Technical Planning Report for Interchange Improvements

Watt Road at I-40/75

February 2022

TN TDOT Department of Transportation

Executive Summary

The Tennessee Department of Transportation (TDOT), in collaboration with the Knoxville Regional Transportation Planning Organization (TPO), initiated a study of interchange improvements of the Interstate 40/75 at Watt Road interchange (Exit 369) in Knox County, Tennessee, as a result of the analysis performed on the I-40/81 Multimodal Corridor Study. The I-40/I-75 at Watt Road interchange is located in western Knox County and as shown in Figure ES-1, is situated between the I-40/75 system interchange and Campbell Station Road (Exit 373) interchange. Two (2) truck weigh stations (one in each direction) are located between the Watt Road and Campbell Station Road interchanges.

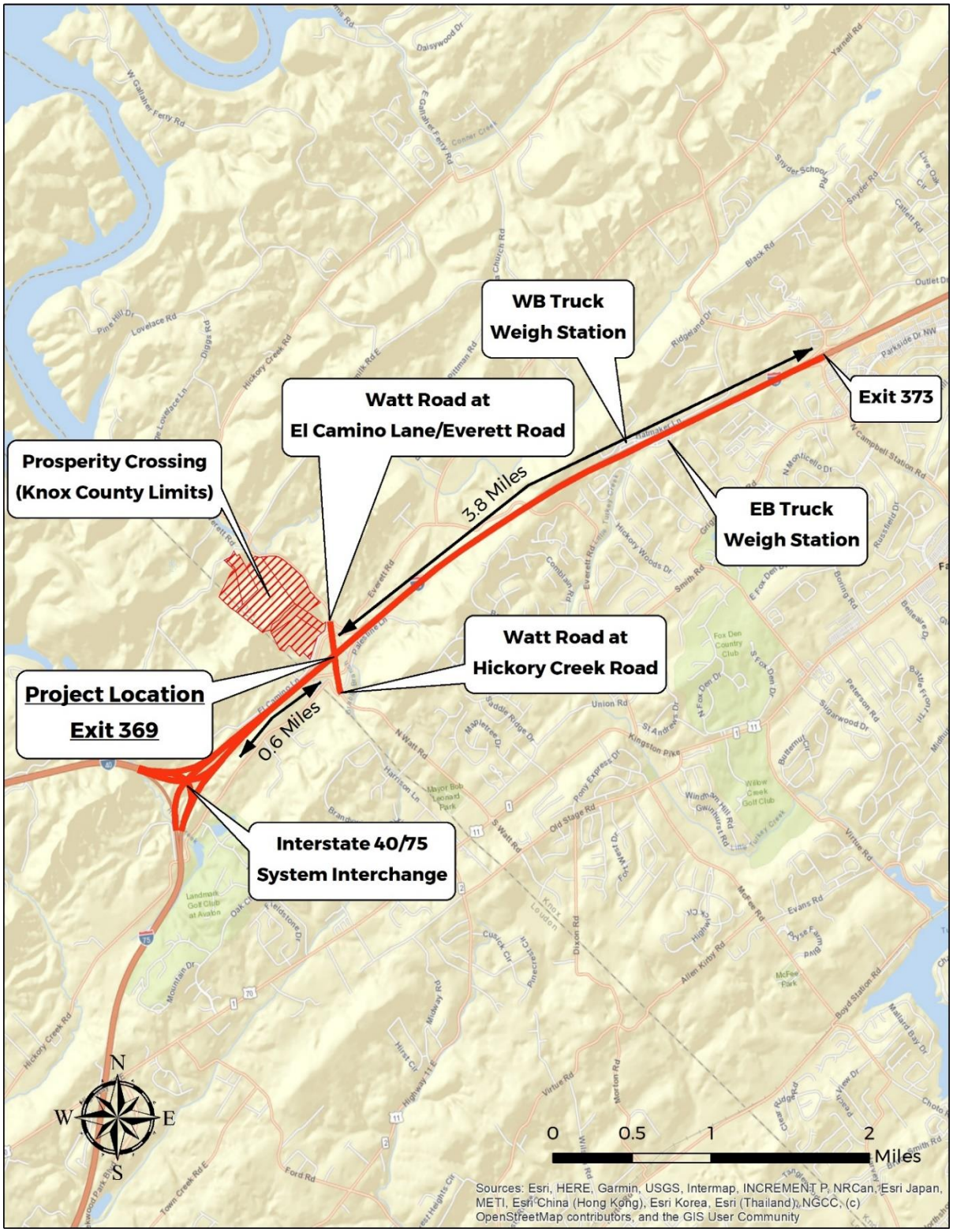
The purpose of proposed interchange improvements is to accommodate future traffic demands and relieve anticipated capacity deficiencies at the subject interchange. The Watt Road interchange is positioned approximately 0.6 mile from the I-40/75 system interchange (to the west) and approximately two miles from two (2) truck weigh stations (to the east) and is home to several large-scale gas stations with truck parking facilities. Therefore, the subject interchange attracts heavy volumes of freight traffic due to its location, land use composition, and presence of truck-oriented amenities. Furthermore, a large mixed-use commercial development (i.e. Prosperity Crossing) is proposed at the northwest quadrant of the interchange. Prosperity Crossing will encompass approximately 260 acres and include a variety of businesses such as restaurants, hotels, sports facilities, residential living facilities, entertainment venues, etc. The development of Prosperity Crossing is expected to alter passenger and freight traffic volumes and patterns in and around the Knox/Loudon County line.

Three (3) options were further evaluated in developing potential alternatives for the interchange: No-Build, Build Alternative 1 [Single Point Urban Interchange (SPUI)], and Build Alternative 2 (maintain existing diamond configuration while adding lanes to the ramps, bridge, and along Watt Road within the study limits). Interstate improvements were also evaluated as part of the subject interchange study, which included widening the interstate mainlines from the I-40/75 system interchange to Lovell Road (SR-131)[1] and adding an auxiliary in each direction from Campbell Station Road to Lovell Road (SR-131).

The estimated cost of Build Alternative 1 is approximately $48,900,000, which includes right-of-way and utility expenditures. The estimated cost of Build Alternative 2 is approximately $41,600,000 and also includes costs associated with right-of-way and utilities. The total estimated cost for interstate improvements, which includes adding a lane in each direction as well as an auxiliary lane in each direction from Exit 373 to Exit 374 is $79,000,000. Figures ES-2, ES-3, ES-4, and ES-5 outline these total costs in 2021 dollars and are broken down into preliminary engineering, ROW, utilities, and construction phases. Additionally, inflated estimates for the opening and future years (i.e. 2025 and 2045) are provided which utilize a 5% inflation factor.

[1] Identified as a recommended improvement project within the I-40/81 Multimodal Corridor Study.

Figure ES-1. Location Map



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Build Alternative 1

Figure ES-2. Build Alternative 1 Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
0.00	Modify Interchange	$ 2,910,000	$ 1,570,000	$ 1,380,000	$ 43,000,000	$ 48,900,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
3	2025	$ 3,370,000	$ 1,820,000	$ 1,600,000	$ 49,800,000	$ 56,600,000
23	2045	$ 8,940,000	$ 4,820,000	$ 4,240,000	$ 132,000,000	$ 150,000,000

Build Alternative 2

Figure ES-3. Build Alternative 2 Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Modify Interchange	$ 2,620,000	$ 1,610,000	$ 1,380,000	$ 36,000,000	$ 41,600,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 3,030,000	$ 1,860,000	$ 1,600,000	$ 41,700,000	$ 48,200,000
23	2045	$ 8,050,000	$ 4,950,000	$ 4,240,000	$ 111,000,000	$ 128,000,000

Interstate Improvements

Figure ES-4. 8 Lane Widening Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Widen	$ 3,540,000	$ -	$ -	$ 64,900,000	$ 68,400,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 4,100,000	$ -	$ -	$ 75,100,000	$ 79,200,000
23	2045	$ 10,900,000	$ -	$ -	$ 199,000,000	$ 210,000,000

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Figure ES-5. Auxiliary Lanes Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Widen	$ 960,000	$ -	$ -	$ 9,600,000	$ 10,600,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 1,110,000	$ -	$ -	$ 11,100,000	$ 12,300,000
23	2045	$ 2,950,000	$ -	$ -	$ 29,500,000	$ 32,600,000

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1.0 Introduction

The Tennessee Department of Transportation (TDOT), in collaboration with the Knoxville Regional Transportation Planning Organization (TPO), initiated a study of interchange improvements of the Interstate 40/75 at Watt Road interchange (Exit 369) in Knox County, Tennessee, as a result of the analysis performed on the I-40/81 Multimodal Corridor Study. The purpose of proposed interchange improvements is to accommodate future traffic demands and relieve anticipated capacity deficiencies at the subject interchange. In addition to being noted as a potential interchange improvements project within the *Multimodal Solutions Technical Memorandum*[2], the subject project is also listed in the region's long-range transportation plan with a 2026 horizon year (*Mobility Plan 2045, KRMP ID 09-651*).

1.1 Study Background

The subject interchange falls within the corridor limits of the I-40/81 Multimodal Corridor Study[3] and was evaluated as part this statewide study. Currently underway, the statewide study identified the Watt Road interchange as a potential interchange improvement candidate, with the improvement description noted as "reconfigure interchange to reduce weaving movements and capacity issues[4]." The Watt Road interchange is positioned approximately 0.6 mile from the I-40/75 system interchange (to the west) and approximately two miles from two (2) truck weigh stations (to the east) and is home to several large-scale gas stations with truck parking facilities. Therefore, the subject interchange attracts heavy volumes of freight traffic due to its location, land use composition, and presence of truck-oriented amenities.

Furthermore, a large mixed-use commercial development (i.e. Prosperity Crossing) is proposed at the northwest quadrant of the interchange. Prosperity Crossing will encompass approximately 260 acres and include a variety of businesses such as restaurants, hotels, sports facilities, residential living facilities, entertainment venues, etc. Although the exact date of its opening is still unknown, most recently the Knoxville-Knox County Planning Commission approved a concept plan (contingent on specific variances and conditions) for the Prosperity Crossing development. The development of Prosperity Crossing is expected to alter passenger and freight traffic volumes and patterns in and around the Knox/Loudon County line.

The subject study was initiated through an extension of the ongoing efforts and work associated with the I-40/81 Multimodal Corridor Study and to further identify improvements and solutions to the Watt Road interchange.

1.2 Project Location

As shown in Figure 1, the I-40/I-75 at Watt Road interchange (Exit 369) is in far western Knox County, immediately west of the Town of Farragut. As shown in Figure 2, the Watt

[2] https://www.tn.gov/content/dam/tn/tdot/long-range-planning/studies/i-40-81-study/I-40-81-Multimodal-Solutions-Memo.pdf
[3] https://www.tn.gov/content/tn/tdot/government/g/planning-studies/i-40-81-multimodal-corridor-study/map.html
[4] Multimodal Solutions Technical Memorandum, p 10, https://www.tn.gov/content/dam/tn/tdot/long-range-planning/studies/i-40-81-study/I-40-81-Multimodal-Solutions-Memo.pdf

Road interchange is located between the I-40/75 system interchange and Campbell Station Road (Exit 373) interchange. Two (2) truck weigh stations (one in each direction) are located between the Watt Road interchange and Campbell Station Road interchange. Table 1 below lists the distances to adjacent interchanges/ramps. The study area also extends north and south along Watt Road – north to the intersection with El Camino Lane/Everett Road and south to near Hickory Creek Road.

Table 1. Distance to Adjacent Interchanges

Interchange/Ramp	I-40/I-75 Exit Number or MM	Direction from Watt Road	Distance from Watt Road (Miles)
I-40/75 Junction	368	West	0.6
Watt Road	369	N/A	0
I-40/I-75 WB Weigh Station	371.4	East	2.3
I-40/I-75 EB Weigh Station	371.6	East	2.3
Campbell Station Road	373	East	3.8

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Figure 1. Vicinity Map

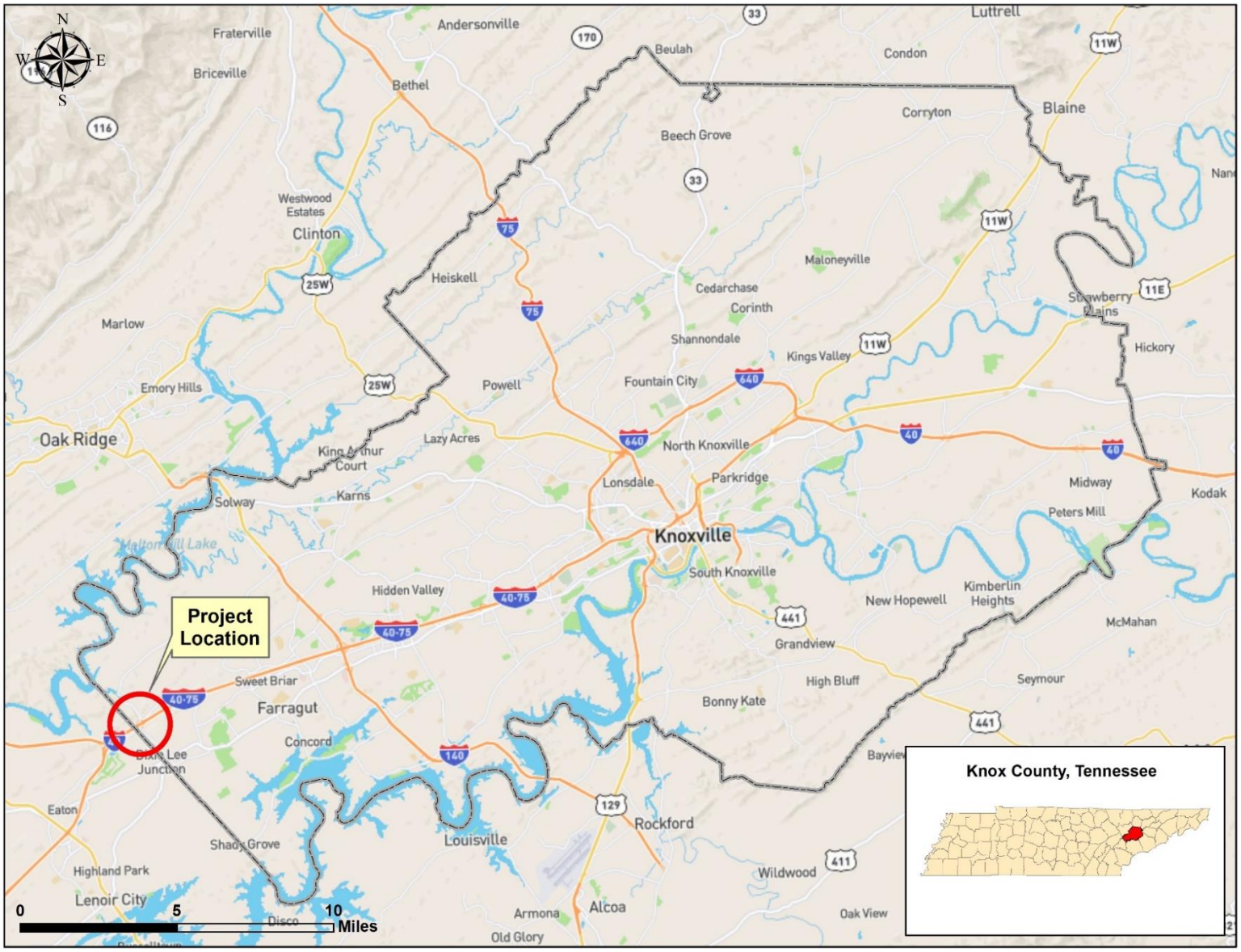
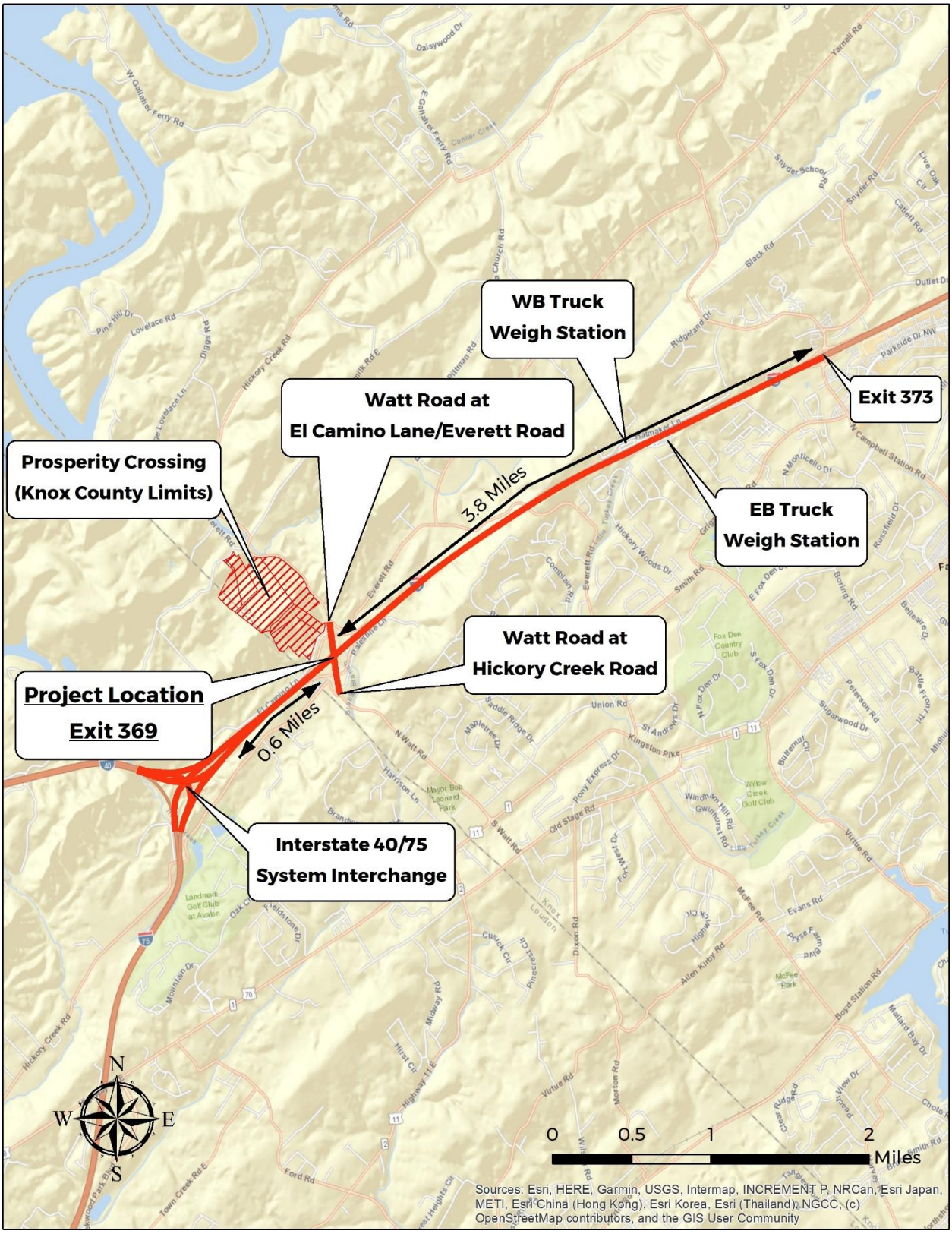


Figure 2. Study Area Map



1.3 Purpose and Need

The preliminary purpose of proposed interchange improvements is to improve current and future traffic operations. The subject interchange attracts a large volume of freight traffic based on its location near the merge of two (2) major interstate systems to the west, i.e. Interstates 40 and 75, and two (2) heavily utilized truck weigh stations to the east. As outlined in TDOT's Tennessee Statewide Multimodal Freight Plan[5], truck trip origins and destinations in the Knoxville region are centered along I-40 and, in particular, around the I-40/75 merge. As identified within the I-40/81 Multimodal Corridor Study, it is recommended to widen the interstate within the study limits from six (6) to eight (8) lanes total. This subject widening will further impact operations of the existing Watt Road interchange. The identified need to be addressed via improvements includes traffic operational deficiencies.

Population and economic activity within the study are projected to gradually increase moving forward. With the recent concept plan approval of Prosperity Crossing, the proposed development will heavily impact the subject interchange by increasing traffic volumes and patterns. Furthermore, the subject interchange directly connects to Knox County's fastest growing community – the Hardin Valley area – to the north, which is likely to further deteriorate the subject interchange. Overall, growth is projected to continue within the study area and further increase congestion in the transportation network. The proposed improvements will improve operations and stimulate economic development at the subject interchange and surrounding area.

[5] p. 2-18, https://www.tn.gov/content/dam/tn/tdot/freight-and-logistics/TDOT_FreightPlan_AMENDED_05212021.pdf

2.0 Existing Conditions

2.1 Land Use and Zoning

Existing land use types vary within the study area, as outlined within Figure 3. Commercial (CO) is the predominant land use type along Watt Road within the study boundaries (i.e. from El Camino Lane/Everett Road to Hickory Creek Road) – with the exception of the large parcels located at the northwest quadrant of the subject interchange which are Agriculture/Forestry/Vacant land (AgForVac), and the large parcel on the northeast side of the interchange which is Mining and Landfills. (Prosperity Crossing – a large mixed-use, regional commercial development is proposed at the AgForVac land. More information on this development is outlined in Section 3.2 Planned Development.) Existing commercial properties along Watt Road include multiple service stations geared towards truck traffic such as Flying J Travel Center, Shell, Petro, and TA Travel Center. Along I-40 east of the interchange, the area is characterized by CO land use (north of the interstate) and Transportation/ Communications/Utilities (TCU), Industrial (Manufacturing) (IND), and AgForVac (south of the interstate). AgForVac encompasses the area along I-40 west of the interchange within the boundaries of Loudon County.

The majority of existing zoning within the study area is Business and Manufacturing Zone (CB), as shown in Figure 4. CB denotes an area/zone intended for a wide range of business and manufacturing uses.

Figure 3. Existing Land Use Surrounding Study Area

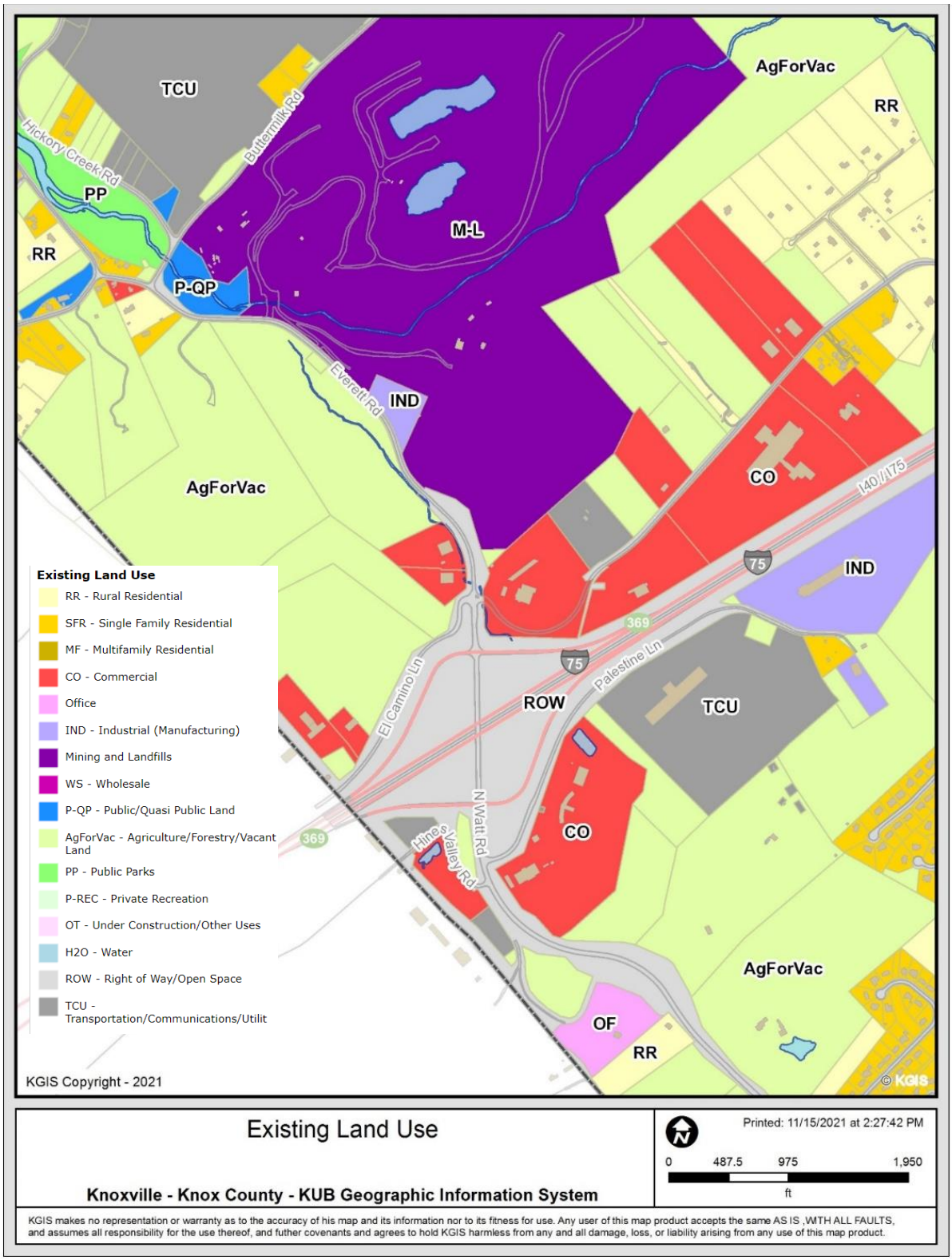
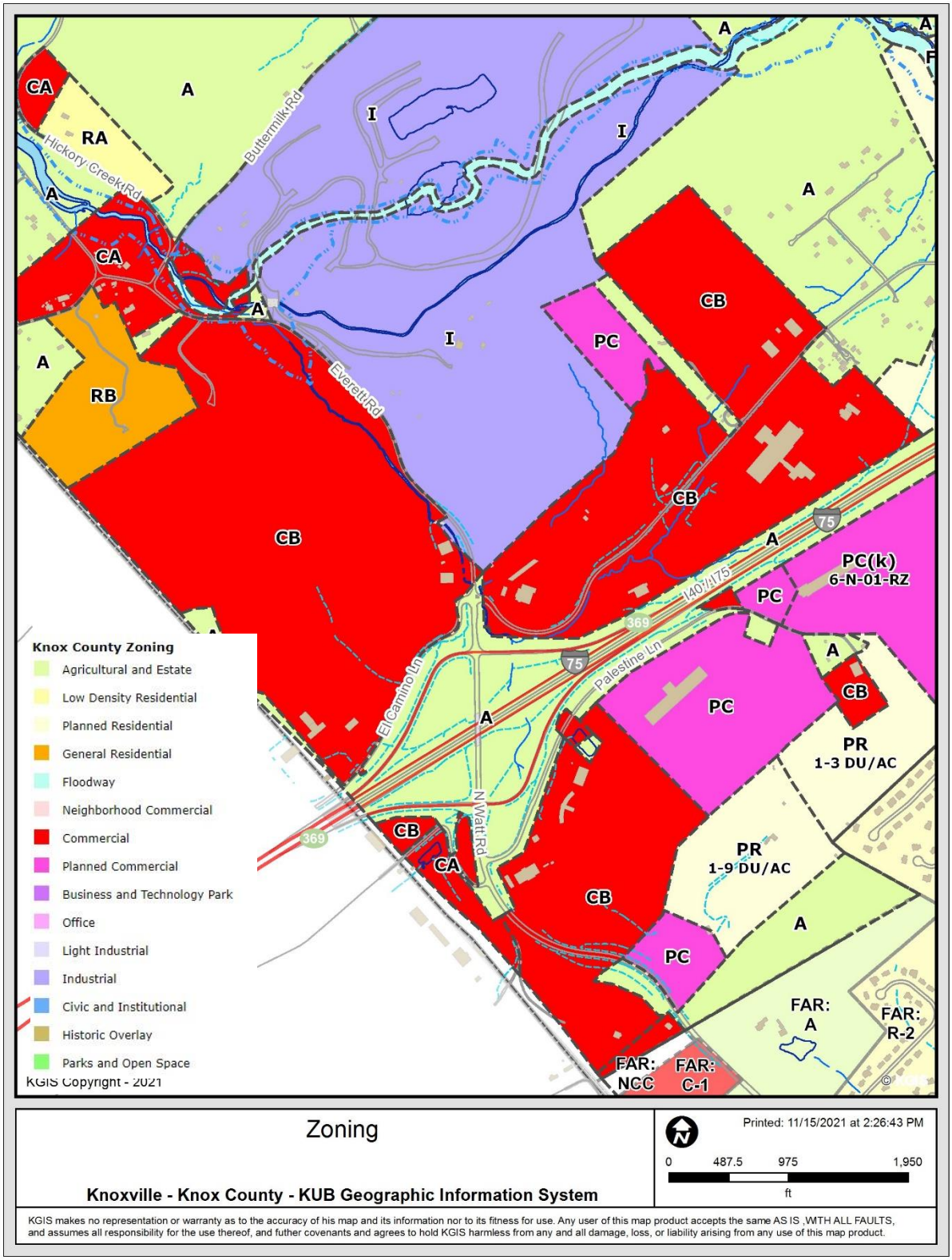


Figure 4. Existing Zoning Surrounding Study Area



2.2 Roadway Network

2.2.1 Interstate 40/75

Just east of the system interchange (as shown in Figure 2), I-40/75 is composed of four (4) lanes in each direction with a large grassy median which tapers down to a median barrier wall near the Watt Road interchange. Immediately west of the system interchange, two (2) lanes head west to continue on as I-40 westbound and two (2) lanes head south to continue on as I-75 southbound. At this location along I-40/75 eastbound at the merge, two (2) lanes from I-40 eastbound merge with two (2) lanes from I-75 northbound. In the eastbound direction, the outside, fourth lane drops just east of the Watt Road exit ramp.

East of the Watt Road interchange, I-40/75 is a six (6)-lane barrier divided interstate with three (3) lanes in each direction. (A center concrete median barrier separates the directions of travel.) I-40/75 travel lanes are twelve (12) feet wide. The inside (median) shoulders are ten (10) feet wide; the outside shoulders are sixteen (16) feet wide. The posted speed limit is 65 mph.

2.2.2 Watt Road

Within the study area (as shown in Figure 2), Watt Road extends from Hickory Creek Road (to the south of the interchange), through the I-40/Watt Road interchange, and terminates at El Camino Lane/Everett Road to the north. Watt Road is categorized as an urban major collector north of the existing bridge and an urban minor arterial south of the existing bridge.

Within the limits of the eastbound and westbound ramps, Watt Road consists of a three (3) lane facility with two twelve (12) foot travel lanes in each direction, a twelve (12) foot two-way left turn lane (TWLTL), and ten (10) foot outside shoulders – see Figure 5 below. South of the eastbound interchange ramps, Watt Road consists of a three (3) lane facility with two twelve (12) foot southbound travel lanes and a twelve (12) foot northbound travel lane with ten (10) foot outside shoulders plus a dedicated right turn lane for the eastbound on-ramp – see Figure 6 below. North of the westbound interchange ramps, Watt Road consists of a two (2) lane facility with twelve (12) foot travel lanes and ten (10) foot shoulders and a twelve (12) foot right-turn lane onto Everett Road - see Figure 7 below.

Figure 5. Watt Road Looking South – Approaching Existing Bridge

Figure 6. Watt Road Looking North – South of Interchange

Figure 7. Looking South from Everett Road - Just North of Interchange

2.2.3 I-40/Watt Road Interchange

The I-40/Watt Road interchange is classified as a diamond interchange. Both eastbound and westbound ramps are signalized at Watt Road. All ramps consist of one (1) lane. There are no dedicated multimodal facilities within the interchange.

As shown in Figure 8, the intersection of the I-40 westbound ramps with Watt Road creates a signalized, four (4)-leg intersection. The westbound entrance ramp is a sixteen (16) foot, single lane ramp which widens to two (2) twelve (12) foot lanes at the traffic signal. One (1) lane turns left to travel southbound on Watt Road; the other lane turns right to travel northbound on Watt Road. In the southbound direction travelling towards the signalized ramp, Watt Road is composed of one (1) twelve (12) foot thru lane and one (1) dedicated right-turn lane to access the westbound entrance ramp. In the northbound direction travelling towards the signalized ramp, Watt Road is comprised of two (2) twelve (12) foot lanes. The outside lane is a thru lane; the inside lane is a left-turn lane to access the westbound entrance ramp.

Figure 8. I-40 Westbound Ramps at Watt Road

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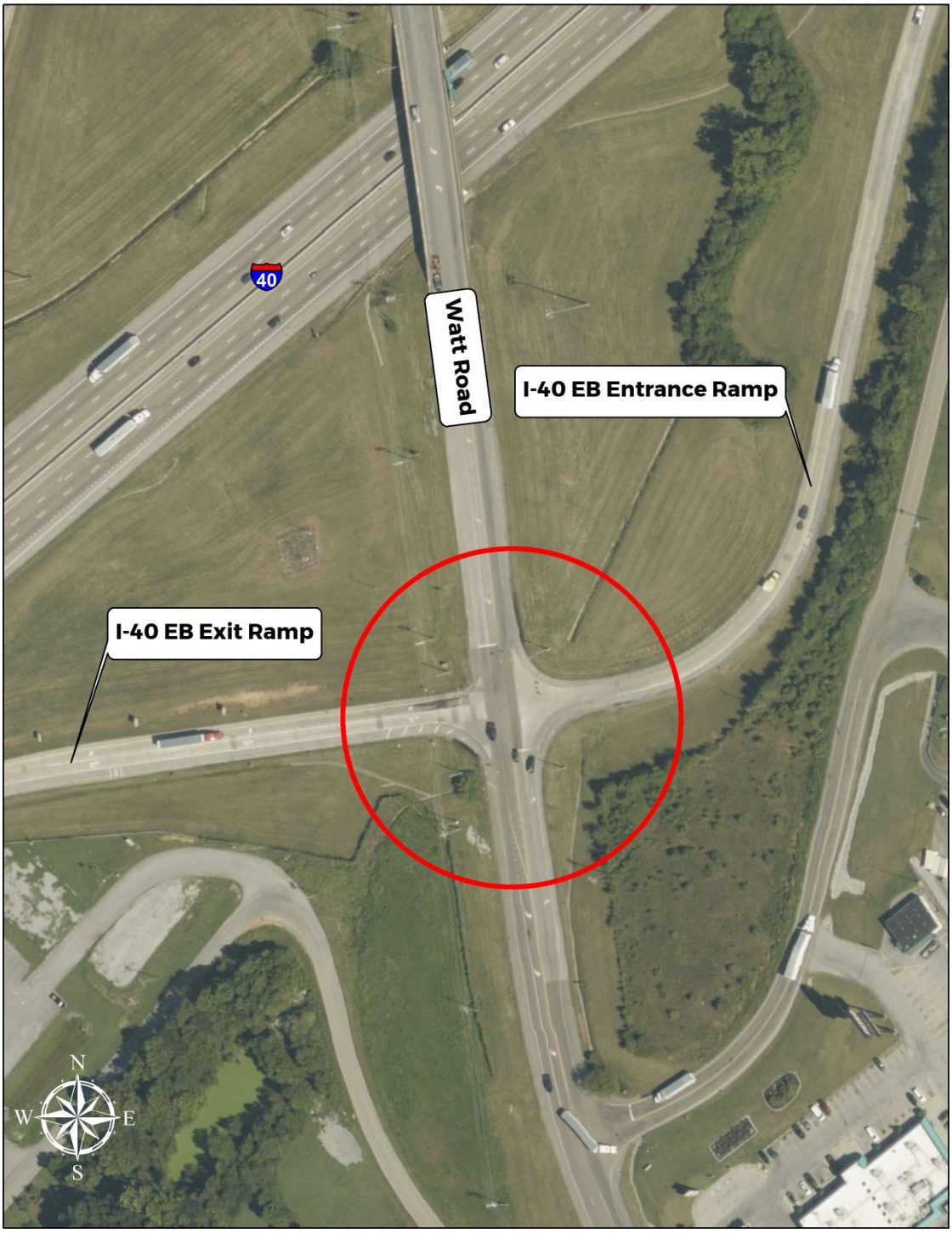
As shown in Figure 9, the intersection of the I-40 eastbound ramps with Watt Road creates a signalized, four (4)-leg intersection. The eastbound entrance ramp is a sixteen (16) foot, single lane ramp which widens to two (2) twelve (12) foot lanes at the traffic signal. One (1) lane turns left to travel northbound on Watt Road; the other lane turns right to travel southbound on Watt Road. In the southbound direction travelling towards the signalized ramp, Watt Road is composed of two (2) twelve (12) foot lanes. The outside lane is a thru lane; the inside lane is a left-turn lane to access the eastbound entrance ramp. In the northbound direction travelling towards the signalized ramp, Watt Road is comprised of one (1) twelve (12) foot thru lane and a dedicated right turn lane to access the eastbound entrance ramp.

Figure 9. I-40 Eastbound Ramps at Watt Road



2.3 Existing Structure

The Watt Road bridge (bridge ID 47I00400001) over I-40/75 is a four (4) span concrete continuous bridge. It was built in 1965, was rehabbed in 1976, and was most recently inspected on October 5, 2020. (Figure 10 is the most recent Inventory and Appraisal Report). As shown in Figure 10, the bridge received a sufficiency rating of 100.0. (Usually, bridges with a sufficiency rating of 50 or below are considered for replacements; whereas bridges with a sufficiency rating between 50 and 80 are considered for rehabilitation.)

Furthermore, Table 2 outlines the existing bridge condition. As outlined on TDOT's Structures Division webpage[7], if the lowest rating is greater than or equal to 7 then the bridge is classified as Good (G). If it is rated 5 or 6, the bridge is classified as Fair (F). If it is less than or equal to 4, the classification is Poor (P). The most recent inspection did not result in any type of recommended improvements to the existing structure.

Table 2. Bridge Condition Ratings

Bridge Component	Rating
Deck	7
Superstructure	7
Substructure	6
Stream Channel & Channel Protection	N
Culvert Condition (if applicable)	N

[7] https://www.tn.gov/tdot/structures-/tennessee-bridge-facts.html

Figure 10. Bridge Inventory and Appraisal Report

NATIONAL BRIDGE INVENTORY
TENNESSEE INVENTORY AND APPRAISAL REPORT

TN TDOT DEPARTMENT OF TRANSPORTATION

BRIDGE ID NUMBER: **47I00400001**
BRIDGE OWNER: **STATE OF TENNESSEE**
FIPS CODE: **00000**
ROAD NAME: **WATT RD.**
CROSSING: **WATT ROAD / I40**
LOCATION: **ON THE KNOX-LOUDON CO LN**

COUNTY: **KNOX**
ROUTE: **01248**
SPECIAL CASE: **0**
COUNTY SEQUENCE: **1**
LOG MILE: **1.76**
SUFFICIENCY RATING: **100.0**

IDENTIFICATION

(16a,b) LATITUDE:	N	35.87788	DEGREES
(17a,b) LONGITUDE:	W	84.23728	DEGREES
(98a) BORDER BRIDGE STATE CODE:			N/A
(98b) PERCENT SHARE:			N/A
(99) BORDER BRIDGE NUMBER:			NOT APPLICABLE

BRIDGE TYPE AND MATERIAL

(43a) MAIN SPAN MATERIAL: **CONCRETE CONTINUOUS**
(44a) APPR SPAN MATERIAL: **NOT APPLICABLE**

(45) NUMBER OF MAIN SPANS: **4**
(46) NUMBER OF APPROACH SPANS: **0**
(107) TYPE OF DECK: **CONCRETE CAST-IN-PLACE**
(108) TYPE OF WEARING SURFACE AND DECK PROTECTION:
A) TYPE OF SURFACE: **ASPHALT**
B) TYPE MEMBRANE: **NONE**
C) TYPE PROTECTION: **NONE**

AGE AND SERVICE

(27) YEAR THE BRIDGE WAS BUILT: **1965**
(106) YEAR THE BRIDGE WAS REHABILITATED: **1976**
(42a) SERVICE ON BRIDGE: **HIGHWAY**
(42b) UNDER BRIDGE: **HIGHWAY**
(28a) NUMBER OF LANES CARRIED BY BRIDGE: **2**
(28b) NUMBER OF LANES UNDER THE BRIDGE: **6**

GEOMETRIC DATA

(48) MAXIMUM SPAN LENGTH: **76.1 FT**
(49) TOTAL BRIDGE LENGTH: **259.8 FT**
(50a) LEFT SIDEWALK WIDTH: **0.0 FT**
(50b) RIGHT SIDEWALK WIDTH: **0.0 FT**
(51) BRIDGE CURB TO CURB WIDTH: **47.9 FT**
(52) BRIDGE OUT TO OUT WIDTH: **49.9 FT**
(32) APPROACH ROADWAY (W/ SHLDS) WIDTH: **44.0 FT**
(33) BRIDGE MEDIAN: **NO MEDIAN**
(34) BRIDGE SKEW: **0 DEGREES**
(35) BRIDGE FLARE: **NO FLARE**
(520) MIN VERTICAL CLEARANCE OVER RD: **NO RESTRICTION**
(47) MIN HORIZONTAL CLEARANCE ON ROADWAY: **47.9 FT**
(54a) VERT UNDERCLR: **HIGHWAY BENEATH BRIDGE**
(54b) MIN VERTICAL UNDERCLEARANCE: **16.93 FT**
(55a) HORZ UNDERCLR: **HIGHWAY BENEATH BRIDGE**
(55b) MIN HORZ UNDERCLR ON RIGHT: **12.14 FT**
(56) MIN HORZ UNDERCLR ON LEFT: **7.87 FT**

NAVIGATION DATA

(38) NAV CONTROL: **NO NAVIGATION CONTROL**
(39) NAVIGATION VERTICAL CLEARANCE: **N/A**
(116) LIFT BRIDGE VERT CLEARANCE: **N/A**
(40) NAVIGATION HORZ CLEARANCE: **N/A**

PUBLICATION DATE
09-Mar-21

CLASSIFICATION

(112) MEETS NBIS BRIDGE LENGTH: **YES**
(104) NATIONAL HIGHWAY SYSTEM: **NOT A NHS ROUTE**
(26) FUNCTIONAL CLASS: **RURAL MINOR COLLECTOR**
(101) PARALLEL BRIDGE: **NO PARALLEL BRIDGE**
(102) TRAFFIC DIR: **2-WAY TRAFFIC**
(103) TEMPORARY BRIDGE: **NOT APPLICABLE**
(110) NATIONAL TRUCK ROUTE: **NOT ON TRUCK NETWORK**
(37) HISTORICAL CLASS: **HISTORICAL SIGNIFICANCE HAS NOT BEEN DETERMINED**

CONDITION RATINGS

(58) DECK: **7**
(59) SUPERSTRUCTURE: **7**
(60) SUBSTRUCTURE: **6**
(61) STREAM CHANNEL AND CHANNEL PROTECTION: **N**
(62) CULVERT CONDITION (IF APPLICABLE): **N**

DESIGN LOAD AND WEIGHT POSTING

(31) DESIGN LOADING: **H-20-44**
WEIGHT POSTING (2 AXLE VEHICLES): **ALL LEGAL LOADS**
WEIGHT POSTING (3 OR MORE AXLES): **ALL LEGAL LOADS**
(70) BRIDGE POSTING CODE: **5**
(41) WT POSTING STATUS: **OPEN**

APPRAISAL

(67) STRUCTURAL EVALUATION: **6**
(68) DECK GEOMETRY: **9**
(69) UNDERCLEARANCE RATING: **6**
(71) WATERWAY ADEQUACY: **N**
(72) APPROACH ROADWAY ALIGNMENT: **8**
(36) TRAFFIC SAFETY FEATURES: **1110**
(113) SCOUR CONDITION RATING: **N**

RECOMMENDED IMPROVEMENTS

(75) TYPE OF WORK: **NOT APPLICABLE**
(76) LENGTH OF BRIDGE IMPROVEMENT: **N/A**
(94) BRIDGE IMPROVEMENT COST:
(95) ROADWAY IMPROVEMENT COST:
(96) TOTAL PROJECT COST:
(97) YEAR OF IMPROVEMENT COST ESTIMATE:

INSPECTION DATES

(90) DATE OF LAST REGULAR INSPECTION: **10/5/2020**
(91) REGULAR INSPECTION FREQUENCY (MONTHS): **24**
(93b) DATE OF LAST UNDERWATER INSP (MO/YR): **N/A**
(92b) UNDERWATER INSP FREQUENCY (MONTHS): **N**
(93c) DATE OF SPECIAL INSPECTION (MO/YR): **N/A**
(92c) SPECIAL INSP FREQUENCY (MONTHS): **N**

PRODUCED PURSUANT TO PUBLIC RECORDS REQUEST
This document is covered by 23 USC §409 and its production pursuant to a public document records request does not waive the provisions of §409

2.4 Preliminary Environmental Constraints

A preliminary desktop review of environmental constraints within the study area was conducted, using publicly available data sources. The findings discussed herein should be considered preliminary and are subject to change and/or clarification after additional studies (including ecological, hazardous, materials, air quality/noise, archaeological, and/or historical) are conducted.

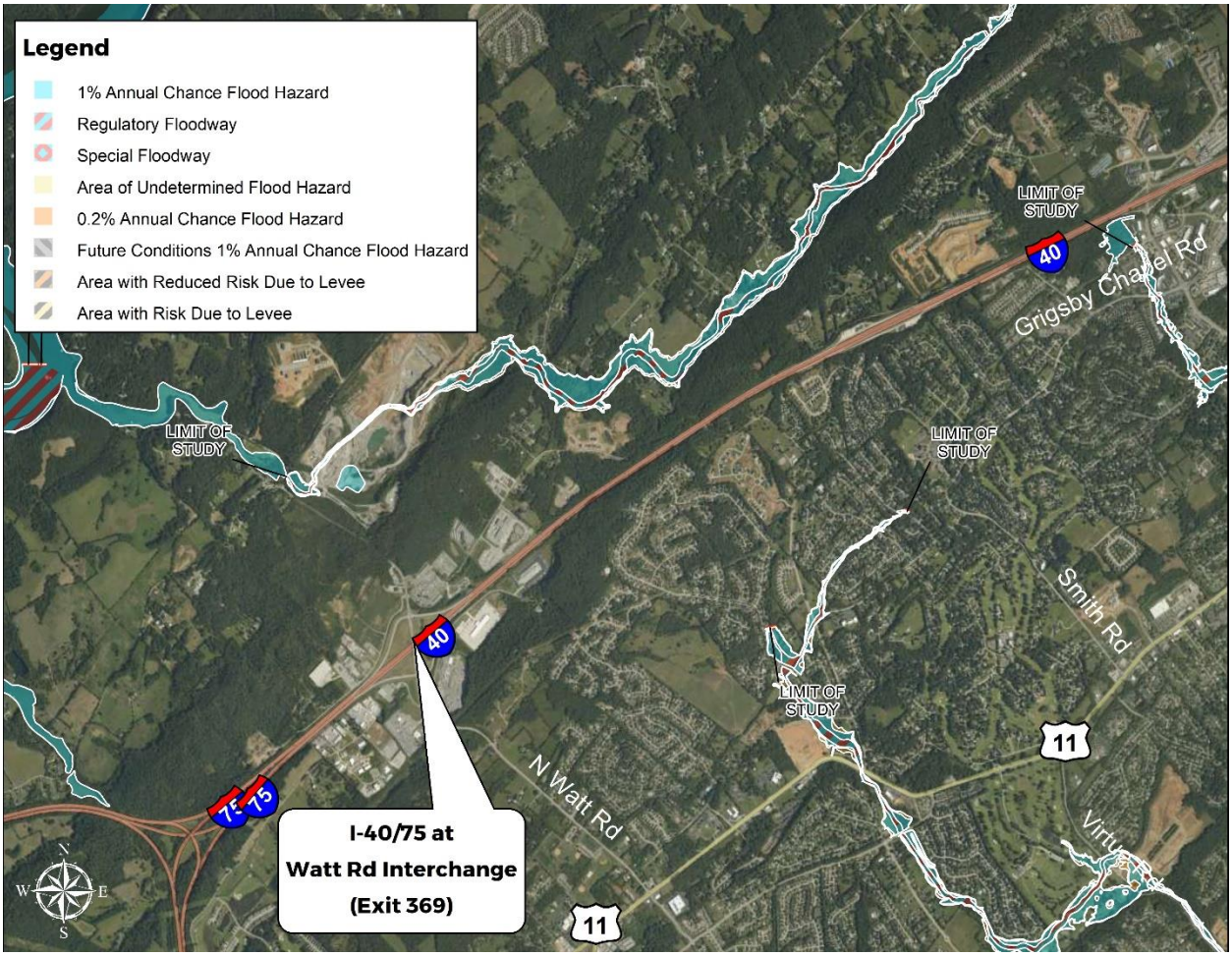
National Ambient Air Quality Standards (NAAQS) are established for six (6) criteria pollutants: particulate matter, ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, and lead. Furthermore, the United States Environmental Protection Agency (EPA) regulates these pollutants by setting maximum limits on exposure levels – which are periodically reviewed. Geographic areas are classified as being in "attainment" or "nonattainment." A geographic area with air quality that meets NAAQS standards is referred to as an attainment area; whereas an area that does not meet NAAQS standards is classified as a non-attainment area. The Knoxville Region (which encompasses the study area) is designated as attainment with a maintenance plan for:

- 2008 8-hour Ozone Standard
- 2006 Particulate Matter 2.5 (PM2.5) Daily Standard

One (1) named stream is present within the study area: Grable Branch. This stream is not identified as Exceptional Tennessee Waters (ETW) and is classified as "not supporting" in the Tennessee Department of Environment and Conservation's (TDEC) draft 2022 List of Impaired and Threatened Waters[8]. The Federal Emergency Management Agency (FEMA) flood map service center platform was utilized to identify flood zones within the study area. FEMA data indicates no floodplains within the study area, as outlined in Figure 11.

[8] https://tdeconline.tn.gov/dwr/

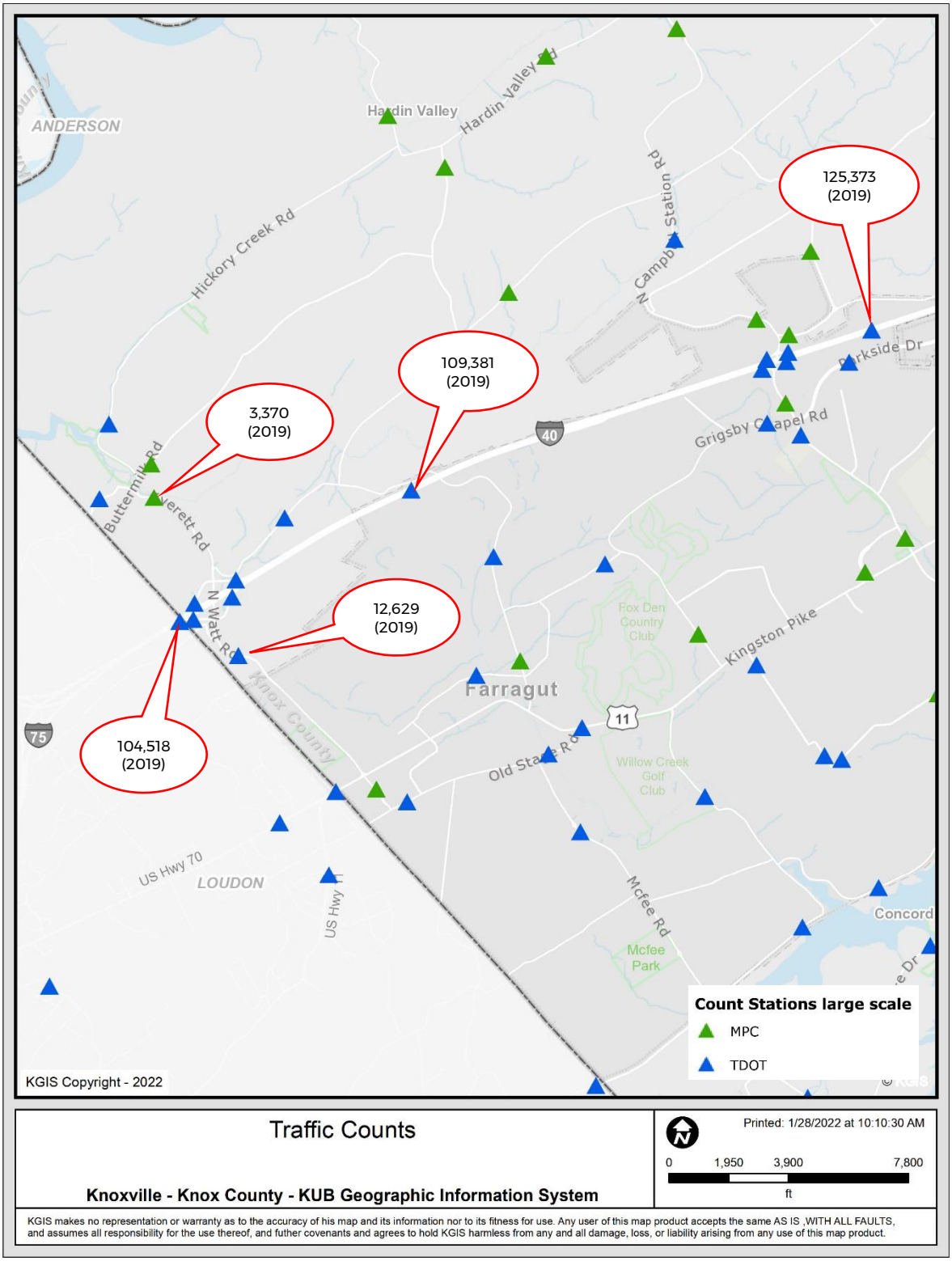
Figure 11. FEMA Flood Data Map



2.5 Existing Traffic

Figure 12 highlights 2019 annual average daily traffic (AADT) along I-40 and Watt Road within the vicinity of the study area. As noted within the figure, data sources include both TDOT and the Knoxville-Knox County Planning Commission. (Although 2020 data is available, it was not reported on this figure due to irregular travel patterns in 2020 from the pandemic.)

Figure 12. Existing AADT



2.6 Crash History

Crash history was reviewed for both Watt Road and I-40 within the study area for the three (3)-year period of 2017, 2018, and 2019. As summarized in Table 3, 48 crashes occurred along Watt Road between El Camino Lane/Everett Road (to the north) and near Hickory Creek Road (to the south). Most crashes were property damage crashes which occurred at the terminal ramps and at intersections along Watt Road.

Table 3. Crash Statistics – Watt Road (Exit 369)

Condition	2017-2019	
	Number of Crashes	Percentage of Total
Lighting Conditions		
Daylight	36	75%
Dark-Not Lighted	5	11%
Dark-Lighted	3	6%
Dark-Unknown Lighting	0	0%
Dusk/Dawn	3	6%
Other/Not Indicated/Unknown	1	2%
Crash Severity		
Property Damage	41	85%
Suspected Minor Injury	7	15%
Suspected Serious Injury	0	0%
Fatal	0	0%
Manner of Collision		
Rear-End	19	40%
Rear to Rear	0	0%
Rear to Side	0	0%
Angle	10	21%
Sideswipe (Same Direction)	11	23%
Sideswipe (Opposite Direction)	3	6%
Head On	0	0%
No Collision	3	6%
Other/Unknown/Unlisted	2	4%
Weather Conditions		
Clear	30	62%
Cloudy	6	13%
Rain	11	23%
Snow/Blowing Snow	0	0%
Fog	0	0%
Not Indicated /Unknown	1	2%

3.0 Future Conditions

3.1 Planned Projects

Including the subject interchange, there are six (6) planned and proposed roadway projects within and near the project's study area, as outlined in Table 4. These projects are noted via TDOT's Interactive Road Improvement Program (iTRIP) platform[9] and/or outlined in the Knoxville Regional Transportation Planning Organization's *Mobility Plan 2045*. (Project sheets from the *Mobility Plan 2045* are located in Appendix A.)

Table 4. LRTP Project Summary

ID	Project Description	Lead Agency	Year
LRTP 09-651	I-40/I-75/Watt Road interchange – reconfigure existing interchange to improve capacity, safety, and operations.	Knox County	2026
TDOT PIN 124480.01	IMPROVE Act Project which entails bridge improvements/modifications to the I-40 westbound structure over I-75 northbound lane/bridge at the I-40/75 system interchange.	TDOT	TBD
TDOT PIN 124480.00[10]	IMPROVE Act Project which includes widening improvements to I-75 from Pond Creek Road to the I-40/75 junction.	TDOT	2025
LRTP 13-603	I-40/75 widening from Campbell Station Road to Lovell Road (SR-131), add auxiliary lane in each direction.	Town of Farragut	2030
LRTP 09-691	I-40/75 widening from I-40/75 junction to Lovell Road (SR-131), from 6 to 8 lanes total.	Town of Farragut	2035
LRTP 09-669	Everett Road improvements, including widening the existing to a 3-lane typical section with bicycle/pedestrian amenities.	Town of Farragut	2045

In addition to the projects noted in Table 4, a study is currently underway to analyze and evaluate potential solutions to Watt Road north of the interchange, from El Camino Lane/Everett Road to near Buttermilk Road[11].

3.2 Planned Development

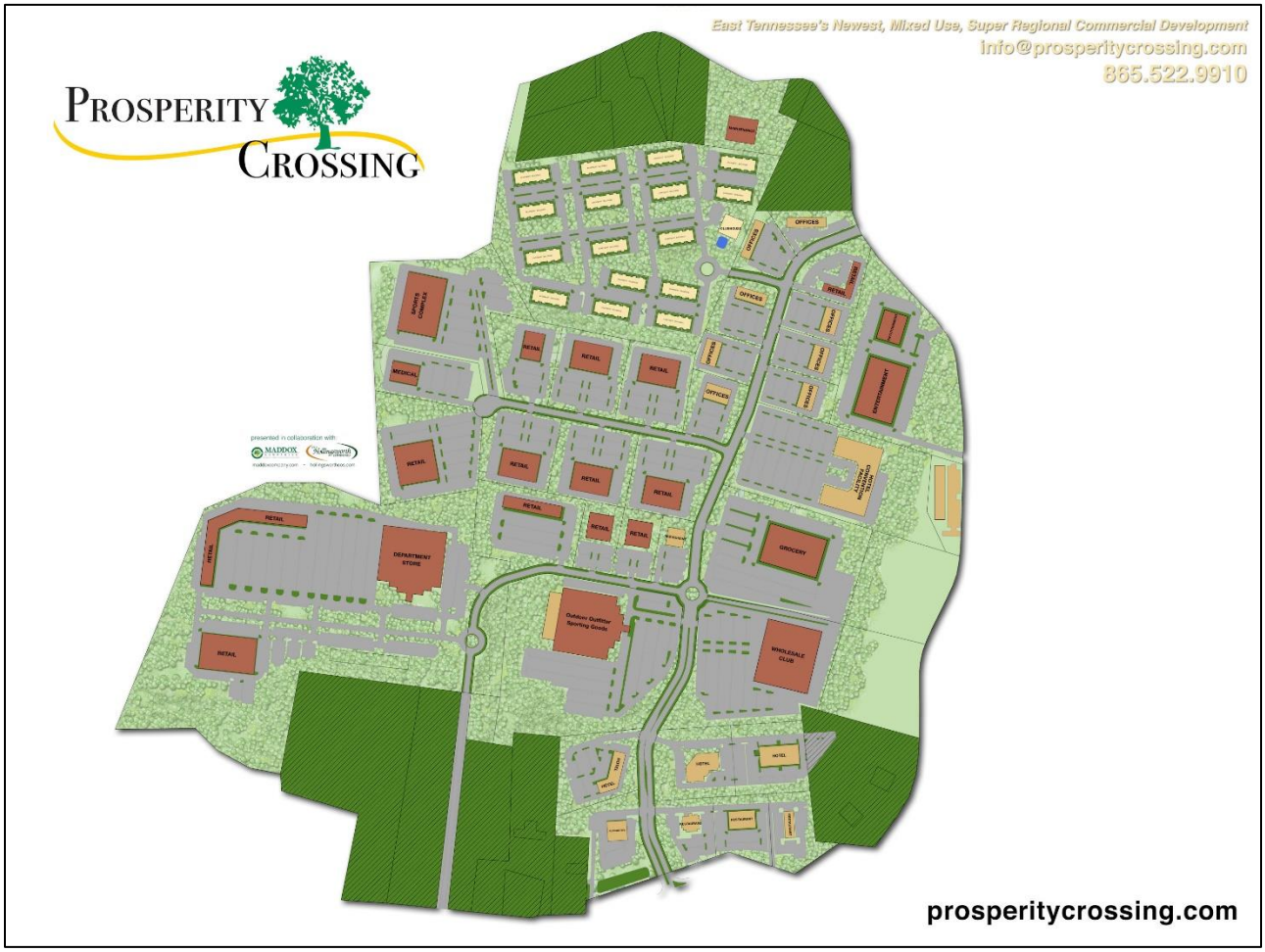
The primary planned development in the study area is a proposed mixed-use development to be located at the northwest quadrant of the subject interchange. Known as Prosperity Crossing, this large commercial development will encompass approximately 260 acres and will include a variety of businesses such as hotels,

[9] https://www.arcgis.com/apps/opsdashboard/index.html#/e14888bce2954050a10df5e949a1bc1d
[10] Also listed in the region's long-range transportation plan with a 2040 horizon year (*Mobility Plan 2045, KRMP ID 21-4001).*
[11] This is also noted on the conceptual layouts in Appendix C. This study is scheduled to be complete in March 2022.

restaurants, retail stores, sports/entertainment venues, and dealerships. Figure 13 shows a general, preliminary rendering of the proposed development. Figure 14 shows the development in relation to the subject interchange.

Most recently, the Knoxville-Knox County Planning Commission approved a concept plan for the development on December 9, 2021. The approval was contingent on specific variances and conditions, as outlined in the case file[12].

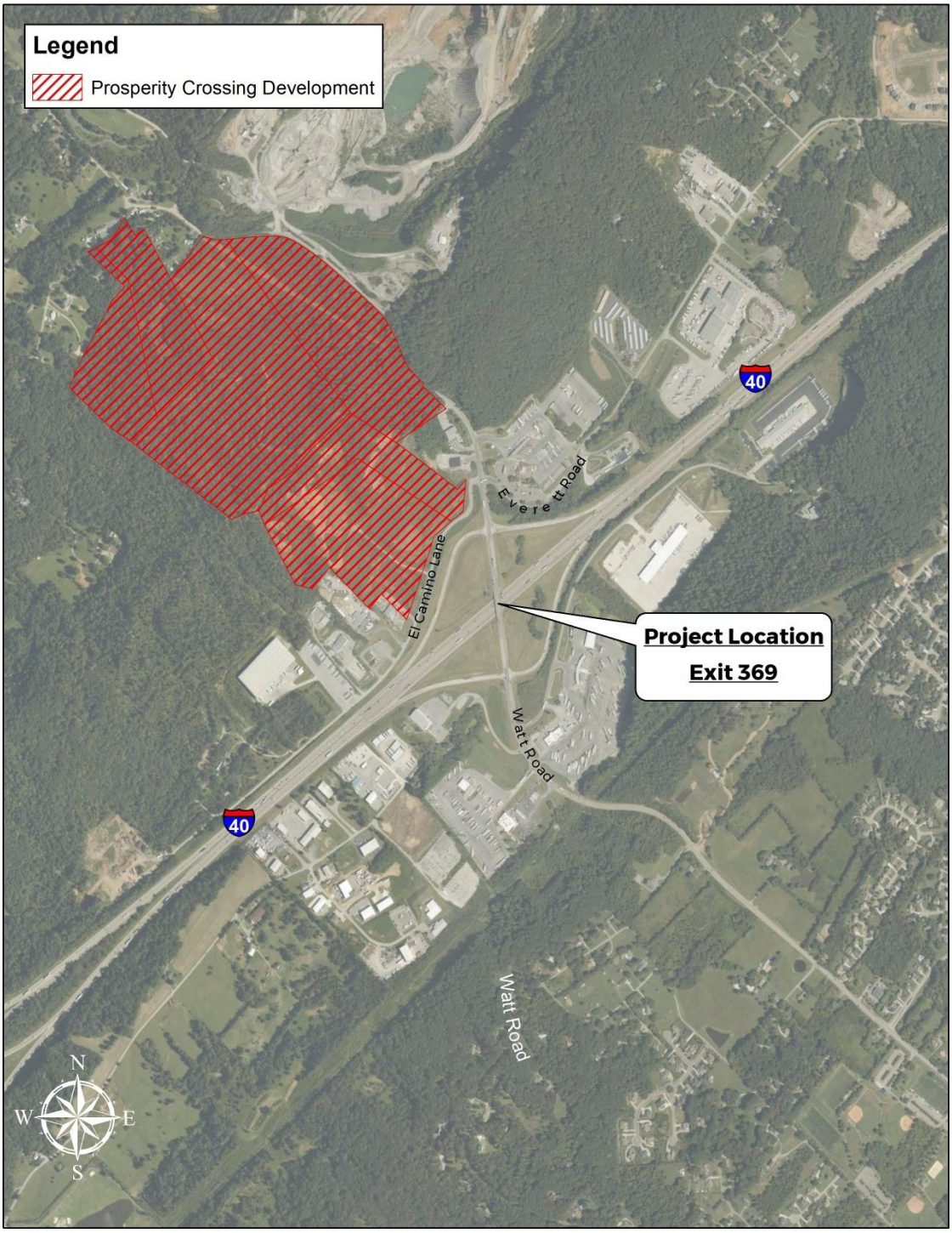
Figure 13. Preliminary Prosperity Crossing Rendering



Source: http://www.prosperitycrossing.com/

[12] https://agenda.knoxplanning.org/2021/december/12-SE-21-C.pdf

Figure 14. Prosperity Crossing Location

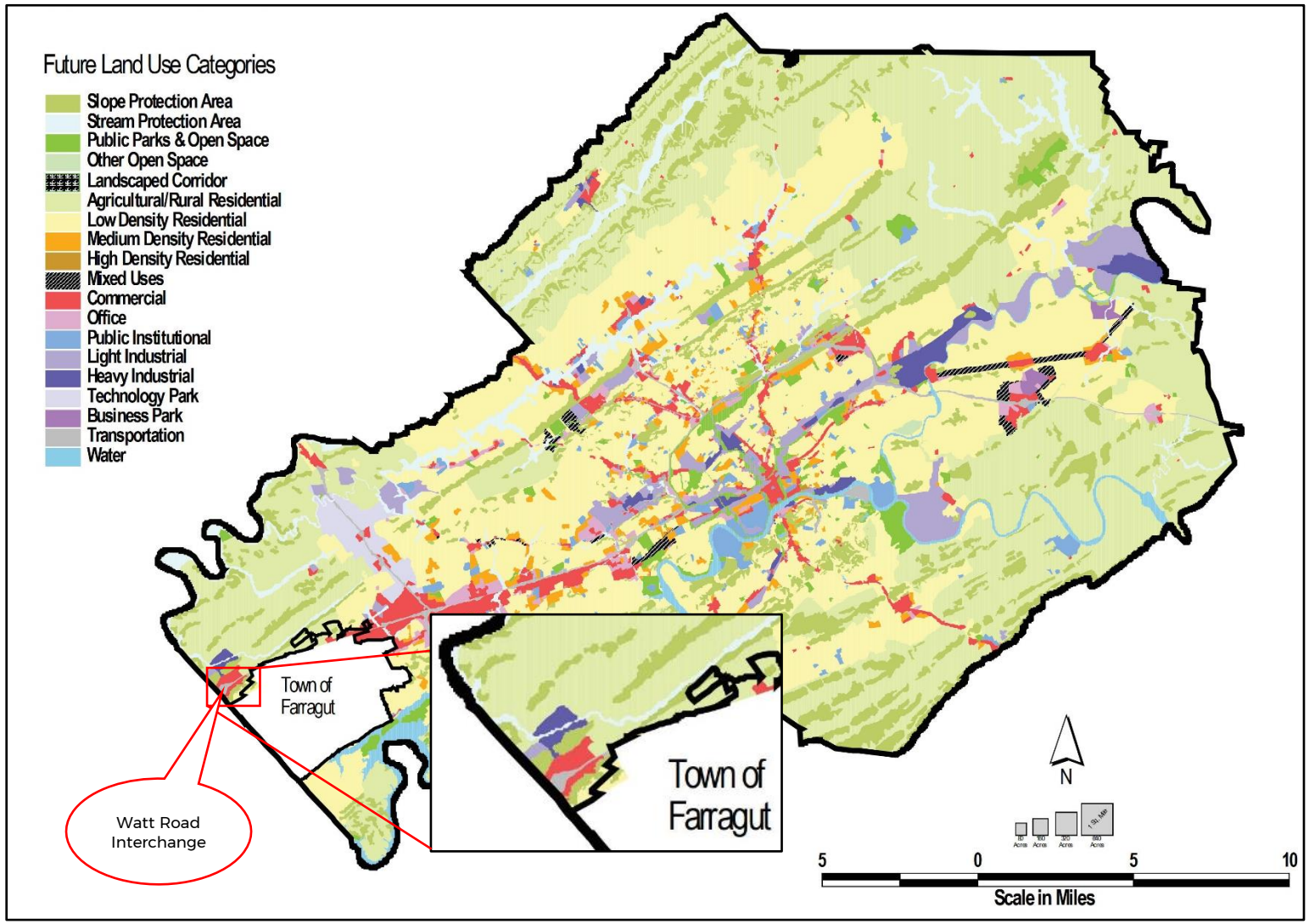


3.4 Future Growth & Land Use

Knox County recently initiated a comprehensive update to the county's General Plan. The *Comprehensive Land Use and Transportation Plan* will analyze population growth projections, land availability, and infrastructure conditions to identify areas of Knox County that should be preserved and areas that are appropriate for new growth and investment[13]. In the current *General Plan 2033*, the land use types/categories for land within the study area are similar to existing land use patterns – as highlighted in Figure 15. (Figure 16 is provided to show future land use patterns for the Farragut area since the study limits of the subject interchange are near the Town of Farragut jurisdiction.) Furthermore, the study area is located within a "Planned Growth" for Knox County.

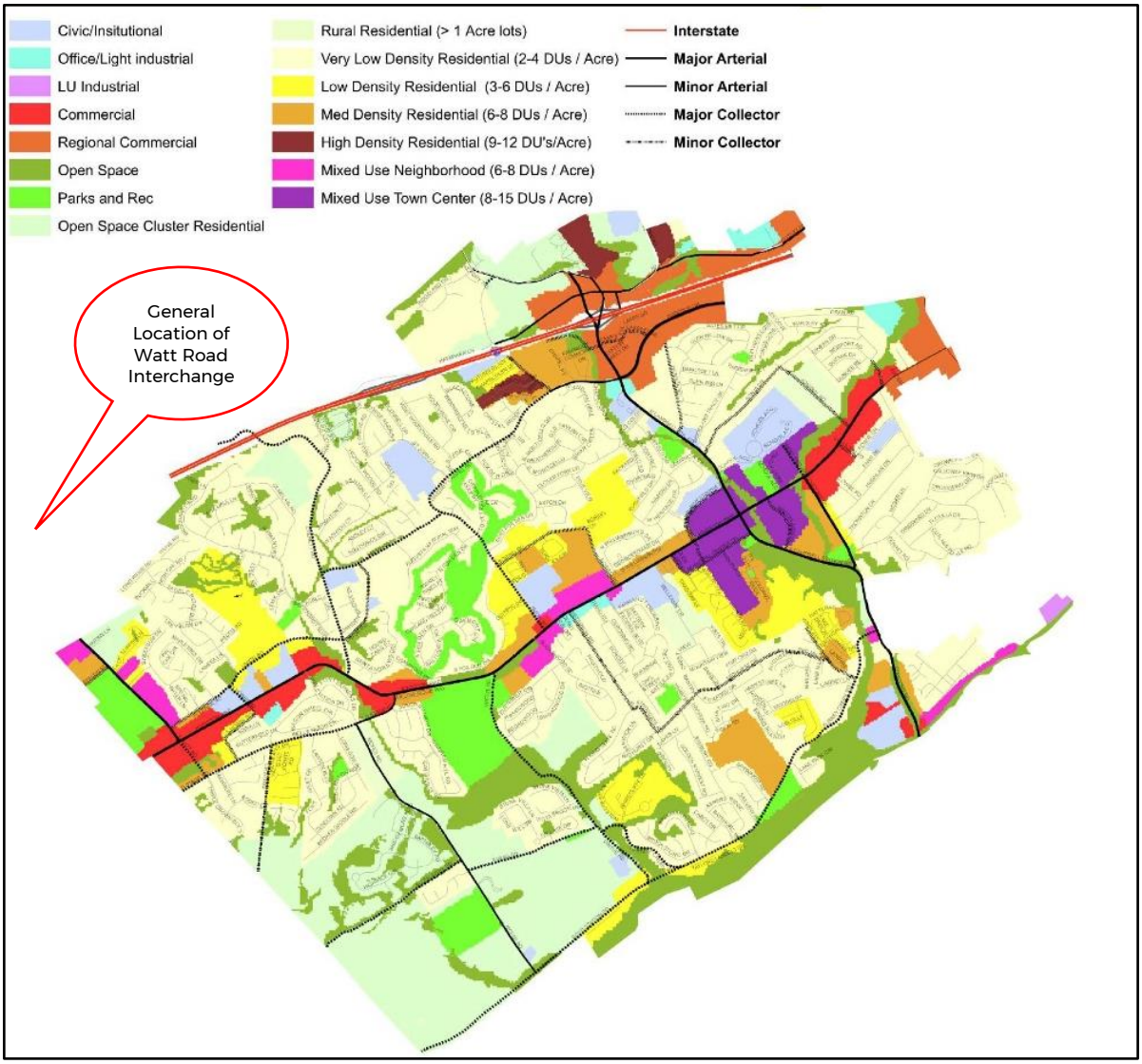
[13] https://knoxplanning.org/comprehensive-plan

Figure 15. Future Land Use



Source: Knoxville-Knox County General Plan 2033

Figure 16. Farragut Area Future Land Use



Source: Comprehensive Land Use Plan: Farragut 2025

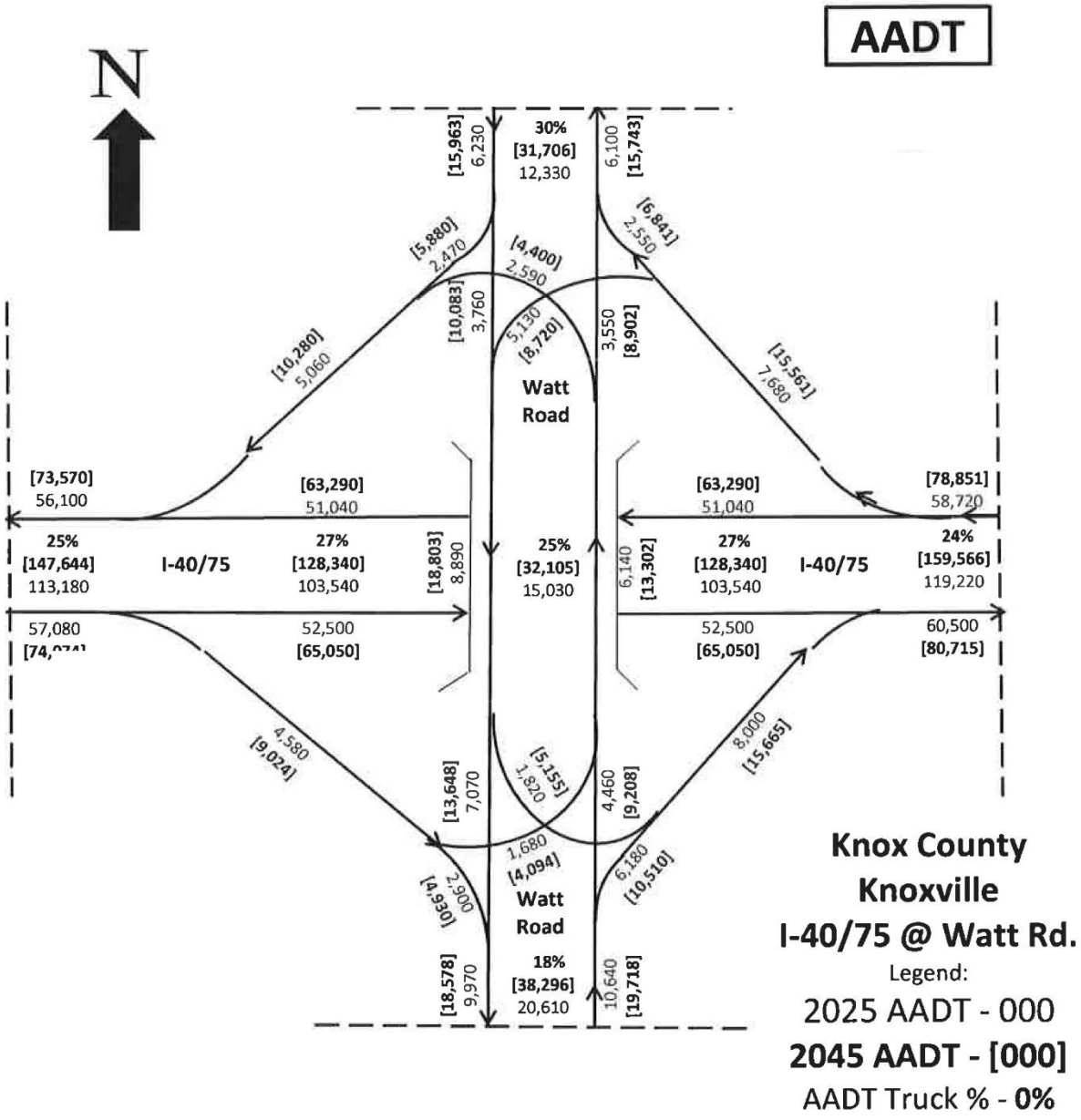
3.5 Future Traffic Volumes

TDOT, in conjunction with the Knoxville Regional TPO, developed the base year (2025) and future year (2045) traffic volumes. Projected traffic volumes were based on a number of sources:

- Knoxville Regional TPO Travel Demand Model
- 2019 cycle and ramp counts
- Four (4) 2018, 8-hour turning movement counts
- Twelve (12) 2021, 8-hour turning movement counts

The 2025 and 2045 Average Annual Daily Traffic (AADT) volumes at the I-40/Watt Road interchange are summarized in Figure 17. Appendix B includes additional AADT data and Design Hourly Volumes (DHVs) for the entire study area. The proposed Prosperity Crossing development, as outlined in Section 3.2 Planned Development, was included in the development of 2045 volumes.

Figure 17. 2025 and 2045 AADT



4.0 Conceptual Alternatives

TDOT's Highway System Access Manual (HSAM) – Intersection and Interchange Evaluation (IIE) tool was utilized as a baseline to develop conceptual alternatives. This tool utilizes project specific data to screen interchange options. Furthermore, previous and concurrent studies were referenced as a guide, while also taking into account various factors such as engineering, environmental limitations, constructability, and cost to develop the alternatives discussed below. For each alternative, two (2) years were evaluated: 2025 and 2045.

4.1 Methodology and Initial Alternatives

TDOT's HSAM IIE process and corresponding spreadsheet tool was implemented in the early stages of the study in order to evaluate and develop various concepts, which lead to the build alternatives noted below. As noted in HSAM Volume 2[14], the benefits to the Department and the traveling public by utilizing IIE procedures include:

- Implementation of safer, more balanced, and more cost-effective options.
- Consistent documentation that improves the transparency of transportation decisions.
- Increased awareness of innovative intersection solutions and emphasis on objective performance metrics for consistent comparisons.
- Opportunity to consolidate and streamline existing intersection-related policies and procedures, including access or encroachment approvals, new traffic signal requests, and impact studies for development.

TDOT's HSAM IIE process is a two (2) stage approach to developing potential improvements:

1. Stage I – Scoping. This step results in a short list of all possible options that merit further consideration. This step requires input of various study-specific data, such as traffic data, opening and design years, functional classifications of roadways, land use context, multimodal activity, etc. In addition, the Stage 1 – Scoping requires CAP-X traffic analysis.
2. Stage II – Preferred Option Selection. This step results in the preferred option(s) based on more detailed evaluations conducted during preliminary engineering activities. This step requires further traffic analysis of potential options, as well as development of high-level cost estimates for each option.

The results of each stage are detailed within the following sections.

4.1.1 Stage I – Scoping Results

For the subject study, the Stage I – Scoping phase resulted in three (3) options (in addition to the existing configuration) to carry forward to the Stage II – Preferred Option Section stage: **Diverging Diamond Interchange (DDI), Single Point Urban Interchange (SPUI),** and **Partial Cloverleaf**. The completed Stage 1 – Scoping spreadsheet (including

[14] https://www.tn.gov/content/dam/tn/tdot/traffic-engineering/hsam/TDOT%20HSAM%20Vol%202%20IIE%20012921.pdf

the data input sheet) are depicted in Figure 18 and Figure 19. (As outlined in Figure 18, the Crash History and Intersection Crash Data and Turning Movement Volumes sections were not completed since these sections apply to intersections – not interchanges. As shown in Figure 19, the Conflict Point Score column was populated used the tool's Conflict Point Score tab/calculations, and the AM V/C Ratio and PM V/C Ratio columns were completed via CAP-X analysis. Options which resulted in "Yes" progressed forward.)

Figure 18. TDOT IIE Data Input

TN TDOT Department of Transportation

Intersection and Interchange Evaluation (IIE) Forms

TDOT IIE Form - Data Inputs — Version: 09142020

Project Information

Project and Location Data

Project Name:	I-40 & Watt Road Interchange Improvements				
Major Road Name:	I-40	Minor Road Name:	Watt Road		
PIN:		County:			
Date:	8/5/2021	Analyst/Firm:	WSP		
Existing Control Type:	Diamond	No. of Legs:	-		
Major Road Direction:	E-W	Opening Year:	2025	Design Year:	2045
Funct. Class of Major Road:	Interstate	Land Use Context:	Suburban		
Project Type of Work:	Modify Interchange				

Traffic Data

Opening Year	2025	Major Road AADT:	119,220
Design Year	2045	Major Road AADT:	159,566
Major Road T % (AADT):	24%	Minor Road T % (AADT):	18%
Major Road T % (DHV):	16%	Minor Road T % (DHV):	12%

Multimodal Activity

Within a 1/2 mile of the project location are there:

Bus stop:	No	School:	No	Library:	No
Retail Center:	Yes	Other Civic Institution:	No	Context to Support Multimodal Activity:	No

Existing or Future Estimated Multimodal Activity Level: Low

Crash History and Intersection Crash Rate

Crash Data Year(s):		No. of Years:	
		No. of Crashes:	

Leg	Current AADT		
North:		SW Avg. Rate:	
East:		Crash Rate (A):	######
South:		Critical Rate (C):	######
West:		A/SW:	######
Entering AADT:	0	A/C:	####

Turning Movement Volumes (TMV)

2025 =Opening Year Design Hourly Volumes (DHV)

				Watt Road						
				0	261	248	172			
				(0)	(206)	(172)	(140)	SB		
	EB	PEDS	↑	←	↓	→	PEDS	(0)	0	
162	(171)	↑					↑	(258)	183	
3201	(4902)	→		Entering Hourly Volumes			←	(3078)	4859	I-40
371	(203)	↓					↓	(422)	595	
0	(0)	PEDS	←	↑	→	PEDS	WB			
		NB	(294)	(143)	(766)	(0)				
			232	199	499	0				

(AM) = AM Peak Hour Approach

PM = PM Peak Hour Approach

Blue = Pedestrian Volumes

N W E S

2045 = Design Year Design Hourly Volumes (DHV)

				Watt Road						
				0	531	531	411			
				(0)	(434)	(355)	(400)	SB		
	EB	PEDS	↑	←	↓	→	PEDS	(0)	0	
367	(382)	↑					↑	(594)	512	
3894	(6029)	→		Entering Hourly Volumes			←	(3729)	6006	I-40
631	(345)	↓					↓	(717)	1011	
0	(0)	PEDS	←	↑	→	PEDS	WB			
		NB	(500)	(416)	(1302)	(0)				
			394	469	848	0				

Figure 19. TDOT IIE Stage I – Scoping

Intersection Location:	I-40 at Watt Road in County								
Number of Intersection Legs:	-		**PIN:**		0.00		**Date:**	8/5/21	
Existing Control Type:	Diamond		**Analyst:**		WSP		Version: 09142020		
Control Type	Conflict Point Score (lower # is better)	Is the option feasible and reasonable?	Is the option likely to improve or maintain safety?	Is the option likely to improve operations?	Is the Option likely to improve or maintain multimodal access?	AM V/C Ratio (CAP X)	PM V/C Ratio (CAP X)	Should the Option proceed to Stage II?	TDOT IIE Stage I Form - Scoping
At-Grade Intersection	Safety	Q1	Q2	Q3	Q4	Capacity		Decision	Screening Decision Justification
Traffic Signal	48	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Two-Way Stop Control	48	No	-	-	-			No	Subject junction is an interchange, this option is not viable
All-Way Stop Control	48	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Continuous Green T	n/a	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Quadrant Roadway	40	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Partial Displaced Left Turn	44	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Displaced Left Turn	40	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Signalized RCUT	20	No	-	-	-			No	Subject junction is an interchange, this option is not viable
J-Turn (Unsignalized RCUT)	20	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Median U-Turn	20	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Partial Median U -Turn	28	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Bowtie	24	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Split Intersection	36	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Roundabout	8	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Other (provide description)		-	-	-	-			No	
Grade-Separated Intersection	Safety	Q1	Q2	Q3	Q4	CAP-X		Decision	Screening Decision Justification
Echelon	28	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Center Turn Overpass	32	No	-	-	-			No	Subject junction is an interchange, this option is not viable
Interchange	Safety	Q1	Q2	Q3	Q4	CAP-X		Decision	Screening Decision Justification
Diamond	28	Yes	Yes	No	Yes	1.75	2.35	**Yes**	Existing interchange type, included in Stage II
Partial Cloverleaf	20	Yes	Yes	Yes	Yes	0.62	0.61	**Yes**	Potential alternative, included in Stage II
Displaced Left Turn Interchange	28	Yes	Yes	No	Yes	0.76	0.98	No	Inadequate capacity
Contraflow Left Interchange	32	Yes	No	No	Yes	0.97	0.92	No	Inadequate capacity
DDI	20	Yes	Yes	Yes	Yes	0.70	0.82	**Yes**	Potential alternative, included in Stage II
Single Point	32	Yes	No	Yes	Yes	0.75	0.80	**Yes**	Potential alternative, included in Stage II
Single Point with Roundabout	12	No	-	-	-			No	Traffic volumes not desirable for roundabouts
Other (provide description)		-	-	-	-			-	

Descriptions of the three (3) interchange options which progressed forward are noted within the sections below.

4.1.1.1 DDI Overview[15]

A DDI, as depicted in Figure 20, is a variation of a conventional diamond interchange which uses directional crossover intersections to shift traffic to the opposite side between ramp terminals within the interchange area. Crossing the thru movements to the opposite side replaces left-turn conflicts with same direction merge/diverge traffic and also eliminates exclusive left-turn signal phases to and from the ramps. The DDI concept has several advantages compared to other interchange designs:

- Ability to accommodate varying traffic patterns due to the two-phase signal operations.
- Fewer vehicle-to-vehicle, vehicle-to-pedestrian, and vehicle-to-bike conflict points compared to a traditional diamond interchange.
- Left-turn capacity is higher.
- Ability to provide fewer and shorter signal phases for both motorized and

[15] *AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition, pp. 10-53 through 10-57*

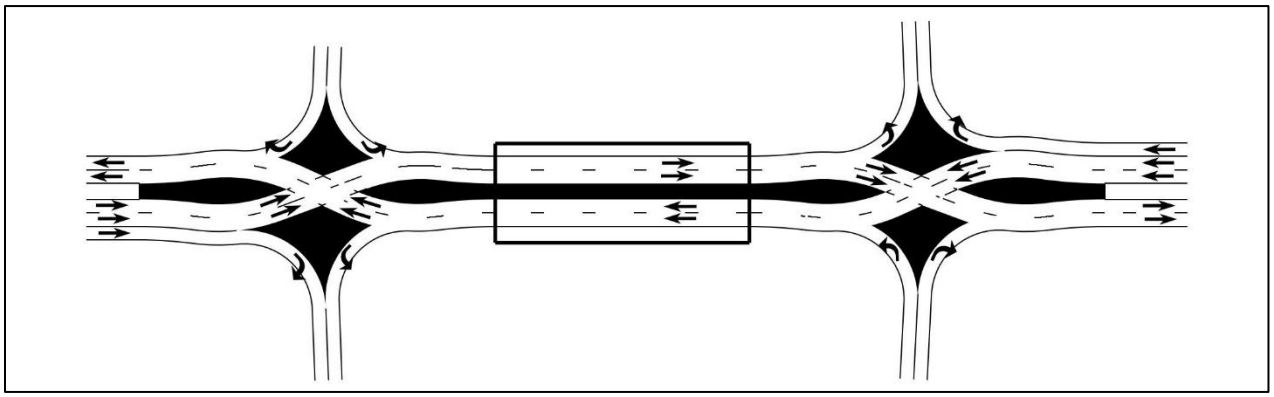
nonmotorized movements.
- Crossing distances for pedestrians are shorter and traditionally involve traffic approaching from only one (1) direction at a time.

For the DDI concept, several specific design factors must be considered:

- Proximity of the interchange to adjacent signalized intersections
- Design speed
- Crossover radii
- Lane widths
- Sight distance for crossover intersection and ramps

The primary disadvantage for the DDI concept is its limited ability to accommodate trucks, oversized trucks, and transit vehicles.

Figure 20. DDI Example



Source: AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition

4.1.1.2 SPUI Overview[16]

A SPUI, as depicted in Figure 21, is an interchange design which features all four (4) turning movements controlled by a single traffic signal and opposing left turns operate to the left of each other. Traditionally, SPUIs are best suited for areas with tight ROW and provide greater capacity than tight diamond interchanges (TDI). The SPUI concept has several advantages compared to other interchange designs:

- Additional green time allows more vehicles to pass through the intersection allowing for improved travel time at the interchange signal as well as nearby, adjacent traffic signals (if applicable).
- Constructability within areas with limited/tight ROW parameters.
- Vehicles making opposing left turns pass to the left of each other (compared to the right), so their paths do not intersect.
- Right turn movements are traditionally free-flow or yield control only.
- Curve radii for left-turn movements is significantly flatter, therefore, the

[16] *AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition, pp. 10-48 through 10-52*

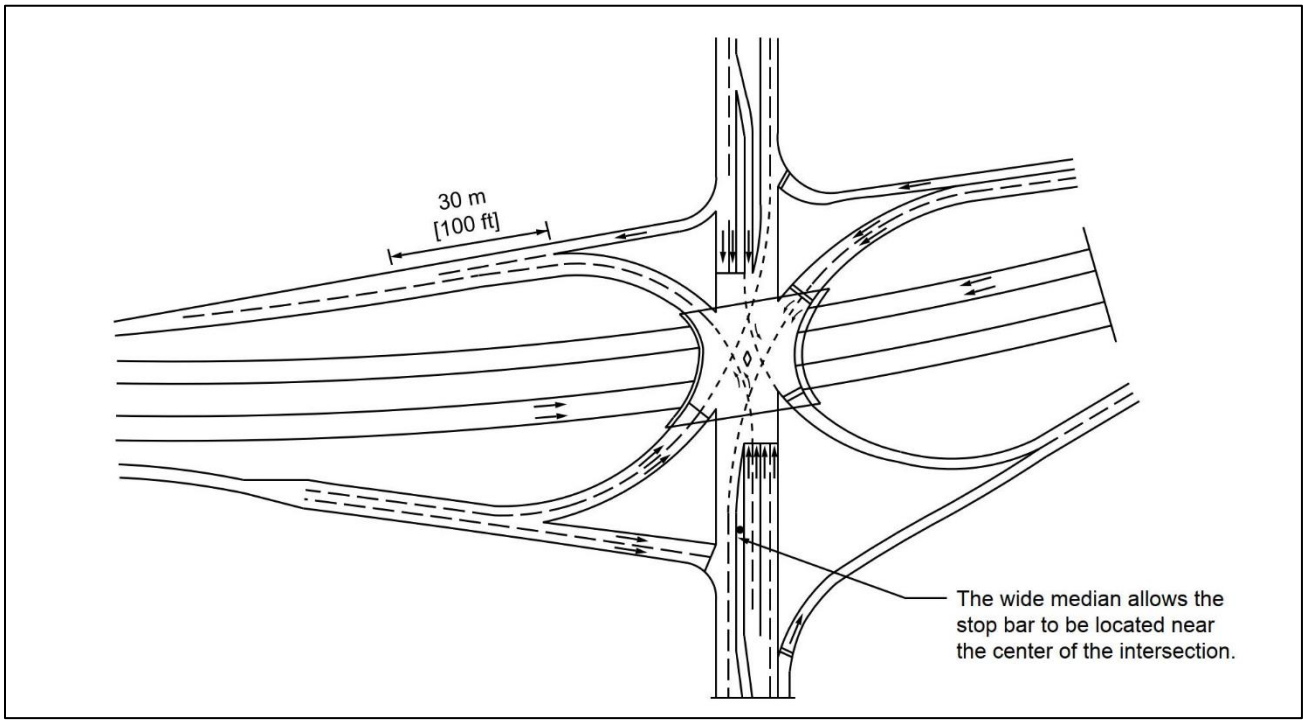
movement can occur at higher speeds.

For the SPUI concept, several specific design factors must be considered:

- Single radius left-turn curve
- Stopping sight distance for the left-turn movements

The primary disadvantage for the SPUI concept is the high construction cost of the bridge due to the large structure dimensions and irregular shape.

Figure 21. SPUI Example



Source: AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition

4.1.1.3 Partial Cloverleaf Overview[17]

A partial cloverleaf, as depicted in Figure 22, is a modified version of a full cloverleaf which utilizes loop ramps to accommodate left-turning movements. A partial cloverleaf design has three (3) or less loops and site conditions play a key role in determining which quadrants loops should be located. The Partial Cloverleaf concept has several advantages compared to other interchange designs:

- Accommodate left-turn movements
- Freedom of movement for traffic on the major road
  Potentially increased speeds

For the partial cloverleaf concept, several specific design factors must be considered:

[17] *AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition, pp. 10-57 through 10-63*

- Ramp arrangement should enable major turning movements to be made by right-turn exits and entrances
- Where and when through traffic on the major route is greater than the minor, preference should be for an arrangement that places the right turns (exit or entrance) on the major route

There are several disadvantages to the cloverleaf design:

- Weaving maneuver, which is generated, and short weave length is traditionally available
- Relatively large ROW required
- Potential for wrong-way movements

Figure 22. Partial Cloverleaf Example

Source: AASHTO's "A Policy on Geometric Design of Highways and Streets," 7th Edition

4.1.2 Stage II – Preferred Option Selection Results

The three (3) options from the Stage I – Scoping stage were furthered analyzed in the 2nd stage. The intent of the form/table is to summarize the results of the evaluation process. As outlined in Figure 23, input values include project cost (from a high-level perspective), traffic operations, and multimodal qualitative assessment. (It should be noted that the Life Cycle Cost and Predictive Crash Analysis sections are optional, therefore, were not included as part of the review.)

The results of the Stage II – Preferred Option Selection process were used to evaluate geometric features and constructability of options which ultimately lead to the development of Build Alternative 1 and Build Alternative 2, which are further detailed in subsequent sections below. The DDI and partial cloverleaf options were not further

evaluated past the Stage II – Preferred Option Selection process due to their disadvantages specifically related to heavy truck traffic including the difficult crossover maneuver of the DDI and the potential for wrong-way maneuvers of the partial cloverleaf.

Figure 23. TDOT IIE Stage II - Preferred Option Selection

TN TDOT Department of Transportation	Intersection Location:		I-40 at Watt Road in County							
	Number of Intersection Legs:		-		PIN:	0.00			Date:	8/5/21
	TDOT IIE Stage II Form - Selection				Analyst:	WSP			Version: 09142020	
	Existing Control		Option 1		Option 2		Option 3		Option 4	
TDOT IIE Stage II Form - Selection	Diamond		DDI		Single Point		Partial Cloverleaf		None	
Project Cost										
Tool Used	Not Applicable		TDOT STID Tool		TDOT STID Tool		TDOT STID Tool		-	
Total Project Cost	Not Applicable		$35,600,000		$45,600,000		$19,900,000		-	
Life Cycle Cost										
Tool Used	-		-		-		-		-	
Analysis Period	2025 to 2045		2025 to 2045		2025 to 2045		2025 to 2045		2025 to 2045	
Total Life Cycle NPV Cost	-		-		-		-		-	
Traffic Operations										
Traffic Analysis Software Used	Synchro		Synchro		Synchro		Synchro		-	
2025 Opening Year	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
LOS	D	E	B	B	B	C	A	B	-	-
Delay (s/veh)	50.3	62.3	14.2	16.4	18.1	21.1	9.8	11.9		
v/c	1.14	1.2	0.59	0.66	0.68	0.8	0.64	0.7		
Queues Accommodated?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-
2045 Design Year	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
LOS	F	F	C	D	D	D	C	C	-	-
Delay (s/veh)	275.4	337.4	24.9	43.3	36.2	40.7	24.3	29.7		
v/c	2.11	2.02	0.83	0.99	1.06	1.05	1.06	0.97		
Queues Accommodated?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-
Predictive Crash Analysis										
Tool Used	Not Applicable		Not Applicable		Not Applicable		Not Applicable		Not Applicable	
Analysis Period	2025 to 2045		2025 to 2045		2025 to 2045		2025 to 2045		2025 to 2045	
Total Crashes										
Fatal & Injury Crashes										
Multimodal										
Are peds, bicyclists, and transit riders accommodated?	Not Accommodated		Adequately		Adequately		Poorly		-	

4.2 No Build Alternative

The No-Build Alternative assumes that the subject interchange would remain as-is (with the exception of routine maintenance improvements) and mirror the features laid out in Section 2.0 Existing Conditions.

4.3 Build Alternative 1 – Single Point Urban Interchange (SPUI)

Build Alternative 1 shifts Watt Road to the west of the existing structure in order to construct and provide a Single Point Urban Interchange (SPUI). This alternative will provide two (2) thru lanes in each direction on Watt Road as well as double left turn lanes for entrance ramp movements from Watt Road. Build Alternative 1 will require

additional right-of-way (ROW) for side street improvements – in the northwest, northeast, and southwest quadrants of the interchange. A summary of improvements to the interchange include:

- Shift existing alignment of Watt Road to the west (approximately 280 feet from existing bridge centerline to proposed new structure centerline) for constructability of new structure and maintenance of traffic (MOT).
    - New structure will be long enough to accommodate interstate widening improvements
- Remove existing ramps and provide new ramps for SPUI concept. New ramp configurations are as follows:
    - Eastbound off ramp to be a one (1) lane ramp which widens to provide double left turn lanes for northbound Watt Road traffic and double right turn lanes for southbound Watt Road traffic.
    - Westbound off ramp to be a one (1) lane ramp which widens to provide double left turn lanes for southbound Watt Road traffic and one (1) right turn lane for northbound Watt Road traffic.
    - Eastbound on ramp to be a three (3) lane ramp which tapers down to one (1) lane as it merges with I-40/75 eastbound lanes.
    - Westbound on ramp to be a two (2) lane ramp which tapers down to one (1) lane as it merges with I-40/75 westbound lanes.
- Add an additional northbound lane, near Palestine Lane, along Watt Road – for a total of two (2) lanes through the interchange. This additional through lane continues through the intersection of Watt Road and El Camino Lane/Everett Road and is included and being evaluated as part of a separate study.
- Add an additional southbound lane, at the intersection of Watt Road and El Camino Lane/Everett Road, along Watt Road – for a total of two (2) southbound thru lanes through the interchange. This additional southbound thru lane is proposed to tie-into existing geometrics south of Hickory Creek Road.
- Realign and improve the intersection of Watt Road and El Camino Lane/Everett Road and provide dual left turn lanes along Everett Road and one (1) left turn lane and one (1) channelized right-turn lane at El Camino Lane.
- Realign Hickory Creek Road to provide a four (4)-leg intersection with Watt Road and Palestine Lane.

Figure 24 shows the layout for Build Alternative 1. A functional layout of this alternative can be found in Appendix C. Improvements to Watt Road north of El Camino Lane/Everett Road are currently being analyzed and evaluated as part of a separate study (as noted in the layout in Appendix C) and considered a separate project (if applicable) that should develop in conjunction with the subject interchange improvements.

Figure 24. Build Alternative 1 Overview

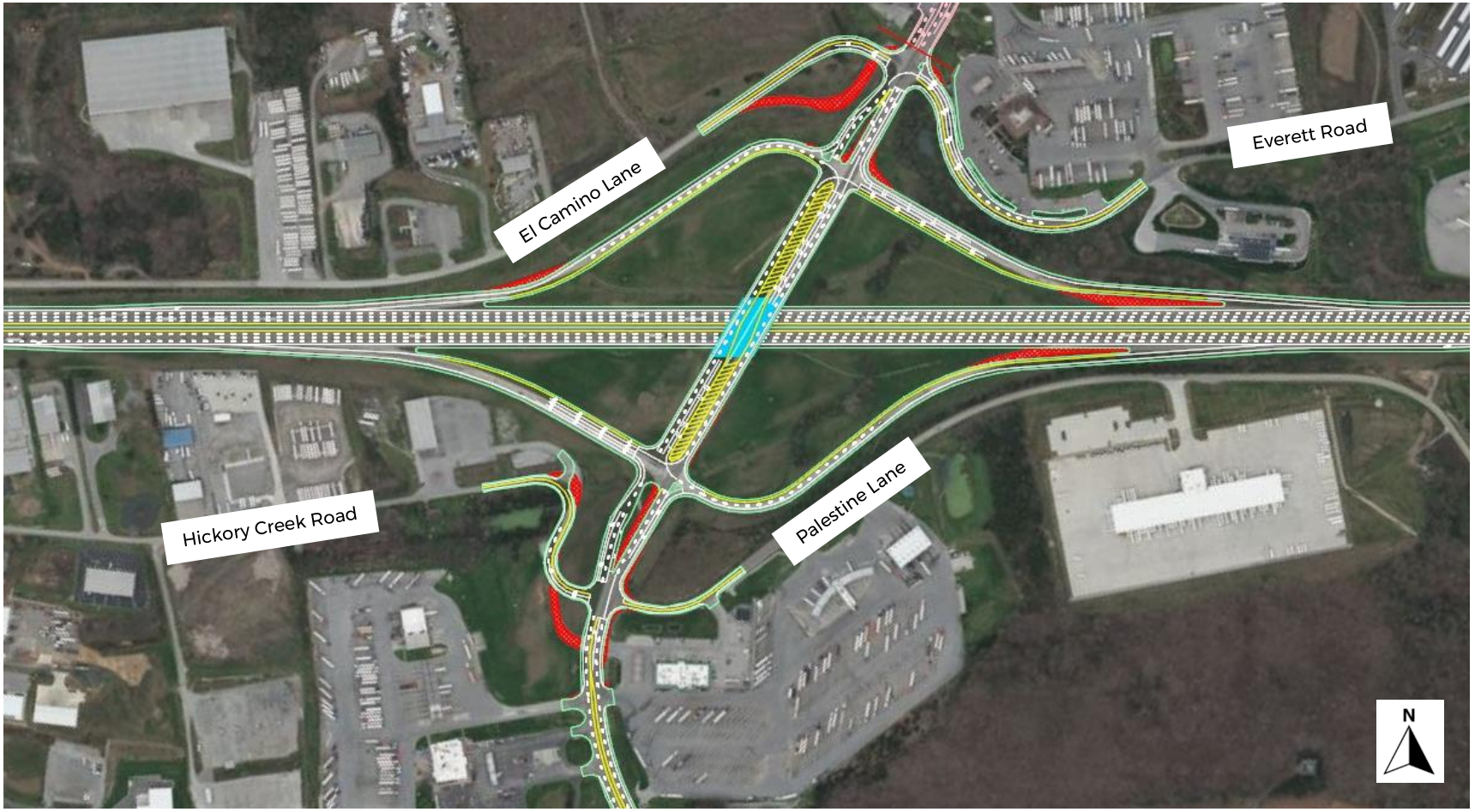
4.4 Build Alternative 2 – Improve Existing Diamond Interchange

Build Alternative 2 maintains the existing diamond interchange with improvements – including additional lanes on Watt Road and the existing ramps. This alternative will provide two (2) thru lanes in each direction on Watt Road as well as double left turn lanes for entrance ramp movements from Watt Road. Similar to Build Alternative 1, Build Alternative 2 will require additional right-of-way (ROW) for side street improvements – in the northwest, northeast, and southwest quadrants of the interchange. A summary of improvements to the interchange include:

- Maintain existing alignment of Watt Road and remove and replace existing bridge with wider and longer structure to accommodate widening on Watt Road as well as future widening on I-40/75 mainlines.
- Widen existing ramps to provide the following additional lane configurations:
    - Eastbound off ramp to be a one (1) lane ramp which widens to provide double left turn lanes for northbound Watt Road traffic and double right turn lanes for southbound Watt Road traffic.
    - Westbound off ramp to be a one (1) lane ramp which widens to provide double right turn lanes for northbound Watt Road traffic and double left turn lanes for southbound Watt Road traffic.
    - Eastbound on ramp to be a two (2) lane ramp which tapers down to one (1) lane as it merges with I-40/75 eastbound lanes.
    - Westbound on ramp to be a two (2) lane ramp which tapers down to one (1) lane as it merges with I-40/75 westbound lanes.
- Add an additional northbound lane, near Palestine Lane, along Watt Road – for a total of two (2) lanes through the interchange. This additional through lane continues through the intersection of Watt Road and El Camino Lane/Everett Road and is included and being evaluated as part of a separate study.
- Add an additional southbound lane, at the intersection of Watt Road and El Camino Lane/Everett Road, along Watt Road – for a total of two (2) southbound thru lanes through the interchange. This additional southbound thru lane is proposed to tie-into existing geometrics south of Hickory Creek Road.
- Realign and improve the intersection of Watt Road and El Camino Lane/Everett Road and provide dual left turn lanes along Everett Road.
- Realign Hickory Creek Road to provide a four (4)-leg intersection with Watt Road and Palestine Lane.

Figure 25 shows the layout for Build Alternative 2. A functional layout of this alternative can be found in Appendix C. Improvements to Watt Road north of El Camino Lane/Everett Road are currently being analyzed and evaluated as part of a separate study (as noted in the layout in Appendix C) and considered a separate project (if applicable) that should develop in conjunction with the subject interchange improvements.

Figure 25. Build Alternative 2 Overview



4.5 Interstate Improvements

As outlined in Table 4, there are multiple planned and proposed roadway projects within and near the study area. For purposes of the subject study and applicable study area, these alternatives are as follows:

- Widen I-40/75 from six (6) to eight (8) lanes from the I-40/75 junction to Lovell Road (SR-131).
- Add an auxiliary lane (in each direction) along I-40/75 from Campbell Station Road to Lovell Road (SR-131).
- Bridge modification/improvements to the I-40 westbound bridge over I-75 northbound lane.

In addition, the existing truck weigh stations along I-40/75 within the study area are recommended to be removed/relocated, and the future analysis (i.e. 2045) reflects this recommendation.

Functional layouts of these improvements are included in Appendix C.

4.6 I-40/75 Future Need

Through the traffic analysis of the subject interchange (further detailed in section 5.0 Traffic Analysis), improvements to the I-40/75 system interchange were identified and developed. These improvements include the following:

- I-40 Eastbound and I-75 Northbound
    - West of the system junction, separation of I-40 eastbound traffic from Watt Road exit traffic prior to merge of interstates
    - New bridge over I-75 northbound to I-40 eastbound for Watt Road exit
    - Diverge of Watt Road traffic (from I-75 northbound) prior to merge of interstates mainlines
    - Eastbound Watt Road traffic separated from I-40/75 traffic (via ramp)
- I-40 Westbound/Westbound Watt Road Traffic
    - Westbound traffic from Watt Road separated from I-40/75 traffic (via ramp) – with the goal of reducing the weave between the I-40/75 junction and the Watt Rd interchange
    - New bridge to accommodate westbound Watt Road traffic to I-75 southbound

Functional layouts of these improvements are included in Appendix C.

5.0 Traffic Analysis

Traffic analysis was performed for both the No Build and Build Alternatives. Furthermore, analysis was performed for both AM and PM peak hour conditions for years 2025 and 2045 for both alternatives. 2025 is considered the "opening year" and represents the year the project is expected to be open to traffic for use. 2045 is considered the "design year" or "future year" and represents the year for which the project is designed for. Analysis included applicable planned projects noted in section 3.1 Planned Projects.

As outlined in Section 4.0 Conceptual Alternatives, two (2) build alternatives were evaluated for the Watt Road interchange through TDOT's HSAM IIE process:

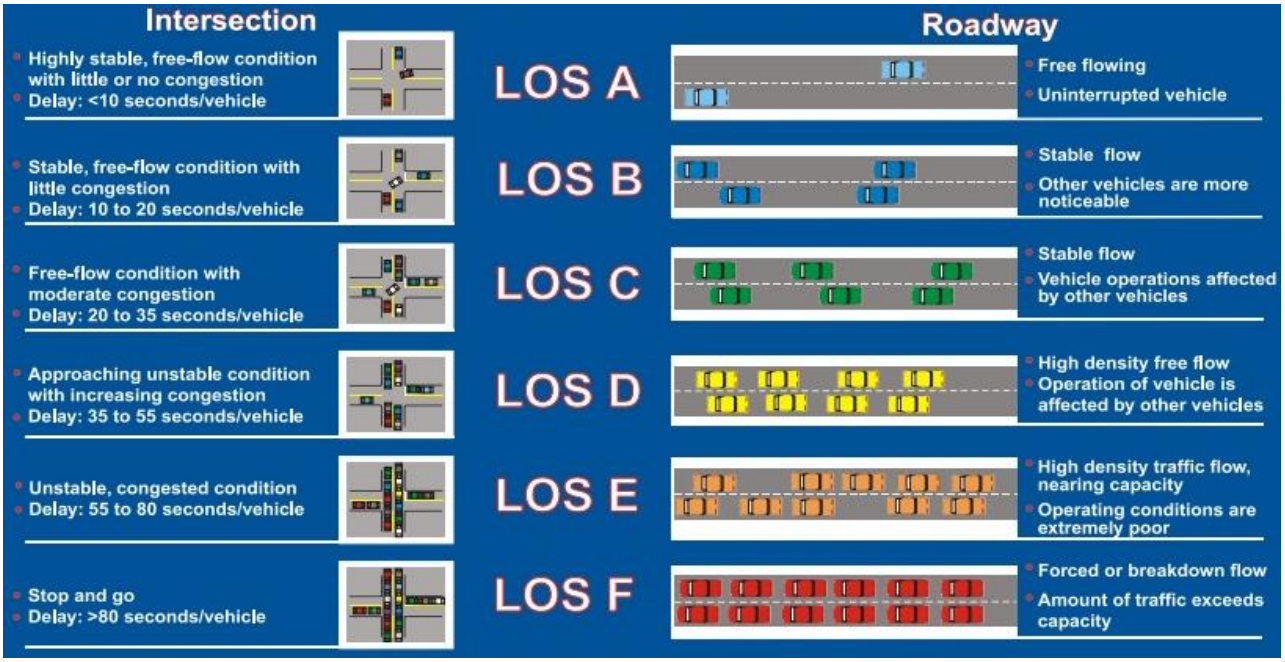
- Build Alternative 1: Single Point Urban Interchange (SPUI)
- Build Alternative 2: Diamond Interchange

For the freeway analysis of the Build Alternatives, the gore points for the ramps along I-40/75 are assumed to be in the same location. Therefore, the freeway analysis results are the same for both build alternatives.

5.1 Level of Service Concept

Level of service (LOS) is a qualitative measure that characterizes the operational conditions within a traffic stream and the perception of traffic service by motorists and passengers. The Highway Capacity Manual (HCM), 6th Edition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The LOS takes qualitative values such as congestion and substandard geometry and transforms them into quantitative values such as operating speeds, flow densities, and vehicular delay. The HCM characterizes LOS A (best) to LOS F (worst) where level A represents ideal, low-volume traffic operations and level F represents over-saturated, high-volume traffic operations. Figure 26 provides a visual of LOS as it related to intersections and freeway segments.

Figure 26. LOS Description[19]



LOS for freeway facilities is determined based on vehicular density of a freeway segment, merge/diverge area, or weaving section; whereas for intersections, it is determined based on average delay per vehicle. Table 5 provides a general description of the various LOS categories and delay ranges for freeways and signalized and unsignalized intersections. Six (6) levels are used, ranging from A to F.

Table 5. Level of Service Criteria[20]

LOS	Freeway (Density in pc/mi/in)			Intersection (Delay per Vehicle in seconds)	
	Basic Freeway	Weaving Area	Merge/Diverge Area	Signal Control	Stop-Control
A	0-11.0	0-10.0	0-10.0	0-10.0	0-10.0
B	>11.0-18.0	>10.0-20.0	>10.0-20.0	>10.0-20.0	>10.0-15.0
C	>18.0-26.0	>20.0-28.0	>20.0-28.0	>20.0-35.0	>15.0-25.0
D	>26.0-35.0	>28.0-35.0	>28.0-35.0	>35.0-55.0	>25.0-35.0
E	>35.0-45.0	>35.0-43.0	>35.0	>55.0-80.0	>35.0-50.0
F	>45.0 OR demand exceeds capacity	>43.0 OR demand exceeds capacity	Demand exceeds capacity	>80.0	>50.0

[19] *MDOT Online Policy Manual,* *https://policymanual.mdot.maryland.gov/mediawiki/index.php?title=Roadways:_Facility_Selection*
[20] *Source: Highway Capacity Manual (HCM), 6th Edition*

All freeway analyses, such as ramp merges and diverges, were analyzed using the Highway Capacity Software (HCS7) Freeway Facilities module for AM and PM peak period results. Freeway Facilities integrates individual segment analyses into a corridor analysis to study potential multi-segment operational issues.

For intersections, the AM and PM peak period results are based on the LOS and delay procedures in the HCM and Synchro software was used to perform the analysis.

5.1.1 Freeway Analysis Methodology

The initial procedure for freeway analysis input into the HCS7 Freeway Facilities module involved the segmentation of existing and the proposed freeway facility. The corridor was segmented into the following categories – basic freeway segments, merge areas, diverge areas, and weaving sections.

For basic freeway segments, the following inputs and typical values were used in the analysis:

- Peak hour traffic volumes and heavy percent were obtained from traffic forecasting/development by TDOT.
- Number of lanes were based on existing and proposed future geometry. The existing geometry was modeled based on the latest available aerial imagery.
- Terrain type was assumed to be "Rolling" for this area per the design criteria.
- Base free flow speed was be assumed to be 5 mph greater than the posted speed limits.
- Lane width were set to twelve (12) feet.
- Right shoulder lateral clearance was set to ten (10) feet.
- Segment lengths were determined by aerial photography or functional designs between upstream/downstream merge/diverge points.
- The analysis includes four 15-minute time periods for both the AM and PM peak hours with traffic demand adjusted using factors of 1.0, 1.12, 1.0, and 0.88 to replicate a peak hour factor (PHF) of 0.90.
- The traffic volumes at the truck weigh stations were estimated using the origin-destination data collected in 2019.

The freeway facilities inputs for merge, diverge and weaving segments involve the same inputs as a basic segment, but with some additional parameters including:

- Acceleration/deceleration lane lengths were determined from aerial photography.
- Free flow speeds on ramps were set 50 mph for diamond on/off ramps and 30 mph for loop ramps.

5.1.2 Intersection Analysis Methodology

The capacity for the signalized and unsignalized ramp terminal intersections in the study area is performed using Synchro, Version 10. The traffic analysis was completed in accordance with the Tennessee Department of Transportation (TDOT) Traffic Design

Manual. The existing roadway network was modeled in Synchro to contain existing lane configuration and traffic control. Existing signal timings and phasing were obtained from local entities.

The traffic volumes for the AM and PM peak hours are entered in Synchro for each analysis scenario. Synchro is used to obtain the optimized signal timings for the peak period traffic conditions in each scenario. The following additional details are to be included in the analysis:

- PHF was set to 0.90 for all intersections.
- Cycle length ranges: 60 to 90 seconds for 2-phases, 70 to 120 seconds for 3-phases, 80-150 seconds for 4 or more phases. If the traffic signal is located within a coordinated traffic signal system, then the actual coordinated cycle length was used.
- Yellow and red times were set per existing signal plans for all scenarios.
- Yellow Time, All-Red Time, and Lost Time Adjustment will be set to 5.0, 2.0, and -2.0 seconds, respectively, when the lane configuration at an intersection is to be altered.
- Lost Time Adjustment is set to include a total lost time of 5.0 seconds per signal phase.

5.2 2025 No-Build Alternative

Freeway Analysis

The 2025 AM and PM peak hour traffic volumes and existing lane geometrics were inputted into the HCS7 Freeway Facilities software module. Based on the freeway analysis, fourteen (14) of the fifteen (15) segments in the eastbound direction are projected to operate at LOS F in the AM peak hour. In the PM peak, three (3) of the fifteen (15) segments are projected to operate at LOS E. In the westbound direction, six (6) of the seventeen (17) segments are projected to operate at LOS E or LOS F in the AM peak hour. Sixteen (16) of the seventeen (17) segments are projected to operate at LOS F in the PM peak hour.

Intersection Capacity Analysis

Based on the analysis, both the signalized ramp terminal intersections along Watt Road are projected to operate at an overall LOS D in the AM peak and LOS E in the PM peak. The westbound I-40/75 off-ramp approach is projected to operate at LOS F in both the AM and PM peaks. The northbound Watt Road approach at the eastbound I-40/75 off-ramp is projected to operate at LOS E in AM peak and the southbound Watt Road approach is projected to operate at LOS E in the PM peak hour. The unsignalized approaches of El Camino Lane, Everett Road, Palestine Lane, Hickory Creek Drive and the gas station driveway are projected to operate at LOS F in both the AM and PM peak hours. Table 6 summarizes the LOS results for intersections within the study area across the 2025 No-Build Condition.

5.3 2045 No-Build Alternative

Freeway Analysis

The 2045 AM and PM peak hour traffic volumes and existing lane geometrics were inputted into the HCS7 Freeway Facilities software module. Based on the freeway analysis, all fifteen (15) segments in the eastbound direction are projected to operate at either LOS E or F in the AM peak hour. Fourteen (14) of the fifteen (15) segments are projected to operate at LOS F in the PM peak hour. In the westbound direction, fifteen (15) of the seventeen (17) segments are projected to operate at LOS F in the AM peak hour. All seventeen (17) segments are projected to operate at LOS F in the PM peak hour.

Intersection Capacity Analysis

Based on the 2045 No-Build analysis, both the signalized ramp terminal intersections along Watt Road are projected to operate at LOS F in the AM and PM peak hours. All approaches at both the intersections are projected to operate at LOS F in the AM and PM peak hours as well.

The unsignalized Palestine Lane approach is projected to operate at LOS F in both the AM and PM peak hours. Synchro did not report LOS for the unsignalized approaches of El Camino Lane, Everett Road, Hickory Creek Drive and the gas station driveway representing highly oversaturated conditions and major delays.

Table 6 summarizes the LOS results for intersections within the study area across the 2025 and 2045 No-Build Conditions.

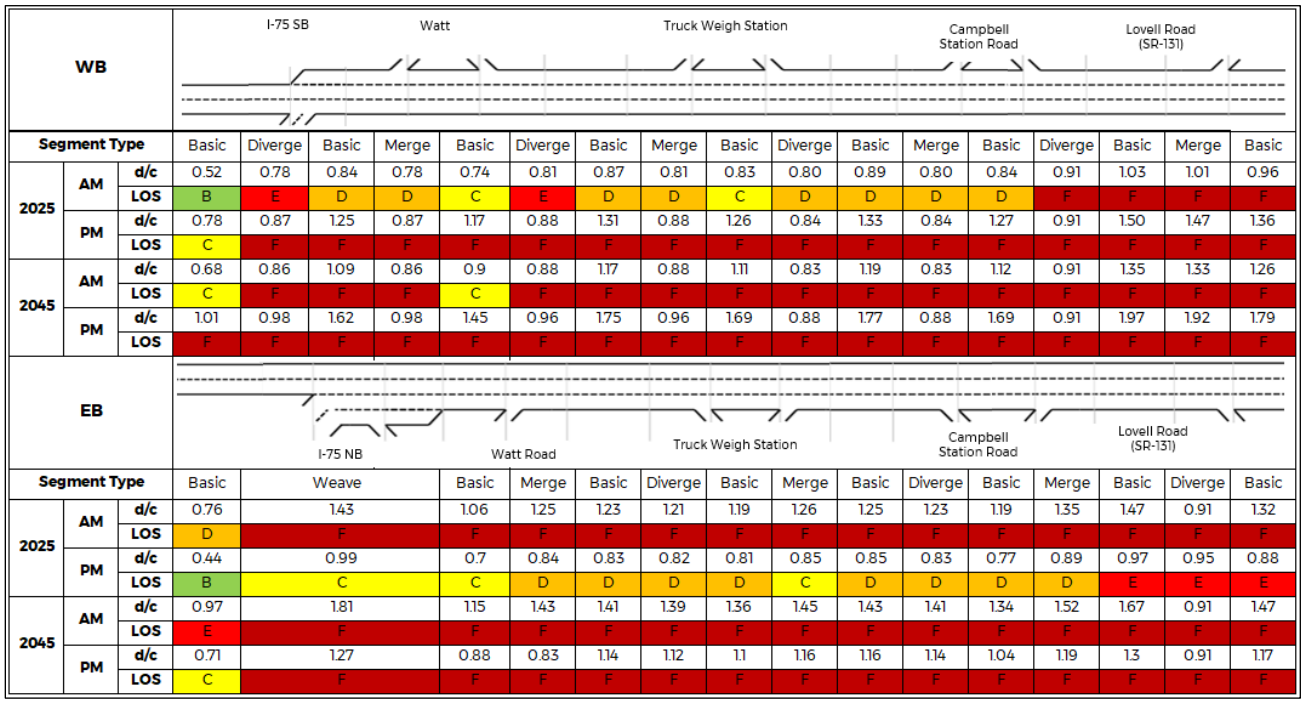
Table 6. No-Build Alternative Capacity Analysis Summary

Intersection	2025 LOS AM/PM	2045 LOS AM/PM
El Camino Lane/Everett Road		
Worst Approach LOS	F/F	*/*
I-40/75 Westbound Ramps		
Northbound Approach	B/C	F/F
Southbound Approach	B/C	F/F
Westbound Approach	F/F	F/F
Overall Intersection LOS	D/E	F/F
I-40/75 Eastbound Ramps		
Northbound Approach	E/D	F/F
Southbound Approach	C/E	F/F
Eastbound Approach	D/D	F/F
Overall Intersection LOS	D/E	F/F
Palestine Lane		
Worst Approach LOS	F/F	F/F
Hickory Creek Road/Gas Station Driveway		
Worst Approach LOS	F/F	*/*

**Synchro did not report LOS for the unsignalized approached due to highly oversaturated conditions.*

Freeway segments and merge/diverge segments were analyzed along I-40/75 between the I-40/75 system interchange and Lovell Road (SR-131), which encompasses the existing truck weigh stations and Watt Road ramps. Figure 27 outlines the resultant LOS and demand to capacity (d/c) ratios.

Figure 27. Segment LOS and Demand-Capacity Ratios for No-Build Alternative



WB																			
Segment Type			Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic
2025	**AM**	**d/c**	0.52	0.78	0.84	0.78	0.74	0.81	0.87	0.81	0.83	0.80	0.89	0.80	0.84	0.91	1.03	1.01	0.96
		LOS	B	E	D	D	C	E	D	D	C	D	D	D	D	F	F	F	F
	PM	**d/c**	0.78	0.87	1.25	0.87	1.17	0.88	1.31	0.88	1.26	0.84	1.33	0.84	1.27	0.91	1.50	1.47	1.36
		LOS	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2045	**AM**	**d/c**	0.68	0.86	1.09	0.86	0.9	0.88	1.17	0.88	1.11	0.83	1.19	0.83	1.12	0.91	1.35	1.33	1.26
		LOS	C	F	F	F	C	F	F	F	F	F	F	F	F	F	F	F	F
	PM	**d/c**	1.01	0.98	1.62	0.98	1.45	0.96	1.75	0.96	1.69	0.88	1.77	0.88	1.69	0.91	1.97	1.92	1.79
		LOS	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
EB																			
Segment Type			Basic	Weave			Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic
2025	**AM**	**d/c**	0.76	1.43			1.06	1.25	1.23	1.21	1.19	1.26	1.25	1.23	1.19	1.35	1.47	0.91	1.32
		LOS	D	F			F	F	F	F	F	F	F	F	F	F	F	F	F
	PM	**d/c**	0.44	0.99			0.7	0.84	0.83	0.82	0.81	0.85	0.85	0.83	0.77	0.89	0.97	0.95	0.88
		LOS	B	C			C	D	D	D	D	C	D	D	D	D	E	E	E
2045	**AM**	**d/c**	0.97	1.81			1.15	1.43	1.41	1.39	1.36	1.45	1.43	1.41	1.34	1.52	1.67	0.91	1.47
		LOS	E	F			F	F	F	F	F	F	F	F	F	F	F	F	F
	PM	**d/c**	0.71	1.27			0.88	0.83	1.14	1.12	1.1	1.16	1.16	1.14	1.04	1.19	1.3	0.91	1.17
		LOS	C	F			F	F	F	F	F	F	F	F	F	F	F	F	F

Figure 28 and Figure 29 on the following pages summarize the No-Build LOS conditions for the study area – including freeway and intersection capacity analysis results.

Figure 28. No-Build LOS Summary for Study Area

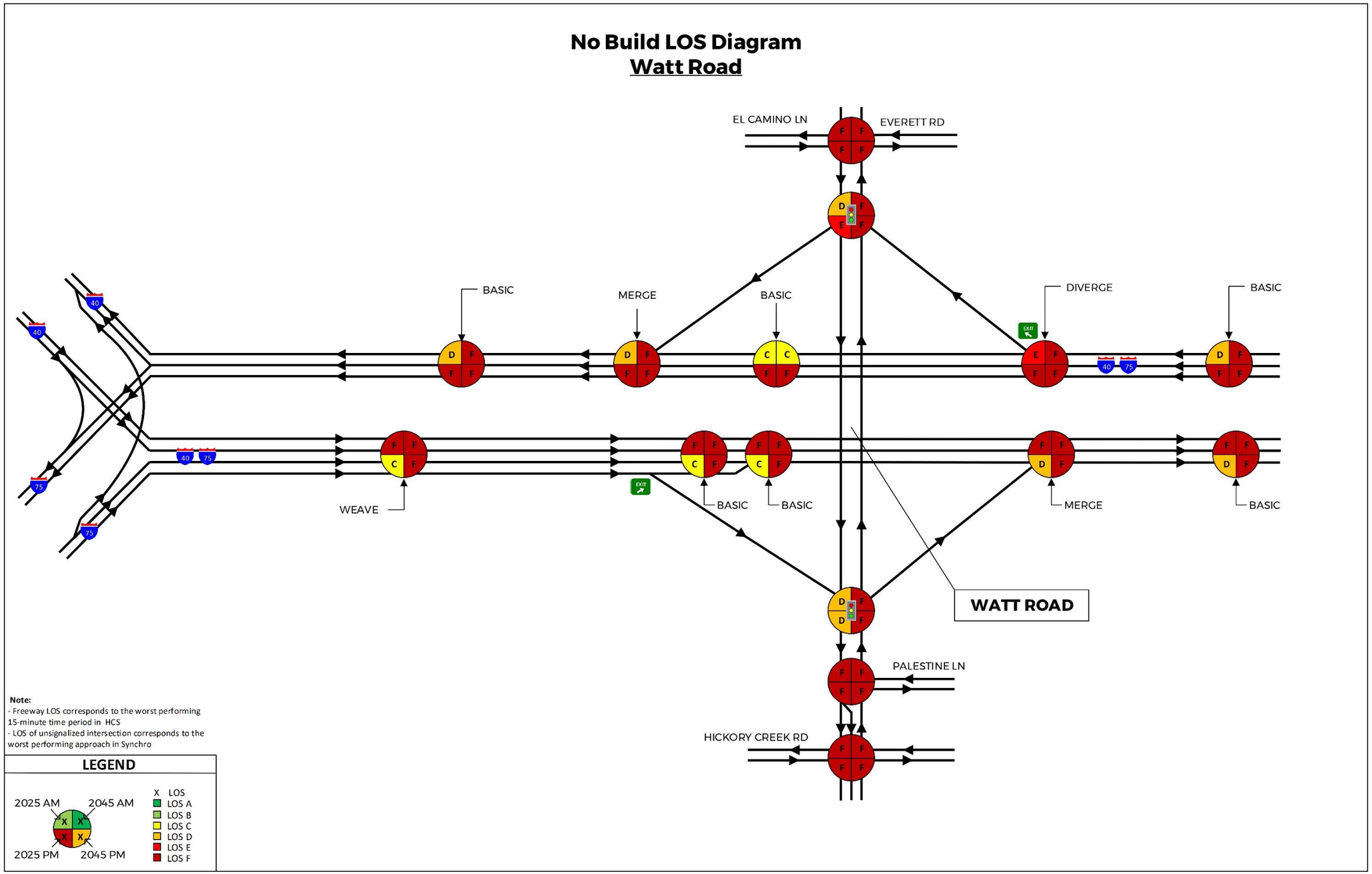
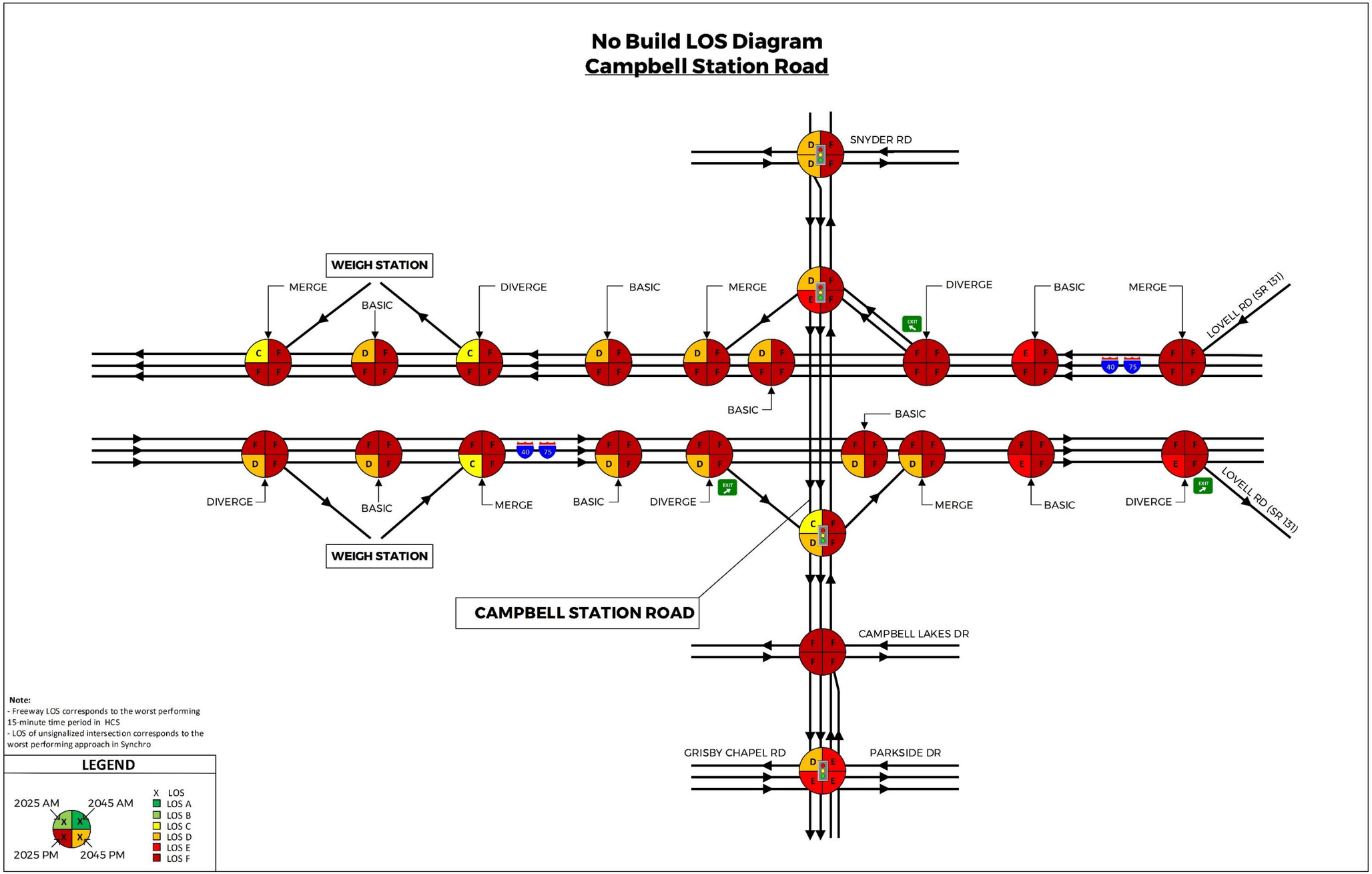


Figure 29. No-Build LOS Summary for Study Area (cont.)



5.4 2025 Build Alternative 1 – Single Point Urban Interchange (SPUI)

The 2025 Build Alternative 1 analysis was performed using the 2025 AM and PM peak hour volumes developed by TDOT and assumes a SPUI at the I-40/75 and Watt Road interchange. The following roadway improvements are assumed in the build alternatives:

- Widening of I-40/75 mainlines from six (6) to eight (8) lanes.
- Widen Watt Road to provide a four-lane cross-section between El Camino Lane/Everett Road and Palestine Lane.
- Realign and signalize the Watt Road and Everett Road/El Camino Lane intersection.
- Realign and signalize the Watt Road and Hickory Creek Road/Palestine Lane.

Freeway Analysis

The 2025 AM and PM peak hour traffic volumes and future lane geometrics were inputted into the HCS7 Freeway Facilities software module. Based on the freeway analysis, eleven (11) of the seventeen (17) segments in the eastbound direction are projected to operate at either LOS E or F in the AM peak hour. All seventeen (17) segments are projected to operate at LOS C or better in the PM peak. In the westbound direction, all segments are projected to operate at LOS D or better in the AM peak hour. In the PM peak, eight (8) of the seventeen (17) segments are projected to operate at LOS E or F.

Intersection Capacity Analysis

All the signalized intersections along Watt Road are projected to operate at an overall LOS B in both the AM and PM peak hours. The unsignalized approaches of gas station driveway is projected to operate at LOS C in the AM peak and LOS B in the PM peak.

5.5 2025 Build Alternative 2 – Diamond Interchange

The 2025 Build Alternative 2 analysis was performed using the 2025 AM and PM peak hour volumes developed by TDOT and assumes additional roadway improvements to the existing configuration at the I-40/75 and Watt Road interchange. However, the gore points for the ramps along I-40/75 are assumed to be in the same location for the purposes of the analysis. Therefore, the freeway analysis results are the same for both the build alternatives. The following roadway improvements are assumed in the build alternatives:

- Widening of I-40/75 mainlines from six (6) to eight (8) lanes.
- Widen Watt Road to provide a four-lane cross-section between El Camino Lane/Everett Road and Palestine Lane.
- Widen the westbound I-40/75 off-ramp at Watt Road to provide dual left and right-turn lanes.
- Widen the eastbound I-40/75 off-ramp at Watt Road to provide dual left and right-turn lanes.

- Realign and signalize the Watt Road and Everett Road/El Camino Lane intersection.
- Realign and signalize the Watt Road and Hickory Creek Road/Palestine Lane.

Freeway Analysis

Based on the freeway analysis, eleven (11) of the seventeen (17) segments in the eastbound direction are projected to operate at either LOS E or F in the AM peak hour. All seventeen (17) segments are projected to operate at LOS C or better in the PM peak. In the westbound direction, all segments are projected to operate at LOS D or better in the AM peak hour. In the PM peak, eight (8) of the seventeen (17) segments are projected to operate at LOS E or F.

Intersection Capacity Analysis

Based on the analysis, all the signalized intersections along Watt Road are projected to operate at LOS C or better in both the AM and PM peak hours. The unsignalized approach of the gas station driveway is projected to operate at LOS C in the AM peak hour and LOS B in PM peak.

5.6 2045 Build Alternative 1 – Single Point Urban Interchange (SPUI)

The 2045 Build Alternative 1 analysis was performed using the 2045 AM and PM peak hour volumes developed by TDOT and assumes a SPUI at the I-40/75 and Watt Road interchange. The following roadway improvements are assumed in the build alternatives:

- Widening of I-40/75 mainlines from six (6) to eight (8) lanes.
- Widen Watt Road to provide a four-lanes cross-section between El Camino Lane/Everett Road and Palestine Lane.
- Realign and signalize the Watt Road and Everett Road/El Camino Lane intersection.
- Realign and signalize the Watt Road and Hickory Creek Road/Palestine Lane.
- Relocation of the truck weigh stations between the Watt Road and Campbell Station Road interchanges

Freeway Analysis

The 2045 AM and PM peak hour traffic volumes and future lane geometrics were inputted into the HCS7 Freeway Facilities software module. Based on the freeway analysis, all the fifteen (15) segments in the eastbound direction are projected to operate at either LOS E or F in the AM peak hour. Two (2) of the fifteen (15) segments is projected to operate at LOS E in the PM peak. In the westbound direction, six (6) of the fifteen (15) segments are projected to operate at either LOS E or F in the AM peak hour. In the PM peak, all the fifteen (15) segments are projected to operate at LOS F.

Intersection Capacity Analysis

All the signalized intersections along Watt Road are projected to operate at an overall LOS D or better in both the AM and PM peak hours.

The eastbound El Camino Lane and the westbound Everett Road approaches are projected to operate at LOS E in both the AM and PM peak hours. The eastbound I-40/75 off-ramp approach is projected to operate at LOS E in the PM peak hour. The eastbound Hickory Creek Road approach is projected to operate at LOS F in the AM peak hour and at LOS E in the PM peak hour. The westbound Palestine Lane approach is projected to operate at LOS E in the AM peak hour.

The unsignalized approaches of gas station driveway is projected to operate at LOS D in the AM peak and LOS C in the PM peak.

5.7 2045 Build Alternative 2 – Diamond Interchange

The 2045 Build Alternative 2 analysis was performed using the 2045 AM and PM peak hour volumes developed by TDOT and assumes additional improvements to the existing Diamond interchange configuration. Since the gore points for the ramps along I-40/75 are assumed to be in the same location for the purposes of the analysis, the freeway analysis results are the same for both the build alternatives. The following roadway improvements are assumed in the build alternatives:

- Widening of I-40/75 mainlines from six (6) to eight (8) lanes
- Widen Watt Road to provide a four-lanes cross-section between El Camino Lane/Everett Road and Palestine Lane.
- Widen the westbound I-40/75 off-ramp at Watt Road to provide dual left-turn lanes.
- Realign and signalize the Watt Road and Everett Road/El Camino Lane intersection.
- Realign and signalize the Watt Road and Hickory Creek Road/Palestine Lane.
- Relocation of the truck weigh stations between the Watt Road and Campbell Station Road interchanges

Freeway Analysis

Based on the freeway analysis, all the fifteen (15) segments in the eastbound direction are projected to operate at either LOS E or F in the AM peak hour. Two (2) of the fifteen (15) segments is projected to operate at LOS E in the PM peak. In the westbound direction, six (6) of the fifteen (15) segments are projected to operate at either LOS E or F in the AM peak hour. In the PM peak, all the fifteen (15) segments are projected to operate at LOS F.

Intersection Capacity Analysis

Based on the analysis, all the signalized intersections along Watt Road are projected to operate at LOS D or better in both the AM and PM peak hours.

At the two ramp terminal intersections, the eastbound El Camino Lane approach is projected to operate at LOS F in both the AM and PM peak hours. The westbound Everett Road approach is projected to operate at LOS E in the AM peak hour and at LOS F in the PM peak. The westbound I-40/75 off-ramp approach is projected to operate at

LOS E in the PM peak hour. The eastbound I-40/75 off-ramp approach is projected to operate at LOS F in the PM peak hour.

At the Watt Road and Palestine Lane/Hickory Creek Road Road intersection, the northbound Watt Road approach is projected to operate at LOS E in the AM peak hour. The eastbound Hickory Creek Road approach is projected to operate at LOS E in both the AM and PM peak hours. The westbound Palestine Lane approach is projected to operate at LOS F in the AM peak hour and at LOS E in the PM peak.

The unsignalized approach of gas station driveway is projected to operate at LOS D in the AM peak and LOS C in the PM peak.

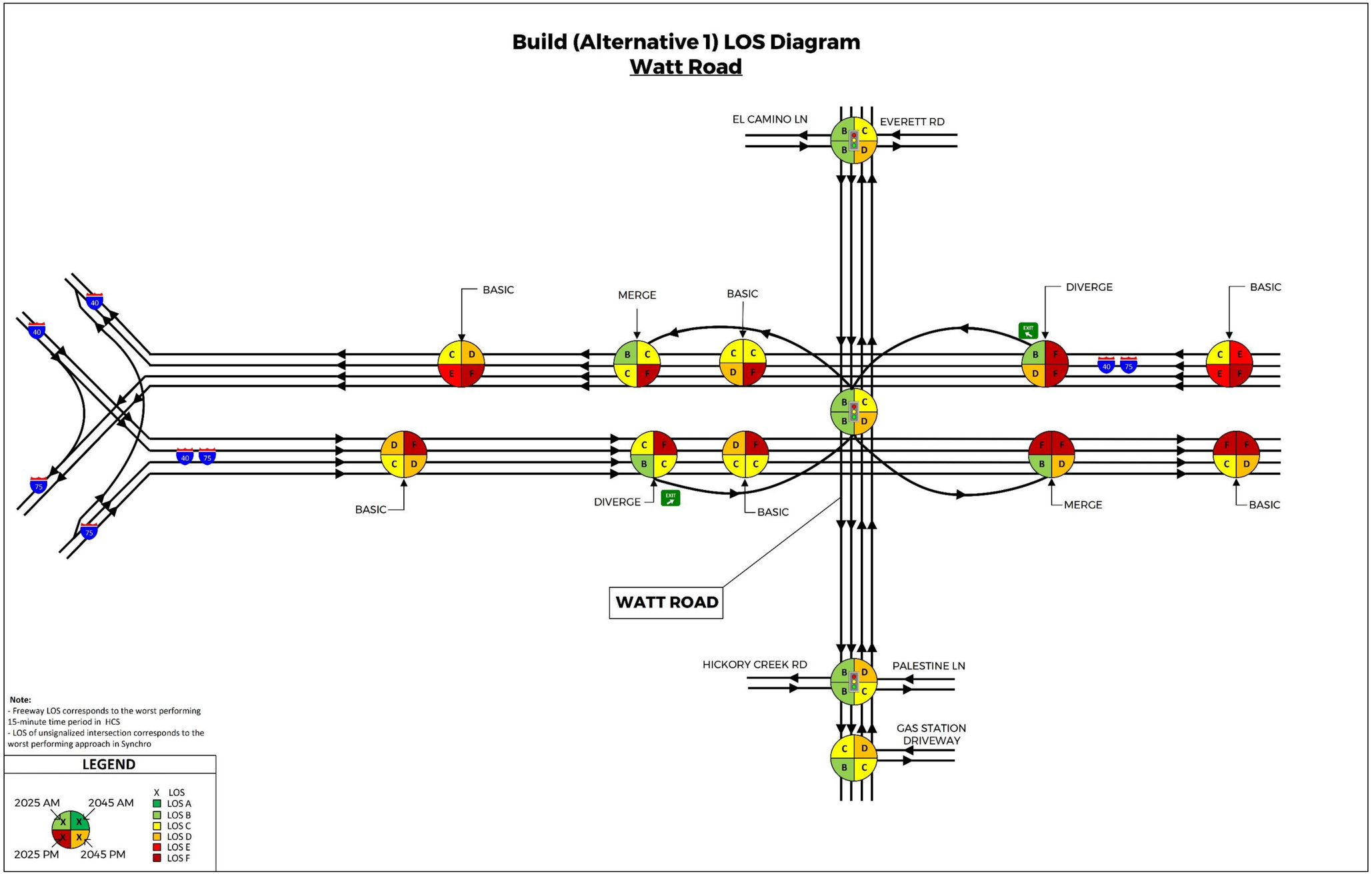
Table 7 summarizes the LOS results for intersections within the study area across the 2025 and 2045 Build Alternative 1 condition. Furthermore, Figure 30 depicts these results in relation to the freeway analysis results near the subject interchange.

Table 7. Build Alternative 1 Capacity Analysis Summary

Intersection	2025 LOS AM/PM	2025 Delay AM/PM	2025 95th Percentile Queue* (feet) AM/PM	2045 LOS AM/PM	2045 Delay AM/PM	2045 95th Percentile Queue* (feet) AM/PM
El Camino Lane/Everett Road						
Northbound Approach	A/B	6.2/10.5	81/96	B/C	15.5/28.2	300/400
Southbound Approach	B/B	11.3/17.7	99/145	C/D	33.4/45.0	427/#501
Eastbound Approach	D/D	37.3/39.2	32/88	E/E	74.3/78.4	#238/#365
Westbound Approach	D/C	35.9/34.1	78/106	E/E	61.0/66.6	#197/#285
Overall Intersection LOS	B/B	13.3/19.9	-	C/D	30.4/44.1	-
I-40/75 Ramps						
Northbound Approach	B/A	11.5/8.9	211/56	D/B	40.7/18.6	m#484/m396
Southbound Approach	B/B	13.9/14.3	73/78	B/D	19.9/42.5	253/m#318
Eastbound Approach	C/C	31.5/34.6	97/173	D/E	40.5/68.9	207/#471
Westbound Approach	C/C	22.2/27.2	163/228	C/C	27.6/33.4	377/#562
Overall Intersection LOS	B/B	17.3/19.7	-	C/D	33/37.5	-
Hickory Creek Road/Palestine Lane						
Northbound Approach	B/B	12.3/11.3	326/221	D/C	51.1/27.4	#1207/669
Southbound Approach	A/A	4.0/7.7	62/276	B/C	14.1/21.0	253/m771
Eastbound Approach	D/D	40.0/36.4	83/97	F/E	88.1/62.1	#152/116
Westbound Approach	D/C	38.6/33.0	86/58	E/D	69.4/52.9	191/118
Overall Intersection LOS	B/B	11.4/11.5	-	D/C	38.4/26.0	-
Gas Station Driveway						
Worst Approach LOS	C/B	15.6/13.3	5.0/5.0	D/C	33.5/22.9	25/20

*Longest 95th Percentile Queues for the approach are reported
m - Volume for 95th Percentile queue is metered by upstream signal
- 95th percentile volume exceeds capacity, queue may be longer
$ - Delay exceeds 300 s

Figure 30. Build Alternative 1 LOS Summary for Study Area



Similar to Build Alternative 1, the LOS results for intersections within the study area across the 2025 and 2045 Build Alternative 2 condition are summarized in Table 8. Furthermore, Figure 31 depicts these results in relation to the freeway analysis results near the subject interchange.

Table 8. Build Alternative 2 Capacity Analysis Summary

Intersection	2025 LOS AM/PM	2025 Delay AM/PM	2025 95th Percentile Queue* (feet) AM/PM	2045 LOS AM/PM	2045 Delay AM/PM	2045 95th Percentile Queue* (feet) AM/PM
El Camino Lane/Everett Road						
Northbound Approach	A/A	4.1/7.9	75/69	B/C	14.1/22.0	m#242/m#262
Southbound Approach	A/B	6.5/12.3	72/113	B/B	10.7/17.9	198/270
Eastbound Approach	D/D	37.3/39.2	32/88	F/F	131.5/135.9	#272/#367
Westbound Approach	D/C	35.8/34.0	78/105	E/F	68.5/101.2	#196/#274
Overall Intersection LOS	B/B	10.8/17.1	-	C/D	27.0/44.3	-
I-40/75 Westbound Ramps						
Northbound Approach	B/B	15.7/14.5	122/111	C/C	23.9/33.3	#304/m#218
Southbound Approach	A/A	8.8/9.6	84/127	C/D	26.0/39.8	m#396/m#415
Westbound Approach	D/C	35.9/32.3	158/211	D/E	53.9/70.2	#388/#535
Overall Intersection LOS	C/B	21.4/19.6	-	C/D	34.9/48.9	-
I-40/75 Eastbound Ramps						
Northbound Approach	A/A	6.2/6.1	328/151	D/B	43.5/15.0	m#952/m470
Southbound Approach	A/A	8.3/7.8	79/145	B/B	13.5/14.6	m195/m301
Eastbound Approach	D/C	37.1/33.4	99/155	D/F	51.2/80.7	203/#380
Overall Intersection LOS	B/B	11.9/12.7	-	C/C	34.8/28.9	-
Hickory Creek Road/Palestine Lane						
Northbound Approach	B/B	12.9/11.3	318/206	E/C	73.0/25.2	#1066/#589
Southbound Approach	A/A	3.8/7.7	93/224	A/D	9.7/43.7	172/m#739
Eastbound Approach	D/D	38.2/40.4	84/105	E/E	66.1/56.7	#132/#140
Westbound Approach	D/D	46.8/42.2	92/66	F/E	117.0/70.4	#235/#132
Overall Intersection LOS	B/B	11.9/11.9	-	D/D	49.9/37.6	-
Gas Station Driveway						
Worst Approach LOS	C/B	15.6/13.3	5.0/5.0	D/C	33.5/22.9	25/20

*Longest 95th Percentile Queues for the approach are reported

Note: Queues rep

m - Volume for 95th Percentile queue is metered by upstream signal
- 95th percentile volume exceeds capacity, queue may be longer
$ - Delay exceeds 300 s

Figure 31. Build Alternative 2 LOS Summary for Study Area

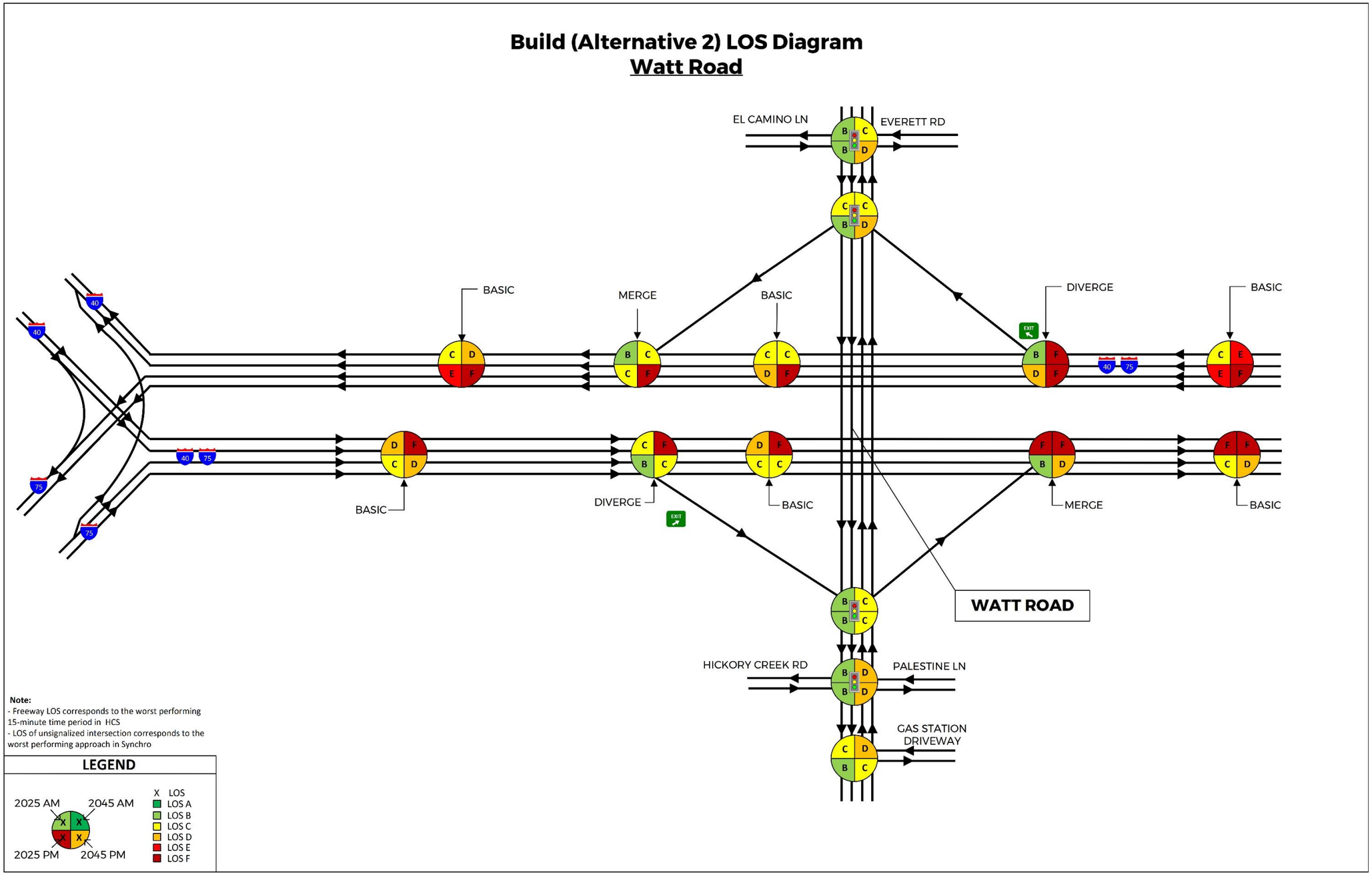
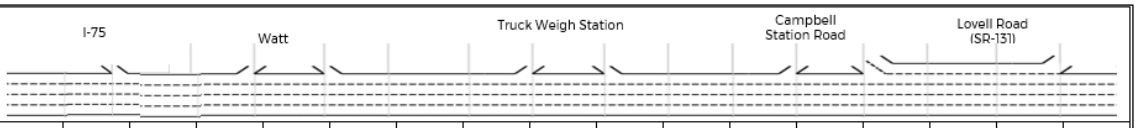


Figure 32 outlines freeway segment LOS along I-40/75 from the I-40/75 system interchange to Lovell Road (SR-131) for both 2025 and 2045 under Build Alternative 1 and Build Alternative 2 conditions.

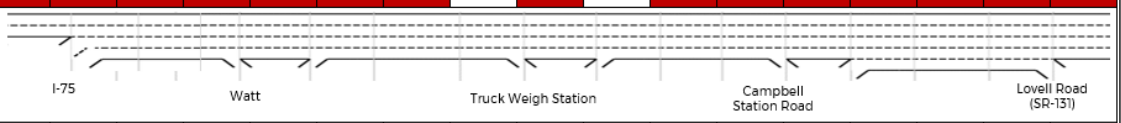
*Figure 32. Segment LOS and Demand-Capacity Ratios for Build Alternatives**

WB



Segment Type			Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic
2025	**AM**	**d/c**	0.52	0.62	0.63	0.62	0.56	0.64	0.66	0.70	0.62	0.65	0.66	0.65	0.63	0.60	0.62	0.61	0.72
		LOS	C	C	C	B	C	B	C	C	C	B	C	B	C	B	C	C	D
	PM	**v/c**	0.78	0.91	0.94	0.91	0.88	0.96	0.98	0.96	0.95	0.96	1.00	0.96	0.95	0.86	0.90	0.86	1.02
		LOS	D	F	E	C	D	D	E	F	E	D	E	C	E	B	D	D	F
2045	**AM**	**v/c**	0.68	0.81	0.82	0.81	0.67	0.88	0.89	-	0.89	-	0.89	0.88	0.84	0.79	0.81	0.79	0.94
		LOS	C	F	D	C	C	F	E	-	E	-	E	C	D	B	D	D	E
	PM	**v/c**	1.01	0.92	1.22	0.92	1.08	0.96	1.33	-	1.33	-	1.33	0.96	1.26	0.83	1.18	0.83	1.34
		LOS	F	F	F	F	F	F	F	-	F	-	F	F	F	F	F	F	F

EB



Segment Type			Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic
2025	**AM**	**d/c**	0.76	0.82	0.93	0.82	0.89	0.92	1.01	0.92	0.98	0.93	1.03	0.93	0.99	0.86	0.95	0.93	1.08
		LOS	D	F	D	C	D	F	F	C	E	F	F	F	E	D	F	F	F
	PM	**d/c**	0.44	0.54	0.61	0.60	0.53	0.63	0.62	0.62	0.61	0.64	0.63	0.62	0.57	0.53	0.58	0.57	0.66
		LOS	B	C	C	B	C	B	C	B	C	B	C	B	C	C	C	C	C
2045	**AM**	**d/c**	0.97	0.87	1.05	0.87	0.95	0.91	1.14	-	1.14	-	1.14	1.14	1.09	0.98	1.09	1.07	1.22
		LOS	E	F	F	F	F	F	F	-	F	-	F	F	F	F	F	F	F
	PM	**d/c**	0.71	0.76	0.86	0.76	0.70	0.84	0.90	-	0.90	-	0.90	0.84	0.83	0.76	0.81	0.76	0.92
		LOS	C	E	D	C	C	D	D	-	D	-	D	C	D	D	D	D	E

**Freeway analysis is the same for the two build alternatives.*

6.0 Constructability & Cost Estimates

A multi-phase construction is proposed for both alternatives in order to maintain functionality of I-40/75 and Watt Road during the construction phase. The following options lay out potential means of constructing each alternative. In addition, preliminary estimated construction costs for each alternative are outlined below. TDOT's most current Strategic Transportation Investments Division (STID) tool was utilized to develop these costs. See Appendix D for detailed cost calculations.

6.1 Build Alternative 1

Build Alternative 1 includes construction of a new bridge structure to the west of the existing bridge, while maintaining the existing geometric features of the interstate mainlines for the SPUI concept. The following general phases could be implemented for building out Build Alternative 1:

Phase 1

- Construct SPUI bridge over I-40/75.
- Construct majority of all four (4) proposed interstate ramps to Watt Road.
- Construct retaining walls.
- Construct new alignment portions of Watt Road.
- Construct adjoining side street/intersection improvements (i.e. El Camino Lane, Everett Road, and Hickory Creek Road)

Phase 2

- Transfer traffic to new SPUI structure.
- Finalize ramp ties and improvements.
- Scarify and abandon old, existing pavement.
- Final surface pavement and striping.

The total projected cost for Build Alternative 1 is $48,900,000. Figure 33[21] outlines the total cost for this alternative, broken down into preliminary engineering, ROW, utilities, and construction phases, as well as inflated estimates for the opening and future years – utilizing a 5% inflation factor.

Figure 33. Build Alternative 1 Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
0.00	Modify Interchange	$ 2,910,000	$ 1,570,000	$ 1,380,000	$ 43,000,000	$ 48,900,000

INFLATED COST ESTIMATE SUMMARY						Report Type: Technical Report
3	2025	$ 3,370,000	$ 1,820,000	$ 1,600,000	$ 49,800,000	$ 56,600,000
23	2045	$ 8,940,000	$ 4,820,000	$ 4,240,000	$ 132,000,000	$ 150,000,000

[21] Referenced directly from the TDOT STID tool – "Inflated Cost" tab.

6.2 Build Alternative 2

Build Alternative 2 includes improving the existing diamond configuration by adding lanes on the ramps and Watt Road and removing and replacing the existing bridge, while maintaining the existing geometric features of the interstate mainlines. The following general phases could be implemented for building out Build Alternative 2:

Phase 1

- Construct west side portion of new structure (i.e. new southbound lanes and median on Watt Road).
- Construct new alignment portions of Watt Road.
- Construct additional lanes on ramps.

Phase 2

- Shift traffic to new structure.
- Remove and replace existing structure and tie-into new.
- Construct adjoining side street/intersection improvements (i.e. El Camino Lane, Everett Road, and Hickory Creek Road).

Phase 3

- Finalize ramp ties and improvements.
- Scarify and abandon old, existing pavement.
- Final surface pavement and striping.

The total projected cost for Build Alternative 2 is $41,600,000. Similar to Build Alternative #1, Figure 34 outlines the total cost for this alternative, broken down into preliminary engineering, ROW, utilities, and construction phases, as well as inflated estimates for the opening and future years – utilizing a 5% inflation factor.

Figure 34. Build Alternative 2 Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Modify Interchange	$ 2,620,000	$ 1,610,000	$ 1,380,000	$ 36,000,000	$ 41,600,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 3,030,000	$ 1,860,000	$ 1,600,000	$ 41,700,000	$ 48,200,000
23	2045	$ 8,050,000	$ 4,950,000	$ 4,240,000	$ 111,000,000	$ 128,000,000

6.3 Interstate Improvements

Interstate improvements within the study area include widening the interstate from six (6) to eight (8) lanes total from the I-40/75 system junction to Lovell Road (SR-131). In addition, it is proposed to add an auxiliary lane in direction between Campbell Station Road and Lovell Road (SR-131). The total projected cost for these improvements is $79,000,000. Table 9 further breaks down this overall cost into specific construction components.

Table 9. Interstate Improvements Projected Cost Estimate

Improvements Description	Interstate Improvements
Widen approximately 6.14 miles of I-40/75 mainlines from the I-40/75 system interchange to Lovell Road (SR-131) from six (6) lanes to eight (8) lanes. This includes bridge improvements to the following bridges to accommodate widening improvements: Everett Road, Turkey Creek, and Lovell Road (SR-131).	$68,400,000
Widen approximately 1.14 miles of I-40/75 from Campbell Station Road to Lovell Road (SR-131) to add an auxiliary lane in each direction.	$10,600,000
Total Projected Cost (2021)	**$79,000,000**

Figure 35 and Figure 36 outline the total cost for these improvements, broken down into preliminary engineering and construction phases, as well as inflated estimates for the opening and future years – utilizing a 5% inflation factor.

Figure 35. 8 Lane Widening Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Widen	$ 3,540,000	$ -	$ -	$ 64,900,000	$ 68,400,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 4,100,000	$ -	$ -	$ 75,100,000	$ 79,200,000
23	2045	$ 10,900,000	$ -	$ -	$ 199,000,000	$ 210,000,000

Figure 36. Auxiliary Lanes Total Cost & Inflated Costs

COST ESTIMATE SUMMARY (2021)						
PIN	Project Type of Work	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Project Cost (2021):
N/A	Widen	$ 960,000	$ -	$ -	$ 9,600,000	$ 10,600,000

INFLATED COST ESTIMATE SUMMARY					Report Type:	Technical Report
No. of Years	Year	Preliminary Engineering:	Right-of-Way:	Utilities:	Construction:	Total Inflated Project Cost
3	2025	$ 1,110,000	$ -	$ -	$ 11,100,000	$ 12,300,000
23	2045	$ 2,950,000	$ -	$ -	$ 29,500,000	$ 32,600,000

7.0 Summary

Based on the operational deficiencies and anticipated growth within the study area, both Build Alternative 1 and Build Alternative 2 provide operational improvements to the future network compared to the No Build Alternative. Both alternatives improve level of service along Watt Road. Both alternatives require right-of-way (ROW) acquisition as part of the ultimate buildout.

Build Alternative 1 shifts the alignment of Watt Road to the west to develop and construct the SPUI concept. Build Alternative 2 maintains the existing alignment and configuration of the interchange but adds lanes to the bridge, ramps, and along Watt Road within the study area. Build Alternative 1 has a total cost estimate of $48,900,000. Build Alternative 2 has a total cost estimate of $41,600,000.

In addition to interchange improvements, it is proposed to widen the interstate from six (6) lanes total to eight (8) lanes, as well as add an auxiliary lane in each direction along the interstate mainlines from Campbell Station Road to Lovell Road (SR-131). These interstate improvements have a total cost estimate of $79,000,000.

Appendix A –Mobility Plan 2045 Project Sheets

Contents

Table G-4. Fiscally Constrained Projects in Knox County

KRMP ID	PROJECT NAME	AGENCY	FACILITY NAME	FROM	TO	LENGTH (MILES)	DESCRIPTION	HORIZON YEAR	HORIZON YEAR COST	PROPOSED FUNDING SOURCE	PM IMPACT
EAST TENNESSEE HUMAN RESOURCE AGENCY (ETHRA)											
21-1002	ETHRA Transit Vehicle Replacement Project	ETHRA	-	-	-	N/A	Purchase of demand response transit vehicles for fleet replacement	2026	$1,348,650	L-STBG	4
TOWN OF FARRAGUT											
09-629	I-40/I-75/Campbell Station Road Interchange	Farragut	Interchange of I-40/75 at Campbell Station Rd			-	Reconfigure existing interchange to improve capacity, safety and operations.	2030	$54,546,881	NHPP	1,3
09-630	Virtue Road Reconstruction	Farragut	Virtue Rd	Boyd Station Rd	2200' S of Broadwood Dr	0.95	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2026	$7,716,121	L-STBG	1,2
09-668	Kingston Pike (SR 1) Widening	Farragut	Kingston Pk	Smith Rd	Campbell Station Rd	1.40	Widen from 4 to 6 lanes with addition of bicycle/pedestrian facilities	2040	$28,812,844	NHPP	1,2,3
09-669	Everett Road Improvements	Farragut	Everett Rd	Watt Rd	Split Rail Lane	2.50	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2045	$41,173,191	L-STBG	1,2
09-691	I-40/75 Widening	Farragut	I-40/75	I-40/75 Interchange	Campbell Station Rd Interchange	5.30	Widen from 6 to 8 lanes	2035	$54,503,516	NHPP	3
13-601	Union Road /N Hobbs Road Reconstruction	Farragut	Union Rd/N. Hobbs Rd	Everett Rd	Kingston Pike (SR 1)	1.00	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2026	$4,546,000	L-STBG	1,2
13-603	I-40/75 Auxiliary Lanes	Farragut	I-40/75	Campbell Station Rd Interchange	Lovell Rd Interchange	1.40	Construct eastbound and westbound auxiliary lanes between interchanges	2030	$12,412,500	NHPP	3
13-813	Farragut Advanced Traffic Management System - Ph 1	Farragut				N/A	Advanced Traffic Management Systems (ATMS) are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project includes the Town's entire signal system.	2026	$7,738,167	CMAQ	3
19-703	Jamestowne Boulevard Study	Farragut	Jamestowne Boulevard	SR 1 (Kingston Pike)	Campbell Station Road	N/A	Feasibility and planning study to determine needed improvements to Jamestowne Boulevard in Farragut to provide additional route for motorists and pedestrians to bypass intersection of Kingston Pike at Campbell Station Road.	2026	$88,184	L-STBG	-

KRMP ID	PROJECT NAME	AGENCY	FACILITY NAME	FROM	TO	LENGTH (MILES)	DESCRIPTION	HORIZON YEAR	HORIZON YEAR COST	PROPOSED FUNDING SOURCE	PM IMPACT
KNOXVILLE AREA TRANSIT (KAT)											
21-1003	Purchase KAT Vehicles - Fixed Route Buses	KAT	-	-	-	N/A	Purchase of fixed-route buses for fleet replacement or minor expansion	2026	$25,480,360	L-STBG/CMAQ	4
21-1004	KAT Bus Engine Overhauls	KAT	-	-	-	N/A	Mid-life engine overhauls on 46 transit buses. An engine "overhaul" is a mid-life action on a major component that enables an asset to achieve its useful life and is an FTA-eligible activity under Circular 5010.1E	2026	$5,248,971	L-STBG	4
KNOX COUNTY											
09-625	Schaad Road Widening	Knox County	Schaad Rd	Oak Ridge Hwy (SR 62)	Pleasant Ridge Rd	1.50	Widen from 2 to 4 lanes with addition of sidewalks	2026	$12,676,484	Local	1,2,3
09-637	Lovell Road Widening (SR 131)	Knox County	Lovell Rd (SR 131)	Cedardale Ln	Middlebrook Pk	1.70	Widen 2-lane to 4-lane, including pedestrian and bicycle facilities.	2030	$25,490,954	L-STBG	1,2,3
09-644	Gov John Sevier Highway (SR 168)	Knox County	Gov John Sevier Hwy (SR 168)	Alcoa Hwy (SR 115/US 129)	Chapman Hwy (US 441/SR 71)	6.50	Widen from 3 to 4-lane divided roadway	2035	$105,690,856	S-STBG	1,2,3
09-645	Northshore Drive (SR 332)	Knox County	Northshore Dr (SR 332)	Morrell Rd	Ebenezer Rd	3.50	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2035	$31,875,020	S-STBG	1,2,3
09-646	Northshore Drive (SR 332)	Knox County	Northshore Dr (SR 332)	Pellissippi Pkwy (SR 162)	Concord Rd (SR 332)	4.50	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2040	$47,359,784	S-STBG	1,2,3
09-647	Pellissippi Parkway (SR 162)	Knox County	Pellissippi Pkwy (SR 162)	Edgemoor Rd (SR 170)	Dutchtown Rd	6.00	Corridor safety and capacity improvements to include access control, interchange reconstruction, frontage roads, additional/auxiliary lanes and provision for a shared use path	2030	$101,976,781	NHPP	1,2,3
09-651	I-40/I-75/Watt Road Interchange	Knox County	I-40 at Watt Rd Interchange	Interchange at Watt Rd		-	Reconfigure existing interchange to improve capacity, safety and operations.	2026	$24,250,665	NHPP	1,3
09-673	Oak Ridge Highway (SR 62)	Knox County	Oak Ridge Hwy (SR 62)	Byington Beaver Ridge Rd (SR 131)	Pellissippi Pkwy (SR 162)	4.20	Widen from 2 to 4 lanes	2035	$62,743,460	NHPP	2,3
10-700	Campbell Station Road Improvements	Knox County	Campbell Station Road	I-40	Hardin Valley Road	3.30	Widening and realignment of Campbell Station Rd from I-40 to Hardin Valley Rd	2030	$27,487,702	L-STBG	1,2

Appendix B – Traffic Data

Contents

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: _____ ROUTE: I-40/75
COUNTY: KNOX CITY: KNOXVILLE
PROJECT PIN NUMBER: _____
PROJECT DESCRIPTION: FROM S.R. 73 INTERCHANGES TO I-140/S.R. 162 INTERCHANGE.
INCLUDES S.R. 73, WATT RD., CAMPBELL STATION RD., S.R. 131 & I-140.

DIVISION REQUESTING:

MAINTENANCE	☐	PAVEMENT DESIGN	☐
S.T.I.D.	☒	STRUCTURES	☐
PROG. DEVELOPMENT & ADM.	☐	SURVEY & ROADWAY DESIGN	☐
PUBLIC TRANS. & AERO.	☐	TRAFFIC SIGNAL DESIGN	☐
		OTHER WSP USA	☒

YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: _____
PROJECTED LETTING DATE: _____

TRAFFIC ASSIGNMENT:

BASE YEAR		[SEE ATTACHMENTS] DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
	2025				2045					

REQUESTED BY: NAME PAIGE HARRIS DATE 6/28/21
DIVISION WSP USA
ADDRESS 2100 WEST END AVE. SUITE 630
NASHVILLE TN 37203

REVIEWED BY: RANDY BOGUSKIE Randy Boguskie DATE 7/19/2021
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: TONY ARMSTRONG Tony Armstrong DATE 7/19/2021
TRANSPORTATION MANAGER 2
SUITE 1000, JAMES K. POLK BUILDING

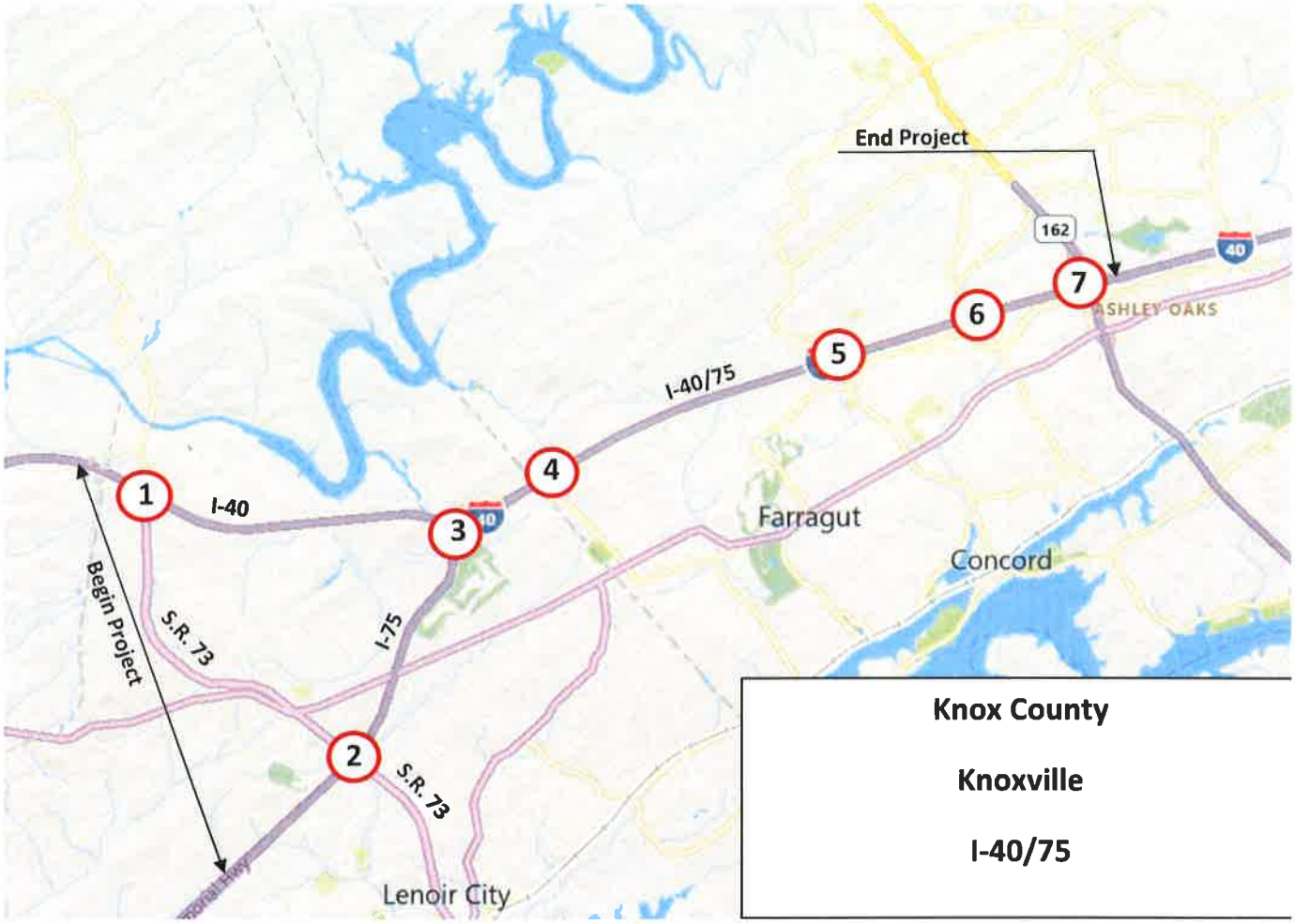
COMMENTS:

THIS TRAFFIC IS BASED ON 2019 CYCLE AND RAMPS COUNTS, [4] 8-HOUR TURNING MOVEMENT COUNTS [OCT. 2018] AND [12] 8-HOUR TURNING MOVEMENT COUNTS [APRIL 2021]. THE DESIGN YEAR TRAFFIC IS BASED ON GROWTH RATES FROM THE KNOXVILLE [LRTP] TPO COMPUTER ASSIGNMENT MODEL PLUS TRIP GENERATION FOR THE DEVELOPMENT PROPOSED AT THE WATT ROAD INTERCHANGE. AADT's, AND BOTH YEAR DHV's ARE INCLUDED.

Cc: SHAUN ARMSTRONG, S.T.I.D.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS. (REV. 6/9/21)


End Project
162
40
7
6
5
I-40/75
4
1
I-40
3
40
Farragut
Concord
Begin Project
S.R. 73
I-75
2
S.R. 73
Lenoir City
Knox County
Knoxville
I-40/75

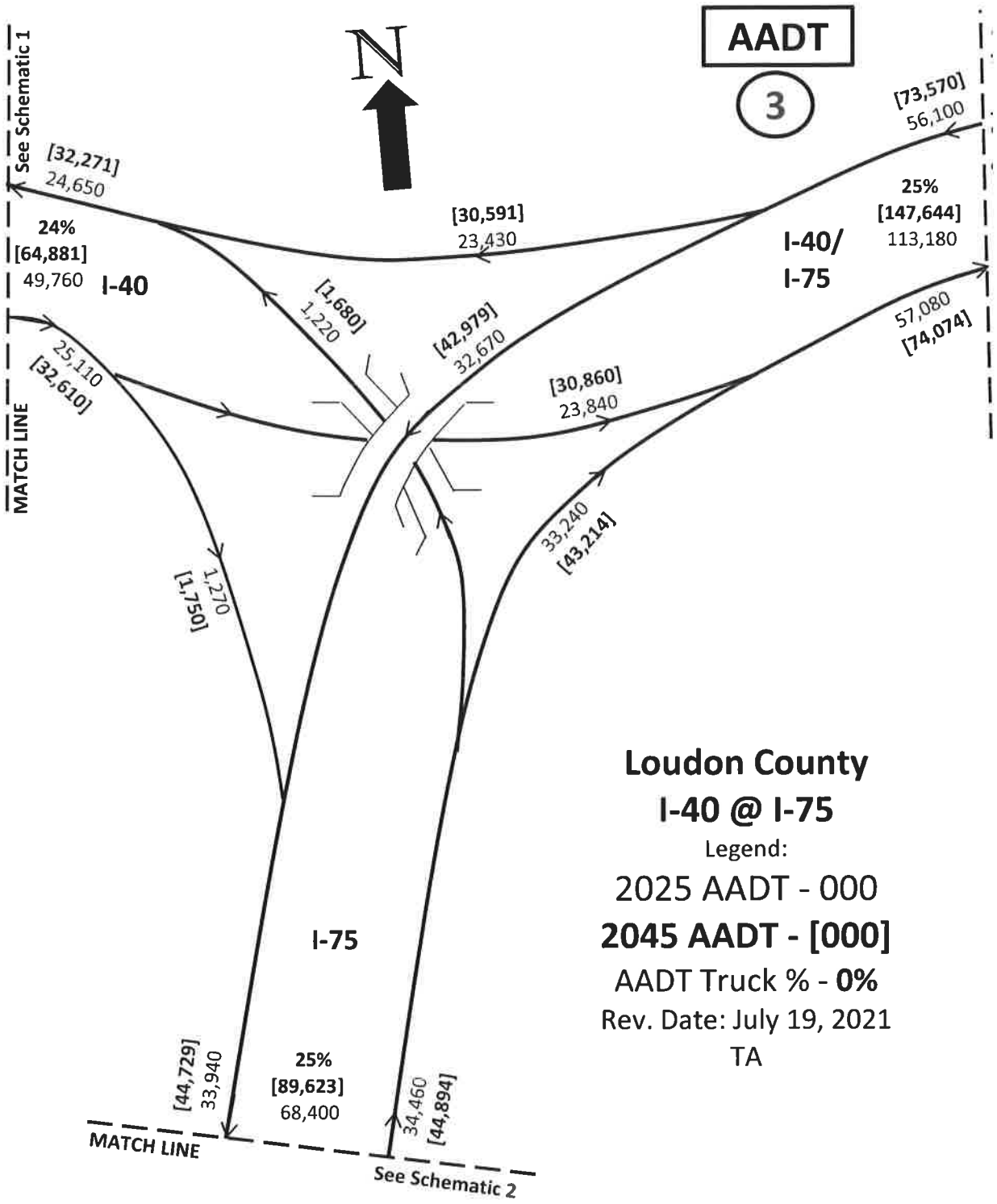
TOTAL PROJECT

	Proposed Use
1-3	Two 2,000sf Fast Food, 1 90 Room Hotel
4	1 Casual Dining Restaurant
5-6	2 120 Room Hotels
7	120 Room Hotel
8	Entertainment Destination
9	Destination Hotel Resort (Knox Portion)
10-12	3 Casual Dining Restaurants
13	Destination Hotel Resort (Loudon Portion)
14	300 Apartments Phase II (Loudon)
15	12 Field Regional Outdoor Sports Complex
16	8-Court Indoor Sports Facility
17	4,000 SF C-Store
18	10,000sf Shopping Center
19	300 Apartments Phase I
	TOTAL

					Weekday			AM Peak			PM Peak			
		Size	Units	ITE LU Code	Total	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	# of Employees
1	Fast Food	2000	square feet	934	942	471	471	80	41	39	65	34	31	20
2	Fast Food	2000	square feet	934	942	471	471	80	41	39	65	34	31	20
3	Hotel	90	rooms	310	752	376	376	42	25	17	54	28	26	36
4	Casual Dining	10000	square feet	932	1122	561	561	99	54	45	98	61	37	99
5	Hotel	120	rooms	310	928	464	464	55	32	23	64	33	31	48
6	Hotel	120	rooms	310	928	464	464	55	32	23	64	33	31	48
7	Hotel	120	rooms	310	928	464	464	55	32	23	64	33	31	48
8	Entertainment Destination	Assume no Weekday traffic generation												
9	Resort Hotel	400	rooms	330	3344	1672	1672	128	92	36	153	66	87	160
10	Casual Dining	10000	square feet	932	1122	561	561	99	54	45	98	61	37	99
11	Casual Dining	10000	square feet	932	1122	561	561	99	54	45	98	61	37	99
12	Casual Dining	10000	square feet	932	1122	561	561	99	54	45	98	61	37	99
13	Resort Hotel	400	rooms	330	3344	1672	1672	128	92	36	153	66	87	160
14	Apartments	300	dwellings	220	2196	1098	1098	138	32	106	168	106	62	
15	Sports Fields	12	fields	488	856	428	428	12	7	5	197	130	67	
16	Indoor Athletic Facility	20000	square feet	493	189	116	73	63	38	25	126	78	48	
17	Convenience Store	4000	square feet	851	3049	1524	1525	250	125	125	196	100	96	12
18	Shopping Center	36000	square feet	820	1359	679	680	34	21	13	137	66	71	99
19	Apartments	300	dwellings	220	2196	1098	1098	138	32	106	168	106	62	
				TOTAL	26441	13241	13200	1654	858	796	2066	1157	909	1047

Categories for Input to ITE Internal Trip Calculator

Retail	4,408	2,203	2,205	284	146	138	333	166	167
Restaurant	6,372	3,186	3,186	556	298	258	522	312	210
Residential	4,392	2,196	2,196	276	64	212	336	212	124
Hotel	10,224	5,112	5,112	463	305	158	552	259	293
All Other LU's	1,045	544	501	75	45	30	323	208	115
	26,441	13,241	13,200	1,654	858	796	2,066	1,157	909
Internal Capture %	21%	19%	23%	13%	12%	13%	29%	26%	33%
Internal Trips	5,553	2,516	3,036	212	106	106	594	297	297
External Trips	20,888	10,725	10,164	1,442	752	690	1,472	860	612
Trip Generation used in Traffic Model Trips	12,260	6,130	6,130	846	430	416	861	492	369



Loudon County

I-40 @ I-75

Legend:

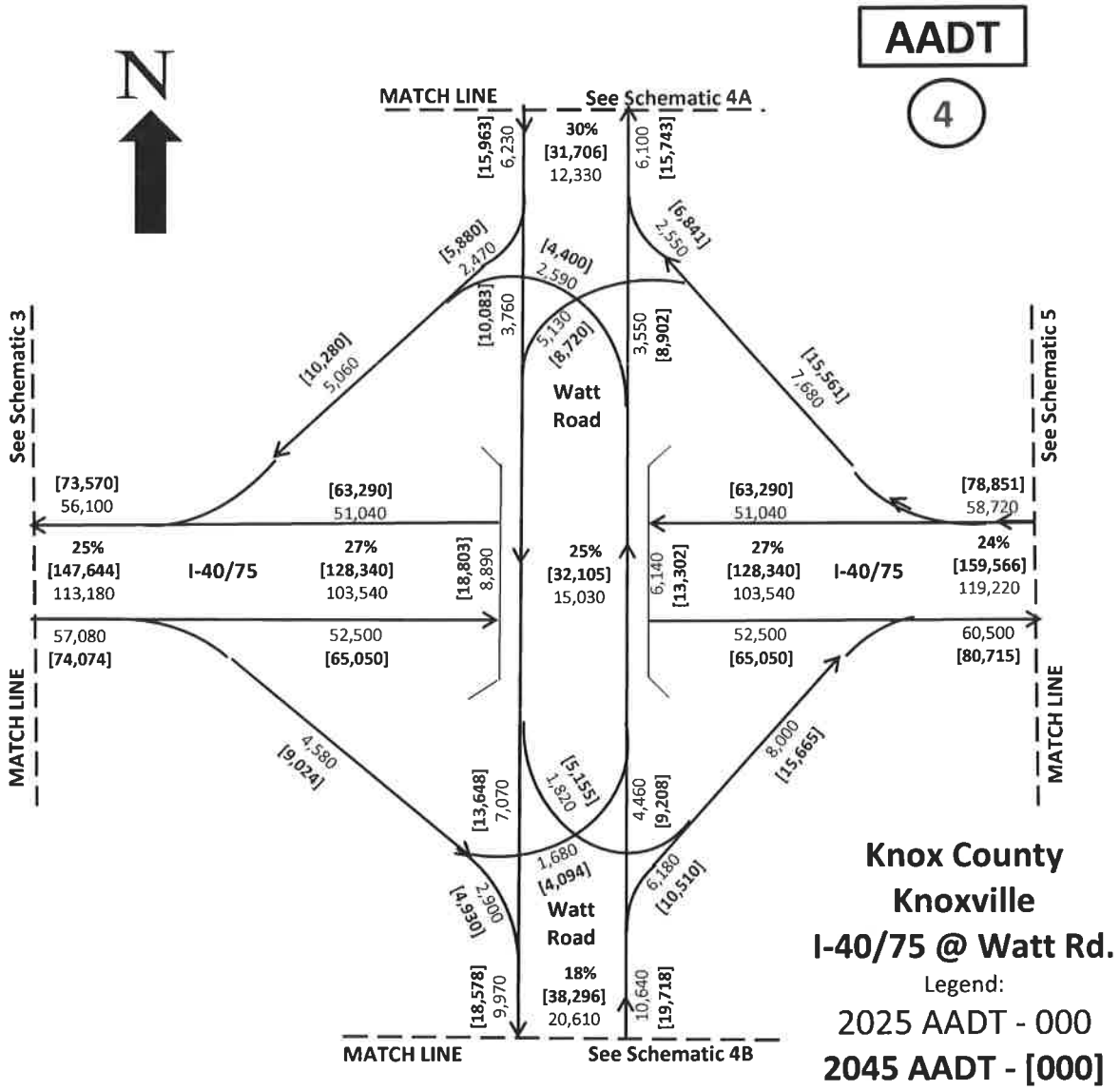
2025 AADT - 000

2045 AADT - [000]

AADT Truck % - **0%**

Rev. Date: July 19, 2021

TA



Knox County
Knoxville
I-40/75 @ Watt Rd.

Legend:

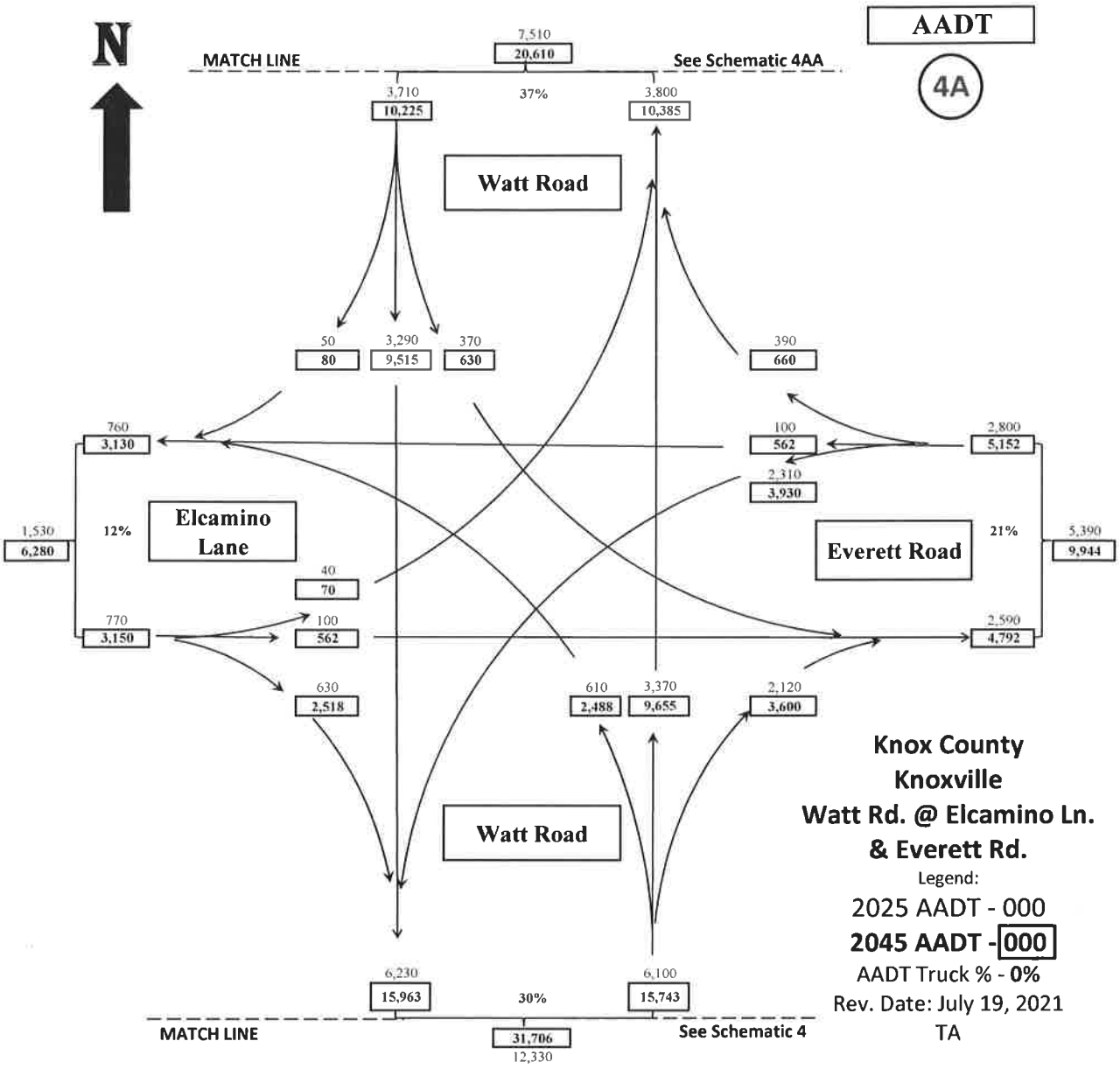
2025 AADT - 000

2045 AADT - [000]

AADT Truck % - **0%**

Rev. Date: July 19, 2021

TA



Knox County
Knoxville
Watt Rd. @ Elcamino Ln.
& Everett Rd.

Legend:

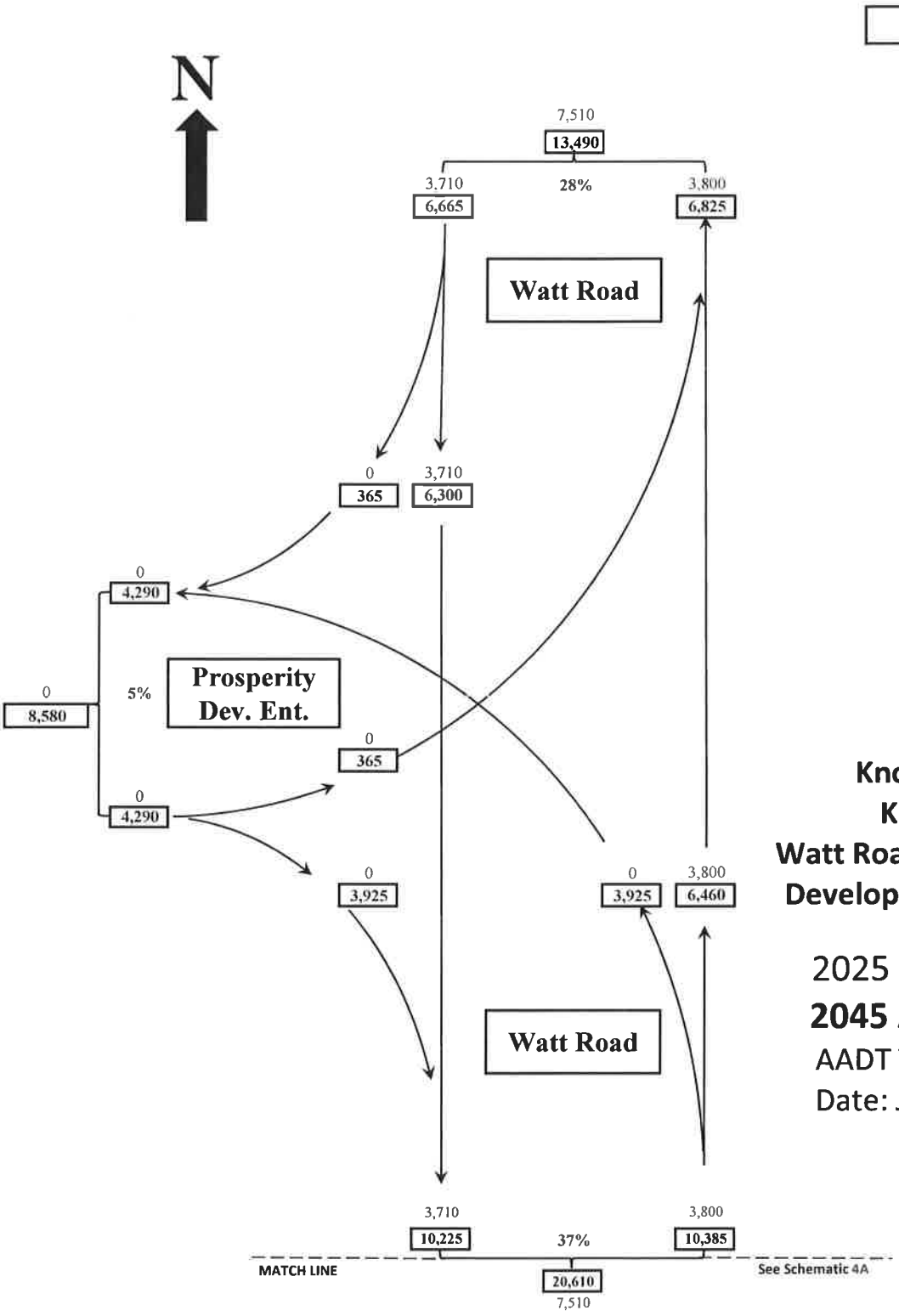
2025 AADT - 000

2045 AADT - 000

AADT Truck % - **0%**

Rev. Date: July 19, 2021

TA



Knox County
Knoxville
Watt Road @ Prosperity Development Entrance

Legend:

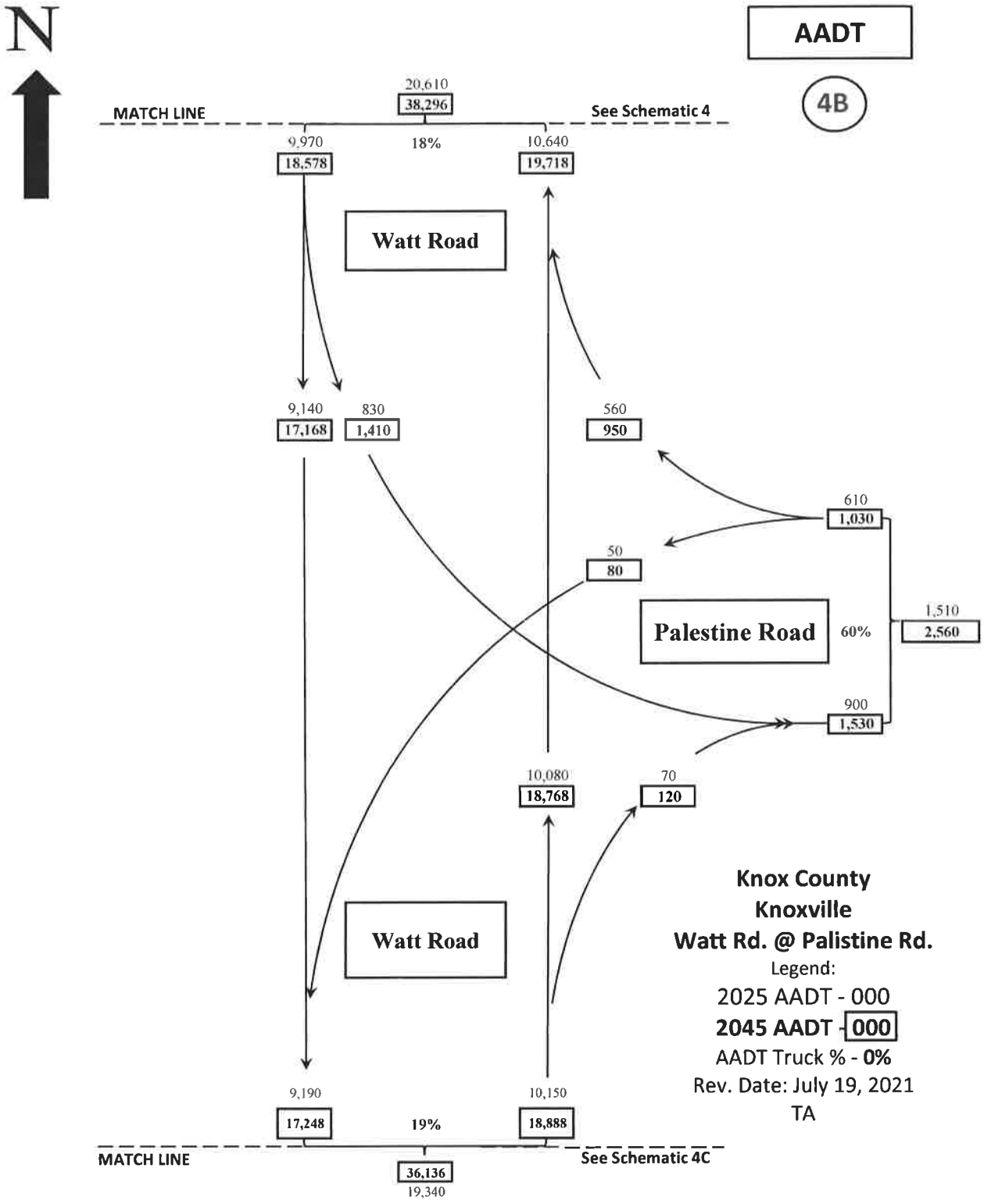
2025 AADT - 000

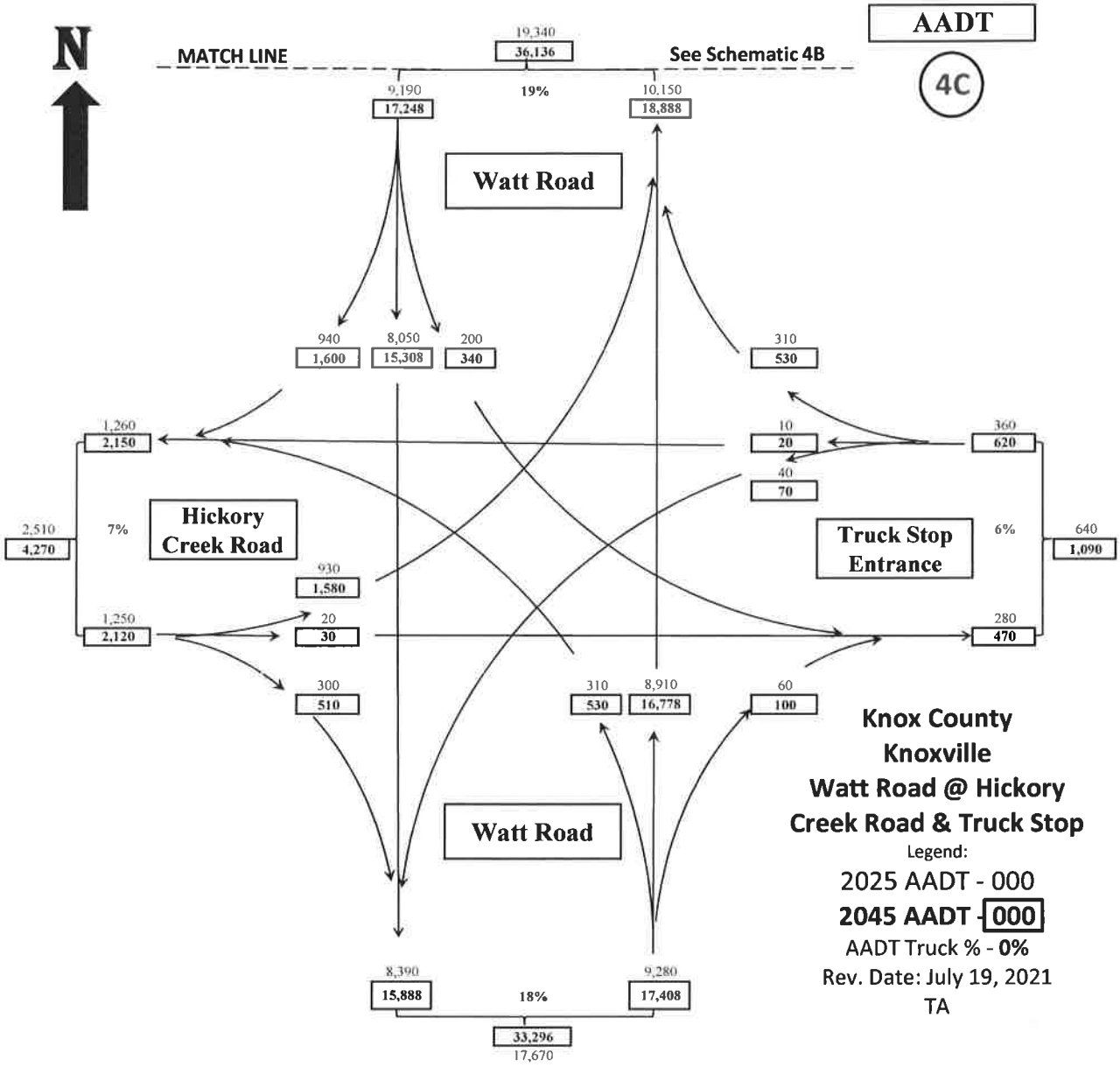
2045 AADT - 000

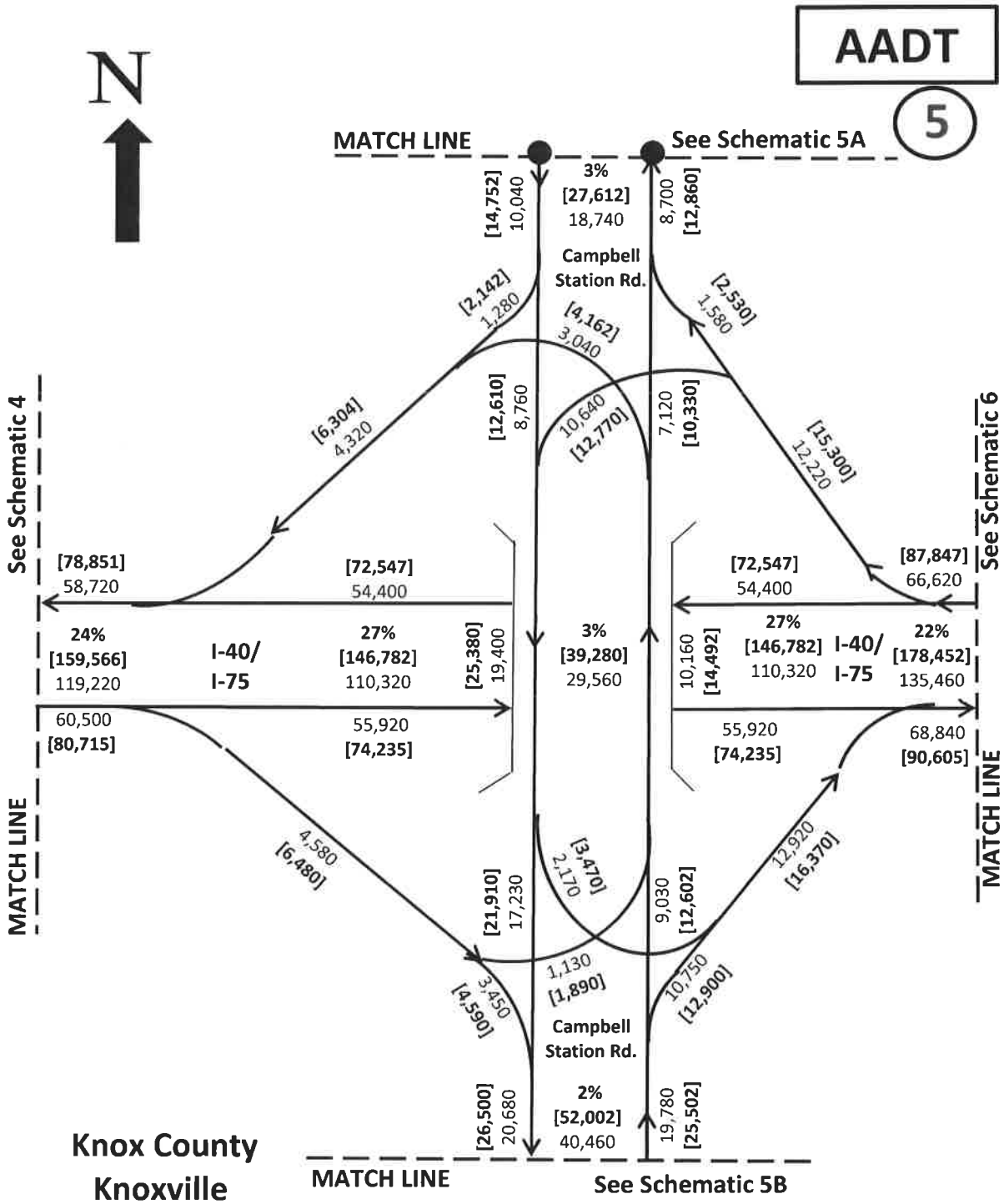
AADT Truck % - **0%**

Date: July 19, 2021

TA


N
AADT
4B
MATCH LINE
See Schematic 4
20,610
38,296
9,970
18,578
18%
10,640
19,718
Watt Road
9,140
17,168
830
1,410
560
950
610
1,030
50
80
Palestine Road
60%
1,510
2,560
900
1,530
10,080
18,768
70
120
Watt Road
9,190
17,248
19%
10,150
18,888
MATCH LINE
See Schematic 4C
36,136
19,340
Knox County
Knoxville
Watt Rd. @ Palistine Rd.
Legend:
2025 AADT - 000
2045 AADT - 000
AADT Truck % - 0%
Rev. Date: July 19, 2021
TA


N
MATCH LINE
See Schematic 4B
AADT
4C
19,340
36,136
9,190
17,248
19%
10,150
18,888
Watt Road
940
1,600
8,050
15,308
200
340
310
530
1,260
2,150
10
20
360
620
40
70
2,510
4,270
7%
Hickory Creek Road
Truck Stop Entrance
6%
640
1,090
930
1,580
1,250
2,120
20
30
280
470
300
510
310
530
8,910
16,778
60
100
Watt Road
8,390
15,888
18%
9,280
17,408
33,296
17,670
Knox County
Knoxville
Watt Road @ Hickory Creek Road & Truck Stop
Legend:
2025 AADT - 000
2045 AADT - 000
AADT Truck % - 0%
Rev. Date: July 19, 2021
TA



Knox County
Knoxville
I-40/75 @ Campbell Station Road

Legend:

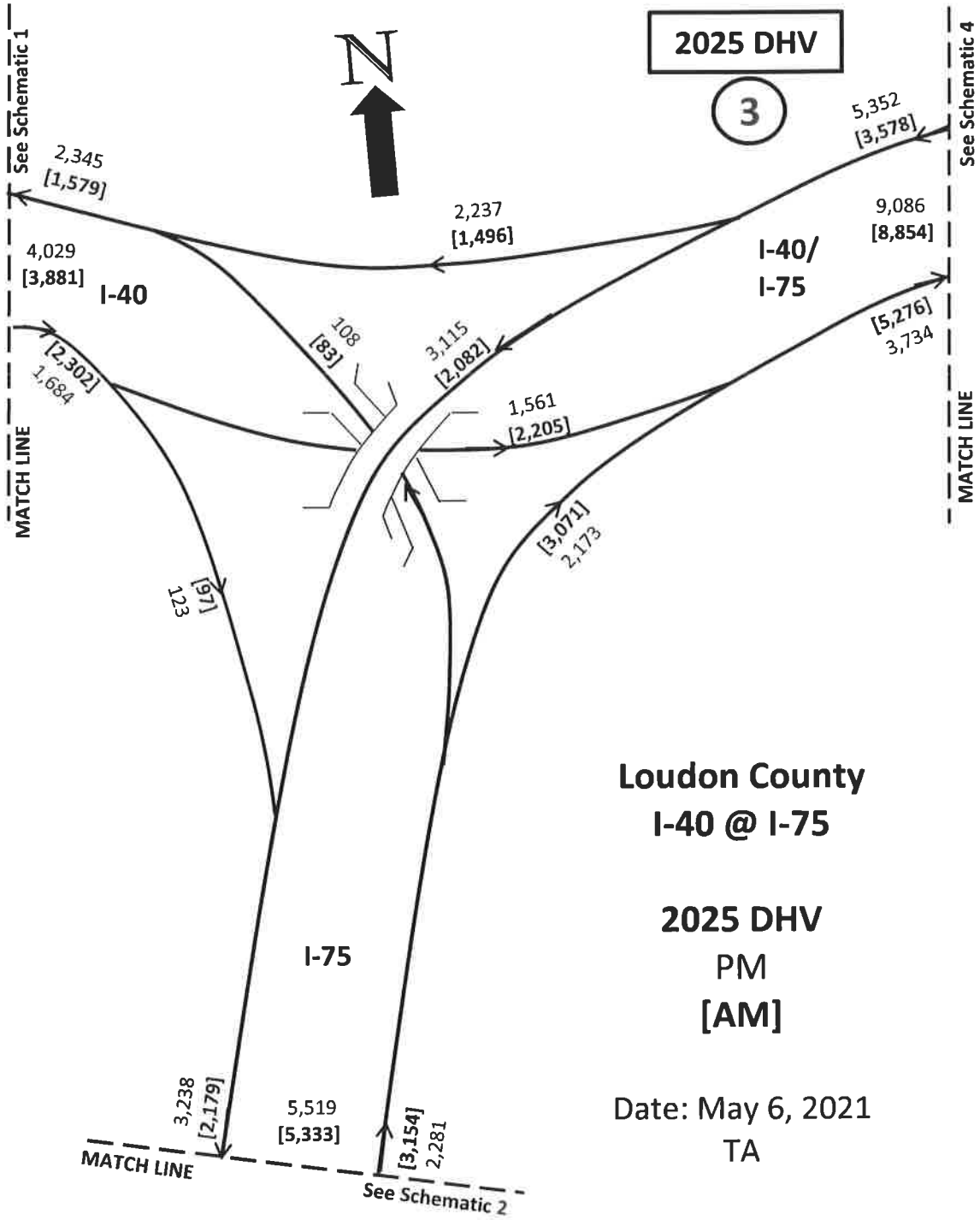
2025 AADT - 000

2045 AADT - [000]

AADT Truck % - **0%**

Rev. Date: July 19, 2021

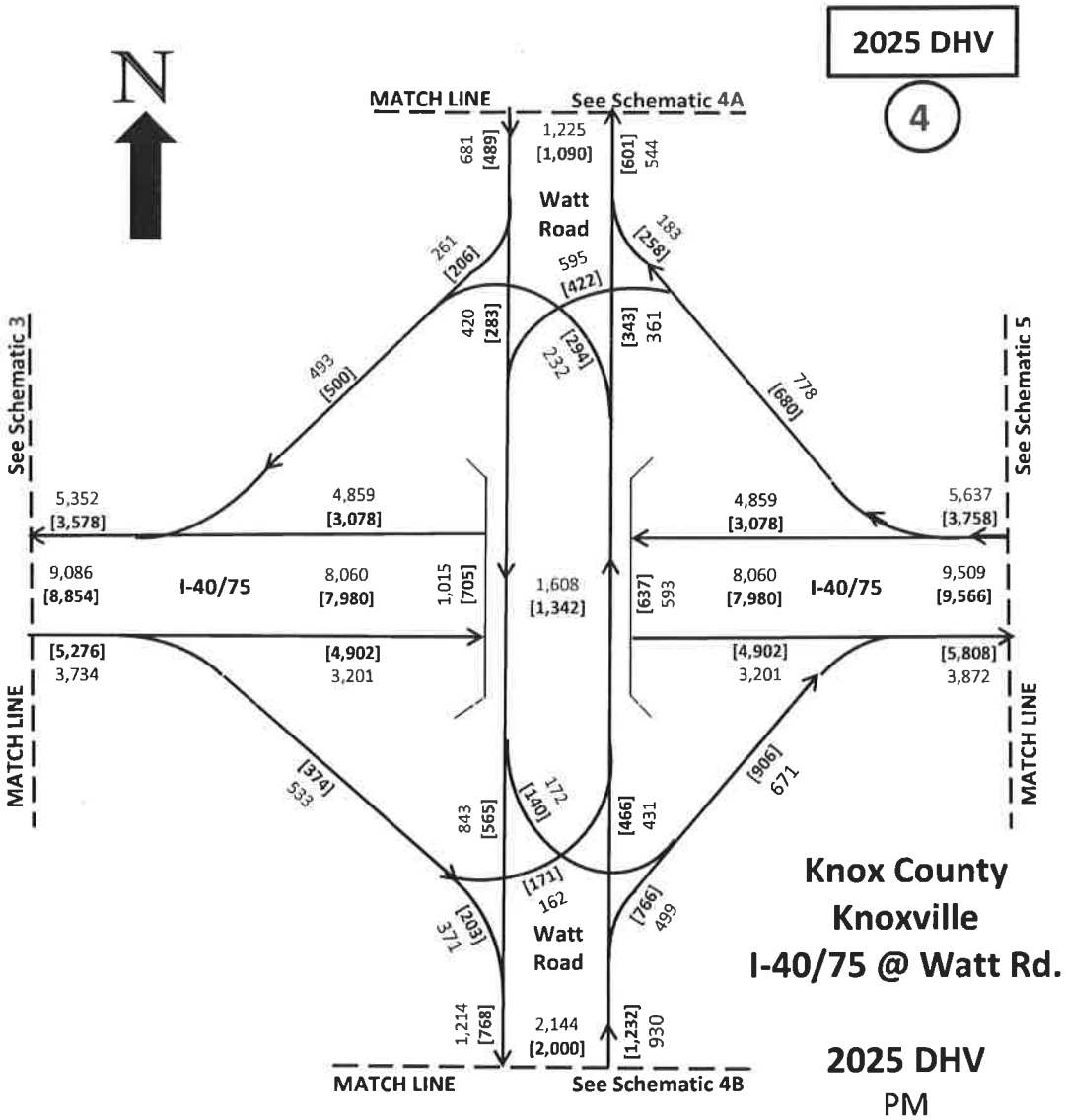
TΔ



Loudon County
I-40 @ I-75

2025 DHV
PM
[AM]

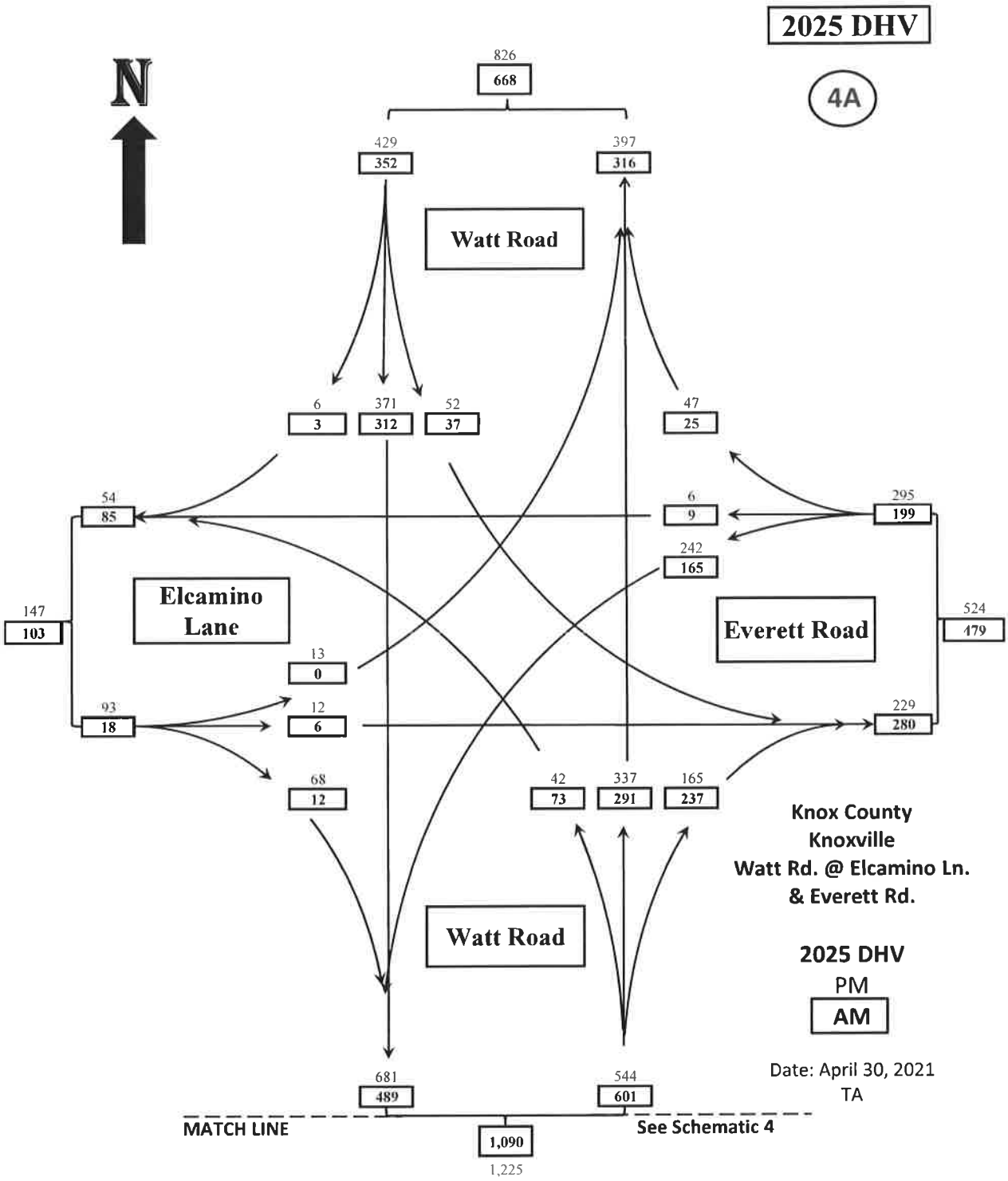
Date: May 6, 2021
TA

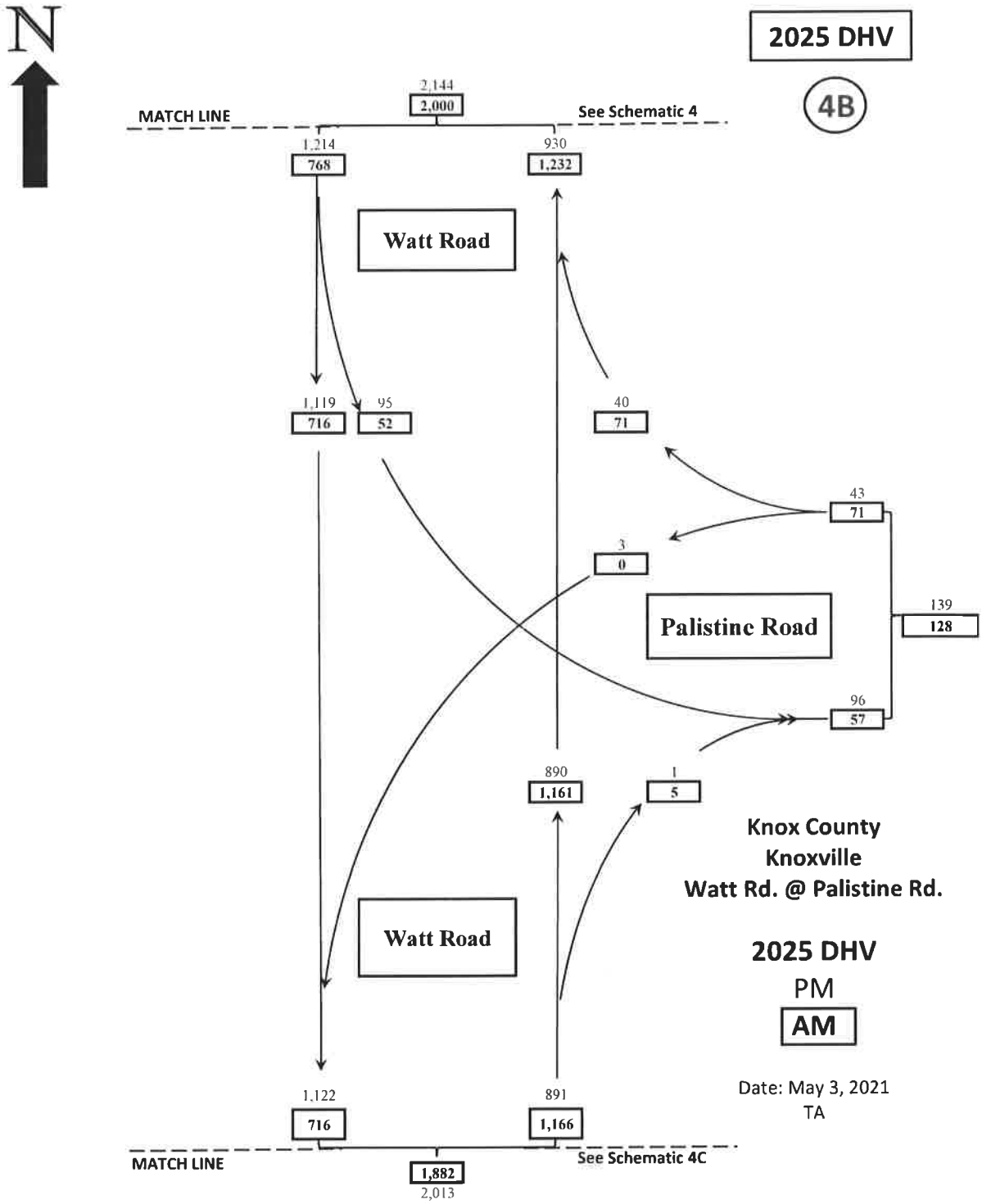


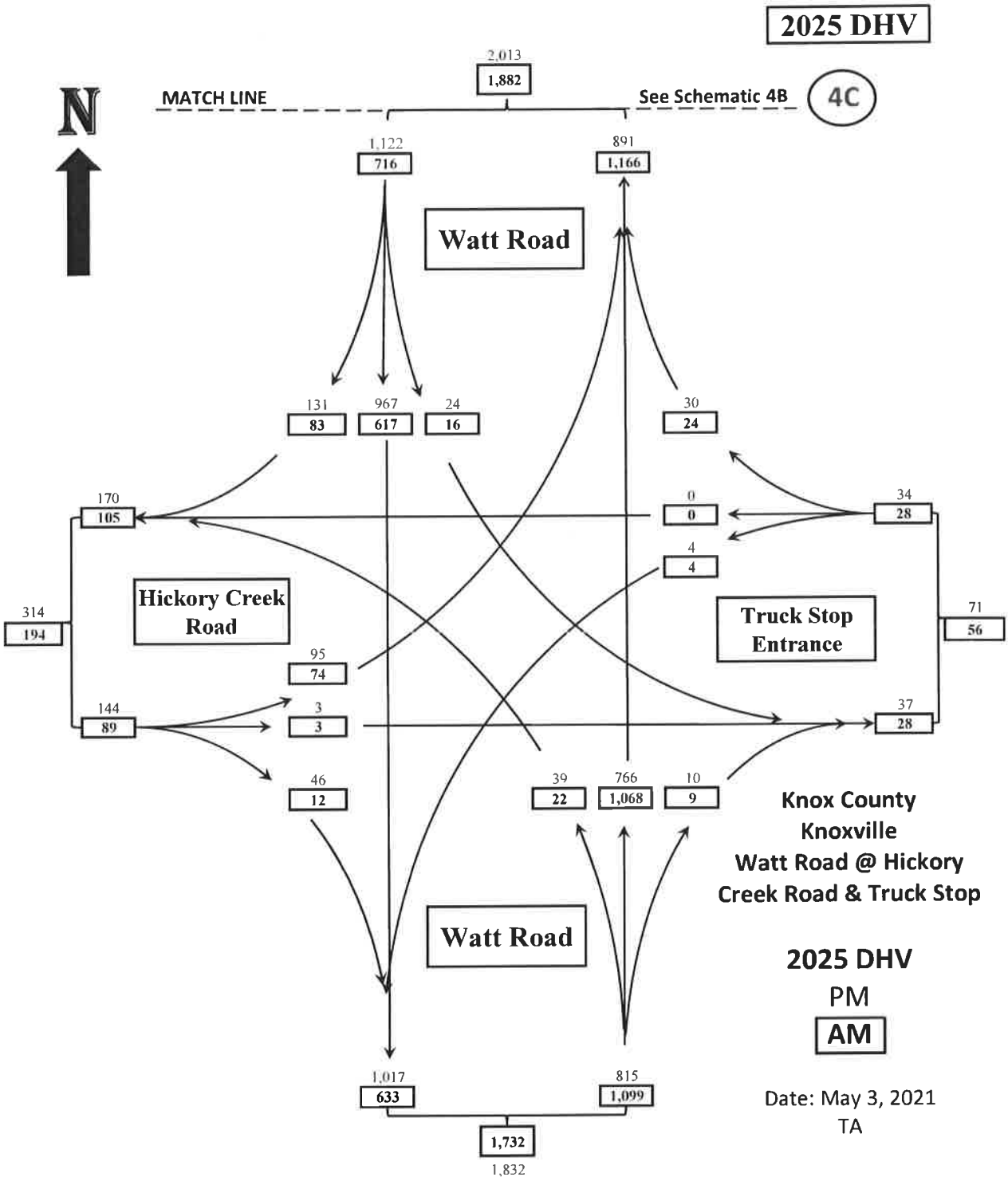
Knox County
Knoxville
I-40/75 @ Watt Rd.

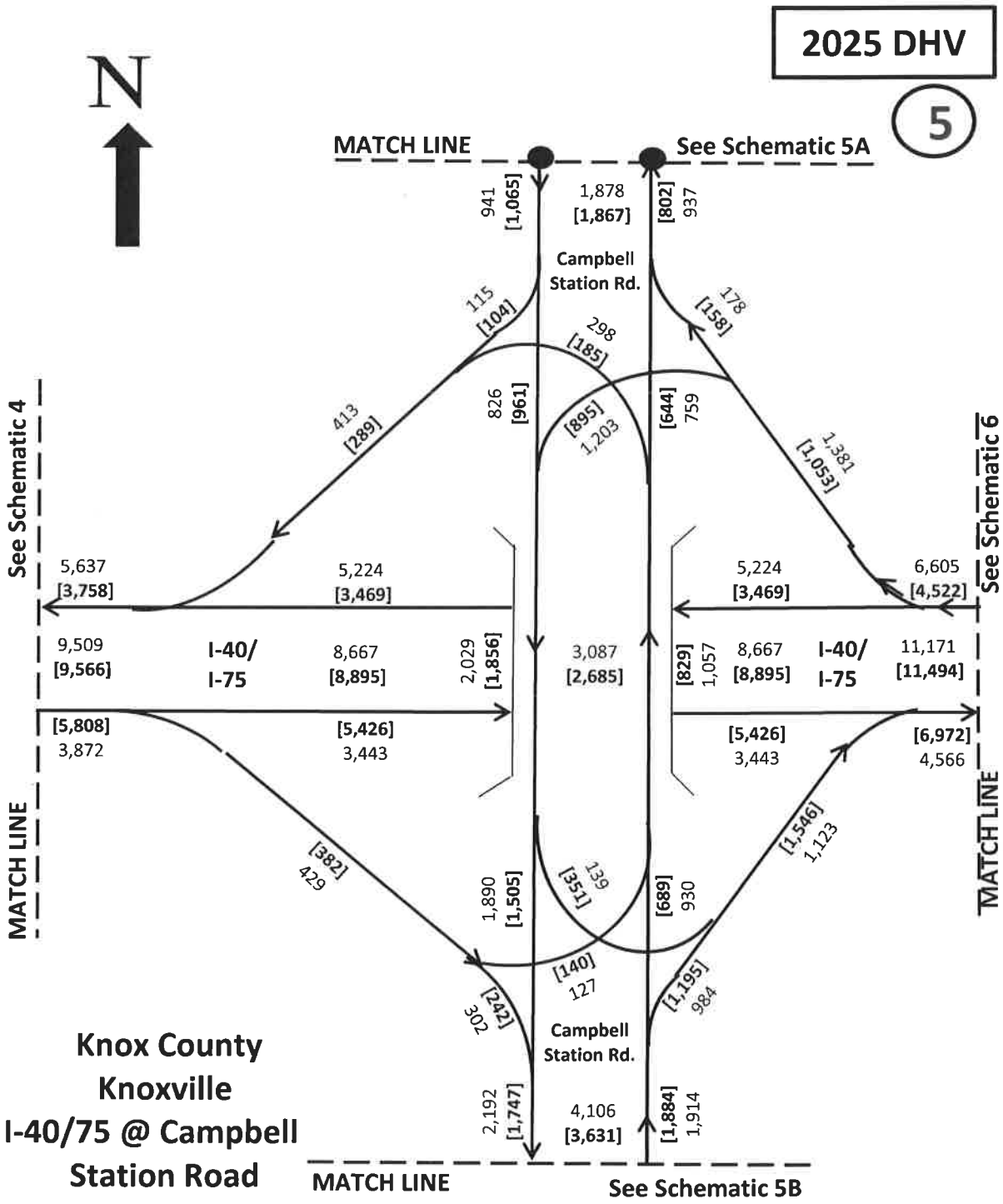
2025 DHV
PM
[AM]

Date: May 5, 2021
TA


2025 DHV
4A
N
826
668
429
352
397
316
Watt Road
6
3
371
312
52
37
47
25
54
85
6
9
295
199
242
165
Elcamino Lane
Everett Road
147
103
524
479
13
0
93
18
12
6
229
280
68
12
42
73
337
291
165
237
Watt Road
681
489
544
601
1,090
1,225
MATCH LINE
See Schematic 4
Knox County
Knoxville
Watt Rd. @ Elcamino Ln.
& Everett Rd.
2025 DHV
PM
AM
Date: April 30, 2021
TA


N
2025 DHV
4B
MATCH LINE
See Schematic 4
2,144
2,000
1,214
768
930
1,232
Watt Road
1,119
716
95
52
40
71
43
71
3
0
Palistine Road
139
128
96
57
890
1,161
1
5
Knox County
Knoxville
Watt Rd. @ Palistine Rd.
Watt Road
2025 DHV
PM
AM
Date: May 3, 2021
TA
1,122
716
891
1,166
MATCH LINE
See Schematic 4C
1,882
2,013

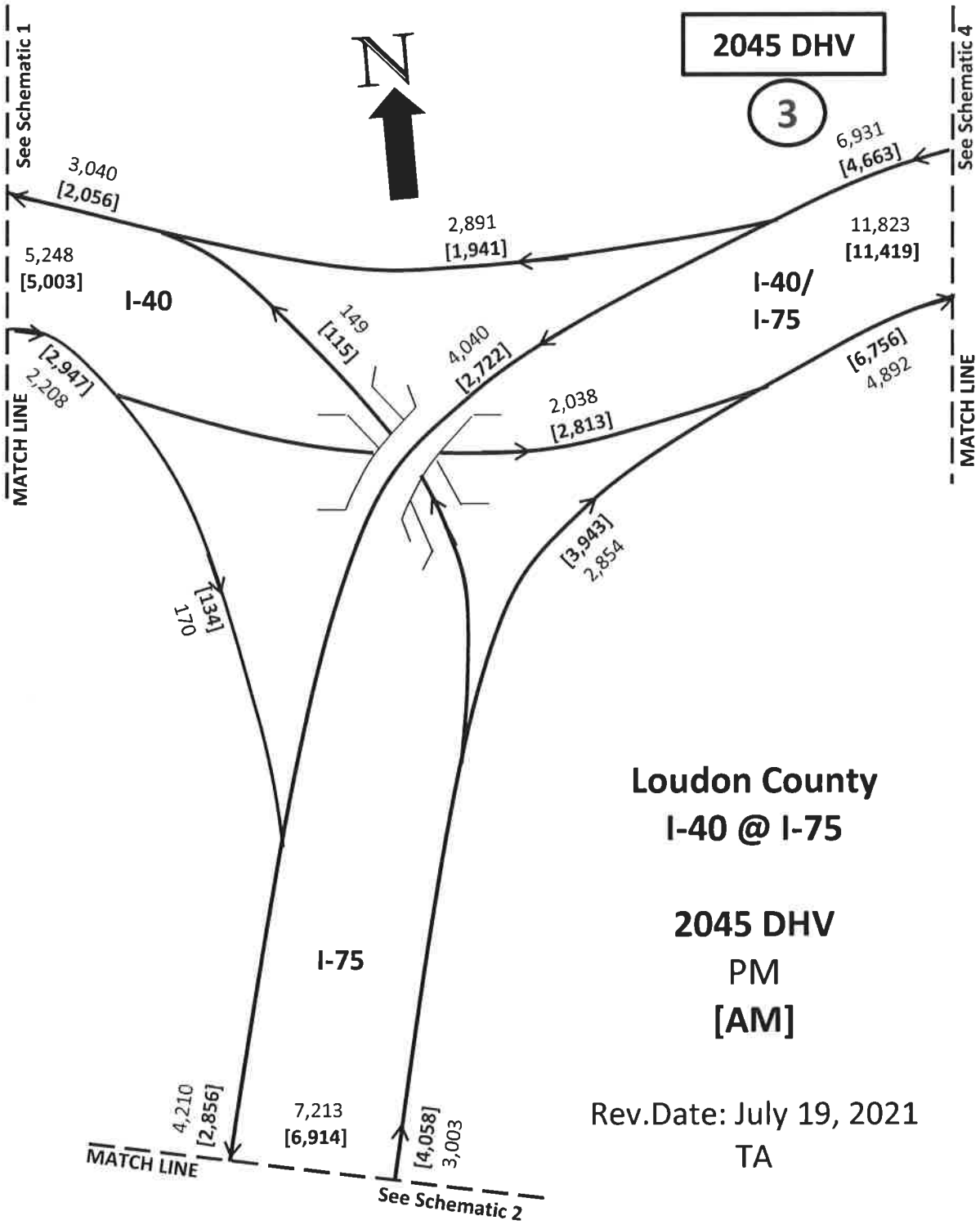

2025 DHV
N
MATCH LINE
See Schematic 4B
4C
2,013
1,882
1,122
716
891
1,166
Watt Road
131
83
967
617
24
16
30
24
170
105
0
0
34
28
4
4
Hickory Creek Road
Truck Stop Entrance
314
194
71
56
95
74
144
89
3
3
37
28
46
12
39
22
766
1,068
10
9
Watt Road
1,017
633
815
1,099
1,732
1,832
Knox County
Knoxville
Watt Road @ Hickory Creek Road & Truck Stop
2025 DHV
PM
AM
Date: May 3, 2021
TA



Knox County
Knoxville
I-40/75 @ Campbell Station Road

2025 DHV
PM
[AM]

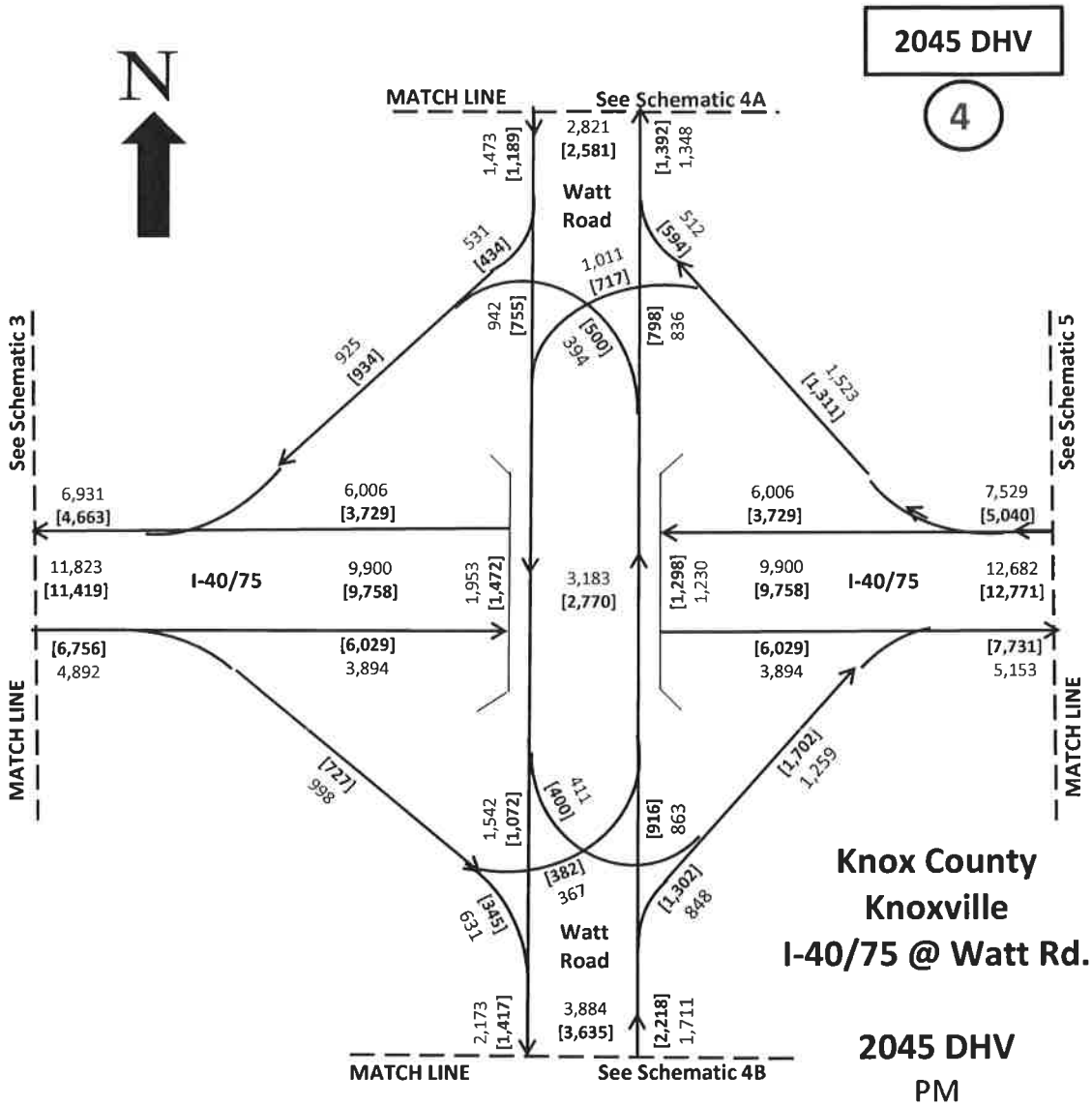
Rev. Date: May 21, 2021
TA



Loudon County
I-40 @ I-75

2045 DHV
PM
[AM]

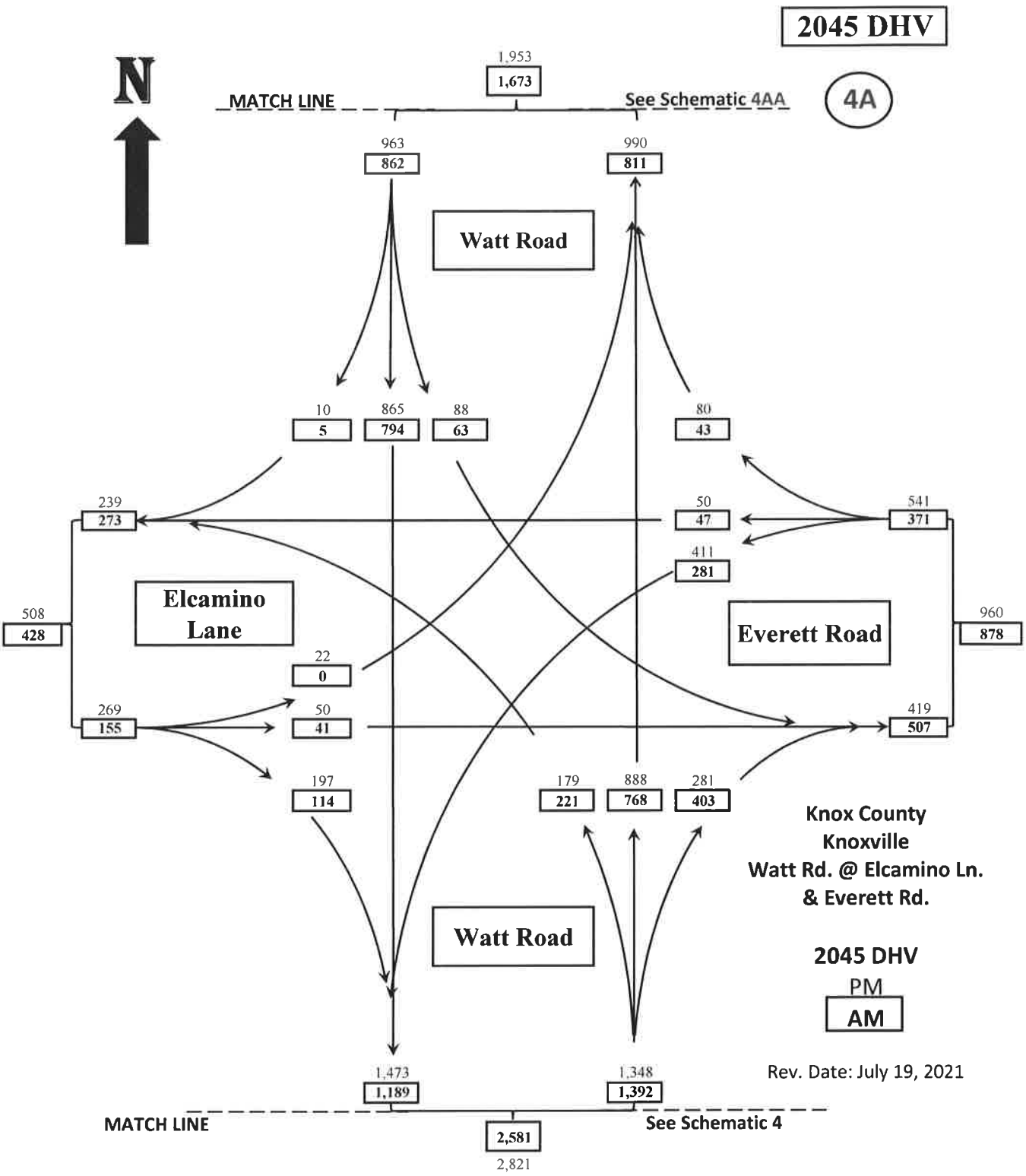
Rev.Date: July 19, 2021
TA

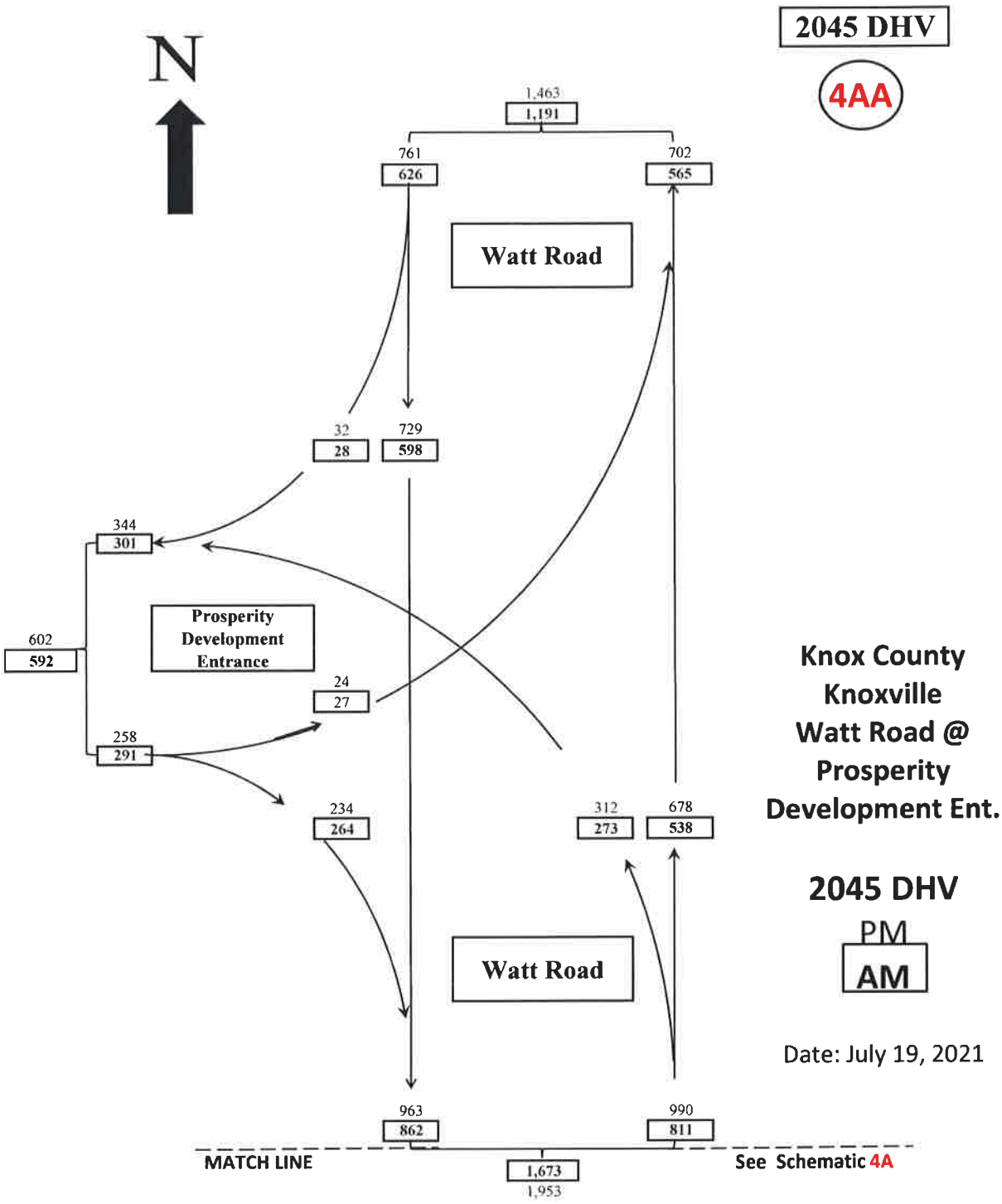


Knox County
Knoxville
I-40/75 @ Watt Rd.

2045 DHV
PM
[AM]

Rev. Date: July 19, 2021
TA


2045 DHV
N
MATCH LINE
1,953
1,673
See Schematic 4AA
4A
963
862
990
811
Watt Road
10
5
865
794
88
63
80
43
239
273
50
47
541
371
411
281
Elcamino Lane
Everett Road
508
428
960
878
22
0
269
155
50
41
419
507
197
114
179
221
888
768
281
403
Watt Road
Knox County
Knoxville
Watt Rd. @ Elcamino Ln.
& Everett Rd.
2045 DHV
PM
AM
Rev. Date: July 19, 2021
1,473
1,189
1,348
1,392
MATCH LINE
2,581
2,821
See Schematic 4

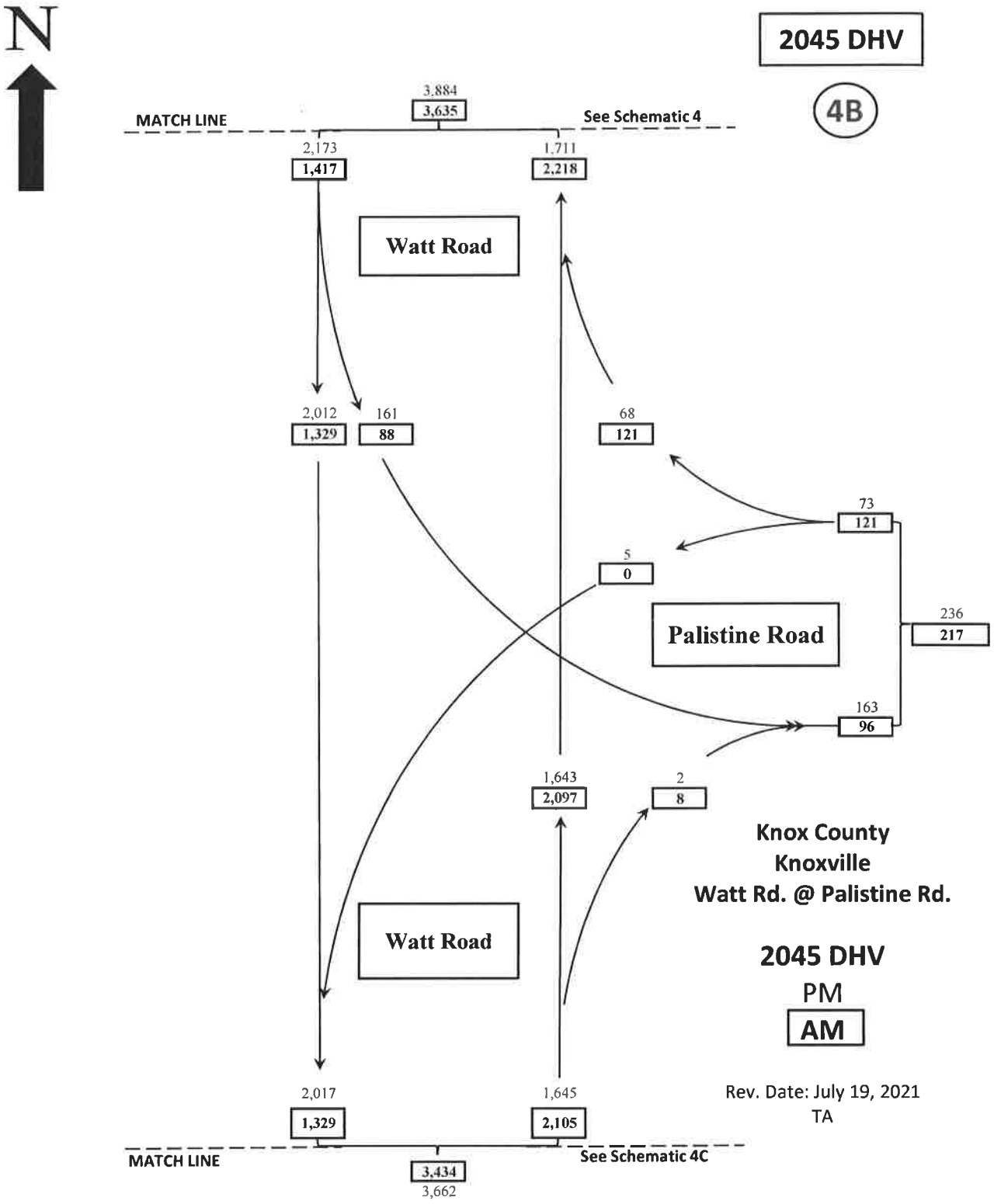


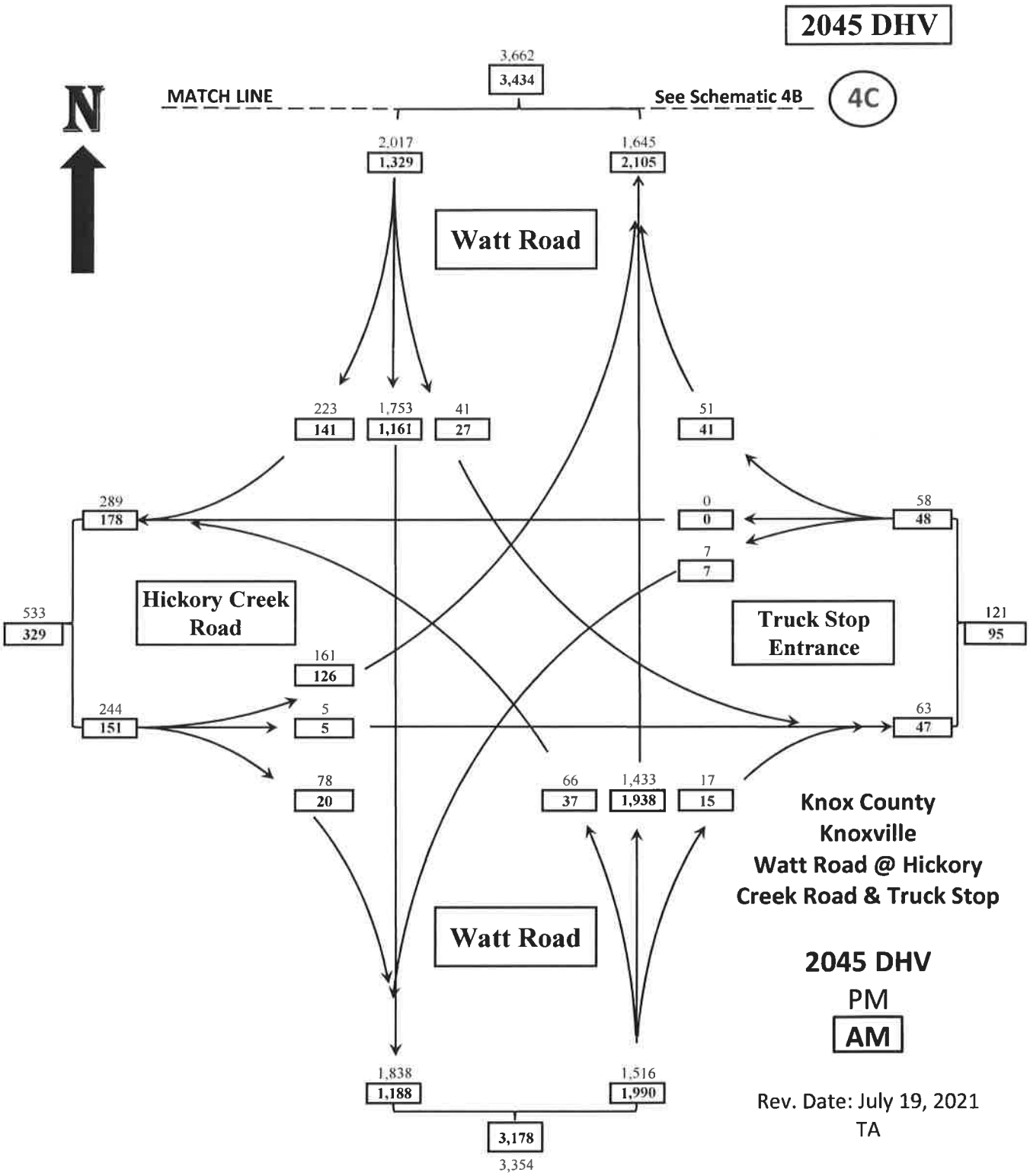
Knox County
Knoxville
Watt Road @
Prosperity
Development Ent.

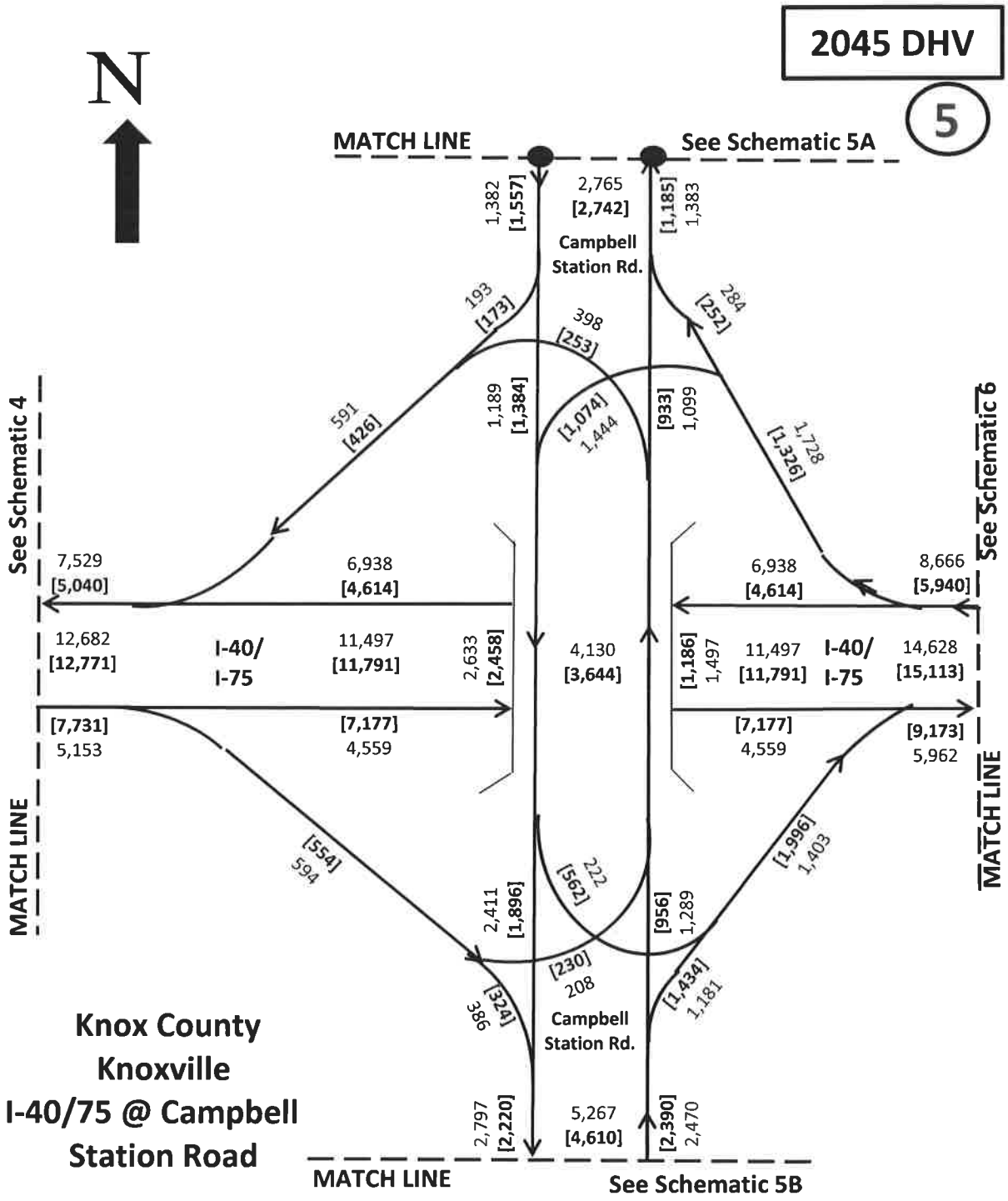
2045 DHV

PM
AM

Date: July 19, 2021


N
2045 DHV
4B
MATCH LINE
See Schematic 4
3,884
3,635
2,173
1,417
1,711
2,218
Watt Road
2,012
1,329
161
88
68
121
73
121
5
0
Palistine Road
236
217
163
96
1,643
2,097
2
8
Watt Road
2,017
1,329
1,645
2,105
MATCH LINE
See Schematic 4C
3,434
3,662
Knox County
Knoxville
Watt Rd. @ Palistine Rd.
2045 DHV
PM
AM
Rev. Date: July 19, 2021
TA


2045 DHV
N
MATCH LINE
See Schematic 4B
4C
3,662
3,434
2,017
1,329
1,645
2,105
Watt Road
223
141
1,753
1,161
41
27
51
41
289
178
0
0
58
48
7
7
Hickory Creek Road
Truck Stop Entrance
533
329
121
95
161
126
244
151
5
5
63
47
78
20
66
37
1,433
1,938
17
15
Watt Road
1,838
1,188
1,516
1,990
3,178
3,354
Knox County
Knoxville
Watt Road @ Hickory Creek Road & Truck Stop
2045 DHV
PM
AM
Rev. Date: July 19, 2021
TA



Knox County
Knoxville
I-40/75 @ Campbell Station Road

2045 DHV
PM
[AM]

Rev. Date: July 19, 2021
TA

Appendix C – Conceptual Layouts

Contents

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	LOUDON	1

I-40 WB

I-40 EB

NEW ALIGNMENT AND BRIDGE AS A PART OF A SEPARATE PROJECT

I-40 WB

I-40 EB TO I-75 SB

I-75 NB TO I-40 WB

I-40 WB/I-75 SB

I-40 EB

I-40 EB/I-75 NB

MATCH LINE SEE FIGURES 2/3

I-75 SB

I-75 NB

HICKORY CREEK RD

I-75 SB

I-75 NB

0 400' 800' 1200'

N

TECHNICAL PLANNING REPORT

I-40 AT I-75 SYSTEM INTERCHANGE
WEST OF WATT ROAD
LOUDON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 1

1/26/2022 2:18:58 PM
C:\PROGRAMDATA\BENTLEY\OPENROADS DESIGNER CE\CONFIGURATION\WORKSPACES\TDOT_STANDARDS\WORKSETS\KNOX\INTERCHANGECUTSHEETS\DGN\WATT ROAD SPUI AND I-40 I-75 JUNCTION CONCEPTUAL LAYOUT.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	2

IMPROVEMENTS TO WATT RD NORTH OF EL CAMINO LN/EVERETT RD TO BE DEVELOPED AS PART OF A SEPARATE STUDY.

EL CAMINO LN

EVERETT RD

POTENTIAL RETAINING WALL

WATT RD

I-40 WB

I-40 WB

MATCH LINE SEE FIGURE 1

I-40 EB

I-40 EB

EXISTING BRIDGE

SCARIFY AND OBLITERATE EXISTING PAVEMENT

HICKORY CREEK RD

PALESTINE LN

WATT RD

TIE TO EXISTING

0 400' 800' 1200'

N

TECHNICAL PLANNING REPORT

I-40 EXIT 369
WATT ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 2
BUILD ALTERNATIVE #1
SINGLE-POINT
URBAN INTERCHANGE

1/13/2022 3:32:15 PM
C:\PROGRAMDATA\BENTLEY\OPENROADS DESIGNER CE\CONFIGURATION\WORKSPACES\TDOT_STANDARDS\WORKSETS\KNOXINTERCHANGECUTSHEETS\DGN\WATT RD\WATT ROAD SPUI AND I-40 I-75 JUNCTION CONCEPTUAL LAYOUT.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	3

IMPROVEMENTS TO WATT RD NORTH OF EL CAMINO LN/EVERETT RD
TO BE DEVELOPED AS PART OF A SEPARATE STUDY.

EL CAMINO LN

EVERETT RD

I-40 WB

WATT RD

I-40 WB

I-40 EB

I-40 EB

SCARIFY AND OBLITERATE
EXISTING PAVEMENT

PROPOSED BRIDGE

MATCH LINE SEE FIGURE 1

HICKORY CREEK RD

PALESTINE LN

WATT RD

0 400' 800' 1200'

N

TECHNICAL PLANNING REPORT

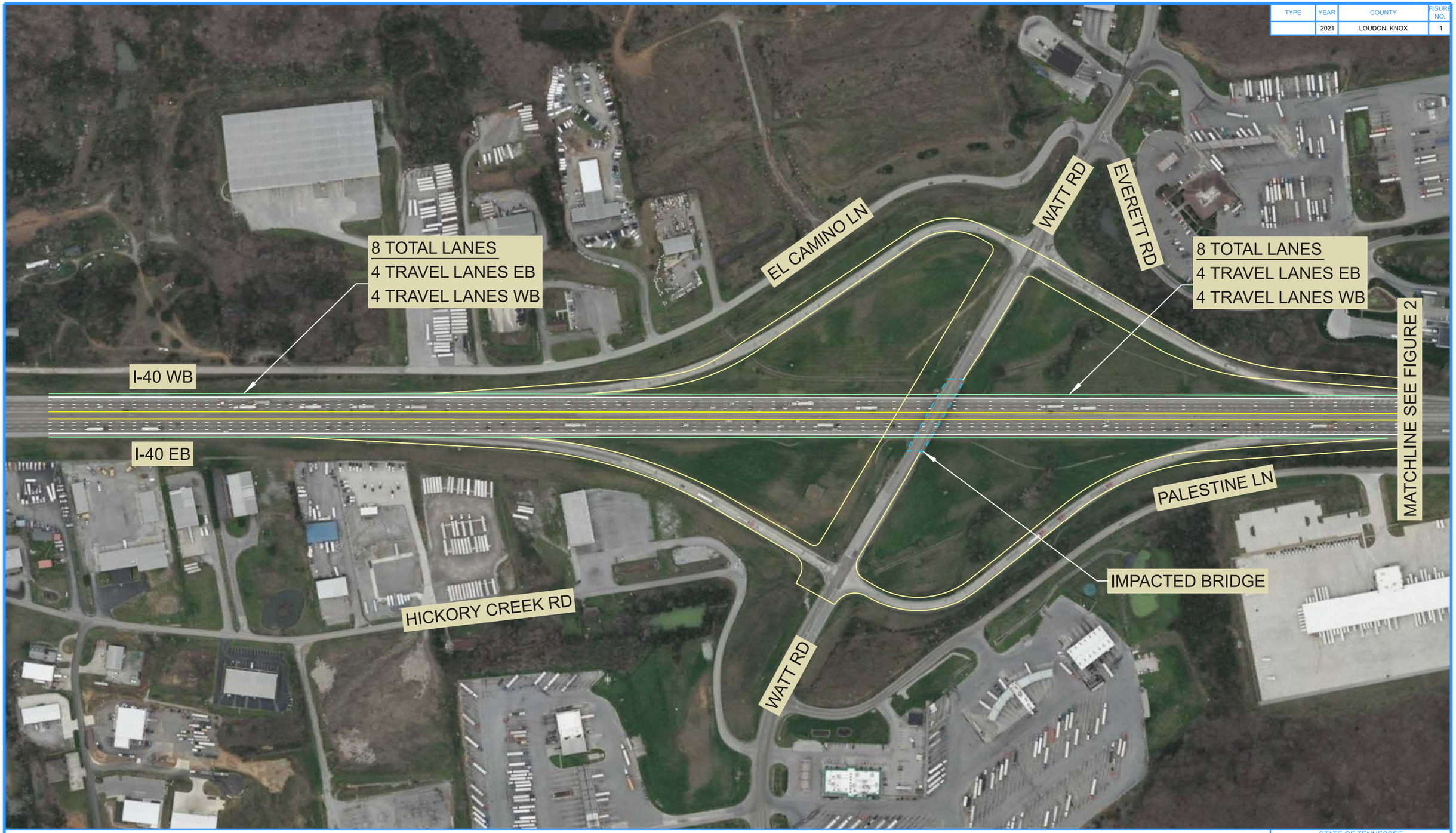
I-40 EXIT 369
WATT ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3
BUILD ALTERNATIVE #2
DIAMOND INTERCHANGE
WITH IMPROVEMENTS

1/27/2022 10:54:15 AM
T:\PRJ\193846 WATT RD & CAMPBELL STATION RD\WATT RD\SPUI\WATT ROAD SPUI AND I-40 I-75 JUNCTION CONCEPTUAL LAYOUT.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	LOUDON, KNOX	1



0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
LOUDON AND KNOX COUNTIES

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 1

2/4/2022 8:41:55 AM
C:\USERS\WILLIAMSC1\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	2

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 2

1/28/2022 3:15:40 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	2

8 TOTAL LANES
4 TRAVEL LANES EB
4 TRAVEL LANES WB

EVERETT RD

I-40 WB

I-40 EB

MATCHLINE SEE FIGURE 2

MATCHLINE SEE FIGURE 4

EVERETT RD

0 300' 600' 900'

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3

1/28/2022 3:16:14 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	4

WEIGH STATION RECOMMENDED TO BE REMOVED/RELOCATED

HATMAKER LN

8 TOTAL LANES
4 TRAVEL LANES EB
4 TRAVEL LANES WB

I-40 WB

I-40 EB

MATCHLINE SEE FIGURE 3

MATCHLINE SEE FIGURE 5

WEIGH STATION RECOMMENDED TO BE REMOVED/RELOCATED

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 4

1/28/2022 3:16:48 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	5

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 5

1/28/2022 3:17:17 PM C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	6

SNYDER RD

CAMPBELL STATION RD

SNYDER RD

AUXILARY LANE DROPPED

10 TOTAL LANES
4 TRAVEL LANES EB
1 AUXILARY LANE EB
4 TRAVEL LANES WB
1 AUXILARY LANE WB

8 TOTAL LANES
4 TRAVEL LANES EB
4 TRAVEL LANES WB

NEW BRIDGE

I-40 WB

I-40 EB

AUXILARY LANE ADDED

PARKSIDE DR

CAMPBELL STATION RD

MATCHLINE SEE FIGURE 5

MATCHLINE SEE FIGURE 7

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 6

1/28/2022 3:17:48 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	7

OUTLET DR

10 TOTAL LANES
4 TRAVEL LANES EB
1 AUXILARY LANE EB
4 TRAVEL LANES WB
1 AUXILARY LANE WB

AUXILARY LANE ADDED

I-40 WB

MATCHLINE SEE FIGURE 6

MATCHLINE SEE FIGURE 8

I-40 EB

AUXILARY LANE DROPPED

PARKSIDE DR

PARKSIDE DR

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 7

1/26/2022 5:02:05 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40\PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	KNOX	8

OUTLET DR

LOVELL RD

LEXINGTON DR

8 TOTAL LANES
4 TRAVEL LANES EB
4 TRAVEL LANES WB

8 TOTAL LANES
3 TRAVEL LANES EB
4 TRAVEL LANES WB

I-40 WB

I-40 EB

IMPACTED BRIDGE

LOVELL RD

MATCHLINE SEE FIGURE 7

0 300' 600' 900'

N

TECHNICAL PLANNING REPORT

I-40 WIDENING
FROM I-75 TO LOVELL ROAD
KNOX COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 8

1/26/2022 5:02:49 PM
C:\USERS\WILLIAMSCT\DESKTOP\CAMB STATION\193646-STID-MAINLINE I-40PROPOSED.DGN

TYPE	YEAR	COUNTY	FIGURE NO.
	2021	LOUDON	4

I-40 WB

I-40 EB

I-40 WB RAMP

EXISTING BRIDGE WIDENED OR REPLACED TO ACCOMMODATE I-40 EB EXIT 369 LANE

NEW ALIGNMENT AND BRIDGE AS PART OF A SEPARATE PROJECT

I-40 WB FROM EXIT 369

I-40 WB/I-75 SB AUXILIARY RAMP FROM EXIT 369 WATT ROAD

FUTURE CONNECTIVITY TO APPLICABLE WATT ROAD ALTERNATIVE/IMPROVEMENTS

I-40 WB/I-75 SB

I-40 EB TO EXIT 369

NEW BRIDGE

I-75 SB FROM EXIT 369

I-75 SB RAMP

I-40 EB/I-75 NB

NEW BRIDGE

I-40 EB/I-75 NB AUXILIARY RAMP TO EXIT 369 WATT ROAD

HICKORY CREEK RD

I-75 NB TO EXIT 369

I-75 SB

I-75 NB

0 400' 800' 1200'

N

TECHNICAL PLANNING REPORT

I-40 AT I-75 SYSTEM INTERCHANGE
WITH AUXILIARY RAMPS FOR EXIT 369 WATT ROAD
LOUDON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 4
FUTURE NEED/OPTION

1/13/2022 3:21:46 PM
C:\PROGRAMDATA\BENTLEY\OPENROADS DESIGNER CE\CONFIGURATION\WORKSPACES\TDOT_STANDARDS\WORKSETS\KNOXINTERCHANGECUTSHEETS\DGN\WATT RD\WATT ROAD SPUI AND I-40 I-75 JUNCTION CONCEPTUAL LAYOUT.DGN

Appendix D – Cost Estimates

Contents

COST ESTIMATE SUMMARY

Route:	**Build Alternative #1 - SPUI**
Termini:	**From El Camino Lane/Everett Road to south of Hickory Creek Road**
Scope of Work:	
Project Type of Work:	**Modify Interchange**
County:	**Knox**
Length:	**2.96 Miles**
Date:	**January 7, 2022**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$216,000
Asphalt Paving		$0	$0	$0	$4,260,000
Concrete Pavement		$0	$0	$0	$4,850,000
Drainage		$0	$0	$0	$1,050,000
Appurtenances		$0	$0	$0	$308,000
Structures		$0	$0	$0	$12,900,000
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$1,000,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$3,400,000
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$63,000
Rip-Rap or Slope Protection		$0	$0	$0	$31,900
Guardrail		$0	$0	$0	$135,000
Signing		$0	$0	$0	$28,200
Pavement Markings		$0	$0	$0	$41,700
Maintenance of Traffic		$0	$0	$0	$304,000
Mobilization	5%	$0	$0	$0	$1,430,000
Other Items and Annual Inflation	10%	$0	$0	$0	$3,000,000
Const. Contingency (Structures Not Included)	30%	$0	$0	$0	$6,040,000
Const. Eng. & Inspec.	10%	$0	$0	$0	$3,910,000
Construction Estimate		$0	$0	$0	$43,000,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Right-of-Way		$0	$0	$0	$1,570,000
Utilities		$0	$0	$0	$1,380,000
Preliminary Engineering		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Prelim. Eng.	6.8%	$0	$0	$0	$2,910,000
Total Project Cost (2021)		$ -	$ -	$ -	$ 48,900,000

COST ESTIMATE SUMMARY

Route:	**Build Alternative #2 - Improve Existing Diamond**
Termini:	**From El Camino Lane/Everett Road to south of Hickory Creek Road**
Scope of Work:	
Project Type of Work:	**Modify Interchange**
County:	**Knox**
Length:	**3.07 Miles**
Date:	**January 7, 2022**
Estimate Type:	**Concept**

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$112,000
Asphalt Paving		$0	$0	$0	$3,600,000
Concrete Pavement		$0	$0	$0	$4,150,000
Drainage		$0	$0	$0	$1,150,000
Appurtenances		$0	$0	$0	$357,000
Structures		$0	$0	$0	$6,590,000
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$1,000,000
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$5,580,000
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$64,700
Rip-Rap or Slope Protection		$0	$0	$0	$31,900
Guardrail		$0	$0	$0	$140,000
Signing		$0	$0	$0	$22,800
Pavement Markings		$0	$0	$0	$44,200
Maintenance of Traffic		$0	$0	$0	$263,000
Mobilization	5%	$0	$0	$0	$1,160,000
Other Items and Annual Inflation	10%	$0	$0	$0	$2,430,000
Const. Contingency (Structures Not Included)	30%	$0	$0	$0	$6,030,000
Const. Eng. & Inspec.	10%	$0	$0	$0	$3,270,000
Construction Estimate		$0	$0	$0	$36,000,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Right-of-Way		$0	$0	$0	$1,610,000
Utilities		$0	$0	$0	$1,380,000
Preliminary Engineering		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Prelim. Eng.	7.3%	$0	$0	$0	$2,620,000
Total Project Cost (2021)		$ -	$ -	$ -	$ 41,600,000

COST ESTIMATE SUMMARY

Route:	I-40/75
Termini:	From I-40/75 system interchange to Lovell Road (SR-131)
Scope of Work:	Widen from 6 lanes total to 8 lanes total
Project Type of Work:	Widen
County:	Knox
Length:	6.14 Miles
Date:	January 31, 2022
Estimate Type:	Concept

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$853,000
Asphalt Paving		$0	$0	$0	$18,800,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$1,600,000
Appurtenances		$0	$0	$0	$0
Structures		$0	$0	$0	$12,600,000
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$0
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$6,710,000
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$163,000
Rip-Rap or Slope Protection		$0	$0	$0	$95,700
Guardrail		$0	$0	$0	$295,000
Signing		$0	$0	$0	$41,100
Pavement Markings		$0	$0	$0	$256,000
Maintenance of Traffic		$0	$0	$0	$432,000
Mobilization	5%	$0	$0	$0	$2,090,000
Other Items and Annual Inflation	10%	$0	$0	$0	$4,390,000
Const. Contingency (Structures Not Included)	30%	$0	$0	$0	$10,700,000
Const. Eng. & Inspec.	10%	$0	$0	$0	$5,900,000
Construction Estimate		$0	$0	$0	$64,900,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Right-of-Way		$0	$0	$0	$0
Utilities		$0	$0	$0	$0
Preliminary Engineering		**LOCAL**	**STATE**	**FEDERAL**	**TOTAL**
		0%	0%	0%	
Prelim. Eng.	5.5%	$0	$0	$0	$3,540,000
Total Project Cost (2021)		$ -	$ -	$ -	$ 68,400,000

COST ESTIMATE SUMMARY

Route:	I-40/75
Termini:	Auxiliary lane in each direction from Campbell Station Road to Lovell Road (SR-131)
Scope of Work:	
Project Type of Work:	Widen
County:	Knox
Length:	1.14 Miles
Date:	January 6, 2022
Estimate Type:	Concept

DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Construction Items					
Removal Items		$0	$0	$0	$200,000
Asphalt Paving		$0	$0	$0	$3,670,000
Concrete Pavement		$0	$0	$0	$0
Drainage		$0	$0	$0	$321,000
Appurtenances		$0	$0	$0	$0
Structures		$0	$0	$0	$0
Fencing		$0	$0	$0	$0
Signalization & Lighting		$0	$0	$0	$0
Railroad Crossing		$0	$0	$0	$0
Earthwork		$0	$0	$0	$1,370,000
Clearing and Grubbing		$0	$0	$0	$0
Seeding & Sodding		$0	$0	$0	$30,200
Rip-Rap or Slope Protection		$0	$0	$0	$0
Guardrail		$0	$0	$0	$45,200
Signing		$0	$0	$0	$5,600
Pavement Markings		$0	$0	$0	$56,600
Maintenance of Traffic		$0	$0	$0	$114,000
Mobilization	5%	$0	$0	$0	$291,000
Other Items and Annual Inflation	10%	$0	$0	$0	$610,000
Const. Contingency (Structures Not Included)	30%	$0	$0	$0	$2,010,000
Const. Eng. & Inspec.	10%	$0	$0	$0	$872,000
Construction Estimate		$0	$0	$0	$9,600,000
Interchanges & Unique Intersections					
Roundabouts		$0	$0	$0	$0
Interchanges		$0	$0	$0	$0
Right-of-Way & Utilties		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Right-of-Way		$0	$0	$0	$0
Utilities		$0	$0	$0	$0
Preliminary Engineering		LOCAL	STATE	FEDERAL	TOTAL
		0%	0%	0%	
Prelim. Eng.	10.0%	$0	$0	$0	$960,000
Total Project Cost (2021)		$ -	$ -	$ -	$ 10,600,000