Vol, veh/h	3	4	827	9	14	1127
Future Vol, veh/h	3	4	827	9	14	1127
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	3	4	899	10	15	1225
111111111111111111111111111111111111111	J	•	077	10	10	1220
Major/Minor N	Minor1	Λ	Najor1	Λ	Major2	
Conflicting Flow All	2159	904	0	0	909	0
Stage 1	904	-	-	-	-	-
Stage 2	1255	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	_	-	_
Critical Hdwy Stg 2	5.42	-	_	_	_	_
Follow-up Hdwy	3.518	3 318	_	_	2.218	_
Pot Cap-1 Maneuver	52	335	_	_	749	_
Stage 1	395	-		_	777	_
	268	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Platoon blocked, %	40	0.05	-	-	7.40	-
Mov Cap-1 Maneuver	49	335	-	-	749	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Annraach	MD		MD		CD	
Approach	WB		NB		SB	
HCM Control Delay, s	45.7		0		0.1	
HCM LOS	Е					
Minor Lane/Major Mvm	t	NBT	NRRV	VBLn1	SBL	SBT
	· ·		NDIN			
Capacity (veh/h)		-		70	749	-
HCM Control Polov (a)		-		0.079	0.02	-
HCM Control Delay (s)		-	-	10.7	9.9	0
HCM Lane LOS		-	-	E	A	Α
HCM 95th %tile Q(veh)		-	-	0.3	0.1	-
HCIVI 95III %IIIe Q(VeII)		-	-	0.3	0.1	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1			4	¥	,,,,,,
Traffic Vol, veh/h	134	0	2	130	0	0
Future Vol, veh/h	134	0	2	130	0	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
Mymt Flow	146	0	2	141	0	0
WIVIIIL I IOW	170	U	2	ודו	U	U
Major/Minor M	1ajor1	N	Major2	ľ	Minor1	
Conflicting Flow All	0	0	146	0	291	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	145	-
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	-	-	1436	-	700	901
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1436	-	699	901
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	880	-
J						
	- FD		MD		ND	
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		0	
HCM LOS					Α	
Minor Lane/Major Mvmt		NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		_			1436	
HCM Lane V/C Ratio		_	_	_	0.002	_
HCM Control Delay (s)		0	_	-	7.5	0
HCM Lane LOS		A	_	_	7.5 A	A
HCM 95th %tile Q(veh)		-	_		0	-
HOW FOUT FOUTE CELVETT)					U	

13.8						
SRI	SRR	SFI	SFT	N\//T	NMP	
		JLL			TVVVIX	
		34			69	
431	57	34		82	69	
0	0	0	0	0	0	
Stop	Stop	Free	Free	Free	Free	
-	Stop	-	None	-	None	
0	50	-	-	-	-	
e, # 0	-	-	0	0	-	
	-	-			-	
468	62	3/	121	89	/5	
Minor2	1	Major1	<u> </u>	Major2		
322	127	164	0	-	0	
127	-	-	-	-	-	
195	-	-	-	-	-	
	6.22	4.12	-	-	-	
	-	-	-	-	-	
	-	-	-	-	-	
			-	-	-	
		1414	-	-	-	
		-	-	-	-	
838	-	-	-	-	-	
652	023	1/1/	-	-	-	
		1414		-		
	-	_	-	_	_	
	_	_	_	_	_	
550						
CB		C.F.		N IV A /		
		1.8		0		
C						
nt	NWT	NWR	SEL	SET	SBLn1 S	SBL _{n2}
	-	-	1414	-	653	923
	-	-		-		0.067
	-	-	,	0	23.2	9.2
			Λ.	Λ.	0	Λ.
)	-	-	A 0.1	Α	C 6	A 0.2
1	SBL 431 431 0 Stop 0 92 2 468 Minor2 322 127 195 6.42 5.42 5.42 5.42 3.518 672 899 838 653 653 874 838 SB 21.6 C	SBL SBR 431 57 431 57 0 0 Stop Stop - Stop 0 50 2,# 0 - 92 92 2 2 468 62 Minor2 322 127 127 - 195 - 6.42 6.22 5.42 - 5.42 - 3.518 3.318 672 923 899 - 838 - 653 923 653 - 874 - 838 - SB 21.6 C other NWT	SBL SBR SEL 431 57 34 431 57 34 0 0 0 0 Stop Stop Free - Stop - 0 50 - 9, # 0 92 92 92 2 2 2 468 62 37 Minor2 Major1 322 127 164 127 195 6.42 6.22 4.12 5.42 5.42 5.42 5.42 5.42 6.42 6.22 4.12 653 653 923 1414 899 838 653 923 1414 899 838 SB SE 21.6 1.8 C	SBL SBR SEL SET 431 57 34 111 431 57 34 111 0 0 0 0 Stop Stop Free Free - Stop - None 0 50 - - 0 0 - 0 0 92 92 92 92 92 2 2 2 2 2 468 62 37 121 121 Minor2 Major1 Major1 Major1 Major1 Major1 Major1 Major1 Major2 Major2 Major3 Major3 <td>SBL SBR SEL SET NWT 431 57 34 111 82 0 0 0 0 0 Stop Free Free Free - Stop Free Free Free - Stop - 0 0 0 50 - - - 4# 0 - 0 0 0 92<td>SBL SBR SEL SET NWT NWR 431 57 34 111 82 69 431 57 34 111 82 69 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - - 0 - - 0 0 - 92<</td></td>	SBL SBR SEL SET NWT 431 57 34 111 82 0 0 0 0 0 Stop Free Free Free - Stop Free Free Free - Stop - 0 0 0 50 - - - 4# 0 - 0 0 0 92 <td>SBL SBR SEL SET NWT NWR 431 57 34 111 82 69 431 57 34 111 82 69 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - - 0 - - 0 0 - 92<</td>	SBL SBR SEL SET NWT NWR 431 57 34 111 82 69 431 57 34 111 82 69 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - - 0 - - 0 0 - 92<

BACKGROUND CAPACITY ANALYSES



Appendix July 2021

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	¥	f)		*	ĵ»		J.	f)		Ž	f)	
Traffic Volume (veh/h)	48	18	70	55	53	40	81	1154	12	8	487	39
Future Volume (veh/h)	48	18	70	55	53	40	81	1154	12	8	487	39
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	52	20	76	60	58	43	88	1254	13	9	529	42
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	26	98	159	77	57	568	1278	13	101	1125	89
Arrive On Green	0.04	0.08	0.08	0.04	0.08	0.08	0.05	0.69	0.69	0.01	0.66	0.66
Sat Flow, veh/h	1774	341	1294	1774	995	738	1774	1840	19	1774	1704	135
Grp Volume(v), veh/h	52	0	96	60	0	101	88	0	1267	9	0	571
Grp Sat Flow(s),veh/h/ln	1774	0	1634	1774	0	1733	1774	0	1859	1774	0	1839
Q Serve(g_s), s	3.2	0.0	7.0	3.7	0.0	6.9	1.8	0.0	78.9	0.2	0.0	18.5
Cycle Q Clear(g_c), s	3.2	0.0	7.0	3.7	0.0	6.9	1.8	0.0	78.9	0.2	0.0	18.5
Prop In Lane	1.00		0.79	1.00		0.43	1.00		0.01	1.00		0.07
Lane Grp Cap(c), veh/h	159	0	124	159	0	134	568	0	1292	101	0	1215
V/C Ratio(X)	0.33	0.00	0.78	0.38	0.00	0.75	0.15	0.00	0.98	0.09	0.00	0.47
Avail Cap(c_a), veh/h	240	0	257	237	0	272	712	0	1292	305	0	1278
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	0.0	54.9	48.8	0.0	54.6	6.8	0.0	17.7	30.1	0.0	10.1
Incr Delay (d2), s/veh	0.4	0.0	3.9	0.5	0.0	3.2	0.1	0.0	20.9	0.3	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	3.3	1.8	0.0	3.4	0.8	0.0	47.3	0.2	0.0	9.8
LnGrp Delay(d),s/veh	49.2	0.0	58.8	49.3	0.0	57.7	6.9	0.0	38.6	30.4	0.0	11.4
LnGrp LOS	D		E	D		E	A		D	С		В
Approach Vol, veh/h		148			161			1355			580	
Approach Delay, s/veh		55.4			54.6			36.5			11.7	
Approach LOS		Е			D			D			В	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.1	90.0	9.7	15.1	10.2	85.8	9.5	15.4				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	15.5	84.0	10.5	19.0	15.5	84.0	10.5	19.0				
Max Q Clear Time (g_c+I1), s	2.2	80.9	5.7	9.0	3.8	20.5	5.2	8.9				
Green Ext Time (p_c), s	0.0	3.0	0.0	0.2	0.1	19.2	0.0	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			32.6									
HCM 2010 LOS			С									

Background - AM Peak

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	72	94	184	225	254	735	254	286	
Average Queue (ft)	35	46	46	78	71	303	14	112	
95th Queue (ft)	67	87	103	137	224	505	90	256	
Link Distance (ft)		1341		1494		744		7279	
Upstream Blk Time (%)						0			
Queuing Penalty (veh)						1			
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)			1	9		16		5	
Queuing Penalty (veh)			1	5		13		0	

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	7	f)	, J	f)	7	f)	¥	f)	
Traffic Volume (vph)	48	18	55	53	81	1154	8	487	
Future Volume (vph)	48	18	55	53	81	1154	8	487	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		
Detector Phase	7	4	3	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0	
Minimum Split (s)	11.0	12.0	11.0	23.0	11.0	31.5	11.0	31.5	
Total Split (s)	15.0	25.0	15.0	25.0	20.0	90.0	20.0	90.0	
Total Split (%)	10.0%	16.7%	10.0%	16.7%	13.3%	60.0%	13.3%	60.0%	
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	None	Min	
Act Effct Green (s)	17.7	9.9	18.1	10.1	87.8	84.8	82.7	75.1	
Actuated g/C Ratio	0.15	0.08	0.15	0.09	0.74	0.72	0.70	0.63	
v/c Ratio	0.24	0.47	0.27	0.61	0.16	0.95	0.06	0.49	
Control Delay	43.0	25.0	43.6	58.9	6.0	34.2	6.6	14.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	43.0	25.0	43.6	58.9	6.0	34.2	6.6	14.7	
LOS	D	С	D	Е	А	С	А	В	
Approach Delay		31.3		53.2		32.4		14.5	
Approach LOS		С		D		С		В	
Interception Cummers									

Cycle Length: 150

Actuated Cycle Length: 118.6

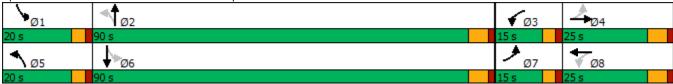
Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95 Intersection Signal Delay: 29.2 Intersection Capacity Utilization 87.0%

Intersection LOS: C ICU Level of Service E

Analysis Period (min) 15



Intersection						
	0.1					
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		f)			ની
Traffic Vol, veh/h	0	8	1240	0	3	607
Future Vol, veh/h	0	8	1240	0	3	607
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
Grade, %	0	-	0	_	_	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	0	9	1348		3	660
IVIVITIL FIOW	U	9	1348	0	3	000
Major/Minor	Minor1	1	Major1	١	Major2	
Conflicting Flow All	2014	1348	0	0	1348	0
Stage 1	1348	-	-	-	-	-
Stage 2	666	-	_	-	-	-
Critical Hdwy	6.42	6.22	_	_	4.12	_
Critical Hdwy Stg 1	5.42	-	_	_		_
Critical Hdwy Stg 2	5.42	_	_	_	_	_
Follow-up Hdwy		3.318	_	_	2.218	_
Pot Cap-1 Maneuver	65	185	-	_	511	_
•	242		-			
Stage 1		-	-	-	-	-
Stage 2	511	-	-	-	-	-
Platoon blocked, %	,,	105	-	-	F44	-
Mov Cap-1 Maneuver	64	185	-	-	511	-
Mov Cap-2 Maneuver	64	-	-	-	-	-
Stage 1	242	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Approach	WB		NB		SB	
	25.4					
HCM Control Delay, s			0		0.1	
HCM LOS	D					
Minor Lane/Major Mvn	nt	NBT	NBRV	VBLn1	SBL	SBT
Capacity (veh/h)		_	_	185	511	-
HCM Lane V/C Ratio		_	_	0.047		_
HCM Control Delay (s))		_	25.4	12.1	0
HCM Lane LOS		-	_	23.4 D	В	A
I IOW LAIR LUS		-	-	U	ט	А

HCM 95th %tile Q(veh)

Intersection			_	_		
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	7>	LDI	1,02	<u>₩</u>	¥	HOIL
Traffic Vol, veh/h	33	2	0	211	2	0
Future Vol, veh/h	33	2	0	211	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	310p	None
Storage Length	-	None -	-	None	0	None
	e,# 0		-	0	0	-
Veh in Median Storage		-	-	0		-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	2	0	229	2	0
Major/Minor	Major1	ľ	Major2	N	Minor1	
Conflicting Flow All	0	0	38	0	266	37
Stage 1	-	-	-	-	37	-
Stage 2	_	_	_	_	229	_
Critical Hdwy	-		4.12	-	6.42	6.22
Critical Hdwy Stg 1		-		-	5.42	0.22
	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-		2.218		3.518	
Pot Cap-1 Maneuver	-	-	1572	-	723	1035
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	809	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver		-	1572	-	723	1035
Mov Cap-2 Maneuver	-	-	-	-	723	-
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	809	-
A	ED		WD		ND	
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10	
HCM LOS					В	
Minor Lane/Major Mvr	nt l	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		723	-	-	1572	-
HCM Lane V/C Ratio		0.003		-	1072	-
HCM Control Delay (s	١	10	-		0	
HCM Lane LOS)	В	-	-		-
	,)		-	-	A	-
HCM 95th %tile Q(veh	1)	0	-	-	0	-

1.5						
SBL	SBR	SEL	SET	NWT	NWR	
*	7		4	₽		
33	27	9	16	159	210	
33	27	9	16	159	210	
. 0	0	0	0	0	0	
	Stop	Free	Free	Free	Free	
-	Stop	-	None	-	None	
0	50	-	-	-	-	
je, # 0	-	-	0	0	-	
0	-	-	0	0	-	
92	92	92	92	92	92	
2		2	2	2	2	
36	29	10				
				Major2		
	287	401	0	-	0	
	-	-	-	-	-	
	-	-	-	-	-	
	6.22	4.12	-	-	-	
	-	-	-	-	-	
	-	-	-	-	-	
3.518	3.318	2.218	-	-	-	
670	752	1158	-	-	-	
762	-	-	-	-	-	
985	-	-	-	-	-	
			-	-	-	
r 664	752	1158	-	-	-	
r 664	-	-	-	-	-	
	-	-	-	-	-	
	-	-	_	_	_	
,00						
				NW		
5 10.4		2.9		0		
В						
mt	NI\A/T	MMD	CEL	CET	CDI n1 (SDI
III	14441					SBI
	-					U.I
5)	-					
	-	-				
h)	-	-	0	-	0.2	(
7 7	33 Stop 0 Stop 0 92 2 36 Minor2 324 287 37 6.42 5.42 5.42 3.518 670 762 985 664 755 985 8 10.4 8	33 27 0 0 0 Stop Stop Stop Stop Stop 0 50 ge, # 0 - 92 92 2 2 36 29 Minor2 324 287 287 - 37 - 6.42 6.22 5.42 - 5.42 - 5.42 - 3.518 3.318 670 752 762 - 985 - 664 755 762 - 985 - 755 - 985 - SB S 10.4 B mt NWT - SS -	33 27 9 0 0 0 Stop Stop Free - Stop - 0 50 - ge, # 0 92 92 92 2 2 2 36 29 10 Minor2 Major1 324 287 401 287 37 6.42 6.22 4.12 5.42 5.42 5.42 3.518 3.318 2.218 670 752 1158 762 985 6664 752 1158 762 985 SB SE 610.4 2.9 B mt NWT NWR SS	33 27 9 16 0 0 0 0 Stop Stop Free Free - Stop - None 0 50 9e, # 0 0 92 92 92 92 2 2 2 2 36 29 10 17 Minor2 Major1 N 287 37 6.42 6.22 4.12 - 5.42 5.43 5.40	33 27 9 16 159 0 0 0 0 0 0 Stop Stop Free Free Free - Stop - None 0 50 0 0 ge, # 0 - 0 0 92 92 92 92 92 2 2 2 2 2 2 36 29 10 17 173 Minor2 Major1 Major2 324 287 401 0 - 287 642 6.22 4.12 542 542 542 542 542 542 542 542 542 542 542 542 542 542 542 542 542 542	33 27 9 16 159 210 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - 0 - 0 0 - 0 - 0 0 - 0 - 0 0 - 92 92 92 92 92 92 2 2 2 2 2 2 2 36 29 10 17 173 228 Minor2 Major1 Major2 324 287 401 0 - 0 287 - - - 37 - - - 6.42 6.22 4.12 - - 5.42 - - - 5.42 - - - 5.42 - - - 3.518 3.318 2.218 - - 670 752 1158 - - 762 - - - 985 - - - 664 752 1158 - - 755 - - - 88 SE NW S 10.4 2.9 0 B mt

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	, A	f)		*	f)		Ţ	f)		*	ĵ»	
Traffic Volume (veh/h)	61	48	156	74	36	1	67	717	84	35	959	22
Future Volume (veh/h)	61	48	156	74	36	1	67	717	84	35	959	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	66	52	170	80	39	1	73	779	91	38	1042	24
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	47	154	156	233	6	171	990	116	284	1077	25
Arrive On Green	0.05	0.12	0.12	0.05	0.13	0.13	0.05	0.60	0.60	0.04	0.59	0.59
Sat Flow, veh/h	1774	384	1257	1774	1808	46	1774	1638	191	1774	1814	42
Grp Volume(v), veh/h	66	0	222	80	0	40	73	0	870	38	0	1066
Grp Sat Flow(s),veh/h/ln	1774	0	1641	1774	0	1855	1774	0	1829	1774	0	1855
Q Serve(g_s), s	3.7	0.0	14.0	4.5	0.0	2.2	1.8	0.0	41.0	0.9	0.0	62.6
Cycle Q Clear(g_c), s	3.7	0.0	14.0	4.5	0.0	2.2	1.8	0.0	41.0	0.9	0.0	62.6
Prop In Lane	1.00		0.77	1.00		0.03	1.00		0.10	1.00		0.02
Lane Grp Cap(c), veh/h	294	0	201	156	0	239	171	0	1106	284	0	1102
V/C Ratio(X)	0.22	0.00	1.10	0.51	0.00	0.17	0.43	0.00	0.79	0.13	0.00	0.97
Avail Cap(c_a), veh/h	360	0	201	211	0	239	204	0	1106	335	0	1105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.0	0.0	50.1	41.6	0.0	44.3	26.9	0.0	17.0	15.3	0.0	22.1
Incr Delay (d2), s/veh	0.1	0.0	93.9	1.0	0.0	0.1	1.2	0.0	5.7	0.2	0.0	20.3
Initial Q Delay(d3),s/veh %ile BackOfQ(50%),veh/ln	0.0	0.0	0.0 11.6	0.0 2.2	0.0	0.0 1.1	0.0 1.4	0.0	0.0 22.3	0.0 0.5	0.0	0.0 37.9
	41.1	0.0	144.0	42.6	0.0	44.4	28.2	0.0	22.3	15.5	0.0	42.4
LnGrp Delay(d),s/veh LnGrp LOS	41.1 D	0.0	144.0 F	42.0 D	0.0	44.4 D	20.2 C	0.0	22.7 C	15.5 B	0.0	42.4 D
	D	288	<u> </u>	U	120	D	C	042	<u> </u>	ь	1104	D
Approach Vol, veh/h		120.4			43.2			943 23.1			41.5	
Approach Delay, s/veh Approach LOS		120.4 F			43.2 D			23.1 C			41.5 D	
•											U	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	75.0	10.5	20.0	9.9	73.8	9.8	20.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	7.5	68.0	9.5	14.0	7.5	68.0	9.5	14.0				
Max Q Clear Time (g_c+I1), s	2.9	43.0	6.5	16.0	3.8	64.6	5.7	4.2				
Green Ext Time (p_c), s	0.0	18.9	0.0	0.0	0.0	3.2	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			43.8									
HCM 2010 LOS			D									

Background - PM Peak

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	224	301	96	94	255	703	254	675	
Average Queue (ft)	50	153	49	35	113	315	44	390	
95th Queue (ft)	118	242	90	71	280	570	163	622	
Link Distance (ft)		1341		1494		744		7279	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)		20	2	0		20		27	
Queuing Penalty (veh)		12	1	0		13		9	

	•	-	•	←	•	†	-	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	, T	ĵ»	ň	f)	¥	f)	, J	f)
Traffic Volume (vph)	61	48	74	36	67	717	35	959
Future Volume (vph)	61	48	74	36	67	717	35	959
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0
Minimum Split (s)	11.0	12.0	11.0	12.0	11.0	31.5	11.0	31.5
Total Split (s)	14.0	20.0	14.0	20.0	12.0	74.0	12.0	74.0
Total Split (%)	11.7%	16.7%	11.7%	16.7%	10.0%	61.7%	10.0%	61.7%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	20.2	11.3	17.5	10.7	77.3	71.7	75.3	69.1
Actuated g/C Ratio	0.18	0.10	0.16	0.10	0.69	0.64	0.68	0.62
v/c Ratio	0.25	0.83	0.41	0.22	0.42	0.74	0.12	0.93
Control Delay	38.5	51.4	44.8	50.4	18.8	21.5	7.2	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	51.4	44.8	50.4	18.8	21.5	7.2	37.0
LOS	D	D	D	D	В	С	Α	D
Approach Delay		48.5		46.6		21.3		36.0
Approach LOS		D		D		С		D

Cycle Length: 120

Actuated Cycle Length: 111.4

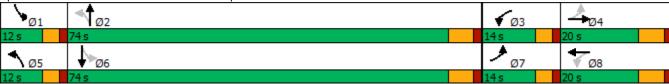
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93 Intersection Signal Delay: 32.3 Intersection Capacity Utilization 86.6%

Intersection LOS: C ICU Level of Service E

Analysis Period (min) 15



Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	₩.	אטוו	\$	NON	ODL	<u>351</u>
Traffic Vol, veh/h	3	4	860	9	14	1173
Future Vol, veh/h	3	4	860	9	14	1173
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	Jiop -	None	-	None	-	None
Storage Length	0	-	_	-	_	-
Veh in Median Storage		_	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	3	4	935	10	15	1275
IVIVIIII FIOW	3	4	930	10	15	1275
Major/Minor N	Minor1	N	Najor1	ľ	Major2	
Conflicting Flow All	2245	940	0	0	945	0
Stage 1	940	-	-	-	-	-
Stage 2	1305	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	_	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	_	-
Follow-up Hdwy		3.318	-	_	2.218	_
Pot Cap-1 Maneuver	46	320	-	_	726	_
Stage 1	380	-	_	_	-	_
Stage 2	254	_	_	_	_	_
Platoon blocked, %	201		_	_		_
Mov Cap-1 Maneuver	43	320	_	-	726	_
Mov Cap-1 Maneuver	43	-		_	720	_
Stage 1	380	-	-		-	-
Stage 2	236	-	-	-	-	-
Slaye 2	230	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	51.5		0		0.1	
HCM LOS	F					
Minor Long/Major Mum		NDT	MDDW	VDI 51	CDI	CDT
Minor Lane/Major Mvm	ll	NBT	NBKV	VBLn1	SBL	SBT
Capacity (veh/h)		-	-	85	726	-
HCM Lane V/C Ratio		-	-		0.021	-
HCM Control Delay (s)		-	-	01.0	10.1	0
HCM Lane LOS		-	-	F	В	Α

0.3

HCM 95th %tile Q(veh)

t Delay, s/veh ovement ane Configurations	0					
ane Configurations						
ane Configurations	EBT	EBR	WBL	WBT	NBL	NBR
	<u>}</u>			4	¥	
affic Vol, veh/h	139	0	2	135	0	0
uture Vol, veh/h	139	0	2	135	0	0
onflicting Peds, #/hr	0	0	0	0	0	0
gn Control	Free	Free	Free	Free	Stop	Stop
T Channelized	-	None	-	None	-	None
orage Length	_	-	_	-	0	-
eh in Median Storag	e,# 0	-	_	0	0	_
rade, %	0	_	_	0	0	_
eak Hour Factor	92	92	92	92	92	92
eavy Vehicles, %	2	2	2	2	2	2
vmt Flow	151	0	2	147	0	0
VIIIL FIOW	131	U	Z	147	U	U
ajor/Minor	Major1	ſ	Major2	N	Minor1	
onflicting Flow All	0	0	151	0	302	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	151	-
ritical Hdwy	-	-	4.12	-	6.42	6.22
ritical Hdwy Stg 1	-	-	-	-	5.42	-
ritical Hdwy Stg 2	-	-	-	-	5.42	-
ollow-up Hdwy	_	-	2.218	_	3.518	3.318
ot Cap-1 Maneuver	_	_	1430	_	690	895
Stage 1	_	_	-	_	877	-
Stage 2	_	_	_	_	877	_
atoon blocked, %	_	_		_	011	
ov Cap-1 Maneuver		_	1430	_	689	895
ov Cap-1 Maneuver		-	1430	-	689	075
	-	_	_		877	-
Stage 1	-	-	-	-		
Stage 2	-	-	-	-	875	-
oproach	EB		WB		NB	
CM Control Delay, s	0		0.1		0	
CM LOS					A	
	nt I	VBLn1	EBT	EBR	WBL	WBT
inor Lane/Major Mvr		-	-	-	1430	-
apacity (veh/h)			_	-		-
apacity (veh/h) CM Lane V/C Ratio		-				
apacity (veh/h) CM Lane V/C Ratio CM Control Delay (s)	0	-	-	7.5	0
apacity (veh/h) CM Lane V/C Ratio				-	7.5 A 0	0 A
inor Lane/Major Mvr			-			0.002

15.2						
SBL	SBR	SEL	SET	NWT	NWR	
448	60	35	116	85	72	
448	60	35	116	85	72	
0	0	0	0	0	0	
Stop	Stop	Free	Free	Free	Free	
-	Stop	-	None	-	None	
0	50	-	-	-	-	
	-	-	0	0	-	
	-	-			-	
487	65	38	126	92	78	
Minor2			N	Major2		
333	131	170	0	-	0	
131	-	-	-	-	-	
	-	-	-	-	-	
		4.12	-	-	-	
		-	-	-	-	
	-	- 040	-	-	-	
			-	-	-	
		1407	-	-	-	
		-	-	-	-	
832	-	-	-	-	-	
6/12	010	1/07	-	-	-	
		1407				
	_		_	-		
	_	_	_	_	_	
302						
CD		CE		N II A /		
		1.8		0		
C						
t	NWT	NWR	SEL	SET:	SBLn1	SBLn2
	-				0.0	919
	-	-		-		
	-	-	,,,	0	25.9	9.2
	-	-	Α	Α	D	Α
	-	-	0.1	-	6.9	0.2
	SBL 448 448 0 Stop 0 ,# 0 0 92 2 487 Minor2 333 131 202 6.42 5.42 5.42 5.42 3.518 662 895 832 643 643 869 832 SB 23.9 C	SBL SBR 448 60 448 60 0 0 Stop Stop - Stop 0 50 ,# 0 - 92 92 2 2 487 65 Minor2	SBL SBR SEL 448 60 35 448 60 35 0 0 0 Stop Stop Free - Stop - 0 50 - ,# 0 - - 92 92 92 2 2 2 2 487 65 38 Minor2 Major1 333 131 170 131 - - - 6.42 6.22 4.12 - 5.42 - - - 5.42 - - - 895 - - 832 - - 869 - - 889 - - 889 - - 832 - - 5 - - 5 - - <	SBL SBR SEL SET 448 60 35 116 448 60 35 116 0 0 0 0 Stop Stop Free Free - Stop - None 0 50 - - 0 0 - 0 92 92 92 92 2 2 2 2 487 65 38 126 Minor2 Major1 N 333 131 170 0 131 - - - 202 - - - 6.42 6.22 4.12 - 5.42 - - - 5.42 - - - 832 - - - 889 - - - 869 - -	SBL SBR SEL SET NWT 448 60 35 116 85 448 60 35 116 85 0 0 0 0 0 Stop Stop Free Free Free - Stop - None - 0 50 - - - 0 0 - 0 0 92 92 92 92 92 2 2 2 2 2 2 487 65 38 126 92 Minor2 Major1 Major2 Major2 333 131 170 0 - 131 - - - - - - 6.42 6.22 4.12 - - - 5.42 - - - - - 5.42 - - </td <td>SBL SBR SEL SET NWT NWR 448 60 35 116 85 72 448 60 35 116 85 72 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - - 0 - - 0 0 - 92 92 92 92 92 92 2</td>	SBL SBR SEL SET NWT NWR 448 60 35 116 85 72 448 60 35 116 85 72 0 0 0 0 0 0 Stop Stop Free Free Free Free - Stop - None - None 0 50 - - - - 0 - - 0 0 - 92 92 92 92 92 92 2

PROJECTED CAPACITY ANALYSES



Appendix July 2021

Lane Configurations Traffic Volume (vehh) 48 21 72 81 61 66 89 1205 21 16 503 39 Number 7 4 14 3 8 8 18 5 2 12 1 16 503 39 Number 7 4 14 3 8 8 18 5 2 12 1 16 503 39 Number 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		•	→	•	•	←	•	•	†	~	>	+	
Traffic Volume (veh/h)	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Future Volume (veh/h)	Lane Configurations	7	₽		ሻ	ĵ∍		7	₽		7	₽	
Number 7 4 14 3 8 18 5 2 12 1 1 6 16 intilital O (Ob), veh 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Traffic Volume (veh/h)						66						
Initial O(Ob), weh O O O O O O O O O O O O O	Future Volume (veh/h)	48	21	72	81	61	66	89	1205	21	16	503	
Ped-Bike Adj(A_pbT)	Number	7	4	14	3	8	18	5	2	12	1	6	16
Parking Bus, Adj	Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Adj Sat Flow, veh/h/ln	Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Adj Flow Rate, veh/h 52 23 78 88 66 72 97 1310 23 17 547 42 Adj No. of Lanes 1 1 0 1 1 0 1 1 0 1 1 0 1 1	Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj No. of Lanes	Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Peak Hour Factor 0,92 0,92 0,92 0,92 0,92 0,92 0,92 0,92	Adj Flow Rate, veh/h	52	23	78	88	66	72	97	1310	23	17	547	42
Percent Heavy Veh, % 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Cap, veh/h 151 29 100 185 79 86 537 1228 22 96 1107 85 Arrive On Green 0.04 0.08 0.08 0.08 0.06 0.10 0.10 0.05 0.67 0.67 0.07 0.02 0.65 0.65 0.65 0.65 0.67 0.07 0.02 0.65 0.65 0.65 0.67 0.07 0.02 0.65 0.65 0.65 0.65 0.67 0.07 0.02 0.65 0.65 0.65 0.65 0.67 0.07 0.02 0.65 0.65 0.65 0.65 0.65 0.65 0.65 0.65	Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Arrive On Green	Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Sat Flow, veh/h 1774 373 1266 1774 816 890 1774 1825 32 1774 1708 131 Grp Volume(v), veh/h 52 0 101 88 0 138 97 0 1333 17 0 589 Grp Sat Flow(s), veh/h/ln 1774 0 1639 1774 0 1706 1774 0 1857 1774 0 1840 O Serve(g_s), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Cycle Q Clear(g_c), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Cycle Q Clear(g_c), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Cycle Q Clear(g_c), s 1.00 0.77 1.00 0.52 1.00 0.02 1.00 0.07 Lane Grp Cap(c), veh/h 151 0 129 185 0 166 537 0 1250 96 0 1192 ViC Ratio(X) 0.34 0.00 0.78 0.48 0.00 0.83 0.18 0.00 1.07 0.18 0.00 0.49 Avail Cap(c_a), veh/h 229 0 250 231 0 260 675 0 1250 278 0 1238 HCM Platon Railo 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Cap, veh/h	151	29	100	185	79	86	537	1228	22	96	1107	85
Grp Volume(v), veh/h 52 0 101 88 0 138 97 0 1333 17 0 589 Grp Sal Flow(s), veh/h/ln 1774 0 1639 1774 0 1706 1774 0 1857 1774 0 1840 0 20.7 Ocerve(g_s), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 3.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 9.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 9.3 0.0 7.5 5.6 0.0 9.9 2.2 0.0 84.0 0.4 0.0 20.7 Ocerve(g_s), s 9.0 1.00 0.02 1.00 0.03 0.18 0.00 1.07 0.18 0.00 0.49 0.49 0.00 0.03 0.18 0.00 0.03 0.18 0.00 1.07 0.18 0.00 0.49 0.49 0.00 0.03 0.18 0.00 0.00 1.00 1.00 1.00 1.00 1.00	Arrive On Green	0.04	0.08	0.08	0.06	0.10	0.10	0.05	0.67	0.67	0.02	0.65	0.65
Grp Sat Flow(s), veh/h/ln	Sat Flow, veh/h	1774	373	1266	1774	816	890	1774	1825	32	1774	1708	131
Grp Sat Flow(s), veh/h/ln	Grp Volume(v), veh/h	52	0	101	88	0	138	97	0	1333	17	0	589
Q Serve(g_s), s													
Cycle Q Clear(g_c), s													
Prop In Lane													
Lane Grp Cap(c), veh/h 151 0 129 185 0 166 537 0 1250 96 0 1192 V/C Ratio(X) 0.34 0.00 0.78 0.48 0.00 0.83 0.18 0.00 1.07 0.18 0.00 0.49 Avail Cap(c_a), veh/h 229 0 250 231 0 260 675 0 1250 278 0 1238 HCM Platoon Ratio 1.00			0.0			0.0			0.0			0.0	
V/C Ratio(X) 0.34 0.00 0.78 0.48 0.00 0.83 0.18 0.00 1.07 0.18 0.00 0.49 Avail Cap(c_a), veh/h 229 0 250 231 0 260 675 0 1250 278 0 1238 HCM Platoon Ratio 1.00 <			0			0			0			0	
Avail Capic_a), veh/h													
HCM Platoon Ratio													
Upstream Filter(I) 1.00 0.00 1.00 1.00 0.00 1.00 1.00 0.00 1.00 0.00 1.00 1.00 0.00 1.00 1.00 0.00 1.00 0.00 1.00 0.00 1.00 1.00 0.00 1.10 1.00 1.10 1.00 1.11 0.0 45.2 0.7 0.0 1.5 1.15 1.00													
Uniform Delay (d), s/veh 50.1 0.0 56.4 49.1 0.0 55.3 8.0 0.0 20.4 33.1 0.0 11.4 Incr Delay (d2), s/veh 0.5 0.0 3.8 0.7 0.0 6.8 0.1 0.0 45.2 0.7 0.0 1.5 Initial Q Delay(d3), s/veh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.													
Incr Delay (d2), s/veh													
Initial O Delay(d3),s/veh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.													
%ile BackOfO(50%),veh/ln 1.7 0.0 3.6 2.8 0.0 5.0 1.1 0.0 58.4 0.4 0.0 11.0 LnGrp Delay(d),s/veh 50.6 0.0 60.2 49.8 0.0 62.2 8.1 0.0 65.6 33.7 0.0 12.8 LnGrp LOS D E D E A F C B Approach Vol, veh/h 153 226 1430 606 Approach LOS E E E E B Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0													
LnGrp Delay(d),s/veh 50.6 0.0 60.2 49.8 0.0 62.2 8.1 0.0 65.6 33.7 0.0 12.8 LnGrp LOS D E D E A F C B Approach Vol, veh/h 153 226 1430 606 606 Approach Delay, s/veh 57.0 57.4 61.7 13.4 Approach LOS E E E E B Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5													
LnGrp LOS D E D E A F C B Approach Vol, veh/h 153 226 1430 606 Approach Delay, s/veh 57.0 57.4 61.7 13.4 Approach LOS E E E E B Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+I), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.2 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>													
Approach Vol, veh/h 153 226 1430 606 Approach Delay, s/veh 57.0 57.4 61.7 13.4 Approach LOS E E E E B Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+I1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9			0.0			0.0			0.0			0.0	
Approach Delay, s/veh 57.0 57.4 61.7 13.4 Approach LOS E E E E B Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+l1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9			152			226			1/30	'		606	
Approach LOS													
Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+I1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9													
Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+I1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Approach LOS		Е			С			С			D	
Phs Duration (G+Y+Rc), s 7.2 90.0 11.8 15.9 10.3 86.9 9.5 18.1 Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+I1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Timer	1		3	4	5	6	7	8				
Change Period (Y+Rc), s 4.5 6.0 4.5 6.0 4.5 6.0 4.5 6.0 Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+l1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Assigned Phs	1	2	3	4	5	6	7	8				
Max Green Setting (Gmax), s 15.5 84.0 10.5 19.0 15.5 84.0 10.5 19.0 Max Q Clear Time (g_c+l1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Phs Duration (G+Y+Rc), s	7.2	90.0	11.8	15.9	10.3	86.9	9.5	18.1				
Max Q Clear Time (g_c+l1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Q Clear Time (g_c+l1), s 2.4 86.0 7.6 9.5 4.2 22.7 5.3 11.9 Green Ext Time (p_c), s 0.0 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Max Green Setting (Gmax), s	15.5	84.0	10.5		15.5	84.0	10.5	19.0				
Green Ext Time (p_c), s 0.0 0.0 0.2 0.1 19.9 0.0 0.2 Intersection Summary HCM 2010 Ctrl Delay 48.9	Max Q Clear Time (g_c+I1), s		86.0	7.6	9.5	4.2	22.7		11.9				
HCM 2010 Ctrl Delay 48.9	Green Ext Time (p_c), s						19.9						
	Intersection Summary												
	HCM 2010 Ctrl Delay			48.9									
TIOW 2010 LOO	HCM 2010 LOS			D									

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	116	133	159	164	254	757	50	284	
Average Queue (ft)	44	52	56	92	69	743	15	136	
95th Queue (ft)	96	106	114	158	222	764	42	255	
Link Distance (ft)		1341		1488		744		7279	
Upstream Blk Time (%)						6			
Queuing Penalty (veh)						85			
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)	0	0	7	18		29		4	
Queuing Penalty (veh)	0	0	9	15		26		1	

	•	→	•	←	4	†	>	↓	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	7	f)	¥	f)	¥	ĵ»	, J	f)	
Traffic Volume (vph)	48	21	81	61	89	1205	16	503	
Future Volume (vph)	48	21	81	61	89	1205	16	503	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		
Detector Phase	7	4	3	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0	
Minimum Split (s)	11.0	12.0	11.0	23.0	11.0	31.5	11.0	31.5	
Total Split (s)	15.0	25.0	15.0	25.0	20.0	90.0	20.0	90.0	
Total Split (%)	10.0%	16.7%	10.0%	16.7%	13.3%	60.0%	13.3%	60.0%	
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	None	Min	
Act Effct Green (s)	20.4	11.1	23.4	14.5	89.3	84.6	84.2	76.7	
Actuated g/C Ratio	0.16	0.09	0.19	0.12	0.71	0.68	0.67	0.61	
v/c Ratio	0.23	0.47	0.36	0.62	0.19	1.06	0.12	0.52	
Control Delay	43.4	25.0	45.9	55.2	7.0	65.2	8.2	16.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	43.4	25.0	45.9	55.2	7.0	65.2	8.2	16.7	
LOS	D	С	D	Е	А	Е	А	В	
Approach Delay		31.2		51.6		61.3		16.4	
Approach LOS		С		D		E		В	

Cycle Length: 150 Actuated Cycle Length: 125

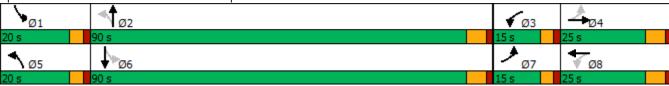
Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06 Intersection Signal Delay: 47.2 Intersection Capacity Utilization 99.4%

Intersection LOS: D ICU Level of Service F

Analysis Period (min) 15



Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥	WDIX	1	NDIX	JDL	<u> </u>
Traffic Vol, veh/h	9	17	1299	3	5	649
Future Vol, veh/h	9	17	1299	3	5	649
Conflicting Peds, #/hr	0	0	0	0	0	017
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized		None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage		-	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	10	18	1412	3	5	705
Major/Minor	Minor1	ľ	Major1	N	Major2	
Conflicting Flow All	2129	1414	0		1415	0
Stage 1	1414	-	-	-	-	-
Stage 2	715	_	_	_	_	_
Critical Hdwy	6.42	6.22	_	_	4.12	_
Critical Hdwy Stg 1	5.42	-		-	-	_
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	55	169	-	-	482	-
Stage 1	225	-	-	-	-	-
Stage 2	485	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	54	169	-	-	482	-
Mov Cap-2 Maneuver	54	-	-	-	-	-
Stage 1	225	-	-	-	-	-
Stage 2	477	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	56.7		0		0.1	
HCM LOS	50.7 F		- 0		J. 1	
NA!		NOT	NDD	NDL 4	CDI	CDT
Minor Lane/Major Mvm	nt	NBT	NRK/	VBLn1	SBL	SBT

97

56.7

- 0.291 0.011

F

1.1

482

12.6

В

0

0

Α

Capacity (veh/h)

HCM Lane LOS

HCM Lane V/C Ratio

HCM Control Delay (s)

HCM 95th %tile Q(veh)

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		LDK	WDL		INDL W	NDR
Traffic Vol, veh/h	♣ 53	5	2	ર્લ 248	" 11	9
			3			
Future Vol, veh/h	53	5	3	248	11	9
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	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	5	3	270	12	10
Major/Minor M	lajor1	Λ	/lajor2	N	Minor1	
Conflicting Flow All	<u>1</u> 001 1	0	63	0	337	61
Stage 1	-	-	-	-	61	-
	-	-			276	
Stage 2			4.12	-		6.22
Critical Howy	-	-		-	6.42	
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	-	-	1540	-	658	1004
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1540	-	657	1004
Mov Cap-2 Maneuver	-	-	-	-	657	-
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	769	-
Ü						
Annroach	EB		WB		NB	
Approach						
HCM Control Delay, s	0		0.1		9.8	
HCM LOS					Α	
Minor Lane/Major Mvmt		NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		778			1540	_
HCM Lane V/C Ratio		0.028	_	_	0.002	_

HCM Control Delay (s)

HCM 95th %tile Q(veh)

HCM Lane LOS

9.8

Α

0.1

7.3

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0

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Α

Intersection							
Int Delay, s/veh	1.7						
Movement	SBL	SBR	SEL	SET	NWT	NWR	
Lane Configurations	ች	7		4	f		
Traffic Vol, veh/h	33	30	18	33	165	210	
Future Vol, veh/h	33	30	18	33	165	210	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	Stop	-	None	-	None	
Storage Length	0	50	-	-	-	-	
Veh in Median Storage		-	-	0	0	-	
Grade, %	0	-	- 02	0	0	-	
Peak Hour Factor	92	92	92 2	92	92	92	
Heavy Vehicles, % Mvmt Flow	36	33	20	36	2 179	2 228	
IVIVIIIL FIUW	30	33	20	30	1/9	228	
	Minor2		Major1		Major2		
Conflicting Flow All	369	293	407	0	-	0	
Stage 1	293	-	-	-	-	-	
Stage 2	76	-	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	-	
Critical Hdwy Stg 2	5.42	2 210	2 210	-	-	-	
Follow-up Hdwy		3.318		-	-	-	
Pot Cap-1 Maneuver	631 757	746	1152	-	-	-	
Stage 1 Stage 2	947	-	-	-	-	-	
Platoon blocked, %	747	-	-	-	-		
Mov Cap-1 Maneuver	620	746	1152	-	-	_	
Mov Cap-1 Maneuver	620	- 140	1132	_	_	-	
Stage 1	743	-	-	-	-	-	
Stage 2	947	-	_	-	_	-	
9							
Annroach	CD		CE		NIVA		
Approach	SB 10.6		SE		NW		
HCM Control Delay, s HCM LOS	10.6		2.9		0		
HOW LUS	В						
Minor Lane/Major Mvm	nt	NWT	NWR	SEL	SET:	SBLn1 S	
Capacity (veh/h)		-	-	1152	-	620	746
HCM Lane V/C Ratio		-	-	0.017		0.058	
HCM Control Delay (s)		-	-	8.2	0	11.2	10
HCM Lane LOS		-	-	A	Α	В	В
HCM 95th %tile Q(veh))	-	-	0.1	-	0.2	0.1

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
		WBR		NDK	SBL	
Lane Configurations	Y	E4	^	-	47	4
Traffic Vol, veh/h	17	51	1251	5	17	641
Future Vol, veh/h	17	51	1251	5	17	641
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	2, # 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	18	55	1360	5	18	697
IVIVIIIL F IOVV	10	บบ	1300	Ü	10	097
Major/Minor I	Minor1	<u> </u>	Major1	N	Major2	
Conflicting Flow All	2096	1363	0	0	1365	0
Stage 1	1363	-	-	-	-	-
Stage 2	733	_	_	_	_	_
Critical Hdwy	6.42	6.22			4.12	_
Critical Hdwy Stg 1	5.42	- 0.22	_		7.12	_
Critical Hdwy Stg 2	5.42			-	_	-
			-	-		
Follow-up Hdwy	3.518		-	-	2.218	-
Pot Cap-1 Maneuver	57	181	-	-	503	-
Stage 1	238	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	54	181	-	-	503	-
Mov Cap-2 Maneuver	54	-	-	-	-	-
Stage 1	238	-	-	-	-	-
Stage 2	447	_	_	_	_	_
Approach	WB		NB		SB	
HCM Control Delay, s	81.9		0		0.3	
HCM LOS	F					
			MES	VDI 1	051	0==
Minor Lane/Major Mvm	nt	NBT	NBRV	VBLn1	SBL	SBT
Capacity (veh/h)		-	-		503	-
HCM Lane V/C Ratio		-	-	0.648	0.037	-
HCM Control Delay (s)		-	-	81.9	12.4	0
HCM Lane LOS		-	-	F	В	Α
HCM 95th %tile Q(veh)	-	-	3.3	0.1	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	7>	LDIN	VVDL	<u>₩</u>	¥	NDIX
Traffic Vol, veh/h	50	5	3	256	17	8
Future Vol, veh/h	50	5	3	256	17	8
Conflicting Peds, #/hr	0	0	0	0	0	0
	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None			Stop -	None
Storage Length	-	None -	-	None -	0	None -
			-	0	0	
Veh in Median Storage,		-	-			-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	5	3	278	18	9
Major/Minor M	ajor1	N	Major2		/linor1	
Conflicting Flow All	0	0	59	0	341	57
Stage 1	-	_	-	-	57	-
Stage 2	_	_	_	_	284	_
Critical Hdwy			4.12	-	6.42	6.22
Critical Hdwy Stg 1	_	_	4.12	_	5.42	0.22
Critical Hdwy Stg 2	-	-	_		5.42	
		-	2.218			3.318
Follow-up Hdwy	-	-				
Pot Cap-1 Maneuver	-	-	1545	-	655	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %	-	-	4545	-	15.	1000
Mov Cap-1 Maneuver	-	-	1545	-	654	1009
Mov Cap-2 Maneuver	-	-	-	-	654	-
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	762	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		10.1	
	U		U. I		_	
HCM LOS					В	
Minor Lane/Major Mvmt	N	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		737	_	_	1545	_
HCM Lane V/C Ratio		0.037	_		0.002	_
HCM Control Delay (s)		10.1	_	-		0
HCM Lane LOS		В	_	_	Α.	A
HCM 95th %tile Q(veh)		0.1	-	_	0	-
		3.1				

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	\$	LUIN	1100	<u>₩</u>	7/	HOIN
Traffic Vol, veh/h	51	11	3	217	34	8
Future Vol, veh/h	51	11	3	217	34	8
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	e, # 0	_	_	0	0	_
Grade, %	0	_	_	0	0	_
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	55	12	3	236	37	9
IVIVIIIL FIOW	33	12	3	230	31	7
Major/Minor I	Major1	<u> </u>	Major2	<u> </u>	Minor1	
Conflicting Flow All	0	0	67	0	303	61
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	242	-
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	-	_	1535	_	689	1004
Stage 1	-	_	-	-	962	-
Stage 2	-	_	-	-	798	-
Platoon blocked, %	_	_		_	, 70	
Mov Cap-1 Maneuver	-	_	1535	-	688	1004
Mov Cap-1 Maneuver	-	-	1000	-	688	1004
Stage 1	-	-	-		962	-
ŭ	-	-	-	-	796	-
Stage 2	-	-	-	-	190	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		10.2	
HCM LOS					В	
Minor Long/Major Music	\+ N	JDI ~1	EDT	EDD	WDI	WDT
Minor Lane/Major Mvm	it f	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		732	-		1535	-
HCM Lane V/C Ratio		0.062	-		0.002	-
HCM Control Delay (s)		10.2	-	-	7.3	0
HCM Lane LOS HCM 95th %tile Q(veh)		В	-	-	A	Α
LICAL Obth Offile Ofuch	1	0.2	_	_	0	_

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	, J	ĵ.		¥	ĵ»		J.	f)		¥	f)	
Traffic Volume (veh/h)	61	57	166	91	41	18	72	750	112	63	1015	22
Future Volume (veh/h)	61	57	166	91	41	18	72	750	112	63	1015	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	66	62	180	99	45	20	78	815	122	68	1103	24
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	51	148	174	169	75	147	933	140	235	1067	23
Arrive On Green	0.05	0.12	0.12	0.06	0.14	0.14	0.05	0.59	0.59	0.05	0.59	0.59
Sat Flow, veh/h	1774	422	1225	1774	1223	544	1774	1584	237	1774	1816	40
Grp Volume(v), veh/h	66	0	242	99	0	65	78	0	937	68	0	1127
Grp Sat Flow(s),veh/h/ln	1774	0	1647	1774	0	1767	1774	0	1821	1774	0	1856
Q Serve(g_s), s	3.7	0.0	14.0	5.6	0.0	3.8	1.9	0.0	50.5	1.7	0.0	68.0
Cycle Q Clear(g_c), s	3.7	0.0	14.0	5.6	0.0	3.8	1.9	0.0	50.5	1.7	0.0	68.0
Prop In Lane	1.00		0.74	1.00		0.31	1.00		0.13	1.00		0.02
Lane Grp Cap(c), veh/h	283	0	199	174	0	244	147	0	1072	235	0	1090
V/C Ratio(X)	0.23	0.00	1.22	0.57	0.00	0.27	0.53	0.00	0.87	0.29	0.00	1.03
Avail Cap(c_a), veh/h	348	0	199	208	0	244	177	0	1072	268	0	1090
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	50.9	41.7	0.0	44.6	28.0	0.0	20.2	20.4	0.0	23.9
Incr Delay (d2), s/veh	0.2	0.0	134.0	1.1	0.0	0.2	2.2	0.0	9.9	0.5	0.0	36.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8 41.9	0.0	13.7	2.8	0.0	1.9 44.9	1.6	0.0	28.2 30.1	1.1 20.9	0.0	45.5
LnGrp Delay(d),s/veh LnGrp LOS	41.9 D	0.0	184.9 F	42.8 D	0.0	44.9 D	30.3 C	0.0	30.1 C	20.9 C	0.0	60.4 F
	U	200	Г	U	1//	U	U	1015	C	C	1100	Г
Approach Vol, veh/h		308			164			1015			1195 58.1	
Approach LOS		154.2 F			43.6 D			30.1 C			58. I E	
Approach LOS											E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	74.2	11.8	20.0	10.0	74.0	9.8	22.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	7.5	68.0	9.5	14.0	7.5	68.0	9.5	14.0				
Max Q Clear Time (g_c+l1), s	3.7	52.5	7.6	16.0	3.9	70.0	5.7	5.8				
Green Ext Time (p_c), s	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			57.7									
HCM 2010 LOS			Е									

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	L	TR	L	TR	L	TR	L	TR	
Maximum Queue (ft)	225	437	96	121	254	600	254	976	
Average Queue (ft)	117	236	54	40	73	290	70	623	
95th Queue (ft)	263	404	93	100	195	469	208	914	
Link Distance (ft)		1341		1488		744		7279	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	125		85		155		155		
Storage Blk Time (%)	0	54	6	2		22		36	
Queuing Penalty (veh)	0	33	3	2		16		22	

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	, j	f)	¥	f)	¥	f)	, j	ĵ»	,
Traffic Volume (vph)	61	57	91	41	72	750	63	1015	
Future Volume (vph)	61	57	91	41	72	750	63	1015	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	į.
Protected Phases	7	4	3	8	5	2	1	6	
Permitted Phases	4		8		2		6		
Detector Phase	7	4	3	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	25.0	6.0	25.0	
Minimum Split (s)	11.0	12.0	11.0	12.0	11.0	31.5	11.0	31.5	
Total Split (s)	14.0	20.0	14.0	20.0	12.0	74.0	12.0	74.0	
Total Split (%)	11.7%	16.7%	11.7%	16.7%	10.0%	61.7%	10.0%	61.7%	
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	None	Min	
Act Effct Green (s)	22.1	12.8	24.4	15.8	75.4	68.5	75.1	68.3	
Actuated g/C Ratio	0.19	0.11	0.21	0.14	0.66	0.60	0.65	0.59	
v/c Ratio	0.23	0.89	0.51	0.25	0.46	0.86	0.31	1.02	
Control Delay	37.8	63.7	45.7	41.1	21.3	30.5	10.4	57.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.8	63.7	45.7	41.1	21.3	30.5	10.4	57.9	
LOS	D	Е	D	D	С	С	В	Е	
Approach Delay		58.1		43.9		29.8		55.2	
Approach LOS		Е		D		С		Е	

Cycle Length: 120

Actuated Cycle Length: 115

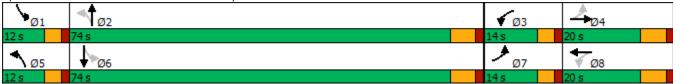
Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02 Intersection Signal Delay: 45.2 Intersection Capacity Utilization 91.8%

Intersection LOS: D ICU Level of Service F

Analysis Period (min) 15



Intersection						
Int Delay, s/veh	0.8					
		MDE	NE	NDE	00:	0.0.7
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		\$			4
Traffic Vol, veh/h	8	9	921	18	24	1246
Future Vol, veh/h	8	9	921	18	24	1246
Conflicting Peds, #/hr		0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storag		-	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	9	10	1001	20	26	1354
Major/Minor	Minor1	N	Major1		Majora	
Major/Minor	Minor1		Major1		Major2	0
Conflicting Flow All	2417	1011	0	0	1021	0
Stage 1	1011	-	-	-	-	-
Stage 2	1406	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	36	291	-	-	680	-
Stage 1	352	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	30	291	-	-	680	-
Mov Cap-2 Maneuver	30	-	-	-	-	-
Stage 1	352	-	-	-	-	-
Stage 2	192	-	-	-	-	-
J						
Annraach	WD		ND		CD	
Approach	WB		NB		SB	
HCM Control Delay, s			0		0.2	
HCM LOS	F					
Minor Lane/Major Mvi	nt	NBT	NBRV	WBLn1	SBL	SBT
Capacity (veh/h)				57	680	
HCM Lane V/C Ratio		_	_	0.324		_
HOM O + ID + /	•			0.324	0.000	-

0

Α

95.9

F

1.2

10.5

0.1

В

HCM Control Delay (s)

HCM 95th %tile Q(veh)

HCM Lane LOS

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ĵ.			4	W	
Traffic Vol, veh/h	182	9	11	167	5	5
Future Vol, veh/h	182	9	11	167	5	5
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
Mymt Flow	198	10	12	182	5	5
IVIVIIIL FIOW	190	10	12	102	3	3
Major/Minor N	Major1	N	Major2	N	Minor1	
Conflicting Flow All	0	0	208	0	409	203
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	206	-
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	_	_	1363	_	599	838
Stage 1	_	_	-	_	831	-
Stage 2	_	_	_	_	829	-
Platoon blocked, %	_	_		_	027	
Mov Cap-1 Maneuver	_		1363	_	593	838
Mov Cap-1 Maneuver	-	-	1303	-	593	030
	-	-	-			
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	821	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.5		10.3	
HCM LOS			0.0		В	
110111 200						
Minor Lane/Major Mvm	it l	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		695	-	-	1363	-
HCM Lane V/C Ratio		0.016	-	-	0.009	-
HCM Control Delay (s)		10.3	-	-	7.7	0
HCM Lane LOS		В	-	-	Α	Α
HCM 95th %tile Q(veh)		0	-	-	0	-
,						

Intersection							
Int Delay, s/veh	17.2						
Movement	SBL	SBR	SEL	SET	NWT	NWR	
Lane Configurations	ሻ	7	OLL	<u>ુર</u>	1 >		
Traffic Vol, veh/h	448	69	40	127	103	72	
Future Vol, veh/h	448	69	40	127	103	72	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	Stop	-	None	-	None	
Storage Length	0	50	-	-	-	-	
Veh in Median Storage	2, # 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	487	75	43	138	112	78	
Major/Minor N	Minor2	ı	Major1	ı	Major2		
Conflicting Flow All	375	151	190	0	<u>viajui 2</u> -	0	
Stage 1	151	101	170	U	-	Ū	
Stage 2	224	-	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12				
Critical Hdwy Stg 1	5.42	0.22	7.12	_	_	_	
Critical Hdwy Stg 2	5.42	_	_	_	_	_	
Follow-up Hdwy		3.318	2 218	_	_	_	
Pot Cap-1 Maneuver	626	895	1384	_	_	_	
Stage 1	877	- 075	-	_	_	_	
Stage 2	813	_	_	_	_	_	
Platoon blocked, %	010			_	_	_	
Mov Cap-1 Maneuver	605	895	1384	_	_	_	
Mov Cap-2 Maneuver	605	-	-	_	_	_	
Stage 1	847	_	_	-	_	_	
Stage 2	813	_	_	_	_	_	
Stage 2	010						
A	C.D.		05		N.11.4		
Approach	SB		SE		NW		
HCM Control Delay, s	28		1.8		0		
HCM LOS	D						
Minor Lane/Major Mvm	nt	NWT	NWR	SEL	SET	SBLn1 S	SBLn2
Capacity (veh/h)		-	-		-	605	895
HCM Lane V/C Ratio		-	-	0.031	-	0.805	
HCM Control Delay (s)		-	-	7.7	0	30.9	9.4
HCM Lane LOS		-	-	Α	A	D	Α
HCM 95th %tile Q(veh))	-	-	0.1	-	8	0.3
70 2(1011)							3.0

2.4					
\//RI	\M/RD	NRT	NRD	SRI	SBT
	WDIX		NDIX	JDL	- उ <u>ष</u> ी
	22		10	5 4	1198
					1198
					0
					Free
		-	None	-	None
	-	-	-	-	-
	-		-	-	0
	-		-	-	0
92	92	92	92	92	92
2	2	2	2	2	2
12	36	985	21	61	1302
Minor1	N	//aior1	1	Maior	
					0
		U	U		
		-	-		-
		-	_		-
		-	-		-
		-	-		-
		-	-		-
		-	-		-
	297	-	-	689	-
357	-	-	-	-	-
222	-	-	-	-	-
		-	-		-
24	297	-	-	689	-
	-	-	-	-	-
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1)	-	-		B 0.3	A -
	WBL 11 11 0 Stop 0 92 2 12 Minor1 2420 996 1424 6.42 5.42 5.42 3.518 36 357 222 24 24 357 151 WB 109.1	WBL WBR 11 33 11 33 0 0 0 Stop Stop - None 0 9, # 0 92 92 2 2 2 12 36 Minor1 N 2420 996 996 1424 6.42 6.22 5.42 5.42 3.518 3.318 36 297 357 222 WB 109.1 F	WBL WBR NBT 11 33 906 11 33 906 0 0 0 Stop Stop Free None - 0 0 - 0 92 92 92 2 2 2 12 36 985 Minor1 Major1 2420 996 0 996	WBL WBR NBT NBR 11 33 906 19 11 33 906 19 0 0 0 0 Stop Stop Free Free - None - None 0 - - - 0 - 0 - 92 92 92 92 2 2 2 2 12 36 985 21 Minor1 Major1 Image: Major1 Image: Major1 Image: Major1 2420 996 0 0 0 996 - - - 1424 - - - 5.42 - - - 3.518 3.318 - - 357 - - - 24 297 - - 24 - - - <td>WBL WBR NBT NBR SBL Y Image: Control of the control of th</td>	WBL WBR NBT NBR SBL Y Image: Control of the control of th

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
		EDK	WDL	WDI		NDK
Lane Configurations	-î			र्स	W	
Traffic Vol, veh/h	185	19	9	163	11	6
Future Vol, veh/h	185	19	9	163	11	6
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 Storag	e,# 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	201	21	10	177	12	7
	201			.,,		
Major/Minor	Major1	N	Major?	N	/linor1	

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0 222	0 409	212	
Stage 1	-		- 212	-	
Stage 2	-		- 197	-	
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	-	- 1347	- 599	828	
Stage 1	-		- 823	-	
Stage 2	-		- 836	-	
Platoon blocked, %	-	-	-		
Mov Cap-1 Maneuver		- 1347	- 594	828	
Mov Cap-2 Maneuver	r -		- 594	-	
Stage 1	-		- 823	-	
Stage 2	-		- 829	-	
Approach	EB	WB	NB		
HCM Control Delay, s	s 0	0.4	10.6		

HCM LOS				В		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	660	-	-	1347	-	
HCM Lane V/C Ratio	0.028	-	-	0.007	-	
HCM Control Delay (s)	10.6	-	-	7.7	0	
HCM Lane LOS	В	-	-	Α	Α	

HCM 95th %tile Q(veh)

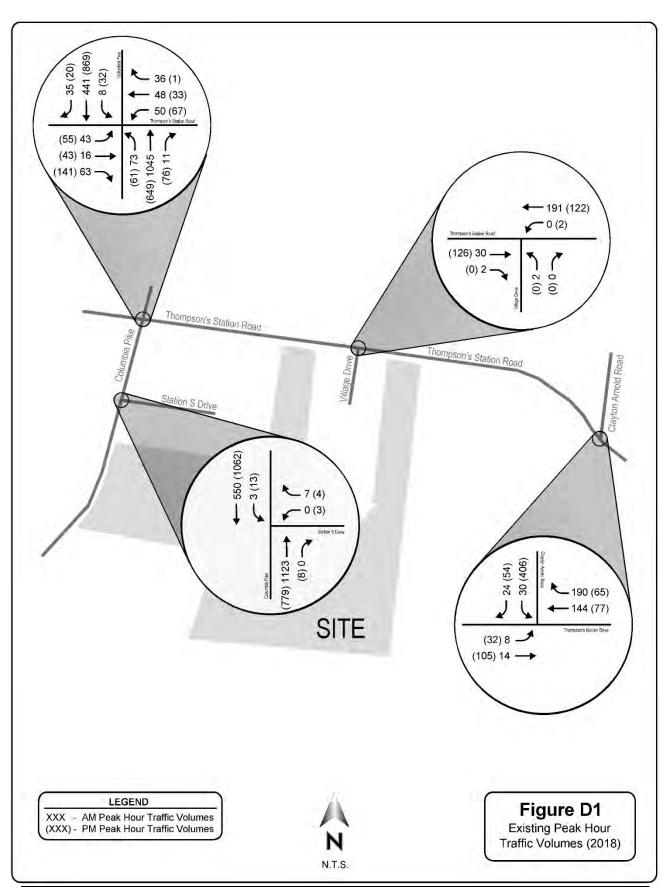
Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	LDIX	****	4	¥	NOIL
Traffic Vol, veh/h	149	38	9	155	23	6
Future Vol, veh/h	149	38	9	155	23	6
Conflicting Peds, #/hr		0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None		None
Storage Length	-	-	-	-	0	-
Veh in Median Storag	e,# 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	162	41	10	168	25	7
				,		
N. A			4 ' 0		\ A' 4	
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	203	0	371	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	188	-
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	
Pot Cap-1 Maneuver	-	-	1369	-	630	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	844	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver		-	1369	-	625	859
Mov Cap-2 Maneuver	-	-	-	-	625	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	837	-
Approach	EB		WB		NB	
			0.4		10.7	
HCM Control Delay, s	. 0		0.4			
HCM LOS					В	
Minor Lane/Major Mvi	mt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		662	-	-	1369	-
HCM Lane V/C Ratio		0.048	_	_	0.007	-
HCM Control Delay (s	s)	10.7	-	-	7.6	0
HCM Lane LOS		В	-	-	A	A
11014 0511 0711 07					_	

HCM 95th %tile Q(veh)

APPENDIX D – ADDITIONAL FIGURES



Appendix July 2021

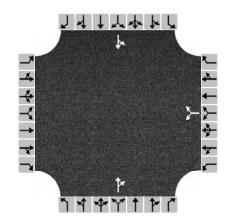


APPENDIX E – SIGNAL WARRANTS



Appendix July 2021

	HCS7 Warrants Report											
Project Information												
Analyst		Date	2021									
Agency	T-Square Engineering	Analysis Year	2023									
Jurisdiction	Town of Thompson's Station	wn of Thompson's Station Time Period Analyzed Projected										
Project Description	Columbia Pike and Station S Drive											
General												
Major Street Direction	North-South	Population < 10,000	No									
Starting Time Interval	6	Coordinated Signal System	No									
Median Type	Undivided	Crashes (crashes/year)	0									
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No									
Nearest Signal (ft)	0											



Approach	Eastbound			١	Vestboun	d	N	Iorthboun	ıd	Southbound		
Movement	L T R		L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0 0 0			0	0	0	0	1	0	0	1	0
Lane Usage					LR			TR			LT	
Vehicle Volumes Averages (veh/h)	0 0 0		6	0	9	0	997	8	11	847	0	
Pedestrian Averages (peds/h)		0		0			0			0		
Gap Averages (gaps/h)		0		0				0		0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		
Calcad Caradaa aad Baadaa	Calcad Curanian and Danduna Natural											

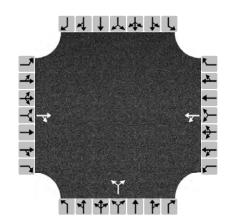
School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10

HCS7 Warrants Report														
Volume Summary														
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)	4A (70%)	4B (70%)
07 - 08	1621	23	1644	0	0	No	No	No	No	No	No	No	No	No
08 - 09	1766	20	1786	0	0	No	No	No	No	No	No	No	No	No
09 - 10	1866 17 1883 0 0 No No No No No No								No	No				
10 - 11	11 1853 17 1870 0 0 No No No No No No No										No	No		
11 - 12	1847	14	1861	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1832	13	1845	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1830	14	1844	0	0	No	No	No	No	No	No	No	No	No
14 - 15	1846	16	1862	0	0	No	No	No	No	No	No	No	No	No
15 - 16	1840	15	1855	0	0	No	No	No	No	No	No	No	No	No
16 - 17	1843	15	1858	0	0	No	No	No	No	No	No	No	No	No
17 - 18	2114	13	2127	0	0	No	No	No	No	No	No	No	No	No
18 - 19	2119	18	2137	0	0	No	No	No	No	No	No	No	No	No
Total	22377	195	22572	0	0	0	0	0	0	0	0	0	0	0
Warrants														
Warrant 1: Eight-Hour Vehicular Volume														
A. Minimu	m Vehicula	ar Volumes	(Both maj	jor approa	chesand	d higher	minor app	roach)c	r					
B. Interrup	tion of Co	ntinuous T	raffic (Both	n major ap	proaches	and hi	gher mino	r approach	n)or					
56% Vehic	ularand	Interrup	tion Volum	nes (Both r	major appı	roaches	and high	er minor a	pproach)					
Warrant 2: I	our-Hou	r Vehicul	ar Volum	ie										
Four-Hour	· Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I	Peak Hou	r												
A. Peak-Ho	our Condit	ions (Mino	r delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho				ajor appro	achesar	id highe	r minor ap	proach)						
Warrant 4: I			?											
A. Four Ho														
B. One-Ho														
Warrant 5: S														
Gaps Same		and												
Student Vo		16: 17	15											
Nearest Tr														
Warrant 6: 0					علم مائم ملاء									
Degree of			inant direc	tion or bo	tn directio	ons)								
Warrant 7: 0 A. Adequa			oc obcomi	inco and -	nforcome	at failed	and							
B. Reporte														
C. 56% Vo						onai penc	ou)aliu							
Warrant 8: I				7 alt 3d	usneu									
A. Weekda				d projec	ted warra	nts 1 2 or	· 3)or							
B. Weeken	•			a projec	vvuii a	1, 2, 01	3, 01							
Warrant 9: (- 10101/											
A. Grade C			:and											
B. Peak-Ho														
D. I Cak-IIC	Jai Verneul	ar volume	5											

HCS7 Warrants Report											
Project Information											
Analyst		Date	2021								
Agency	T-Square Engineering	Analysis Year	2023								
Jurisdiction	Thompson's Station	ompson's Station Time Period Analyzed Projected									
Project Description	Thompsons Station Road and Village Drive										
General											
Major Street Direction	East-West	Population < 10,000	No								
Starting Time Interval	6	Coordinated Signal System	No								
Median Type	Undivided	Crashes (crashes/year)	0								
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No								
Nearest Signal (ft)	0										



Approach	Eastbound			\	Vestboun	d	N	Iorthboun	ıd	Southbound		
Movement	L T R		R	L	Т	R	L	Т	R	L	T	R
Number of Lanes, N	0 1 0		0	1	0	0	0	0	0	0	0	
Lane Usage	TR			LT			LR					
Vehicle Volumes Averages (veh/h)	0 124 6		7	171	0	9	0	5	0	0	0	
Pedestrian Averages (peds/h)		0		0			0			0		
Gap Averages (gaps/h)		0		0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		
Cabaal Crassing and Dandway	Madaira	l.										

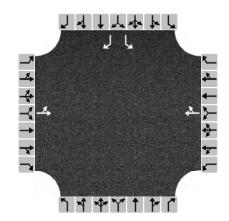
School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)	4		
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0		
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10		
Copyright © 2021 University of Florida. All Righ	Generated: 7/14/2021 5:01:23 PM				

HCS7 Warrants Report														
Volume Summary														
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)	4A (70%)	4B (70%)
06 - 07	253	31	284	0	0	No	No	No	No	No	No	No	No	No
07 - 08	310	14	324	0	0	No	No	No	No	No	No	No	No	No
08 - 09	296	17	313	0	0	No	No	No	No	No	No	No	No	No
09 - 10	292	17	309	0	0	No	No	No	No	No	No	No	No	No
10 - 11	294	13	307	0	0	No	No	No	No	No	No	No	No	No
11 - 12	290	11	301	0	0	No	No	No	No	No	No	No	No	No
12 - 13	295	12	307	0	0	No	No	No	No	No	No	No	No	No
13 - 14	308	14	322	0	0	No	No	No	No	No	No	No	No	No
14 - 15	310	13	323	0	0	No	No	No	No	No	No	No	No	No
15 - 16	318	13	331	0	0	No	No	No	No	No	No	No	No	No
16 - 17	367	13	380	0	0	No	No	No	No	No	No	No	No	No
17 - 18	367	13	380	0	0	No	No	No	No	No	No	No	No	No
Total	3700	181	3881	0	0	0	0	0	0	0	0	0	0	0
Warrants														
Warrant 1: Eight-Hour Vehicular Volume														
A. Minimu	m Vehicula	ar Volumes	(Both ma	or approa	chesand	d higher	minor app	roach)c)r					
B. Interrup	B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or													
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)														
Warrant 2: Four-Hour Vehicular Volume														
Four-Hour Vehicular Volume (Both major approachesand higher minor approach)														
Warrant 3: Peak Hour														
A. Peak-Ho	our Conditi	ions (Mino	r delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho	our Vehicul	ar Volume	s (Both ma	ajor appro	achesar	ıd highe	r minor ap	proach)						
Warrant 4: I	Pedestria	n Volume	2											
A. Four Ho	ur Volume	sor												
B. One-Ho														
Warrant 5: S														
Gaps Sam		and												
Student Vo														
Nearest Tr														
Warrant 6: 0														
Degree of			inant direc	tion or bo	th direction	ons)								
Warrant 7: 0														
A. Adequa														
B. Reporte						onth peric	od)and							
C. 56% Vo				4 are sa	tistied									
Warrant 8: I				نادست ام	tod	nto 1 2	2)							
A. Weekda	•			u projec	ieu warra	iits 1, 2, or	3)or							
B. Weekend Volume (Five hours total) Warrant 9: Grade Crossing														
A. Grade C			and											
B. Peak-Ho														
ь. Реак-Но	our venicul	ar volume	5											

HCS7 Warrants Report											
Project Information											
Analyst		Date	2021								
Agency	T-Square Engineering	Analysis Year	2023								
Jurisdiction	Thompson's Station	Time Period Analyzed	Projected								
Project Description	Thompsons Station Road and Clayton Arnold Road										
General											
Major Street Direction	East-West	Population < 10,000	No								
Starting Time Interval	6	Coordinated Signal System	No								
Median Type	Undivided	Crashes (crashes/year)	0								
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No								
Nearest Signal (ft)	0										



Approach		Eastbound			Westbound			Northbound			Southbound		
Movement	L	L T R L 0 1 0 0 LT		L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0			0	1	0	0	0	0	1	0	1	
Lane Usage					TR					L		R	
Vehicle Volumes Averages (veh/h)	30	81	0	0	113	106	0	0	0	133	0	46	
Pedestrian Averages (peds/h)		0		0		0			0				
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0			0.0		0.0			0.0			
Delay (veh-hrs)		0.0		0.0		0.0			0.0				
Sahaal Cuassing and Daaduusy Naturally													

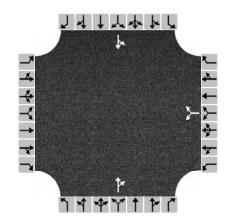
School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)								
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0							
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10							

HCS7 Warrants Report														
Volume Summary														
		Minor	Total	Dods/b	Cans/h	1A	1A	1B	1B	2	3A	3B	4A	4B
Hour	Major Volume	Volume	Volume	Peds/h	Gaps/h	(70%)	(56%)	(70%)	(56%)	(70%)	(70%)	(70%)	(70%)	(70%)
07 - 08	359	29	388	0	0	No	No	No	No	No	No	No	No	No
08 - 09	448	58	506	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	333	86	419	0	0	No	No	No	No	No	No	No	No	No
10 - 11	324	101	425	0	0	No	No	No	No	No	No	No	No	No
11 - 12	318	118	436	0	0	No	Yes	No	No	No	No	No	No	No
12 - 13	306	134	440	0	0	No	Yes	No	No	No	No	No	No	No
13 - 14	304	151	455	0	0	No	Yes	No	No	No	No	No	No	No
14 - 15	303	169	472	0	0	No	Yes	No	No	No	No	No	No	No
15 - 16	296	186	482	0	0	No	Yes	No	No	No	No	No	No	No
16 - 17	292	202	494	0	0	No	Yes	No	No	No	No	No	No	No
17 - 18	341	386	727	0	0	No	Yes	No	No	Yes	No	Yes	No	No
18 - 19	359	540	899	0	0	Yes	Yes	No	No	Yes	No	Yes	No	No
Total	3983	2160	6143	0	0	1	8	0	1	2	0	2	0	0
Warrants														
Warrant 1: Eight-Hour Vehicular Volume														
	ım Vehicula				chesand	d higher	minor app	roach)c)r					
	tion of Co													
	cularand-													
Warrant 2:					-71-1-		<u> </u>		1-1					
	r Vehicular				esand	higher mi	nor appro	ach)						
Warrant 3:								,					√	
	our Conditi		r delav	and min	or volume	and to	otal volum	e)or						
	our Vehicul													
Warrant 4:				ијог аррго	acrics ar	id Highe	типог ар	ргоаспу						
	our Volume													
	our Volume													
Warrant 5:														
	e Period													
Student V		unu												
	affic Contr	ol Cianal (antional)											
Warrant 6:					+h diuc -+'	unc)								
	Platooning		iiiaiit ülrec	.uon or bo	ui directio	n 15)								
Warrant 7:			os observ	nee and -	nforce	at failed	and							
·	ite trials of													
	ed crashes s					ontn perio	oa)and							
	lumes for \			4 are sa	tisfied								<u>√</u>	
Warrant 8:							2)							
	ay Volume			ıd projec	ted warra	nts 1, 2, or	3)or							
	nd Volume		s total)											
Warrant 9:														
	Crossing wi													
B. Peak-H	our Vehicul	ar Volume	S											

HCS7 Warrants Report											
Project Information											
Analyst		Date	2021								
Agency	T-Square Engineering	Analysis Year	2023								
Jurisdiction	Thompson's Station	Time Period Analyzed	Projected								
Project Description	Columbia Pike and Site Acces	Columbia Pike and Site Access 1									
General											
Major Street Direction	North-South	Population < 10,000	No								
Starting Time Interval	6	Coordinated Signal System	No								
Median Type	Undivided	Crashes (crashes/year)	0								
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No								
Nearest Signal (ft)	0										



Approach	ı	Eastbound		\ \	Westbound		Northbound			Southbound		
Movement	L	L T R L 0 0 0 0		L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	0			0	0	0	0	1	0	0	1	0
Lane Usage					LR			TR			LT	
Vehicle Volumes Averages (veh/h)	0	0	0	10	0	15	0	974	10	31	823	0
Pedestrian Averages (peds/h)		0		0		0			0			
Gap Averages (gaps/h)		0			0		0			0		
Delay (s/veh)		0.0			0.0		0.0			0.0		
Delay (veh-hrs)		0.0			0.0		0.0			0.0		
School Crassing and Pandway Naturals												

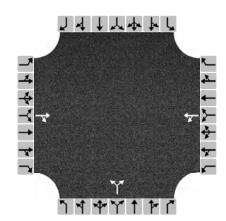
School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)	4							
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0							
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10							

					HCS	7 Wai	rants	Repoi	't					
Volume Si	Volume Summary													
Hour	Major	Minor	Total	Peds/h	Gaps/h	1A	1A	1B	1B	2	3A	3B	4A	4B
	Volume	Volume	Volume			(70%)	(56%)	(70%)	(56%)	(70%)	(70%)	(70%)	(70%)	(70%)
07 - 08	1579	48	1627	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	1731	35	1766	0	0	No	No	No	No	No	No	No	No	No
09 - 10	1842	27	1869	0	0	No	No	No	No	No	No	No	No	No
10 - 11	1830	23	1853	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1826	22	1848	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1814	17	1831	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1810	20	1830	0	0	No	No	No	No	No	No	No	No	No
14 - 15	1821	25	1846	0	0	No	No	No	No	No	No	No	No	No
15 - 16	1818	23	1841	0	0	No	No	No	No	No	No	No	No	No
16 - 17	1820	23	1843	0	0	No	No	No	No	No	No	No	No	No
17 - 18	2093	23	2116	0	0	No	No	No	No	No	No	No	No	No
18 - 19	2093	23	2116	0	0	No	No	No	No	No	No	No	No	No
Total	22077	309	22386	0	0	0	0	0	1	0	0	0	0	0
Warrants														
Warrant 1:	Eight-Hou	ır Vehicu	lar Volui	ne										
A. Minimu	m Vehicula	ar Volumes	(Both ma	jor approa	chesand	d higher	minor app	roach)c)r					
B. Interrup	tion of Co	ntinuous T	raffic (Botl	h major ap	proaches	and hi	gher mino	r approach	n)or					
56% Vehic	ularand	Interrup	tion Volun	nes (Both r	major app	roaches	and high	er minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	ar Volun	1e										
Four-Hou	· Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	r												
A. Peak-H	our Condit	ions (Mino	r delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho	our Vehicul	ar Volume	s (Both ma	ajor appro	achesar	d highe	r minor ap	proach)						
Warrant 4:	Pedestria	n Volume	2											
A. Four Ho	our Volume	sor												
B. One-Ho	ur Volume	s												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student Vo	olumes													
Nearest Tr	affic Contr	ol Signal (optional)											
Warrant 6:	Coordina	ted Signa	l System											
Degree of	Degree of Platooning (Predominant direction or both directions)													
Warrant 7: Crash Experience														
A. Adequate trials of alternatives, observance and enforcement failedand														
B. Reported crashes susceptible to correction by signal (12-month period)and														
C. 56% Volumes for Warrants 1A, 1B,or 4 are satisfied														
Warrant 8:	Roadway	Network												
A. Weekda	y Volume	(Peak houi	totalar	nd projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9:	Grade Cro	ssing												
A. Grade (Crossing wi	thin 140 ft	:and											
B. Peak-Ho	our Vehicul	ar Volume	S											

HCS7 Warrants Report									
Project Information									
Analyst		Date	2021						
Agency	T-Square Engineering	Analysis Year	2023						
Jurisdiction	Thompson's Station	Time Period Analyzed	Projected						
Project Description Thompsons Station Road and Site Access 2									
General									
Major Street Direction	East-West	Population < 10,000	No						
Starting Time Interval	6	Coordinated Signal System	No						
Median Type	Undivided	Crashes (crashes/year)	0						
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No						
Nearest Signal (ft)	0								



Approach		Eastbound			Vestboun	d	N	Iorthboun	ıd	Southbound			
Movement	L	Т	R	L	Т	R	L	T	R	L	Т	R	
Number of Lanes, N	0	0 1 0			1	0	0	0	0	0	0	0	
Lane Usage		TR			LT			LR					
Vehicle Volumes Averages (veh/h)	0	0 127 5			175	0	10	0	5	0	0	0	
Pedestrian Averages (peds/h)		0		0			0			0			
Gap Averages (gaps/h)		0		0				0		0			
Delay (s/veh)		0.0			0.0			0.0		0.0			
Delay (veh-hrs)		0.0			0.0			0.0			0.0		
Calcad Curation and Deadure. Natural													

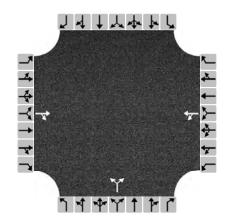
School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10

HCS7 Warrants Report														
Volume Summary														
Hour	Major	Minor	Total	Peds/h	Gaps/h	1A	1A	1B	1B	2	3A	3B	4A	4B
	Volume	Volume	Volume			(70%)	(56%)	(70%)	(56%)	(70%)	(70%)	(70%)	(70%)	(70%)
07 - 08	265	29	294	0	0	No	No	No	No	No	No	No	No	No
08 - 09	312	21	333	0	0	No	No	No	No	No	No	No	No	No
09 - 10	302	16	318	0	0	No	No	No	No	No	No	No	No	No
10 - 11	299	14	313	0	0	No	No	No	No	No	No	No	No	No
11 - 12	300	13	313	0	0	No	No	No	No	No	No	No	No	No
12 - 13	294	10	304	0	0	No	No	No	No	No	No	No	No	No
13 - 14	300	12	312	0	0	No	No	No	No	No	No	No	No	No
14 - 15	314	15	329	0	0	No	No	No	No	No	No	No	No	No
15 - 16	316	14	330	0	0	No	No	No	No	No	No	No	No	No
16 - 17	322	14	336	0	0	No	No	No	No	No	No	No	No	No
17 - 18	371	14	385	0	0	No	No	No	No	No	No	No	No	No
18 - 19	372	14	386	0	0	No	No	No	No	No	No	No	No	No
Total	3767	186	3953	0	0	0	0	0	0	0	0	0	0	0
Warrants														
Warrant 1: I	Eiaht-Hou	ır Vehicu	lar Volur	ne										
A. Minimu					chesand	d hiaher	minor apr	oroach)c)r					
B. Interrup														
56% Vehic														
Warrant 2: I														
Four-Hour					esand	hiaher mi	nor appro	ach)						
Warrant 3: I								,						
A. Peak-Ho	our Conditi	ions (Mino	r delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho			•											
Warrant 4: I				<u>, , , , , , , , , , , , , , , , , , , </u>			<u> </u>	<u> </u>						
A. Four Ho	our Volume	sor												
B. One-Ho	ur Volume	S												
Warrant 5: S	School Cr	ossing												
Gaps Same														
Student Vo														
Nearest Tr	affic Contr	ol Signal (optional)											
Warrant 6: 0	Coordinat	ted Signa	l System											
Degree of Platooning (Predominant direction or both directions)														
Warrant 7: Crash Experience														
A. Adequate trials of alternatives, observance and enforcement failedand														
B. Reported crashes susceptible to correction by signal (12-month period)and														
C. 56% Volumes for Warrants 1A, 1B,or 4 are satisfied														
Warrant 8: I	Roadway	Network												
A. Weekda	y Volume	(Peak hou	totalar	ıd projec	ted warra	nts 1, 2, or	· 3)or							
B. Weeken	d Volume	(Five hour	s total)											
Warrant 9: 0	Grade Cro	ssing												
	A. Grade Crossing within 140 ftand													
B. Peak-Ho														

HCS7 Warrants Report									
Project Information									
Analyst		Date	2021						
Agency	T-Square Engineering	Analysis Year	2023						
Jurisdiction	Town of Thompsons Station	Time Period Analyzed	Projected						
Project Description Thompsons Station Road and SA3									
General									
Major Street Direction	East-West	Population < 10,000	No						
Starting Time Interval	6	Coordinated Signal System	No						
Median Type	Undivided	Crashes (crashes/year)	0						
Major Street Speed (mi/h)	45	Adequate Trials of Crash Exp. Alt.	No						
Nearest Signal (ft)	0								



Approach		Eastbound	k	\	Vestboun	d	N	Iorthboun	ıd	S	outhboun	d	
Movement	L	T	R	L	Т	R	L	Т	R	L	T	R	
Number of Lanes, N	0	0 1 0			1	0	0	0	0	0	0	0	
Lane Usage		TR			LT			LR					
Vehicle Volumes Averages (veh/h)	0	0 98 10			168	0	20	0	5	0	0	0	
Pedestrian Averages (peds/h)		0		0			0			0			
Gap Averages (gaps/h)		0		0				0		0			
Delay (s/veh)		0.0			0.0			0.0			0.0		
Delay (veh-hrs)		0.0			0.0			0.0			0.0		
Sahaal Cuasing and Dandung Naturals													

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10

					HCS	7 Wai	rants	Repor	't					
Volume Su	Volume Summary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)	4A (70%)	4B (70%)
06 - 07	217	49	266	0	0	No	No	No	No	No	No	No	No	No
07 - 08	282	34	316	0	0	No	No	No	No	No	No	No	No	No
08 - 09	273	26	299	0	0	No	No	No	No	No	No	No	No	No
09 - 10	272	24	296	0	0	No	No	No	No	No	No	No	No	No
10 - 11	272	21	293	0	0	No	No	No	No	No	No	No	No	No
11 - 12	271	16	287	0	0	No	No	No	No	No	No	No	No	No
12 - 13	273	20	293	0	0	No	No	No	No	No	No	No	No	No
13 - 14	281	25	306	0	0	No	No	No	No	No	No	No	No	No
14 - 15	284	23	307	0	0	No	No	No	No	No	No	No	No	No
15 - 16	287	23	310	0	0	No	No	No	No	No	No	No	No	No
16 - 17	340	24	364	0	0	No	No	No	No	No	No	No	No	No
17 - 18	342	24	366	0	0	No	No	No	No	No	No	No	No	No
Total	3394	309	3703	0	0	0	0	0	0	0	0	0	0	0
Warrants														
Warrant 1: E	ight-Hou	ır Vehicu	lar Volur	ne										
A. Minimu	m Vehicula	r Volumes	(Both maj	or approa	chesand	d higher	minor app	roach)c)r					
B. Interrup	tion of Co	ntinuous T	raffic (Both	n major ap	proaches	and hi	gher mino	r approach	n)or					
56% Vehic	ularand-	Interrup	tion Volun	nes (Both r	major appı	roaches	and high	er minor a	approach)					
Warrant 2: F	our-Hou	r Vehicul	ar Volum	ie										
Four-Hour	Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: F	Peak Hou	r												
A. Peak-Ho	our Conditi	ions (Mino	r delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho	our Vehicul	ar Volume	s (Both ma	ajor appro	achesar	ıd highei	r minor ap	proach)						
Warrant 4: F	Pedestria	n Volume	?											
A. Four Ho	ur Volume	sor												
B. One-Ho	ur Volume	s												
Warrant 5: S	School Cr	ossing												
Gaps Same	e Period	and												
Student Vo	olumes													
Nearest Tra	affic Contro	ol Signal (optional)											
Warrant 6: 0	Coordinat	ted Signa	l System											
Degree of	Platooning	g (Predom	inant direc	tion or bo	th directio	ns)								
Warrant 7: Crash Experience														
A. Adequate trials of alternatives, observance and enforcement failedand														
B. Reported crashes susceptible to correction by signal (12-month period)and														
C. 56% Volumes for Warrants 1A, 1B,or 4 are satisfied														
Warrant 8: Roadway Network A. Weekday Volume (Peak hour totaland projected warrants 1, 2, or 3)or														
				d projec	ted warra	nts 1, 2, or	3)or							
B. Weeken			s total)											
Warrant 9: 0														
A. Grade Crossing within 140 ftand														
B. Peak-Ho	our Vehicul	ar Volume	S											

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

DATE: August 24, 2021

TO: Planning Commissioners

FROM: Micah Wood, AICP

Planning Director

SUBJECT: Item 2 – Ordinance 2021-012 – Land Development Ordinance Amendment

This text amendment has been revised in an effort to satisfy concerns raised on language in the plat certificates at the July TSPC meeting. The Utility Plat Certificate language as been updated.

In Town Staff's on-going process improvement efforts to provide updates to the Land Development Ordinance to ensure a clear and predicable regulatory process, the following amendments are offered for consideration:

Appendix C

In collaboration with the Town Engineer and Town Attorney, Staff presents these revised plat certificates for review and approval. The intent in presenting these revisions is to ensure that both Town Staff and the Town's consultants can sign plat the certificates for Planning Commission approved final plats.

Recommendation

Staff recommends that the Planning Commission provide a favorable recommendation onto the BOMA for these text amendments.

Attachments
Ordinance 2021-012
Exhibit A

ORDINANCE NO. 2021-012

AN ORDINANCE OF THE TOWN OF THOMPSON'S STATION, TENNESSEE TO AMEND APPENDIX C OF THE LAND DEVELOPMENT ORDINANCE TO CLEAN UP AND CLARY CERTAIN PLAT CERTIFICIATES

WHEREAS, Town Staff and the Planning Commission recommends changes certain provisions of the Town's Land Development Ordinance ("LDO") to amend Appendix C of the LDO in order to revise plat certificates required for signature by officials for final plats approved by the Thompson's Station Planning Commission.

WHEREAS, the Planning Commission has reviewed these proposed changes and has recommended that the Board of Mayor and Aldermen adopt the amendments to the LDO as proposed herein; and

WHEREAS, the Board of Mayor and Aldermen has reviewed the Land Development Ordinance and has determined, based upon the recommendations of Town Staff, the Planning Commission, and the record as a whole, that the proposed amendments are consistent with the General Plan, will not have a deleterious effect on the Town, makes improvements to the LDO, and are in the best interest of the Town.

NOW, THEREFORE, BE IT ORDAINED by the Board of Mayor and Aldermen of the Town of Thompson's Station, Tennessee, as follows:

- **Section 1.** That the Town of Thompson's Station's Land Development Ordinance is hereby amended by adopting the changes as set out in Exhibit A attached hereto and incorporated herein by reference. After final passage, Town Staff is directed to incorporate these changes into an updated, codified Land Development Ordinance document with the date of BOMA approval and said document shall constitute the Zoning Ordinance and Subdivisions Regulations of the Town.
- **Section 2.** If any section or part of the Land Development Ordinance, including any amendments thereto, is determined to be invalid for any reason, such section or part shall be deemed to be a separate and independent provision. All other sections or parts shall remain in full force and effect. If any section or part of the Land Development Ordinance is invalid in one or more of its applications, that section or part shall remain in effect for all other valid applications.
- **Section 3.** This ordinance shall take effect immediately upon the publication of its caption in a newspaper of general circulation after final reading by the Board of Mayor and Aldermen, the public welfare requiring it.

* **	of Mayor and Aldermen of the Town of Thompson's Station,
Tennessee, on the day of, 2021.	
ATTEST:	Corey Napier, Mayor
Regina Fowler, Town Recorder	
Passed First Reading:	
Passed Second Reading:	
Submitted to Public Hearing on the, 2021.	, at 7:00 p.m., after being advertised in the Williamson AM
Recommended for approval by the Planning Commis	ssion on, 2021.
APPROVED AS TO FORM AND LEGALITY:	Town Attorney

EXHIBIT "A"

Words noted with a strikethrough are to be deleted and words in red text includes new language to be added.

Appendix C

PLAT CERTIFICATES

Certificate for Addresses

I do hereby certify that the addresses denoted on this final plat are those assigned by Department of Information Technology (IT) Williamson County E-911.

Date IT Department, Title Williamson County E-911 Department, Title

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 number____, page__, R.O.W.C. 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 utilities have been filed as required by these regulations. I (we) do further certify that the recording of this plat is an irrevocable offer of dedication to the Town (or applicable Utility), subject to the Town's approval and acceptance per the Town's Land Development Ordinance, for all public streets, utilities, and other public improvements.

Date Owner, Title

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 Emergency Communications Agency.

Date Department, Title

Certification of the Approval of Streets

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 Land Development Ordinance, or (2) that a surety bond approved by the Planning Commission has been posted, per the Land Development Ordinance, with the Planning Commission Town to assure completion of all required improvements in case of default.

Date Town Engineer

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 Municipal Planning Commission and that the monuments have been or will be placed as shown here on to the specifications of the subdivision regulations Land Development Ordinance as approved by the Town Engineer. This is a Category__survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon.

Date Registered Land Surveyor

<u>Certificate of Approval for Recording</u>

I hereby certify that the subdivision plat shown hereon has been found to comply with the Thompson's Station Subdivision Regulations Land Development Ordinance with the exception of such variances approved deviations, 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 Secretary, Planning Commission

Certificate of Approval of Utility Systems

Hhereby certify that The following utility systems outlined or indicated on the plan shown hereon have been either installed in conformity accordance with current local and/or state government requirements or that a surety bond has been posted with the Planning Commission Town to assure completion of all required improvements in case of default. Also, I certify that Upon information and review, the hydraulic design criteria specified in Section 3–106 of the Thompson's Station Subdivision Regulations have been met. Any approval is at all times contingent upon continuing compliance with the aforementioned requirements.

Water System

Date Name, Title, and Agency of Authorized Approving Agent

Sewer System

Date Town Engineer or Name, Title, and Agency of Authorized Approving Agent

Certificate of Approval of Middle Tennessee Electric Membership Corporation

I 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 MTEMC. Any approval is at all times contingent upon continuing compliance with the aforementioned requirements.

Date Name, Title, and Agency of Authorized Approving Agent

Middle Tennessee Electric Membership Corporation (MTEMC) will provide electric service to the subject property according to the normal operating practices of MTEMC as defined in the rules and regulations, bylaws, policy bulletins and operational bulletins of MTEMC, and in accordance with the plat approval checklist, tree planting guidelines and other regulations contained on the MTEMC website at www.mtemc.com (collectively the "Requirements"). No electric service will be provided until MTEMC's Requirements have been met and approved in writing by an authorized representative of MTEMC. Any approval is, at all times, contingent upon continuing compliance with MTEMC's Requirements.

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

THOMPSON'S STATION BOND ACTION FORM

BOND	Littlebury Section 1 Sewer Performance Surety <u>Amount</u> : \$838,000
ACTION REQUEST	Reduce Performance Bond established 1-26-21
PLANNING COMMISSON ACTION	Reduce the Performance Bond and extend for until April 23, 2022.
PUBLIC IMPROVEMENT ACTION	Reduce the Performance Bond to \$125,700 and extend for until April 23, 2022.
BOMA ACTION	N/A

Bond History

On January 26, 2021, Section 1 was approved for the creation of single-family lots within Littlebury. The plat was approved with a surety for sewer in the amount of \$838,000.

The applicant's form indicates that this public improvement has been designed and installed per the approved construction plans and Town standards for a reduction.

Staff Recommends the Planning Commission:

Reduce the Performance Surety to \$125,700 and extend for until April 23, 2022.

