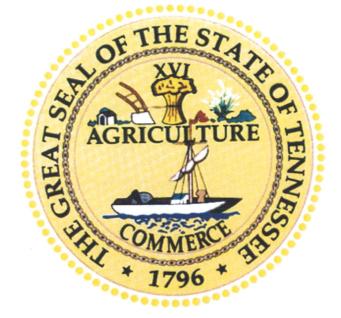
# **TENNESSEE** DEPARTMENT OF TRANSPORTATION



## **TECHNICAL REPORT**

## INTERSTATE 24 FROM I-59 TO I-124 L.M. 1.63 (GEORGIA) TO L.M. 7.33 (TENNESSEE) DADE COUNTY, GEORGIA HAMILTON COUNTY, TENNESSEE PIN 124072.00

PREPARED BY ALFRED BENESCH & COMPANY for the Strategic Transportation Investments Division

Recommended by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION	St. Ole	8-21-18

*This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.* 

#### **Executive Summary**

#### **Purpose of Study**

The purpose of this Technical Report is to provide an overview of the existing route deficiencies, define the preliminary purpose and need for the project, and provide a preliminary design that is feasible, cost effective, and provides improved mobility for this segment of Interstate 24 from Interstate 59 (L.M. 1.63) in Georgia to Interstate 124 (L.M. 7.33) in Tennessee. The proposed project was initiated as result of the Improving Manufacturing, Public Roads and Opportunities for a Vibrant Economy (IMPROVE) Act project delivery commitments.

#### **Description of the Existing Routes**

This section of I-24 is functionally classified as an Urban Interstate and consists primarily of a four (4) lane depressed grass median divided Urban section. The typical section consists of two (2) twelve (12) foot travel lanes in each direction, four (4) to twelve (12) foot paved outside shoulders and four (4) to eighteen (18) foot paved inside shoulders. The existing road is a major interstate entering Chattanooga and the adjacent land use primarily consists of commercial developments. The speed limit along the existing roadway ranges from 55 MPH to 70 MPH. Overall the route has an inadequate number of travel lanes to handle the current and future traffic volumes.

## **Existing Traffic and Safety Conditions**

The base year (2022) annual average daily traffic (AADT) for the section of I-24 under study is 69,630 vehicles per day. The design year (2042) AADT is projected to be 89,230 vehicles per day. The route was analyzed utilizing methodologies from the Highway Capacity Manual (HCM) to evaluate existing operating conditions.

The analysis indicates that much of the route either currently operates at or will eventually reach a Level of Service (LOS) F during the peak hours. This means that the route is likely at or near capacity, which will result in congestion and delay.

Crash data was reviewed and crash rates were calculated for individual segments along I-24. Total crash rates are consistently below the Tennessee statewide average rate throughout the route and the severe crash rates never exceed the statewide severe crash rate average.

#### **Conceptual Alternatives**

After evaluating the safety, operational, and geometric conditions on the existing route within the study limits, two (2) conceptual alternatives were considered to address the deficiencies: No Build and Widen Interstate 24 to three (3) lanes in each direction.

The No Build alternative assumes that only routine maintenance and that no major modifications or improvements will be implemented.

The Build alternative adds one (1) travel lane in each direction to increase the total number of lanes to six (6) along this section of I-24. The proposed typical section will include three (3) twelve (12) foot travel lanes in each direction, twelve (12) foot inside shoulders and twelve (12) foot outside shoulders. From the I-59 (L.M. 1.63) in Georgia to just east of the Browns Ferry Road interchange (approx. L.M. 4.70) in Tennessee, the interstate will be widened towards the inside median, with guardrail and barrier/retaining walls as needed due to grade difference. The remainder of the route will widen mostly to the south with a median barrier and a retaining wall along the eastbound edge of outside shoulder. As per the direction of TDOT Structures and GDOT Structures, the Build alternative will replace six (6) sets of side by side bridges in Tennessee and widen two (2) sets of side by side bridges in Georgia.

Existing right-of-way (ROW) varies from approximately two hundred (200) feet to three hundred (300) feet wide and it appears that most of the improvements can be completed within existing ROW. A small portion (approx. 0.40 acres) of ROW will be required near the end of the project as it ties into I-124 (US-27).

In addition to the proposed roadway improvements in the build alternative, twelve (12) structures within the project limits will be replaced and two (2) will be widened. Any culverts, or other concrete structures under I-24 that are impacted by the widening will be extended or replaced. The existing Box Culvert / Access Road (L.M. 1.27 in Tennessee) that connects areas of the quarry split by the interstate will need to be evaluated by TDOT Structures to determine if it needs modification or upgrading due to the additional loading.

Approximately five (5) ITS poles located in the median and two (2) Dynamic Message Signs (DMS) will need to be replaced/relocated. Railroad coordination will be necessary to ensure that impacts to railroad operations are minimized and access during construction is available as needed. Design Exceptions for limited stopping sight distance due to proposed median barrier on the inside of horizontal curves may be required in the proposed build alternative.

#### **Traffic and Operation Comparison**

The proposed build alternative will reduce congestion and delays throughout this section of I-24. The additional travel lane in both the eastbound and westbound directions will reduce the vehicular density along the route and improve overall travel time. Below is a table showing the Level of Service (LOS) difference between the No Build and the Build alternative. It is important to note that the segment from Browns Ferry Road to U.S. 27 fails prior to the design year of 2042. A LOS of D is maintained until 2031 and an E is maintained until 2040.

Level of Service Comparison				
Segment	Year	Peak Hour	LOS (No Build)	LOS (Build)
	2022	AM	D	С
I-24 from I-59 to GA State Line	2022	PM	D	С
1-24 1101111-59 to GA State Line	2042	AM	F	С
	2042	PM	F	С
	2022	AM	D	С
I-24 from GA State Line to S.R. 2	2022	PM	E	С
1-24 Holli GA State Line to S.R. 2	2042	AM	F	D
		PM	F	D
	2022	AM	E	С
1 24 from S. D. 2 to Browns Form, Dd		PM	E	С
I-24 from S.R. 2 to Browns Ferry Rd.	2042	AM	F	D
		PM	F	D
I-24 from Browns Ferry Rd. to U.S. 27	2022	AM	F	D
		PM	F	D
	2042	AM	F	F*
	2042	PM	F	F**

\* LOS E in 2031, LOS F in 2040

\*\* LOS E in 2032, LOS F in 2041

#### **Cost Estimate**

Due to overall length and cost of the project, the I-24 corridor has been divided into three (3) segments:

Segment 1: From the I-59 interchange to the Georgia State Line

Segment 2: From the Georgia State Line to just east of Browns Ferry Road

Segment 3: From just east of Browns Ferry Road to I-124 (U.S. 27)

The total estimated planning level cost for preliminary engineering, right-of-way and utilities, and construction for this project (per segment) is broken down below:

Segment	Description	Length (Miles)	PE	ROW & UTIL.	CONST	Preliminary Cost
Segment 1	From I-59 to GA State Line	2.47	\$2,406,000	\$0	\$33,691,000	\$36,097,000
Segment 2	From GA State Line to East of Browns Ferry Rd.	4.73	\$3,564,000	\$94,000	\$82,112,000	\$85,770,000
Segment 3	From East of Browns Ferry Rd. to I-124 (US-27)	2.60	\$3,555,000	\$250,000	\$83,591,000	\$87,396,000
Totals		9.80	\$9,525,000	\$344,000	\$199,394,000	\$209,263,000

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#### **1.0 Introduction**

The Technical Report process involves a comprehensive study of all historic, current, and projected highway data. An assembled team reviews the project to validate identified deficiencies and determine cost effective measures to resolve the existing conditions with an emphasis placed on motorist safety, mobility and operations.

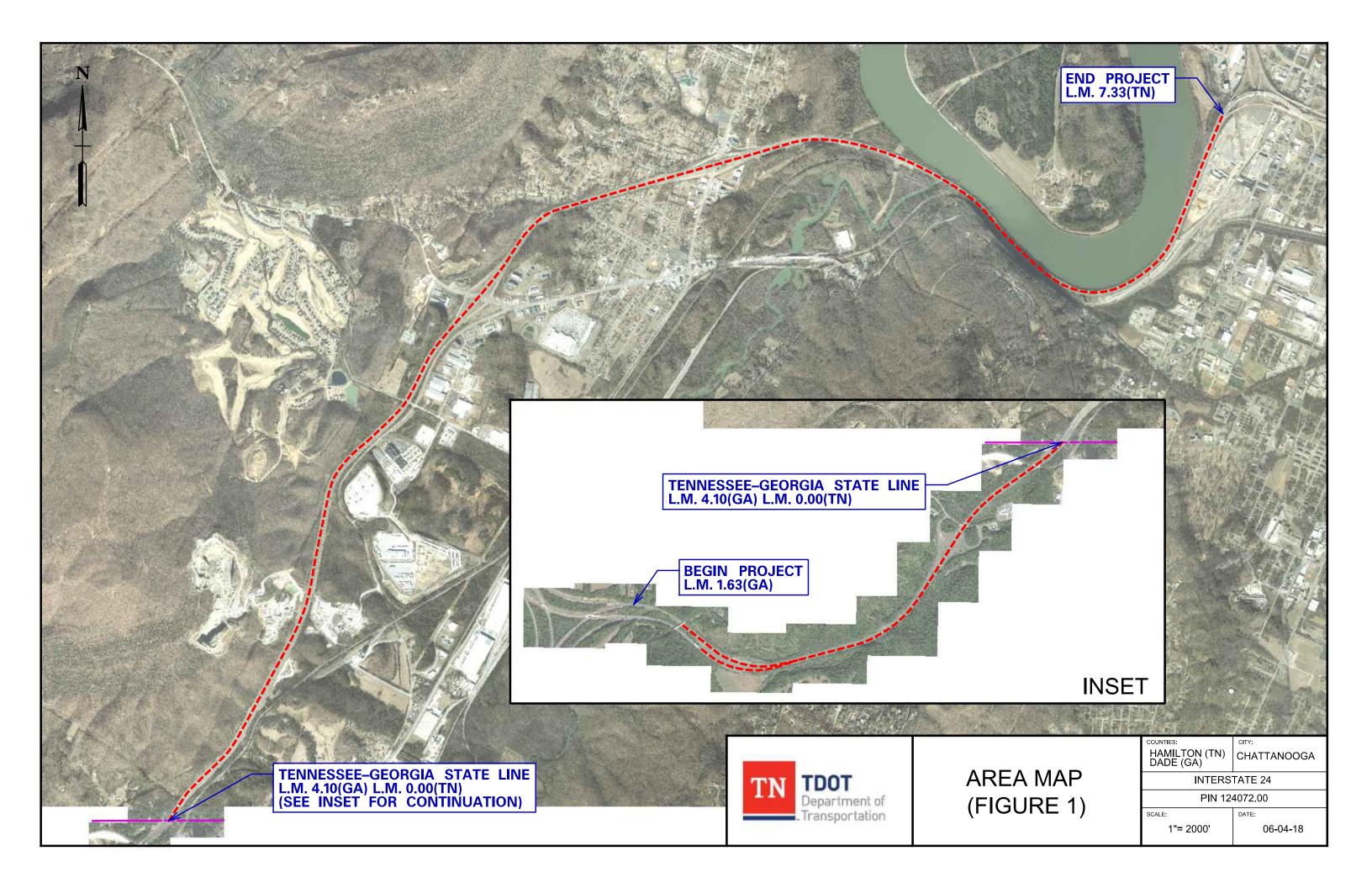
The purpose of this Technical Report is to provide an overview of the existing route deficiencies, define the preliminary purpose and need for the project, and to provide preliminary design that is feasible, cost effective, and provides improved mobility for this segment of Interstate 24. The proposed project was initiated as result of the Improving Manufacturing, Public Roads and Opportunities for a Vibrant Economy (IMPROVE) Act project delivery commitments.

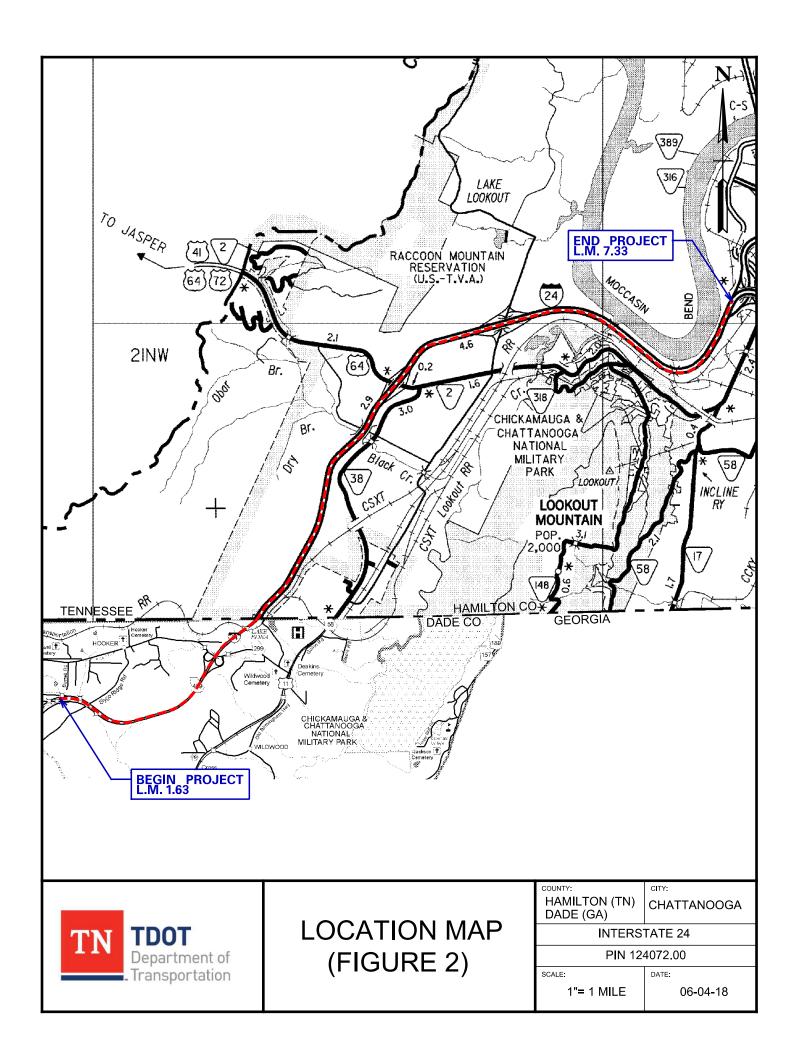
#### 1.1 Study Area, Vicinity, Existing Roadway Network Maps

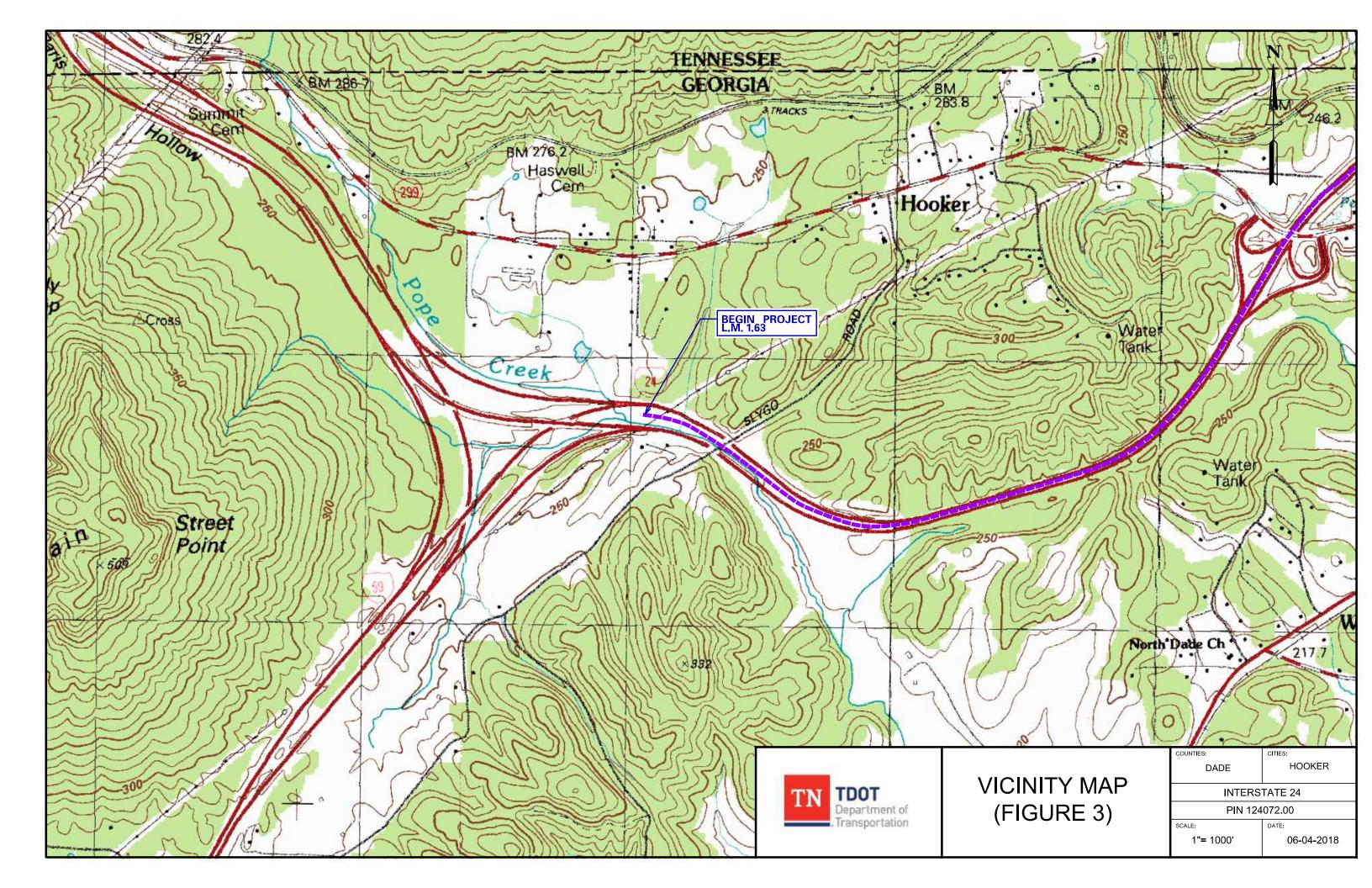
I-24 is being evaluated from I-59 in Georgia to I-124 in Tennessee. This section of I-24 is located within Dade County, Georgia, Hamilton County, Tennessee and the City of Chattanooga. I-24 is a major east/west route through the City of Chattanooga.

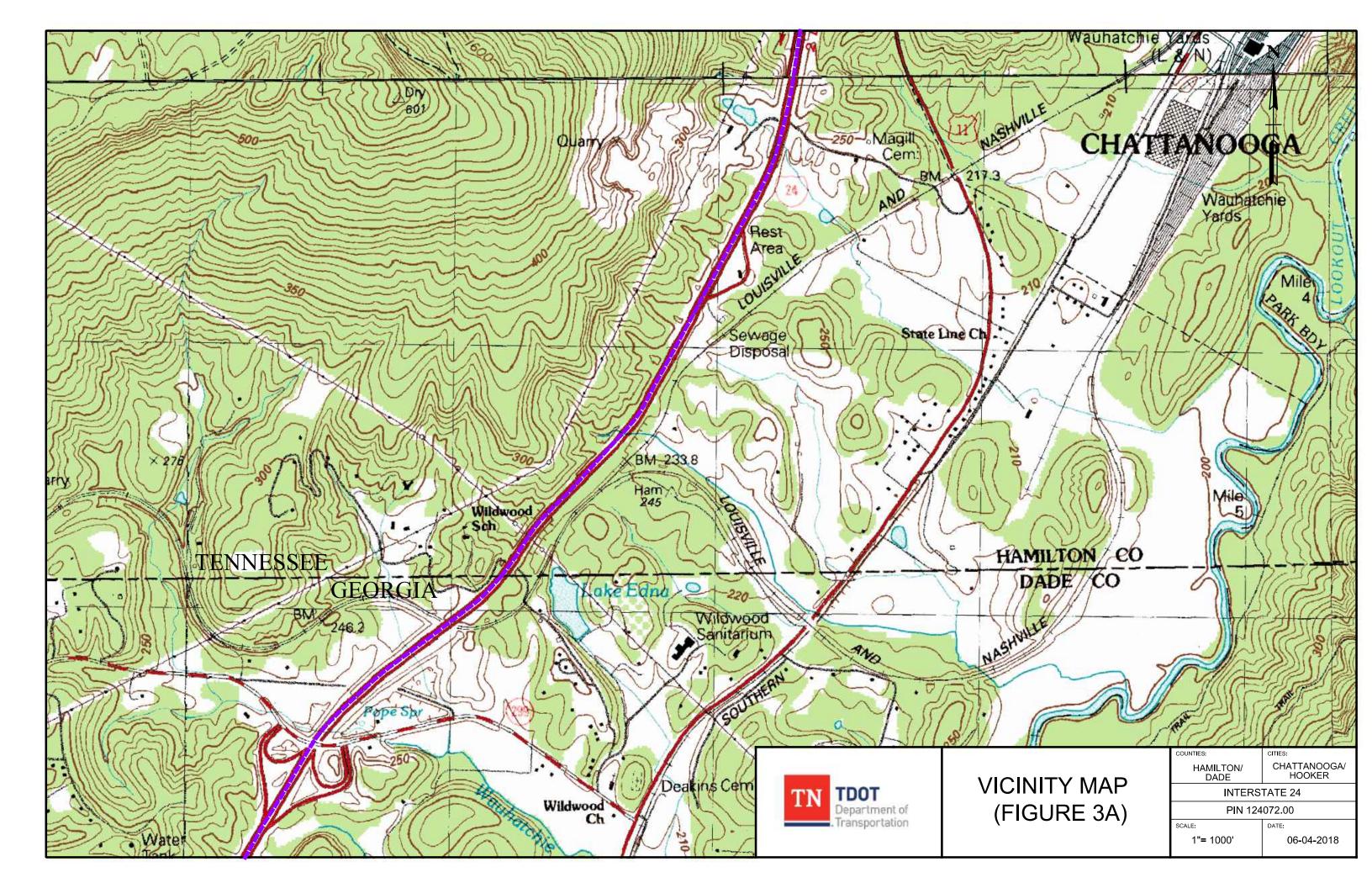
Within the project limits there are three (3) interchanges, a rest area, and seventeen (17) bridges. The area surrounding the interchanges is mostly commercial and industrial with the rest of the corridor being mainly undeveloped. CSX and Norfolk Southern have railroad facilities within the project limits. CSX has a line that crosses underneath I-24 in Georgia and both railroads have lines paralleling the interstate along the south edge for the last 2.5 miles of the project. Also in that area, the Tennessee River runs along the north side of I-24.

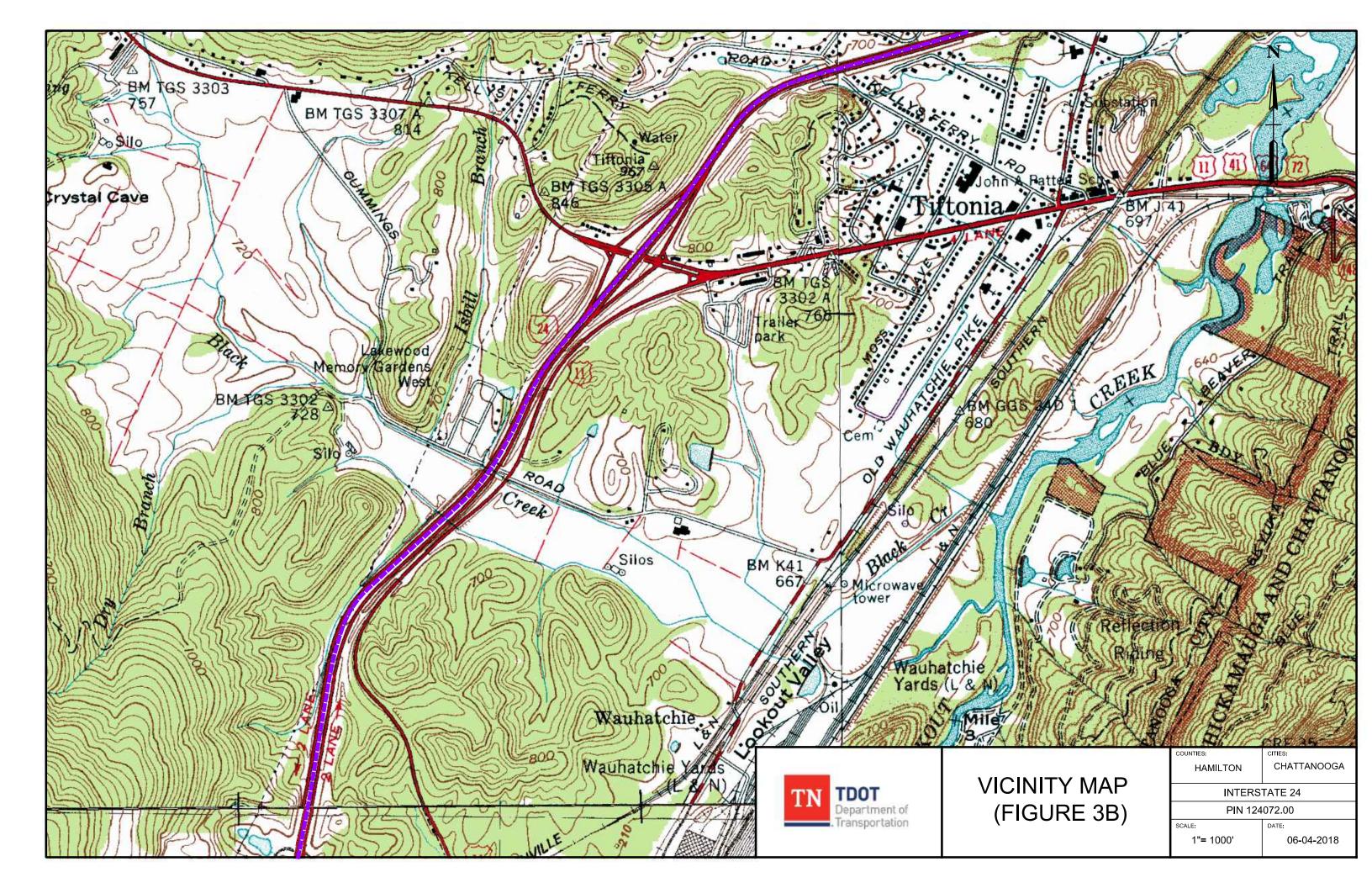
Figure 1 presents an area map, Figure 2 presents a location specific map, and Figures 3 through 3C detail the corridors geographic features on United States Geographical Survey Map.

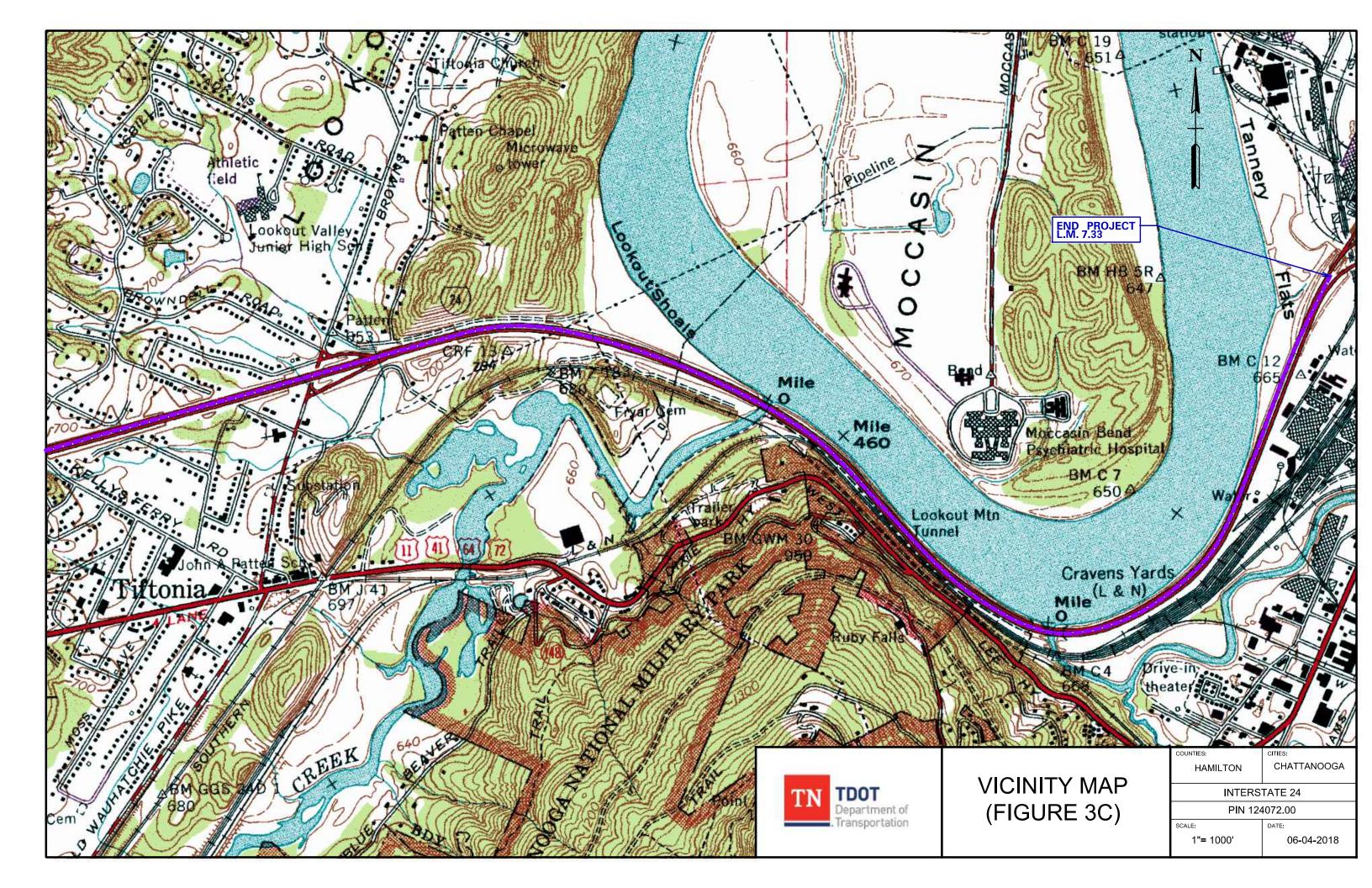












#### **1.2 Demographics**

The 2016 population of Hamilton County was estimated by the US Census Bureau as 357,738. This is a 6.3% increase from the 2010 population of 336,463. Select demographics are provided in Table 1. Equivalent demographics for Tennessee and the United States are provided for comparative purposes.

#### Table 1: Tennessee Demographics

Characteristic	Hamilton County	Tennessee	United States
Population Growth Rate	6.30%	4.80%	4.70%
Unemployment (April 2017)	6.90%	4.70%	4.40%
Minority Population (2016)	28.50%	21.30%	23.10%
Median Household Income (2012-2016)	\$47,898.00	\$48,457.00	\$55,322.00
Persons Below Poverty Level (2012-2016)	13.20%	15.80%	12.70%
Median Age (2016)	39.3	38.6	37.9

Sources: U.S. Census Bureau, QuickFacts

As shown in the table, Hamilton County has similar demographics as both Tennessee and the United States. Unemployment rates and the median household income are slightly lower in Hamilton County when compared to Tennessee. The minority population in Hamilton County is significantly higher than the population percentage for Tennessee and the United States and the median age for Hamilton County is older than both Tennessee and the United States.

#### Table 2: Georgia Demographics

Characteristic	Dade County	Georgia	United States
Population Growth Rate	-2.30%	6.40%	4.70%
Unemployment (April 2017)	4.00%	4.90%	4.40%
Minority Population (2016)	4.10%	28.80%	23.10%
Median Household Income (2012-2016)	\$43,463.00	\$51,037.00	\$55,322.00
Persons Below Poverty Level (2012-2016)	15.60%	16.00%	12.70%
Median Age (2016)	40.3	36.5	37.9

#### Sources: U.S. Census Bureau, QuickFacts

As shown in the table, Dade County has significantly different demographics when compared to both Georgia and the United States. Unemployment rates are slightly lower and the median household income is much lower in Dade County when compared to Georgia and the United States. The minority population in Hamilton County is significantly lower than the population percentage for Georgia and the United States and the median age for Hamilton County is older than both Tennessee and the United States.

#### **1.3 Existing Land Use and Zoning**

Interstate 24 is a major east/west route through Tennessee (and a small portion of Georgia) and the City of Chattanooga. The adjacent land use in this section of the route is primarily commercial with some light industrial and the CXS/NS railroad. A quarry is located on both sides of I-24, approximately one (1) mile east of the Georgia State Line. There is also a park property on the south side of I-24 immediately north of the Browns Ferry Road interchange.

#### **1.4 Other Projects in Vicinity**

TDOT Region 2 representatives indicated that there are multiple projects that could impact this I-24 project: Widening of I-24 in Georgia, Interchange improvements at both State Route 2 and Browns Ferry, and a Ramp realignment at I-124. Any of these other potential improvement projects should be coordinated and open communication maintained to minimize the chance for overlap.

In the past (approx. 2007) the Georgia Department of Transportation communicated with TDOT about possible improvements along the I-24 corridor. These discussions were tabled at the time as improvements in Tennessee were not feasible due to lack of funding. Any improvements recommended as part of this study, especially improvements within the State of Georgia, should be coordinated with GDOT to ensure continuity along the interstate facility.

There is a current TDOT project (PIN 118452.00) at the I-24 interchange with SR-2 (Cummings Highway). The project will redesign the intersections of the On & Off ramps at Cummings Highway and there will be a minor realignment of a portion of each ramp. The project is not expected to be in conflict with any improvements proposed as part of this report.

There is a current TDOT project (PIN 112833.00) at the I-24 interchanges with SR-2 (Broad Street) and SR-58 (Market Street) that realigns the I-24 Eastbound Off Ramp to SR-2. This project is in the Right-Of-Way (R.O.W.) phase and will likely be constructed prior to any proposed improvements recommended in this study. Coordination with current plans will be necessary to ensure the ramp realignment is incorporated into this report.

#### **2.0 Existing Conditions**

Within the study area, this section of I-24 is functionally classified as an Urban Interstate. It consists of two (2) twelve (12) foot travel lanes in each direction, a variable width depressed grass median, two (2) to eight (8) foot outside shoulders and zero (0) to two (2) foot inside shoulders within 200 to 300 feet of existing ROW. The speed limit along the existing roadway is posted as 70 MPH for the section from the

Interstate 59 Interchange (L.M. 1.63) to the Georgia State Line (L.M.4.10 / L.M. 0.00), 65 MPH for the section from the Georgia State Line (L.M. 0.00) to Lookout Creek (L.M. 6.25), and 55 MPH for the section from Lookout Creek (L.M. 6.25) to I-124 (L.M. 7.33).

There are three (3) interchanges within the study area: State Route 299 in Georgia, State Route 2 (US-11/41/64) and Browns Ferry Road, both in Tennessee. The State Route 299 interchange is a two (2) quadrant partial cloverleaf, with both quadrants on the same side of State Route 299. Both of the interchanges in Tennessee are diamond interchanges, with only one of the ramp termini currently signalized.

#### **2.1 Structures and Bridges Conditions**

There are seventeen (17) existing bridges within the project limits:

- 1. Georgia Bridge ID 083-0016-0: Slygo Road over I-24 (sufficiency rating 50.8). Steel structure with a length of 427 feet and a maximum span length of 90 feet. The structure is in good condition.
- Georgia Bridge ID 083-0043-0: I-24 Eastbound over Pope Creek (sufficiency rating 94.7). Concrete structure with a length of 124 feet and a maximum span length of 51 feet. The structure is in good condition.
- 3. Georgia Bridge ID 083-0020-0: Georgia State Route 299 over I-24 (New Construction). Concrete structure with a length of 202 feet and a maximum span length of 104 feet. The structure is in excellent condition.
- 4. Georgia Bridge ID 083-0044-0: I-24 Eastbound over CSX (sufficiency rating 83.7). Steel structure with a length of 221 feet and a maximum span length of 77 feet. The structure is in good condition.
- 5. Georgia Bridge ID 083-0045-0: I-24 Westbound over CSX (sufficiency rating 83.7). Steel structure with a length of 189 feet and a maximum span length of 66 feet. The structure is in good condition.
- Tennessee Structures Number 33I00240001: I-24 Northbound bridge over Black Creek and Cummings Road (sufficiency rating 86.6). Concrete Tee Beam structure with a length of 152 feet and a maximum span length of 44 feet. The structure is in good condition.
- Tennessee Structures Number 33I00240002: I-24 Southbound bridge over Black Creek and Cummings Road (sufficiency rating 86.6). Concrete Tee Beam structure with a length of 152 feet and a maximum span length of 44 feet. The structure is in good condition.

- Tennessee Structures Number 33I00240003: I-24 Northbound bridge over Cummings Hwy (S.R. 2) (sufficiency rating 86.2). Continuous Steel structure with a length of 178 feet and a maximum span length of 56 feet. The structure is in fair condition.
- Tennessee Structures Number 33I00240004: I-24 Southbound bridge over Cummings Hwy (S.R. 2) (sufficiency rating 74.6). Continuous Steel structure with a length of 178 feet and a maximum span length of 56 feet. The structure is in fair condition.
- Tennessee Structures Number 33I00240005: I-24 Eastbound bridge over Kelley's Ferry Road (sufficiency rating 83.1). Steel structure with a length of 116 feet and a maximum span length of 53 feet. The structure is in fair condition.
- Tennessee Structures Number 33I00240006: I-24 Westbound bridge over Kelley's Ferry Road (sufficiency rating 73.5). Steel structure with a length of 116 feet and a maximum span length of 53 feet. The structure is in fair condition.
- Tennessee Structures Number 33I00240007: I-24 Eastbound bridge over Brown's Ferry Road (sufficiency rating 59.0). Steel structure with a length of 139 feet and a maximum span length of 77 feet. The structure is in fair condition.
- Tennessee Structures Number 33I00240008: I-24 Westbound bridge over Brown's Ferry Road (sufficiency rating 71.8). Steel structure with a length of 139 feet and a maximum span length of 77 feet. The structure is in fair condition.
- 14. Tennessee Structures Number 33I00240009: I-24 Eastbound bridge over Lookout Creek (sufficiency rating 82.2). Continuous Prestressed Concrete structure with a length of 198 feet and a maximum span length of 66 feet. The structure is in fair condition.
- 15. Tennessee Structures Number 33I00240010: I-24 Westbound bridge over Lookout Creek (sufficiency rating 82.2). Continuous Prestressed Concrete structure with a length of 198 feet and a maximum span length of 66 feet. The structure is in fair condition.
- 16. Tennessee Structures Number 33I00240011: I-24 Eastbound bridge over Chattanooga Creek (sufficiency rating 82.2). Continuous Prestressed Concrete structure with a length of 228 feet and a maximum span length of 76 feet. The structure is in fair condition.
- 17. Tennessee Structures Number 33I00240012: I-24 Westbound bridge over Chattanooga Creek (sufficiency rating 82.2). Continuous Prestressed Concrete structure with a length of 228 feet and a maximum span length of 76 feet. The structure is in fair condition.
- Tennessee Structures Number 33CULV01019: Access Road underneath I-24 (L.M. 1.27), connecting areas of the quarry on either side of the interstate. Box Culvert is 16 feet wide and is in fair condition.

#### 2.2 Existing Utility Infrastructure

There are minimal utilities along the corridor, with most occurring in the vicinity of the interchanges and rest area. There are also TVA Power lines crossing the interstate at multiple locations. TDOT ITS cameras are located along the outside edge, with a few located in the medians near bridges, and will need to be considered during the design process. Additional field survey during the design will determine if there are any other underground utilities within the project area.

#### **2.3 Preliminary Environmental Constraints**

The National Wetlands Inventory Wetlands Mapper indicated one (1) wetland potentially within the project limits. This wetland is located between the Tennessee River and I-24 near the interchange with I-124 and has an approximate size of 5.89 acres. There are multiple blue line streams that either run along or cross underneath I-24. Four (4) of those streams are considered impaired for various reasons. An Unnamed Tributary to Lookout Creek (approx. L.M. 1.30) and Black Creek (approx. L.M. 2.25) are impaired for E. Coli and loss of streamside and littoral vegetation, Chattanooga Creek (approx. L.M. 6.25) is impaired for multiple items including but not limited to: Dioxin, E. Coli, PCB, Creosote and other anthropogenic substrate alterations, and the Tennessee River/Nickajack Reservoir is impaired for Dioxin and PCB. Precautions should be taken around streams to avoid contamination or destruction. As the project progresses through the National Environmental Policy Act (NEPA) process an ecology field survey will be conducted and a report generated to identify any aquatic features within the proposed project limits.

The Environmental Protection Agency (EPA) classifies geographic areas as "attainment" or "nonattainment" areas with respect to the National Ambient Air Quality Standards (NAAQS). A geographical area with air quality that meets the NAAQS for certain pollutants is referred to as an attainment area, and an area that does not meet the NAAQS is classified as a nonattainment area. A geographical area that is a nonattainment area that then later meets the NAAQS is referred to as a "maintenance" area. The EPA and Tennessee Department of Environment and Conservation (TDEC) Division of Air Pollution and Control have designated Hamilton County as a maintenance area for a few NAAQS criteria pollutants. Dade County in Georgia is classified as an attainment area.

## **3.0 Existing Condition Analysis**

#### 3.1 Crash Analysis on Existing Route

Utilizing the Enhanced Tennessee Roadway Information Management System (ETRIMS) database from June 1, 2014 to May 30, 2017, a crash rate (crashes per one million vehicle miles) was calculated. Table 3 shows the crash rates of the three (3) segments along the route.

#### Table 3: Crash Rate Comparison

Crash Rates				
From I-59 Interch	ange (L.M. 1.63) to GA St	ate Line (L.M. 4.10)		
Туре	Crash Rate TN SW Average			
Total	1.061	1.828		
Severe (Fatal + Incap)	0.017	0.057		
From GA Sta	ate Line (L.M. 0.00) to S.R	. 2 (L.M. 2.90)		
Туре	Crash Rate	TN SW Average		
Total	1.106	1.828		
evere (Fatal + Incap) 0.019 0.057		0.057		
From S.R. 2 (L.M. 2.90) to Browns Ferry Rd (L.M. 4.22)				
Туре	Crash Rate	TN SW Average		
Total	1.516	1.828		
Severe (Fatal + Incap)	0.01	0.057		
From Browns Ferry Rd (L.M. 4.22) to U.S. 27 (L.M. 7.33)				
Туре	Crash Rate	TN SW Average		
Total	1.477	1.828		
Severe (Fatal + Incap)	0.033	0.057		

The calculated crash rate (A) for all segments of I-24 were lower than the Tennessee statewide average. The crash rate calculations are provided in the appendix.

To analyze crashes more in depth, Table 4 on the following page shows distributions of crash severity, type of crash, weather conditions, and more.

#### **Table 4: Crash Statistics**

CRASH STATISTICS					
	6/1/2014 - 5/31/2017				
Condition	Number of Crashes	Percentage of Total			
Lig	hting Conditions				
Daylight	510	69%			
Dark - Not Lighted	67	9%			
Dark - Lighted	59	8%			
Dusk/Dawn	18	3%			
Other / Not Indicated	83	11%			
(	Crash Severity				
Property Damage	627	85%			
Non-Incap Injury	97	13%			
Incap Injury	10	2%			
Fatality	3	1%			
Manner of Collision					
Rear-End	378	51%			
Lane Departure	121	16%			
Angle	19	3%			
Sideswipe	113	15%			
Head On	3	1%			
Overturn	6	1%			
Animal	9	2%			
Other / Not Indicated	88	12%			
Weather Conditions					
Clear	514	70%			
Rain	136	19%			
Snow	2	0%			
Sleet/Hail	1	0%			
Other / Not Indicated	84	11%			

\* Details for crashes on I-24 in Georgia were not available

During the study period, 737 crashes took place along I-24 in Tennessee. The majority of the crashes that occurred were rear-end, lane departure and sideswipes, which is typical for interstate facilities. It is also important to note that a majority of the crashes occurred in clear, dry and daylight conditions. While

almost 20% of the crashes occurred during rainy conditions, there were no significant clusters of crashes that would indicate a specific concern for wet weather travel along the corridor. There were ten (10) incapacitating injury crashes and three (3) fatal crashes within the study area. Crash diagram figures are provided in the appendix.

#### **3.2 Traffic Analysis on Existing Route**

The base year (2022) annual average daily traffic (AADT) for the section of I-24 under study varies from 59,880 to 84,330 vehicles per day. The design year (2042) AADT is projected to be between 68,400 and 111,600 vehicles per day. Project traffic for the entire route is provided in the appendix.

Level of service (LOS) for interstate segments is defined by the density of traffic. Density describes the proximity to other vehicles and is related to the freedom to maneuver within the traffic stream. Table 5 below shows the Highway Capacity Manual (HCM) definitions of LOS for freeway segments.

LOS	Density (pc/mi/ln)	
А	<= 11	
В	> 11 - 18	
С	> 18 - 26	
D	> 26 - 35	
E	> 35 - 45	
F	> 45 (Demand exceeds capacity)	
Courses UCM 2010		

Table 5: LOS Definitions

Source: HCM 2010

The capacity and operation along I-24 was evaluated as an urban interstate facility utilizing the Highway Capacity Software (HCS2010) to determine a level of service (LOS) for each segment. Both AM and PM peak hours in both travel directions were evaluated and the results are summarized in the table on the following page.

Level of Service				
	2022		2042	
Segment	Peak Hour	LOS	Peak Hour	LOS
L 24 from L E0 to CA State Line	AM	D	AM	F
I-24 from I-59 to GA State Line	PM	D	PM	F
I-24 from GA State Line to S.R. 2	AM	D	AM	F
1-24 Holli GA State Line to S.R. 2	PM	E	PM	F
1.24 from S. P. 2 to Provinc Formy Pd	AM	E	AM	F
I-24 from S.R. 2 to Browns Ferry Rd.	PM	E	PM	F
1.24 from Drowing Form, Dd to 11.5, 27	AM	F	AM	F
I-24 from Browns Ferry Rd. to U.S. 27	PM	F	PM	F

#### Table 6: Existing Level of Service

As shown in the previous table, LOS for the segments of I-24 range from a LOS D to a LOS F. This indicates that much of the route is near or above capacity with the existing laneage.

#### 3.3 Geometric Analysis on Existing Route

The existing geometry of I-24 is appropriate for the current posted speeds. The overall horizontal and vertical alignments meet the required design speed parameters.

#### **3.4 Deficiencies of Existing Route**

The main deficiency of I-24 within the project limits is an insufficient capacity to meet demand of the vehicular volume. With just two (2) travel lanes in each direction, vehicles become congested and drivers become impatient. This often leads to sideswipes and rear-end collisions (as indicated by the crash data) as drivers begin following much closer and making more maneuvers to get through traffic.

#### 4.0 Preliminary Purpose and Need

The need for improvements along I-24 is due to the high volumes of traffic and the inability of the route to handle the current and projected traffic volumes. The current deficiencies that need to be addressed include an insufficient number of lanes on I-24 leading to congested conditions.

The purpose of this project is to ease congestion, improve mobility, and increase capacity along this section of I-24. Widening I-24 to include an additional lane in each travel direction will lead to an improved operation (Level of Service) throughout the corridor and increased mobility along the route.

#### **5.0 Proposed Conceptual Alternatives**

After evaluating the safety, operational, and geometric conditions on the existing route within the study limits, two (2) conceptual alternatives were considered to address the deficiencies: No Build alternative and Build Alternative.

The No Build Alternative denotes that only routine maintenance would be made to the existing corridor. No improvements or substantial modifications would be made with the No Build Alternative.

The Build alternative adds one (1) travel lane in each direction to increase the total number of lanes to six (6) along this section of I-24. The proposed typical section will include three (3) twelve (12) foot travel lanes in each direction, twelve (12) foot inside shoulders and twelve (12) foot outside shoulders. From the Interstate 59 Interchange (L.M. 1.63) in Georgia to just east of the Browns Ferry Road interchange (approx. L.M. 4.70), the interstate will be widened towards the inside median, with guardrail and barrier/retaining walls as needed due to grade difference. The remainder of the route will widen mostly to the south with a median barrier and a retaining wall along the eastbound edge of outside shoulder. As per the direction of TDOT Structures and GDOT Structures, the Build alternative will replace six (6) sets of side by side bridges in Tennessee and widen two (2) sets of side by side bridges in Georgia.

Existing right-of-way (ROW) varies from approximately two hundred (200) feet to three hundred (300) feet wide and it appears that most of the improvements can be completed within existing ROW. A small portion (approx. 0.40 acres) of ROW will be required near the end of the project as it ties into I-124 (US-27).

In addition to the proposed roadway improvements in the build alternative, twelve (12) structures in the Tennessee section will be replaced and two (2) structures in the Georgia section will be widened. TDOT Structures and TDOT Environmental have requested that the replacement of the structures over Lookout Creek and Chattanooga Creek attempt to minimize impacts to the streams. If possible, existing piers and abutments should be re-used/modified to keep construction out of the stream. Any culverts, or other concrete structures under I-24 that are impacted by the widening will be extended or replaced. The existing Box Culvert / Access Road (L.M. 1.27 in Tennessee) that connects areas of the quarry split by

the interstate will need to be evaluated by TDOT Structures to determine if it needs modification or upgrading due to the additional loading.

Approximately five (5) ITS poles located in the median and two (2) Dynamic Message Signs (DMS) will need to be replaced/relocated. Railroad coordination will be necessary to ensure that impacts to railroad operations are minimized and access during construction is available as needed. Design Exceptions for limited stopping sight distance due to proposed median barrier on the inside of horizontal curves may be required in the proposed build alternative.

Because the available topographic information is limited at this phase and the desire is to remain within existing ROW, some of the proposed design elements (shoulder width, guardrail location, retaining walls, etc...) could be revised as part of the NEPA/Design phase when a more detailed field survey is available.

#### **5.1 Proposed Alternative Layouts**

The following pages show the conceptual design of the proposed Build alternative. Layouts were not developed for No Build alternative as there are no proposed improvements. The conceptual design layouts are followed by the Environmental Technical Study Area figures.

## Index Of Sheets

SHEET NO.	DESCRIPTION
2	TITLE SHEET TYPICAL SECTIONS BUILD ALTERNATIVE

## STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING

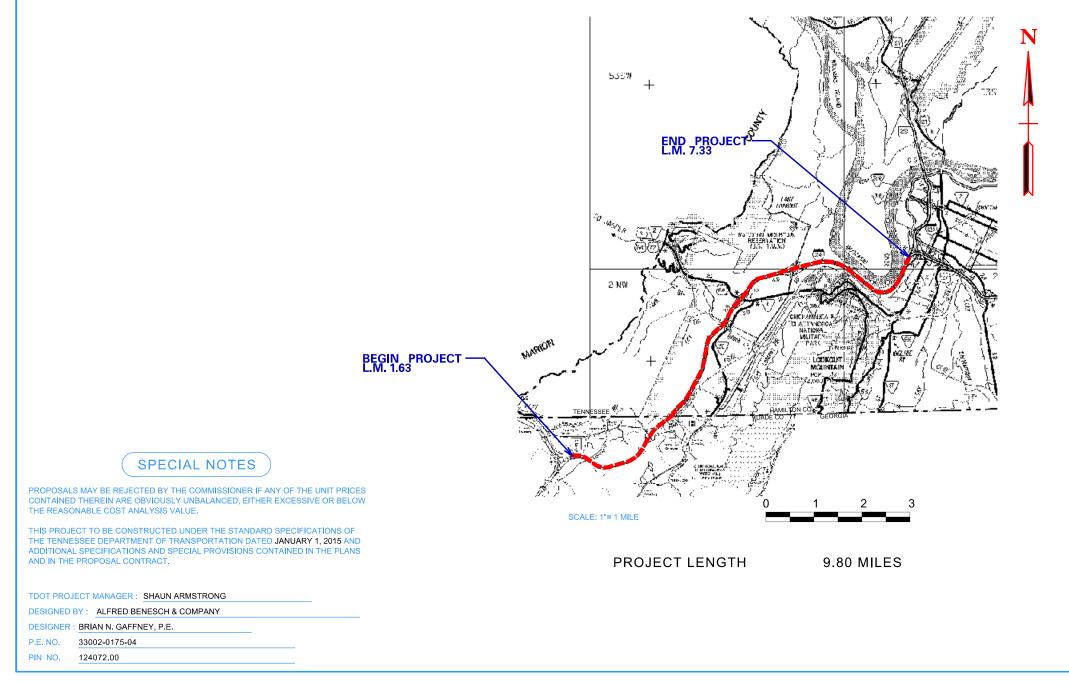
# **HAMILTON COUNTY**

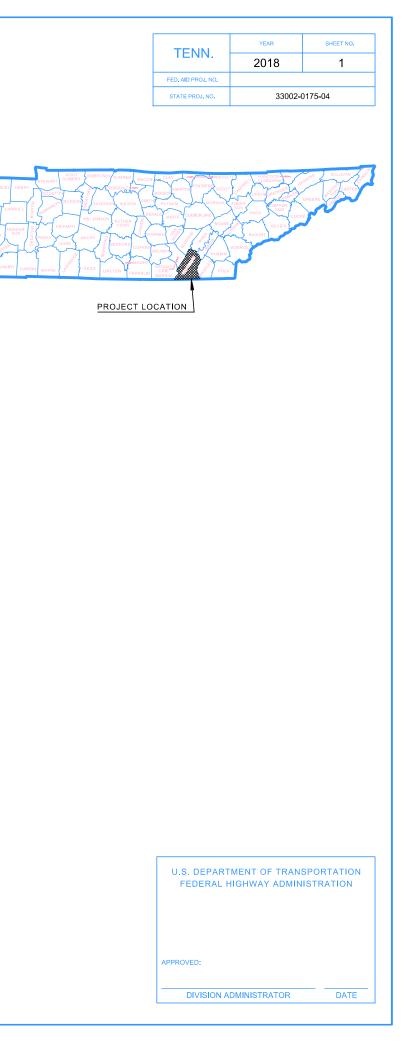
INTERSTATE 24 FROM I-59 TO I-124 L.M. 1.63(GA) TO L.M. 7.33(TN) DADE COUNTY, GEORGIA & HAMILTON COUNTY, TENNESSEE

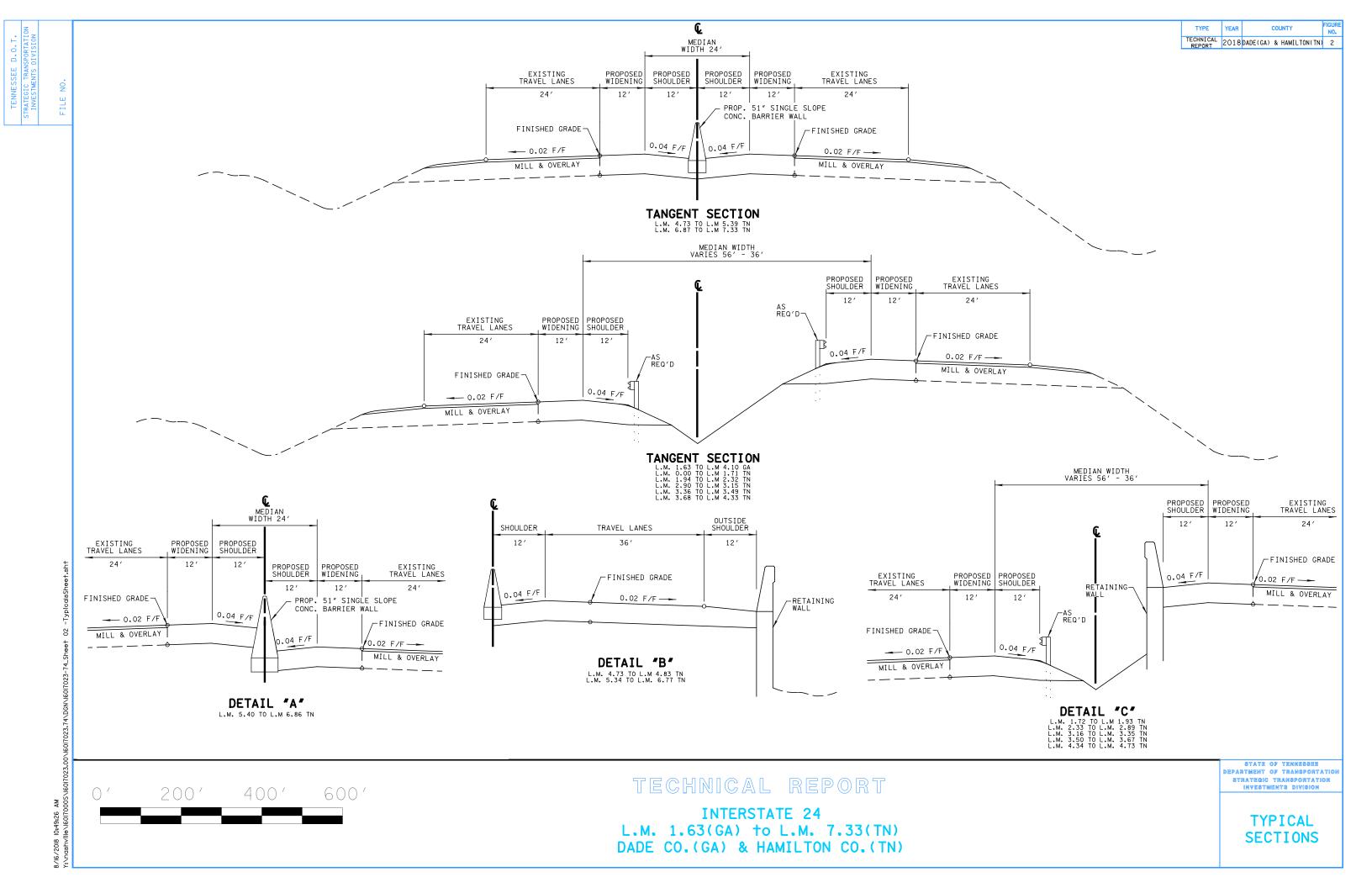
#### TECHNICAL REPORT

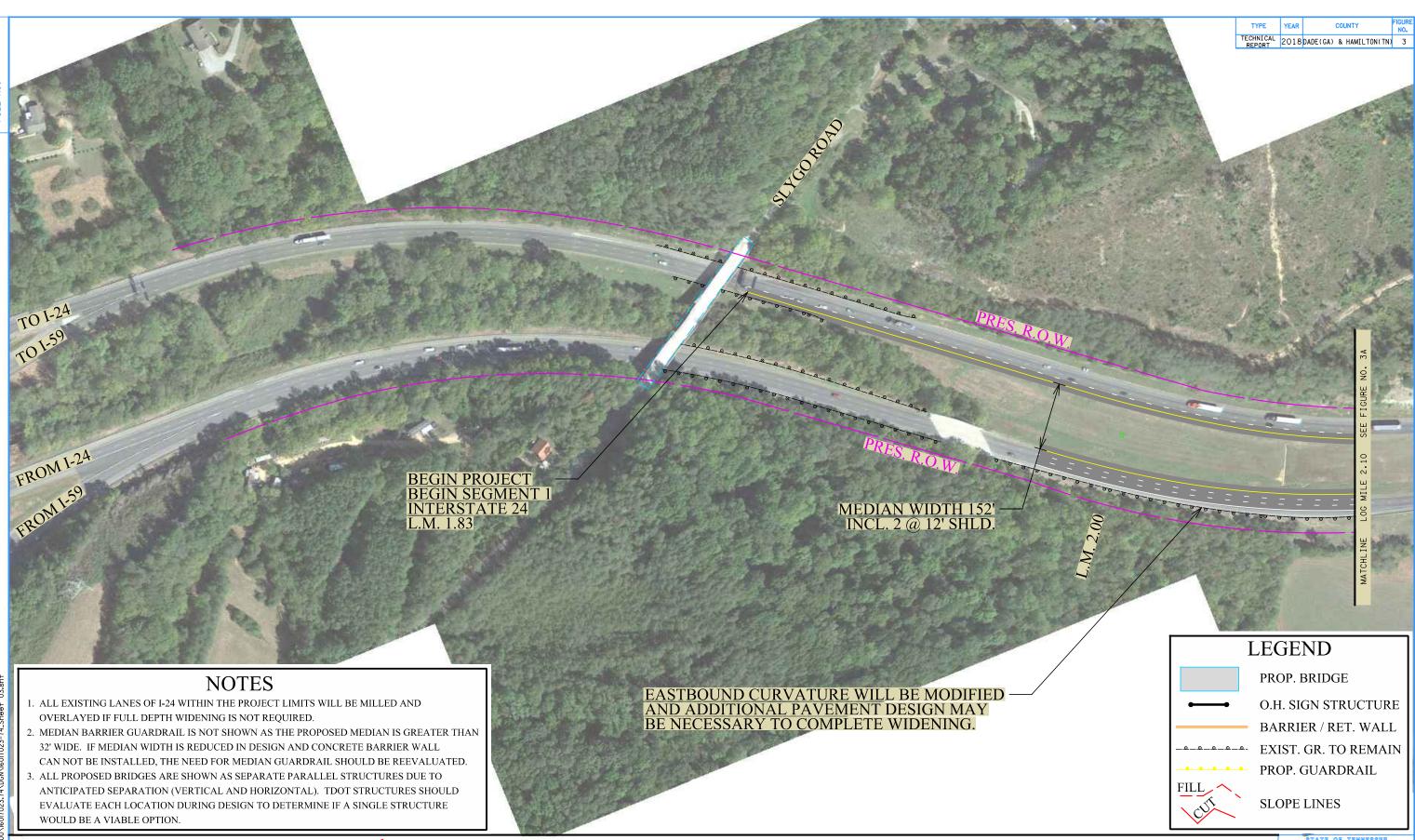
STATE HIGHWAY NO. F.A.H.S. NO.











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TECHNICAL REPORT

**INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)

STATE OF TENNESSEE Department of transportation Strategic transportation Investments division FIGURE 3 I-24 L.M. 1.63 to L.M. 2.10

PRES. R.O.V

MEDIAN WIDTH 40' -INCL. 2 @ 12' SHLD.

**\_INTERSTATE 24** 

EASTBOUND CURVATURE WILL BE MODIFIED AND ADDITIONAL PAVEMENT DESIGN MAY BE NECESSARY TO COMPLETE WIDENING.

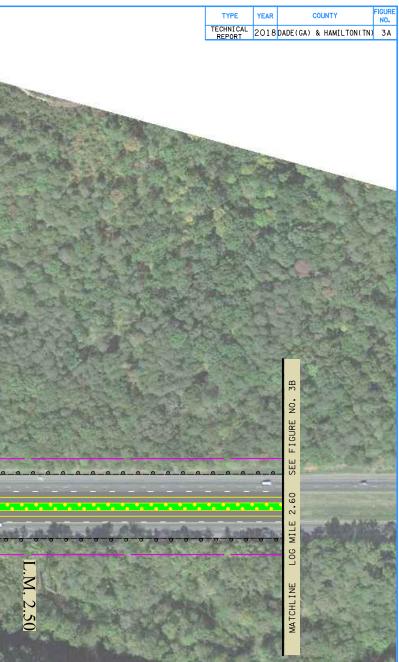
## NOTES

- 1. ALL EXISTING LANES OF I-24 WITHIN THE PROJECT LIMITS WILL BE MILLED AND OVERLAYED IF FULL DEPTH WIDENING IS NOT REQUIRED.
- MEDIAN BARRIER GUARDRAIL IS NOT SHOWN AS THE PROPOSED MEDIAN IS GREATER THAN 32' WIDE. IF MEDIAN WIDTH IS REDUCED IN DESIGN AND CONCRETE BARRIER WALL CAN NOT BE INSTALLED, THE NEED FOR MEDIAN GUARDRAIL SHOULD BE REEVALUATED.
- 3. ALL PROPOSED BRIDGES ARE SHOWN AS SEPARATE PARALLEL STRUCTURES DUE TO ANTICIPATED SEPARATION (VERTICAL AND HORIZONTAL). TDOT STRUCTURES SHOULD EVALUATE EACH LOCATION DURING DESIGN TO DETERMINE IF A SINGLE STRUCTURE WOULD BE A VIABLE OPTION.

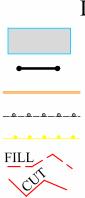
D' 200' 400' 600

# TECHNICAL REPORT

INTERSTATE 24 L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)







## LEGEND

PROP. BRIDGE

O.H. SIGN STRUCTURE BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

SLOPE LINES

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION STRATEGIC TRANSPORTATION INVESTMENTS DIVISION FIGURE 3A I-24 L.M. 2.10 to L.M. 2.60

## **INTERSTATE 24**

MEDIAN WIDTH 40' INCL. 2 @ 12' SHLD.

## NOTES

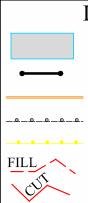
- 1. ALL EXISTING LANES OF I-24 WITHIN THE PROJECT LIMITS WILL BE MILLED AND OVERLAYED IF FULL DEPTH WIDENING IS NOT REQUIRED.
- 2. MEDIAN BARRIER GUARDRAIL IS NOT SHOWN AS THE PROPOSED MEDIAN IS GREATER THAN 32' WIDE. IF MEDIAN WIDTH IS REDUCED IN DESIGN AND CONCRETE BARRIER WALL CAN NOT BE INSTALLED, THE NEED FOR MEDIAN GUARDRAIL SHOULD BE REEVALUATED.
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200′ 400′ 600′

TECHNICAL REPORT INTERSTATE 24

INTERSTATE 24 L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)





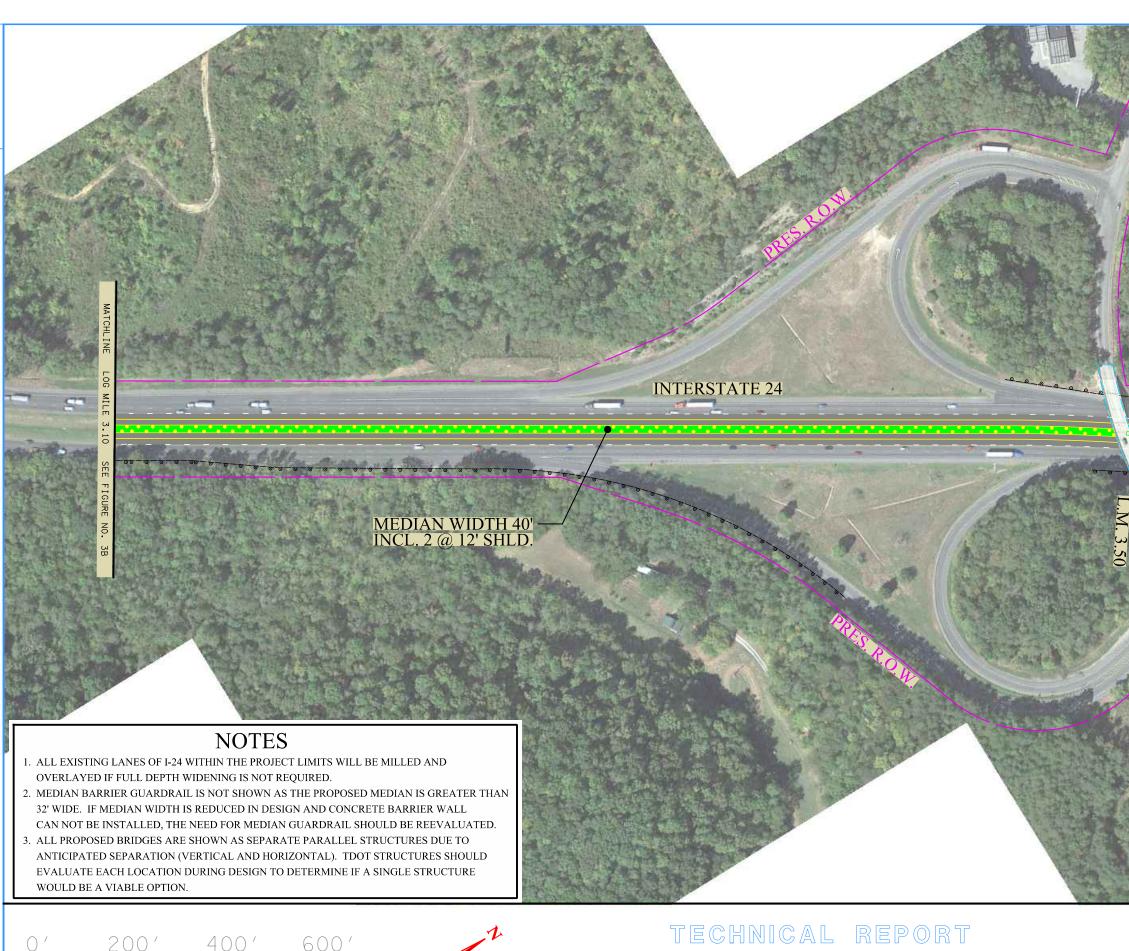
## LEGEND

PROP. BRIDGE

O.H. SIGN STRUCTURE BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

SLOPE LINES

STATE OF TENMESSEE DEPARTMENT OF TRANSPORTATION STRATEGIC TRANSPORTATION INVESTMENTS DIVISION FIGURE 3B I-24 L.M. 2.60 to L.M. 3.10



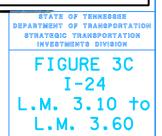
**INTERSTATE 24** 

L.M. 1.63(GA) to L.M. 7.33(TN)

DADE CO.(GA) & HAMILTON CO.(TN)

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TYPE YEAR COUNTY HIGURE NO. TECHNICAL 2018 DADE(GA) & HAMILTON(TN) 3C

NOTES

- 1. ALL EXISTING LANES OF I-24 WITHIN THE PROJECT LIMITS WILL BE MILLED AND OVERLAYED IF FULL DEPTH WIDENING IS NOT REQUIRED.
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600

TECHNICAL REPORT **INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)

ANSPORTATION

. INTERSTATE 24

MEDIAN WIDTH 40' INCL. 2 @ 12' SHLD.



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FILL

PROP. BRIDGE

**O.H. SIGN STRUCTURE** BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

SLOPE LINES

STATE OF TENNESSEE Department of transportatio Strategic transportation Investments division FIGURE 3D I-24 L.M. 3.60 to L.M. 4.10

END SEGMENT 1 BEGIN SEGMENT 2 TENNESSEE (L.M. 0.00) / GEORGIA (L.M. 4.10) STATE LINE

INTERSTATE 24

TECHNICAL REPORT

**INTERSTATE 24** 

L.M. 1.63(GA) to L.M. 7.33(TN)

DADE CO.(GA) & HAMILTON CO.(TN)

CSX TRANSPORTATION

# NOTES

1. ALL EXISTING LANES OF I-24 WITHIN THE PROJECT LIMITS WILL BE MILLED AND OVERLAYED IF FULL DEPTH WIDENING IS NOT REQUIRED.

400

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- 2. MEDIAN BARRIER GUARDRAIL IS NOT SHOWN AS THE PROPOSED MEDIAN IS GREATER THAN 32' WIDE. IF MEDIAN WIDTH IS REDUCED IN DESIGN AND CONCRETE BARRIER WALL CAN NOT BE INSTALLED, THE NEED FOR MEDIAN GUARDRAIL SHOULD BE REEVALUATED.
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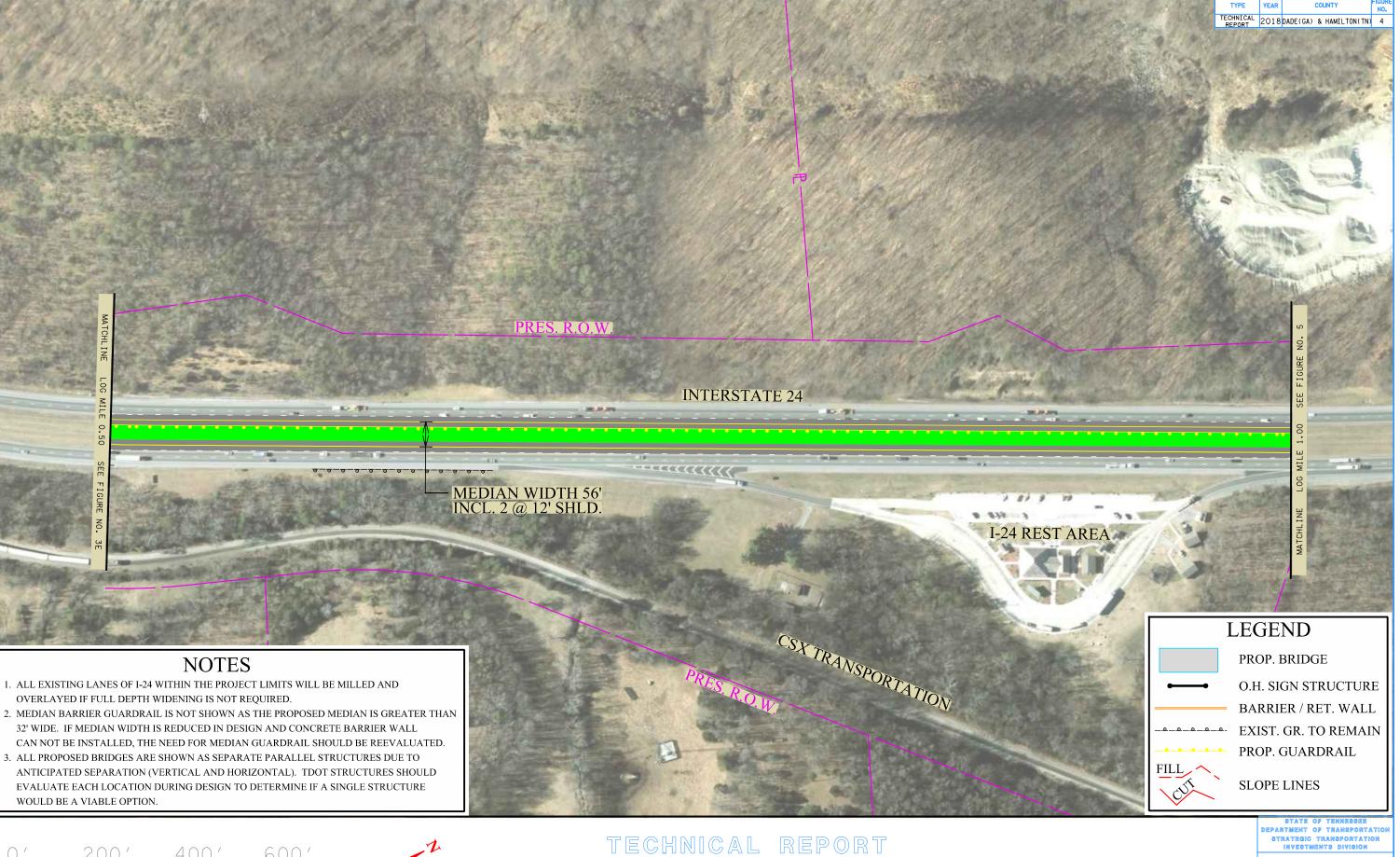
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DEPARTMENT OF TRANSPORTATION Strategic transportation investments division FIGURE 3E I-24 L.M. 0.00 to L.M. 0.50





**INTERSTATE 24** 

L.M. 1.63(GA) to L.M. 7.33(TN)

DADE CO.(GA) & HAMILTON CO.(TN)

2()()

600

4()()

DEPARTMENT OF TRANSPORTATION Strategic transportation investments division FIGURE 4 I-24 L.M. 0.50 to L.M. 1.00

# EXISTING BOX CULVERT / MACHINE PASS (TO BE EVALUATED BY TDOT STRUCTURES FOR REPLACEMENT/MODIFICATIONS)

## NOTES

- 1. ALL EXISTING LANES OF I-24 WITHIN THE PROJECT LIMITS WILL BE MILLED AND OVERLAYED IF FULL DEPTH WIDENING IS NOT REQUIRED.
- 2. MEDIAN BARRIER GUARDRAIL IS NOT SHOWN AS THE PROPOSED MEDIAN IS GREATER THAN 32' WIDE. IF MEDIAN WIDTH IS REDUCED IN DESIGN AND CONCRETE BARRIER WALL CAN NOT BE INSTALLED, THE NEED FOR MEDIAN GUARDRAIL SHOULD BE REEVALUATED.
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600

MEDIAN WIDTH 56' INCL. 2 @ 12' SHLD.

• INTERSTATE 24

TECHNICAL REPORT **INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN)

DADE CO.(GA) & HAMILTON CO.(TN)



## LEGEND

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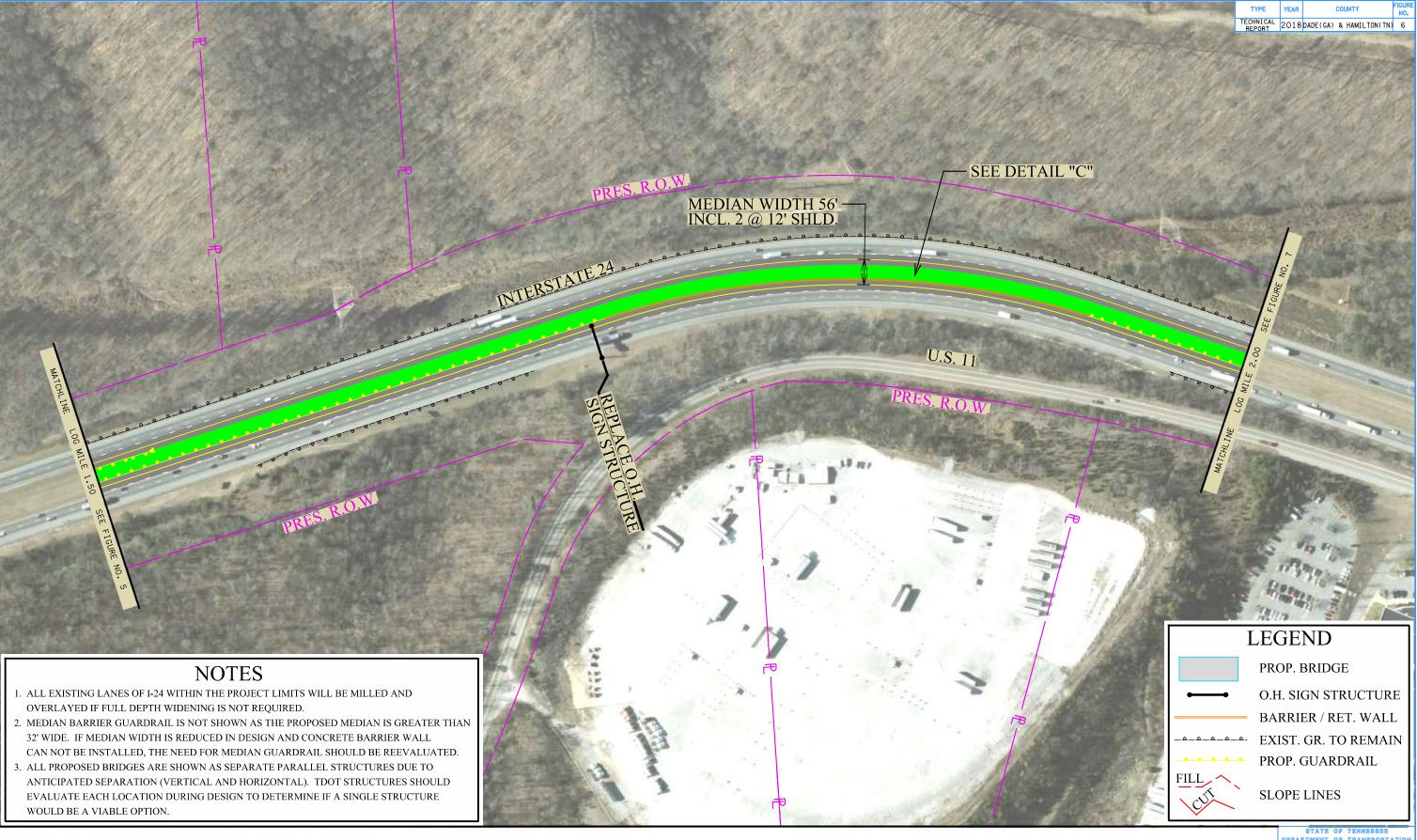
FILL

PROP. BRIDGE

O.H. SIGN STRUCTURE BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

SLOPE LINES

EPARTMENT OF TRANSPORTATION Strategic transportation Investments Division FIGURE 5 I-24 L.M. 1.00 to L.M. 1.50



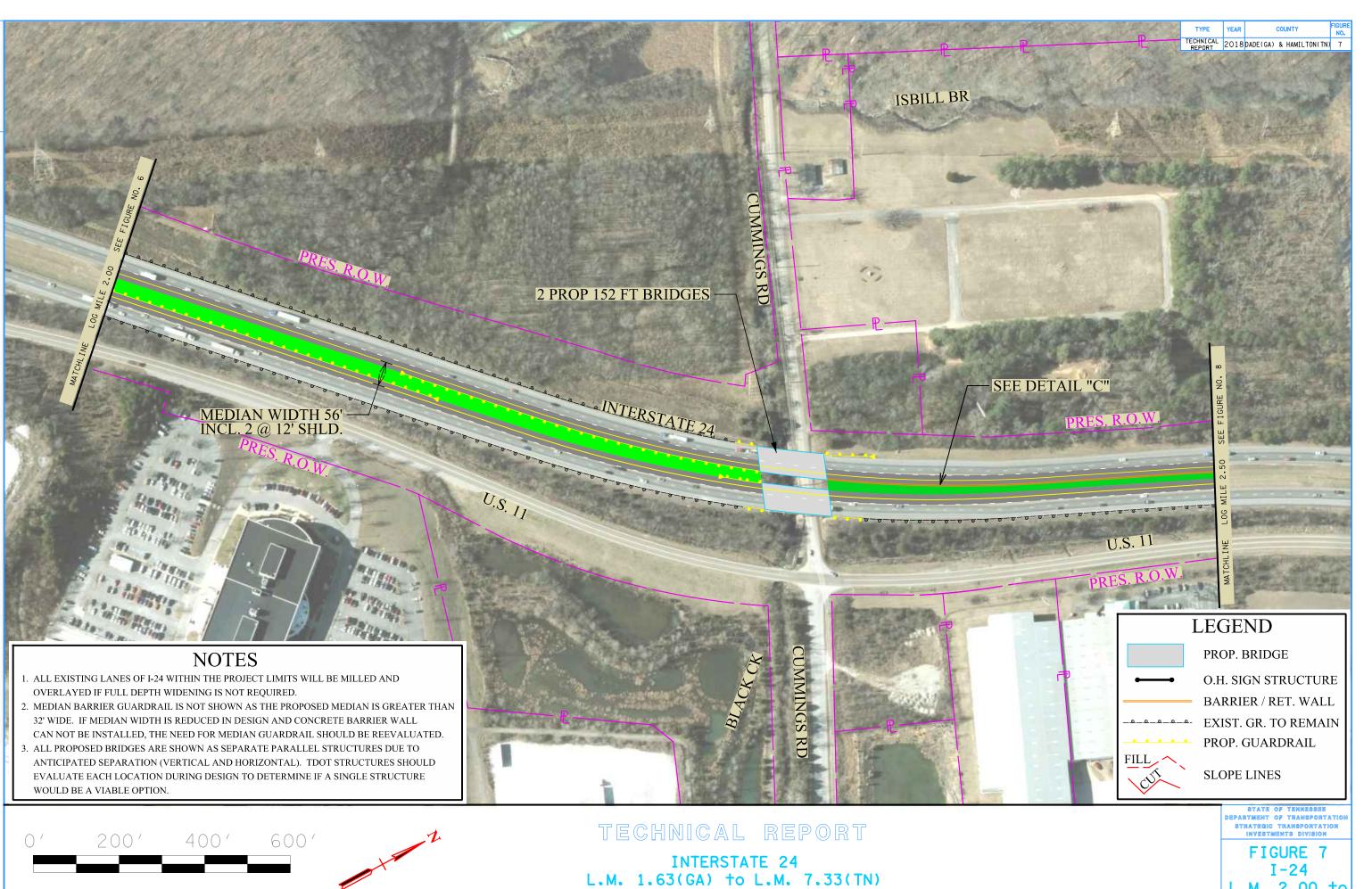
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TECHNICAL REPORT **INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)

EPARTMENT OF TRANSPORTATION Strategic transportation Investments Division FIGURE 6 I-24 L.M. 1.50 to L.M. 2.00

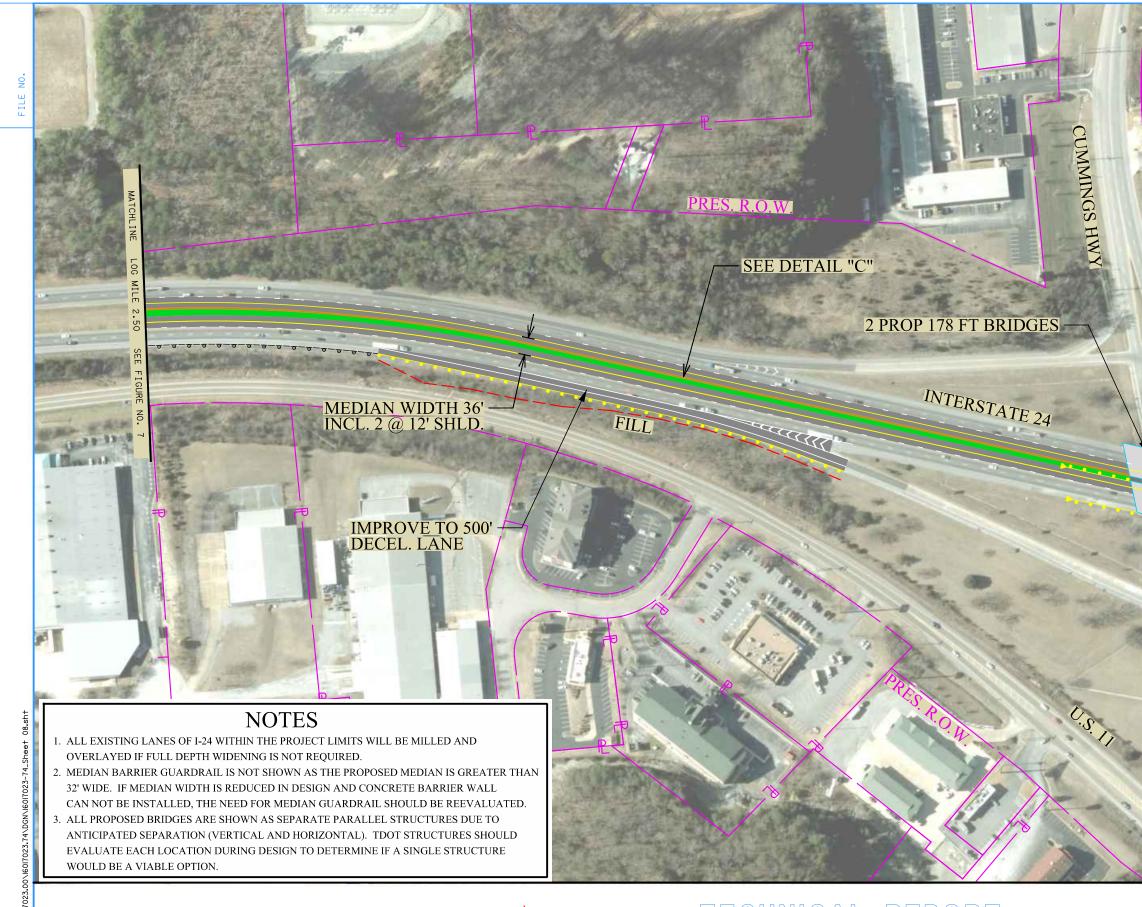


DADE CO.(GA) & HAMILTON CO.(TN)

L.M. 2.00 to

L.M. 2.50





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TECHNICAL REPORT **INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)



# LEGEND

PROP. BRIDGE

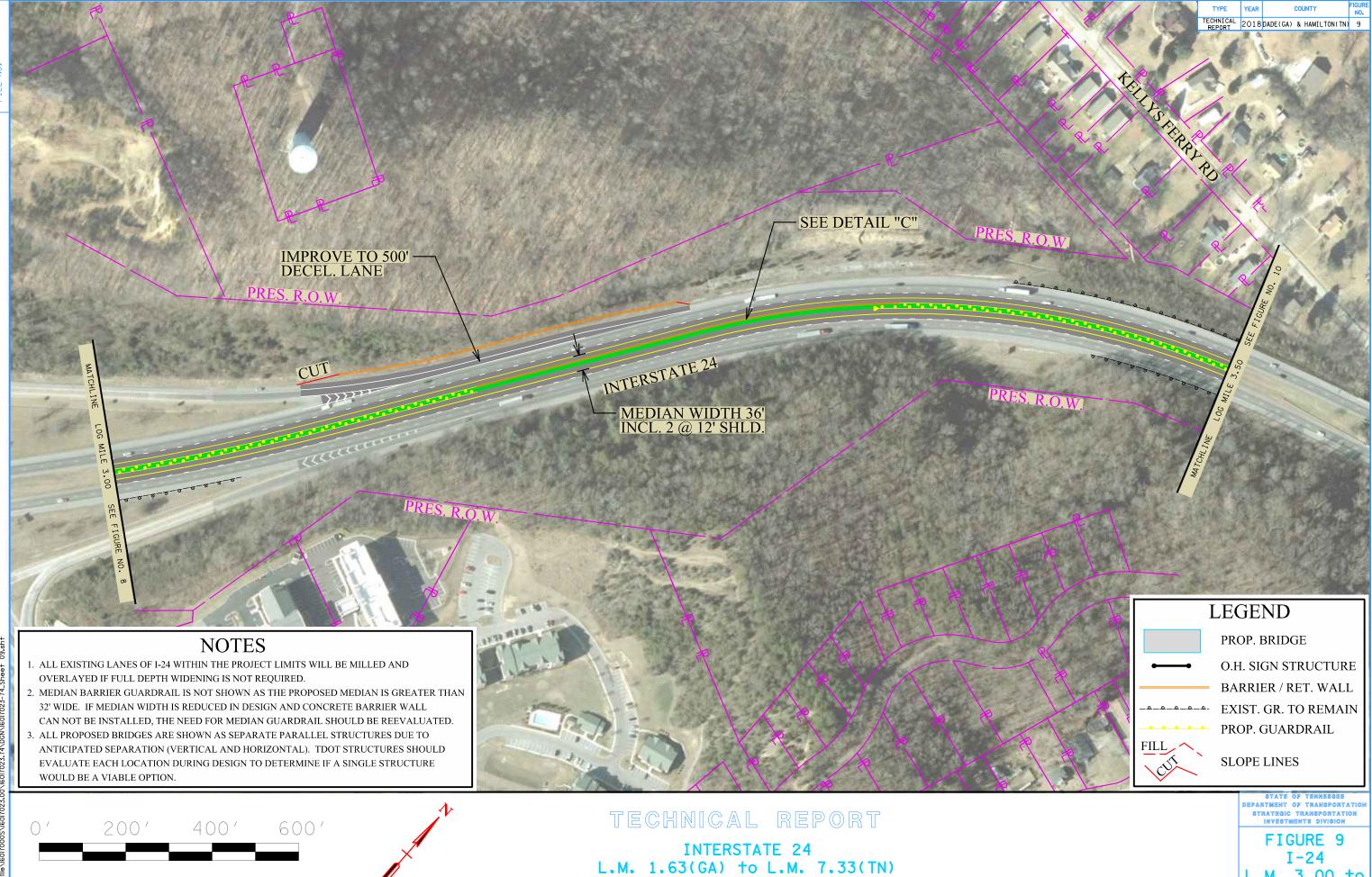
O.H. SIGN STRUCTURE BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

COUNTY

TECHNICAL 2018 DADE(GA) & HAMILTON(TN) 8

SLOPE LINES

STATE OF TENNESSEE Department of transportatio Strategic transportation Investments division FIGURE 8 I-24 L.M. 2.50 to L.M. 3.00

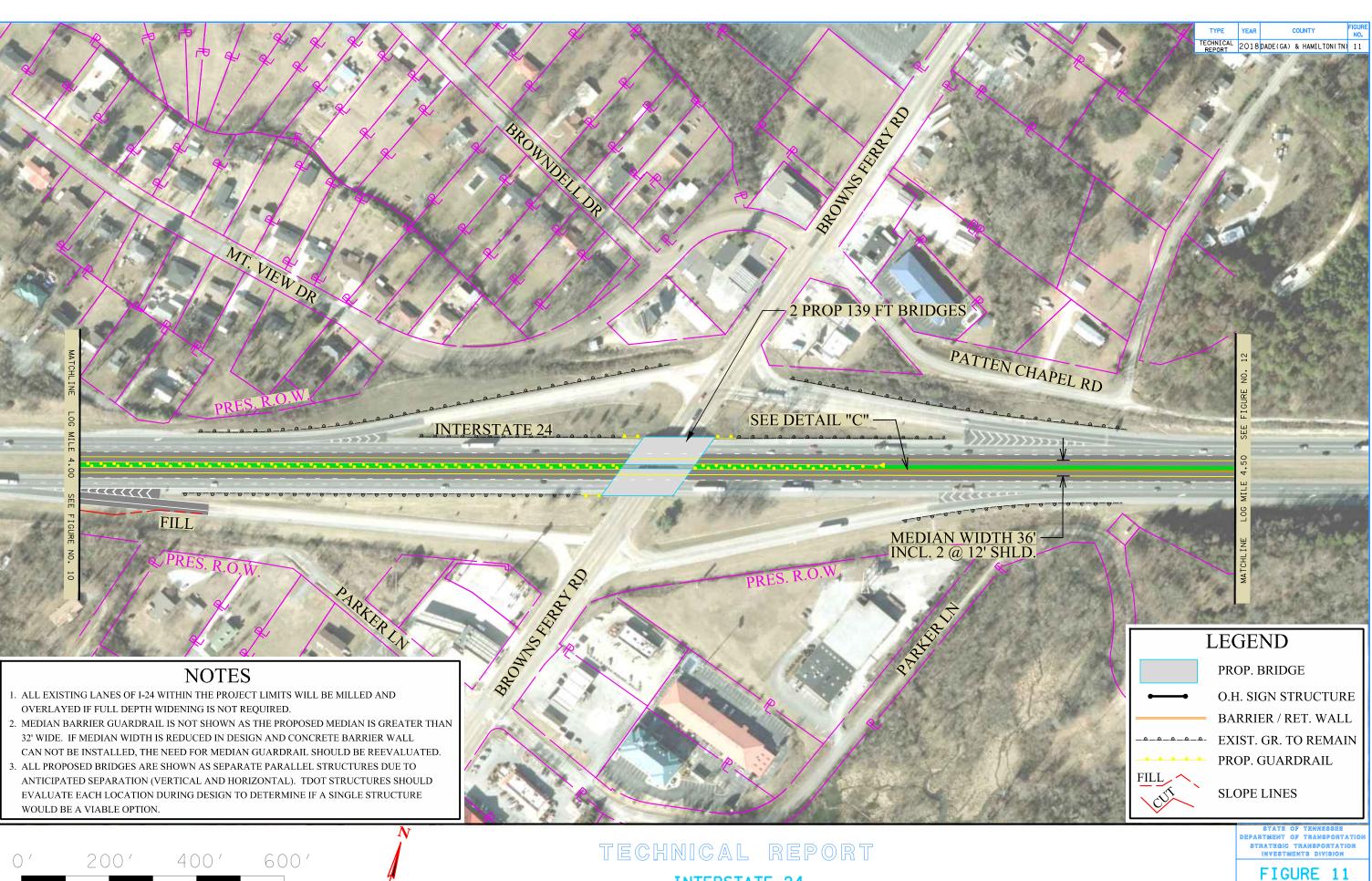


DADE CO.(GA) & HAMILTON CO.(TN)

L.M. 3.00 to L.M. 3.50



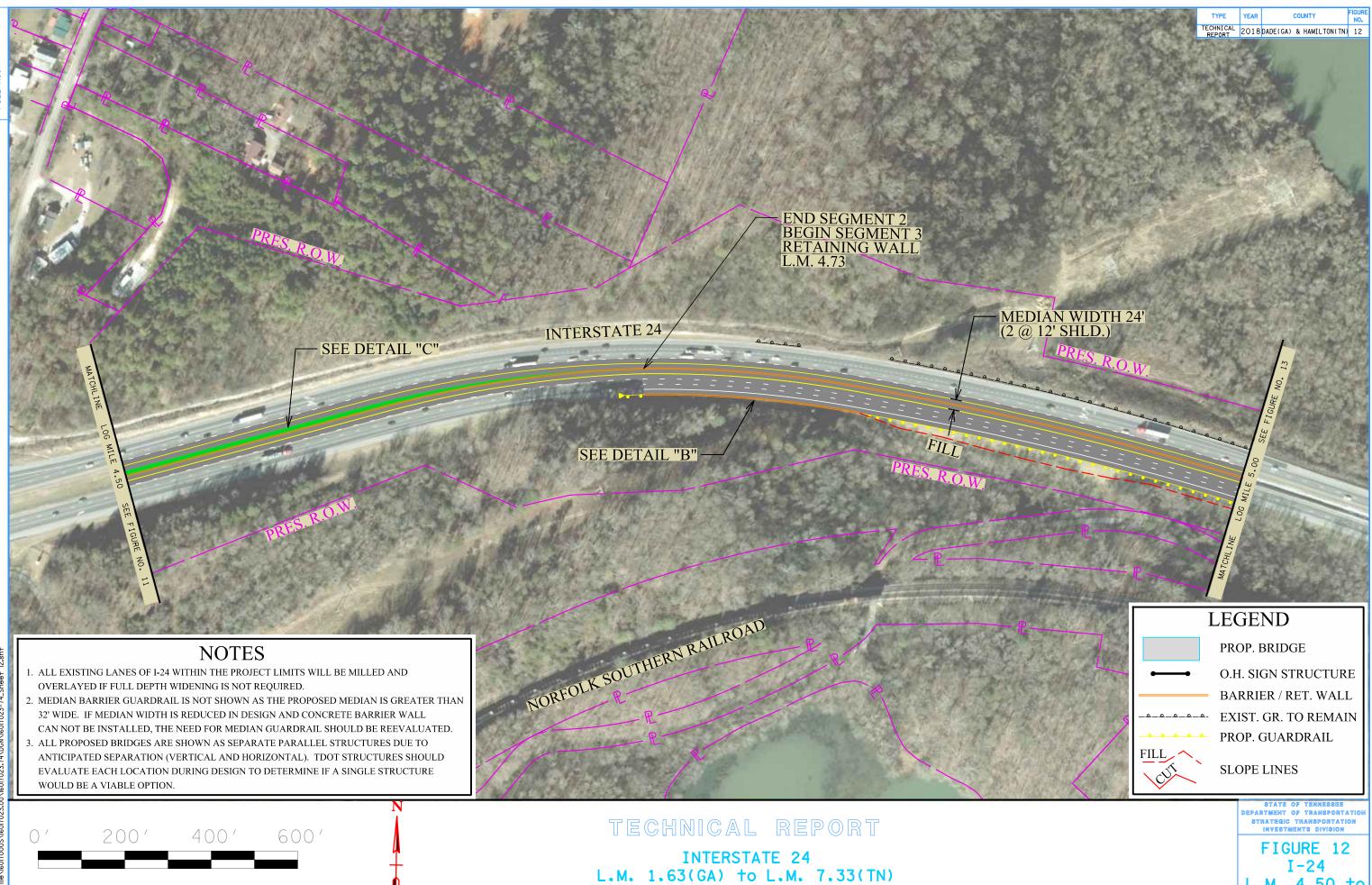
I-24 L.M. 3.50 to L.M. 4.00



I-24

L.M. 4.00 to

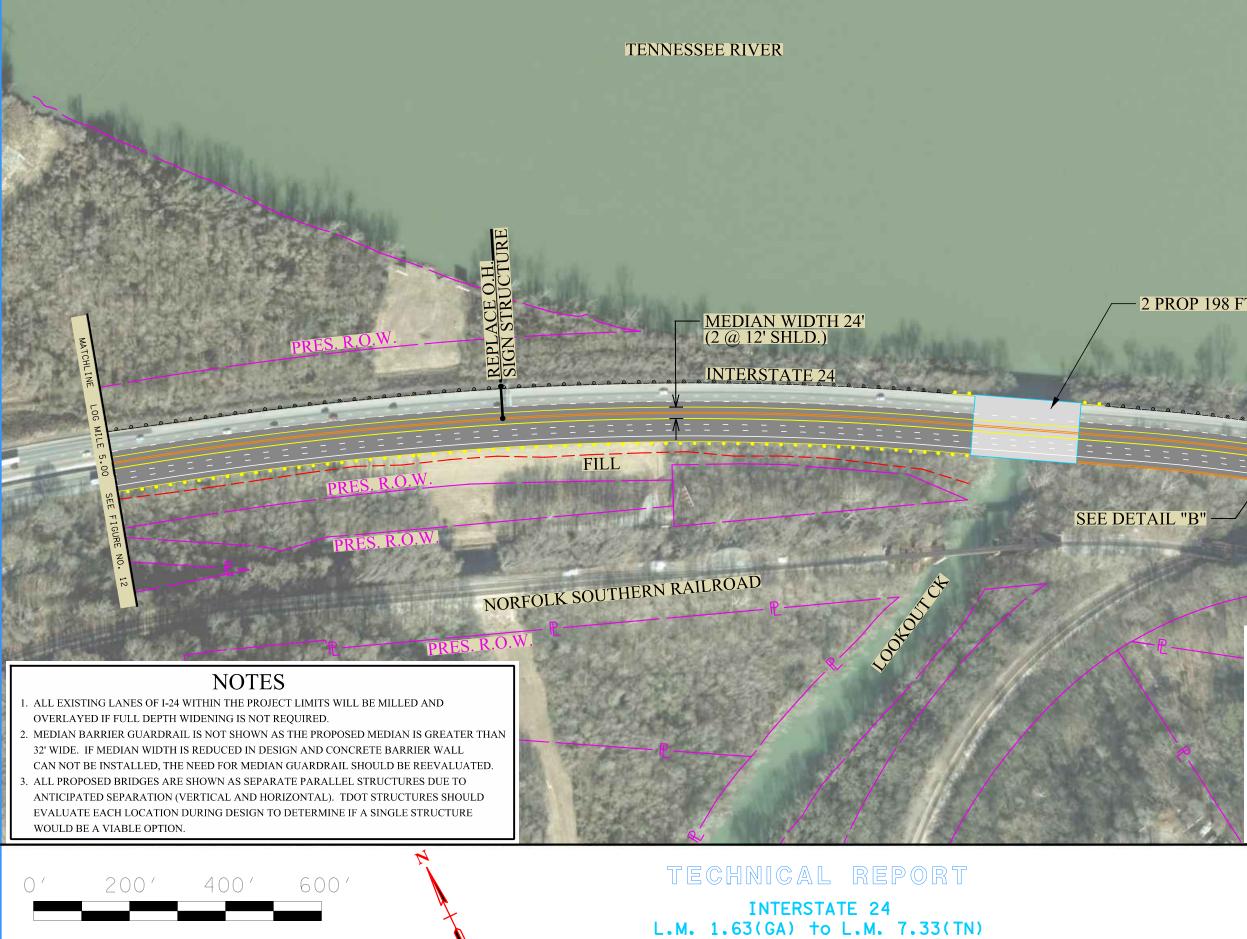
L.M. 4.50



DADE CO.(GA) & HAMILTON CO.(TN)

L.M. 4.50 to L.M. 5.00

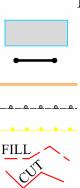




DADE CO.(GA) & HAMILTON CO.(TN)



## 2 PROP 198 FT BRIDGES



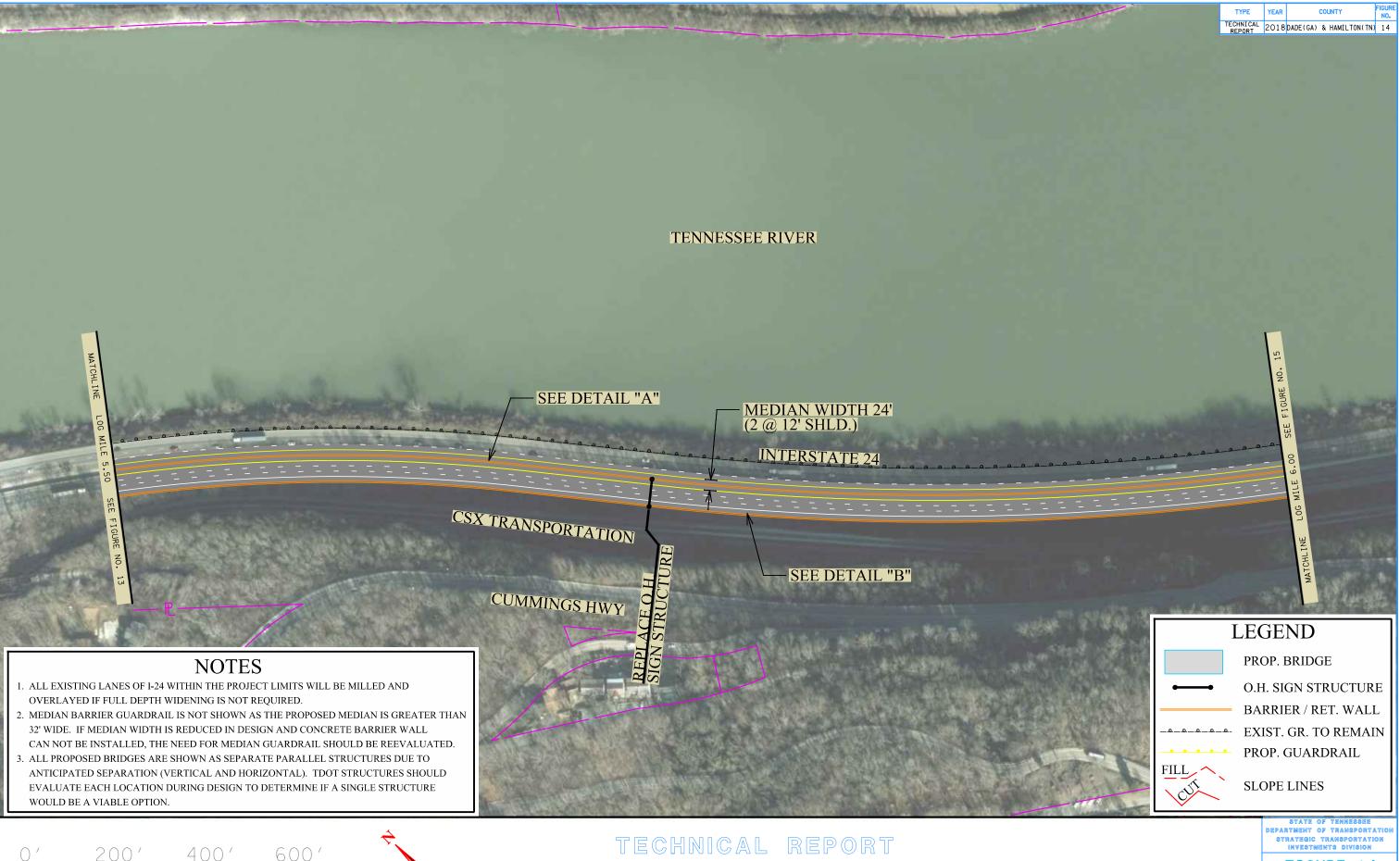
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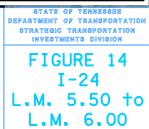
PROP. BRIDGE

O.H. SIGN STRUCTURE BARRIER / RET. WALL EXIST. GR. TO REMAIN PROP. GUARDRAIL

SLOPE LINES







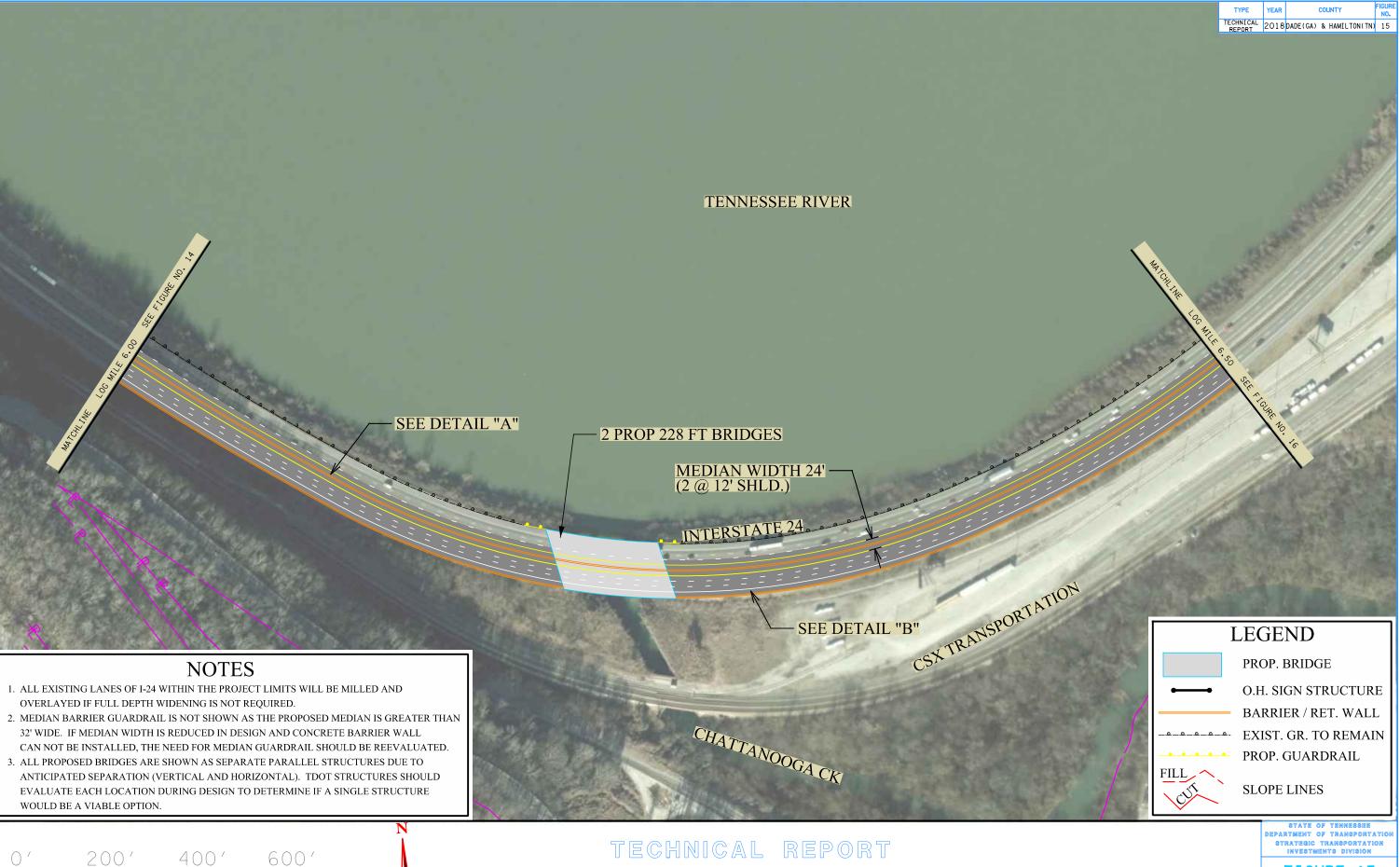


FIGURE 15 I-24 L.M. 6.00 to L.M. 6.50



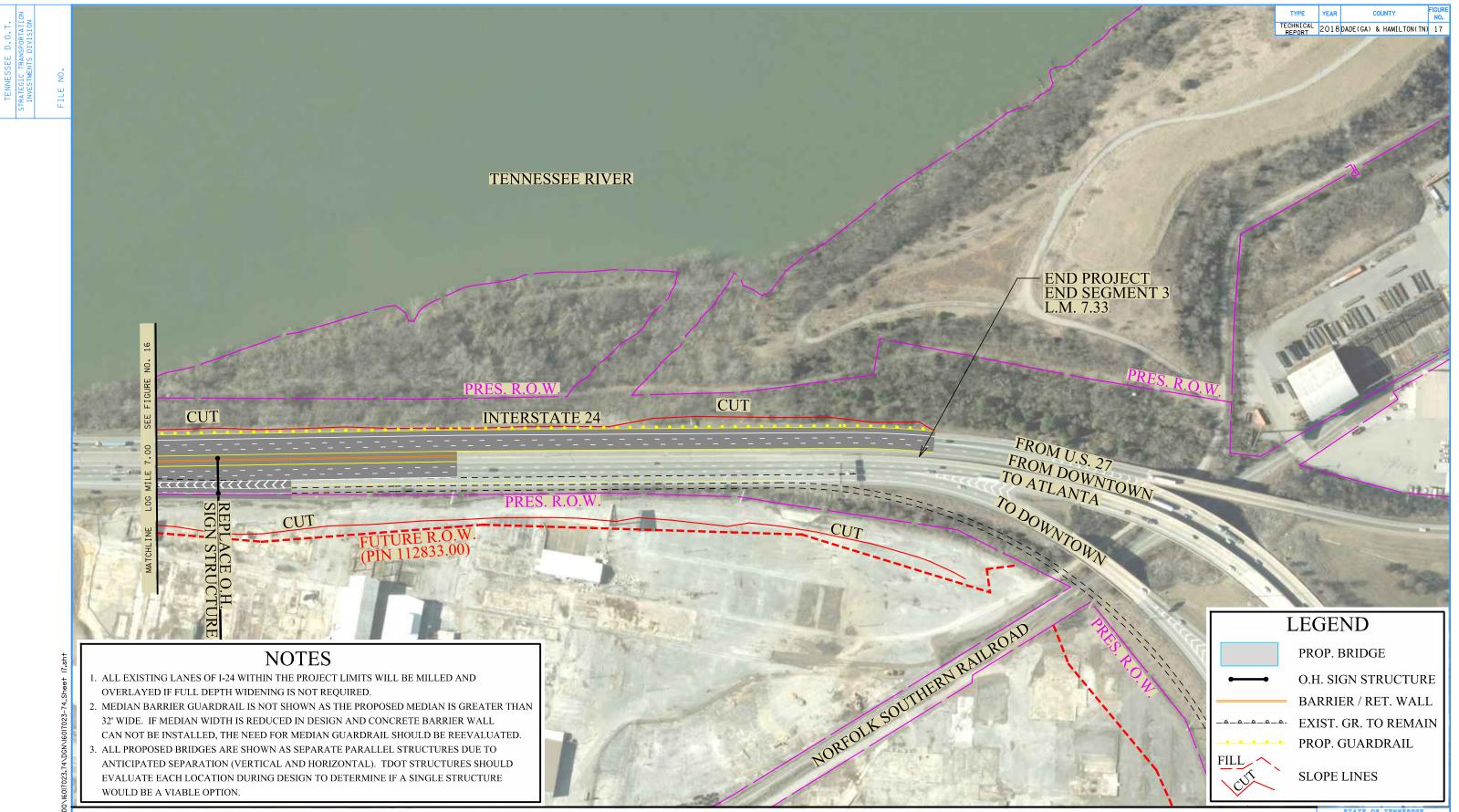
600

400

200

**INTERSTATE 24** L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)

STATE OF TENNESSEE Department of transportatio Strategic transportation Investments division FIGURE 16 I-24 L.M. 6.50 to L.M. 7.00



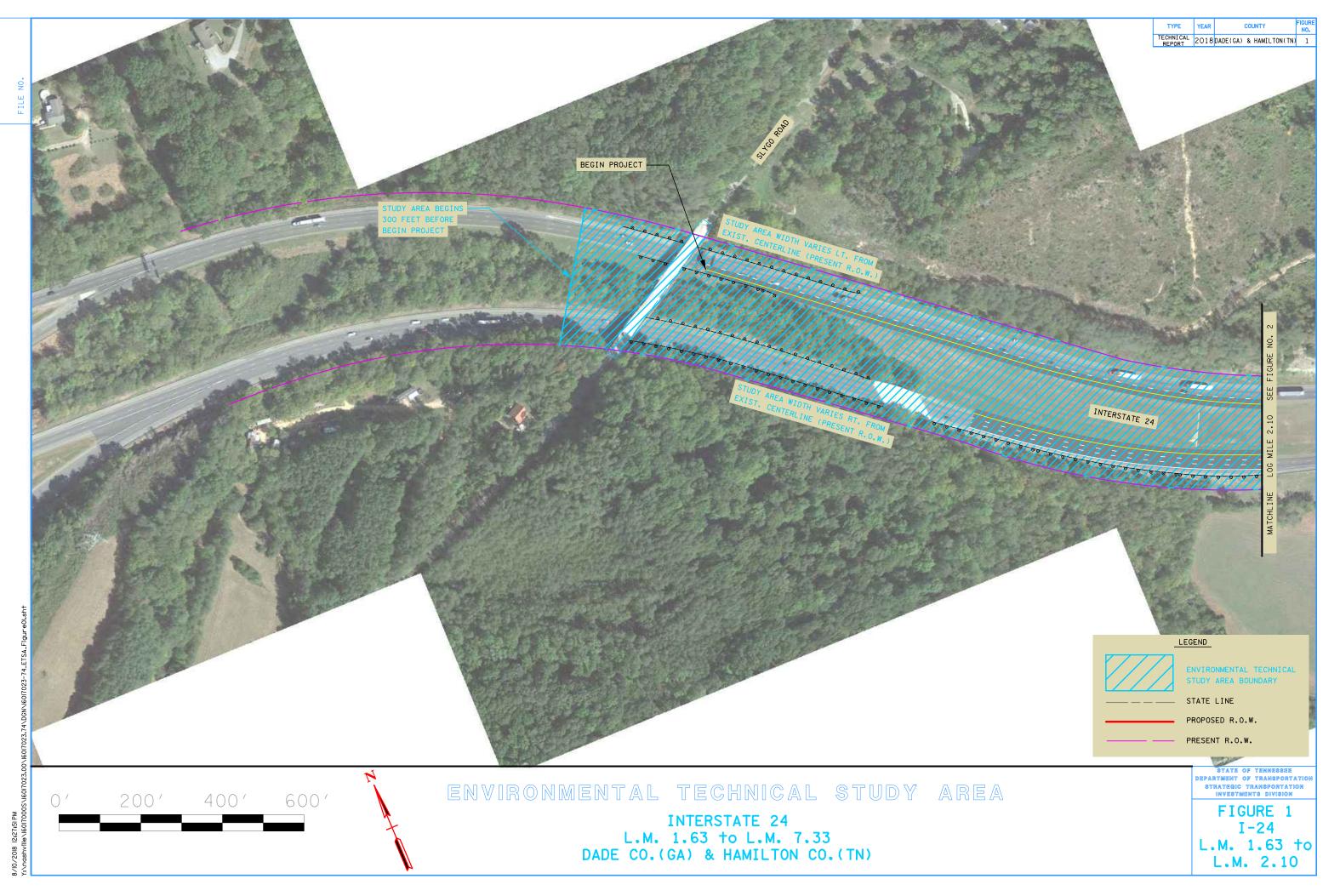
TECHNICAL REPORT **INTERSTATE 24** 

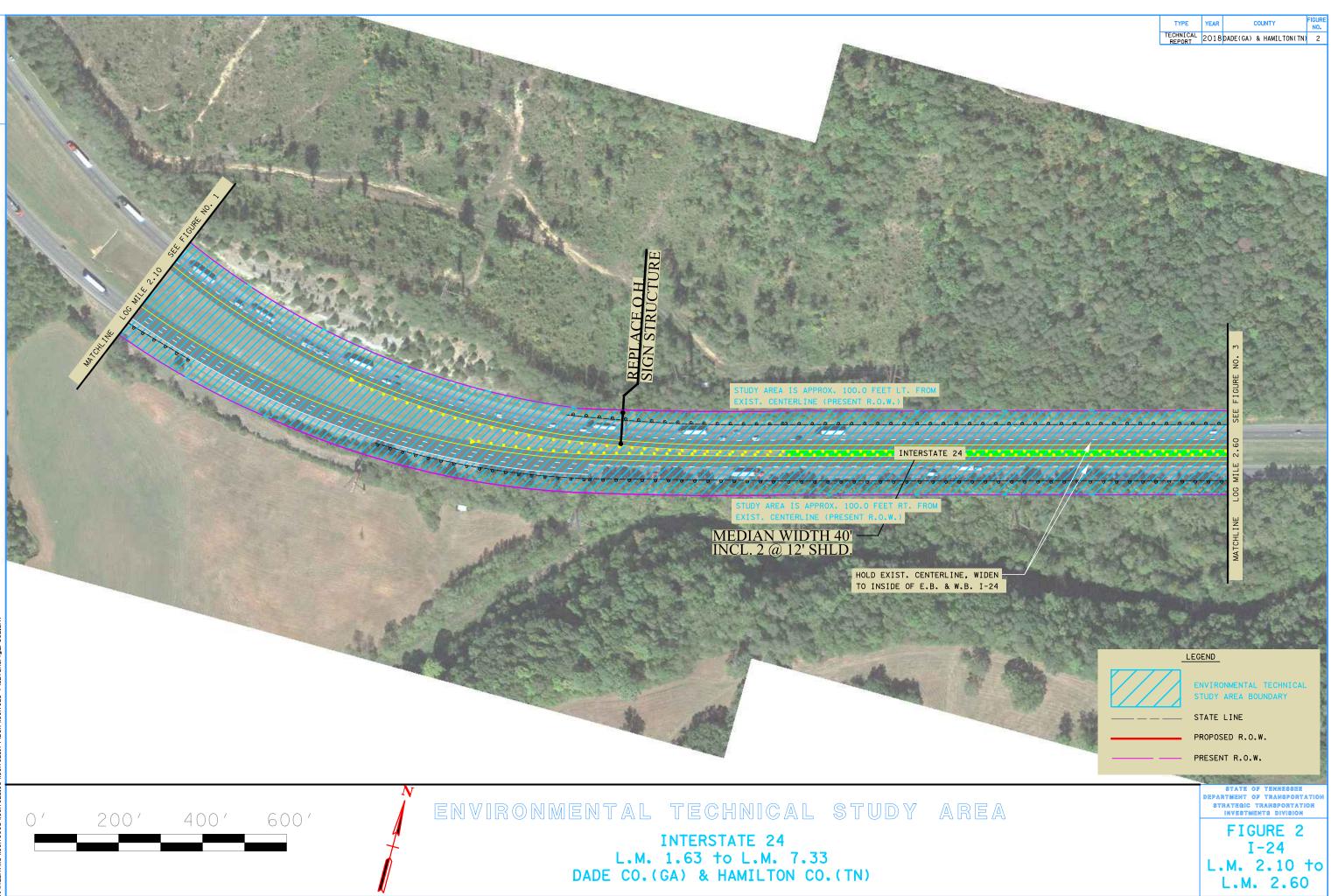
L.M. 1.63(GA) to L.M. 7.33(TN) DADE CO.(GA) & HAMILTON CO.(TN)

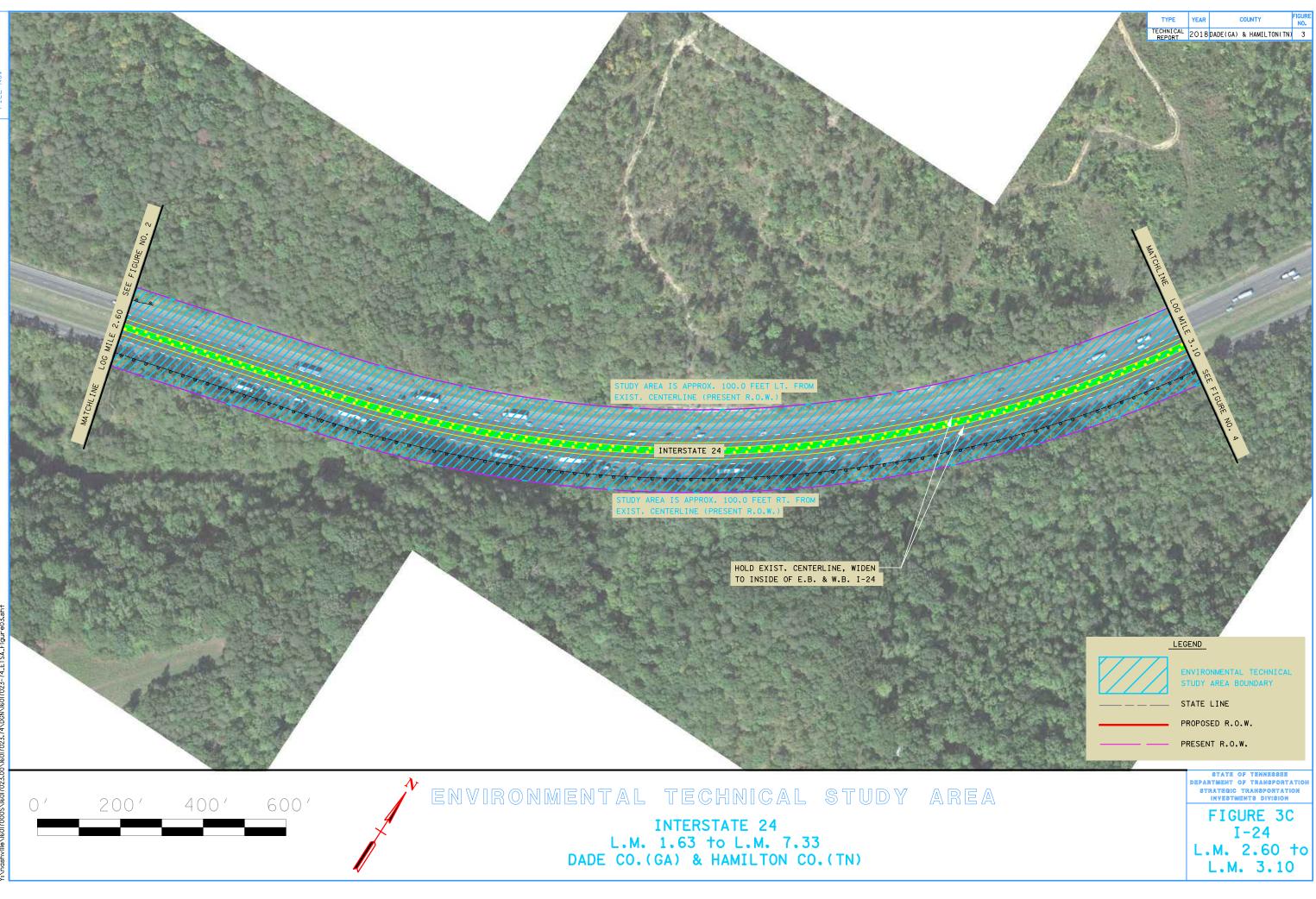
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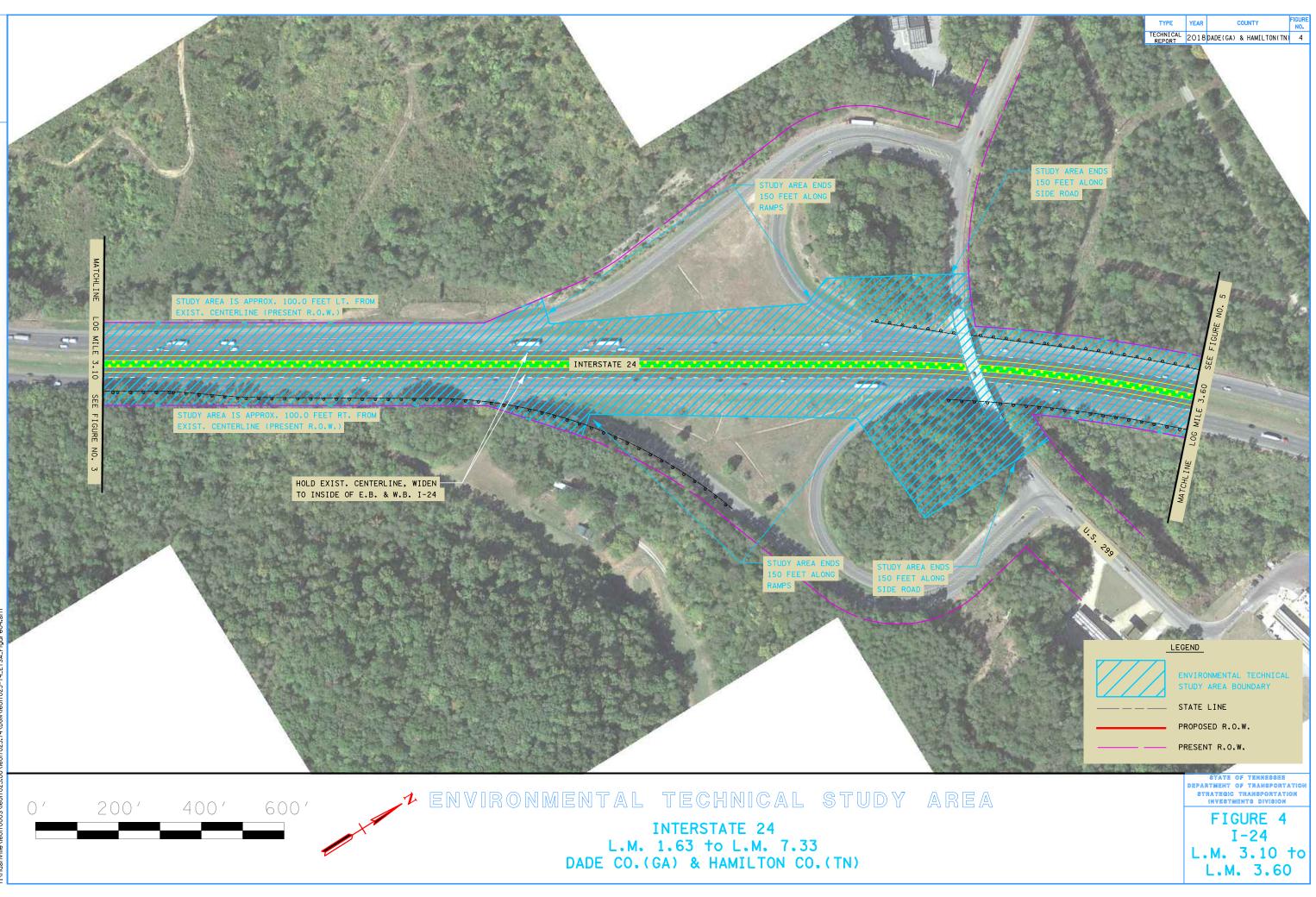
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STATE OF TENNESSEE Department of transportatio Strategic transportation Investments division FIGURE 17 1-24 L.M. 7.00 to L.M. 7.33



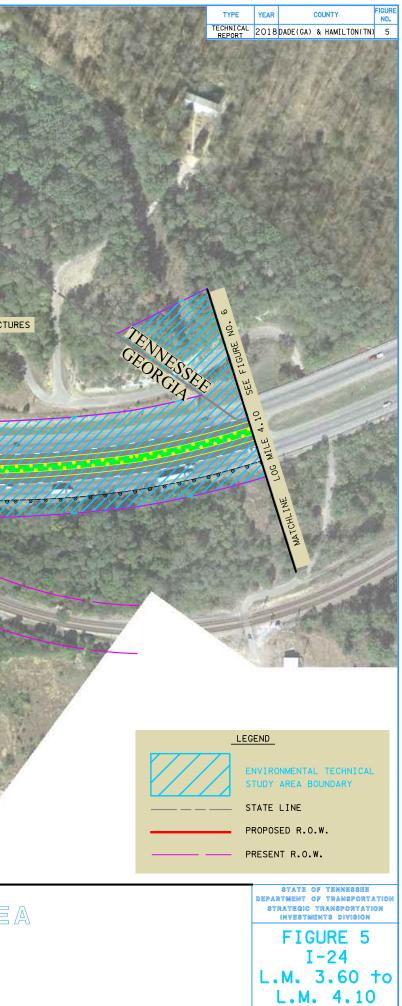




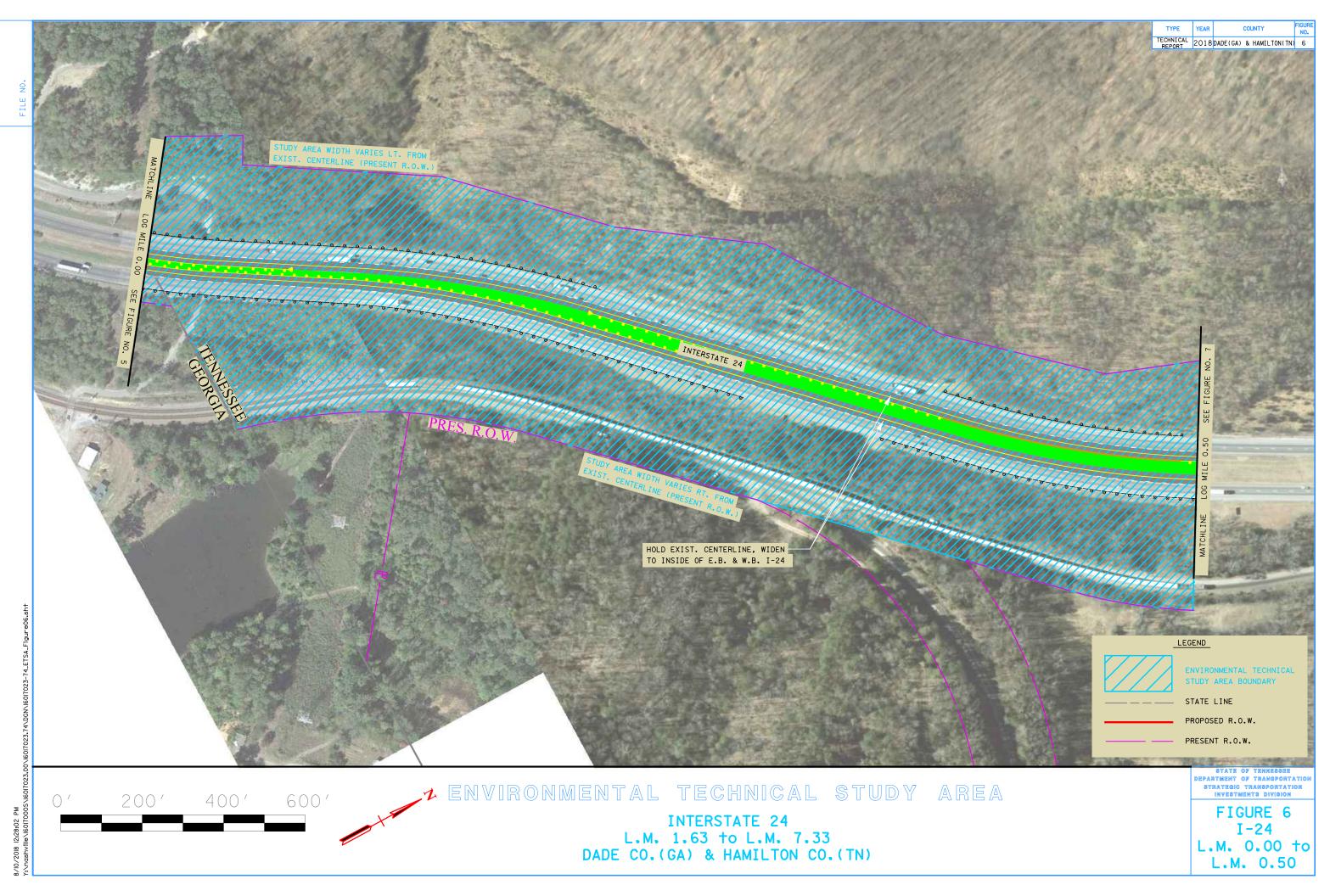


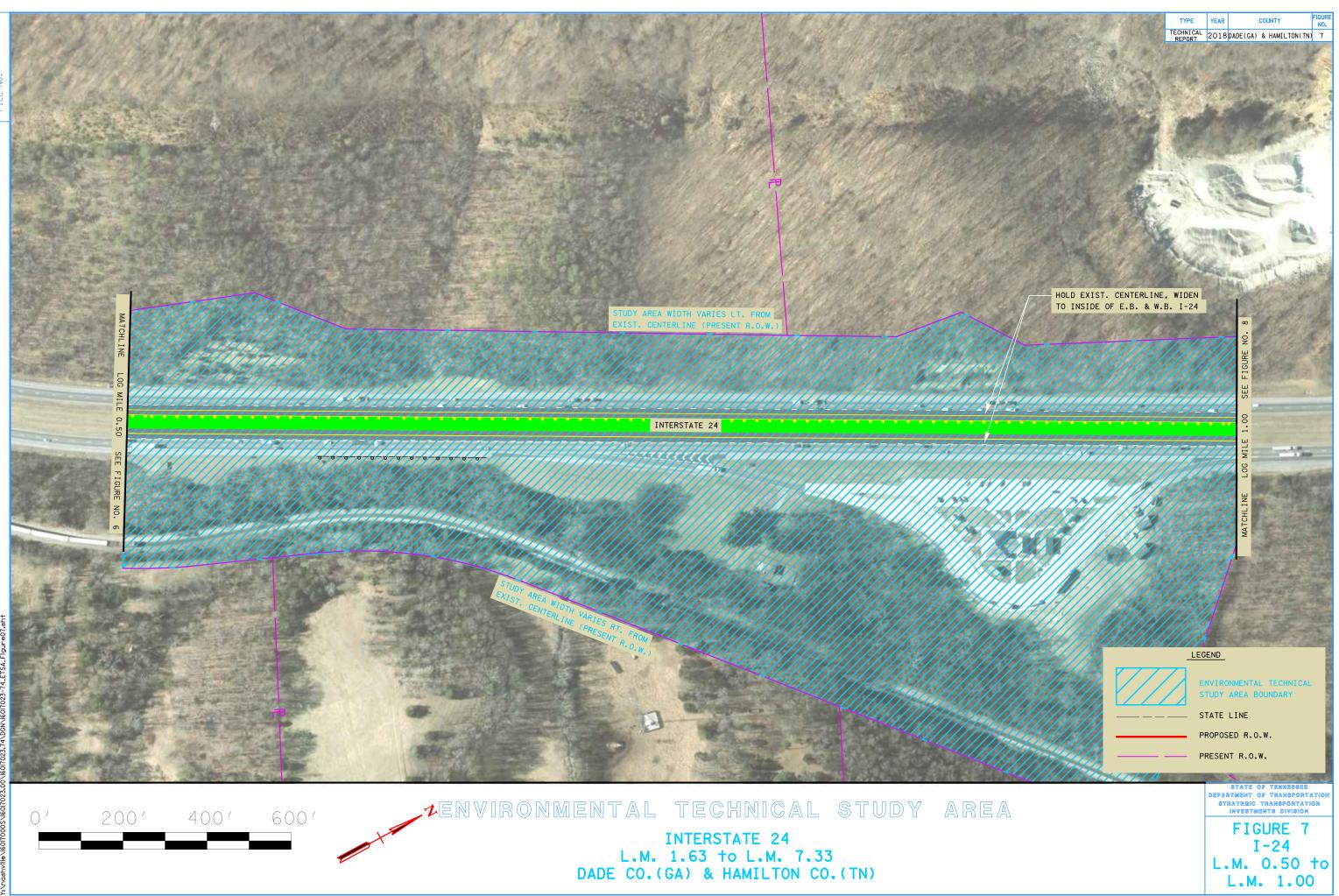
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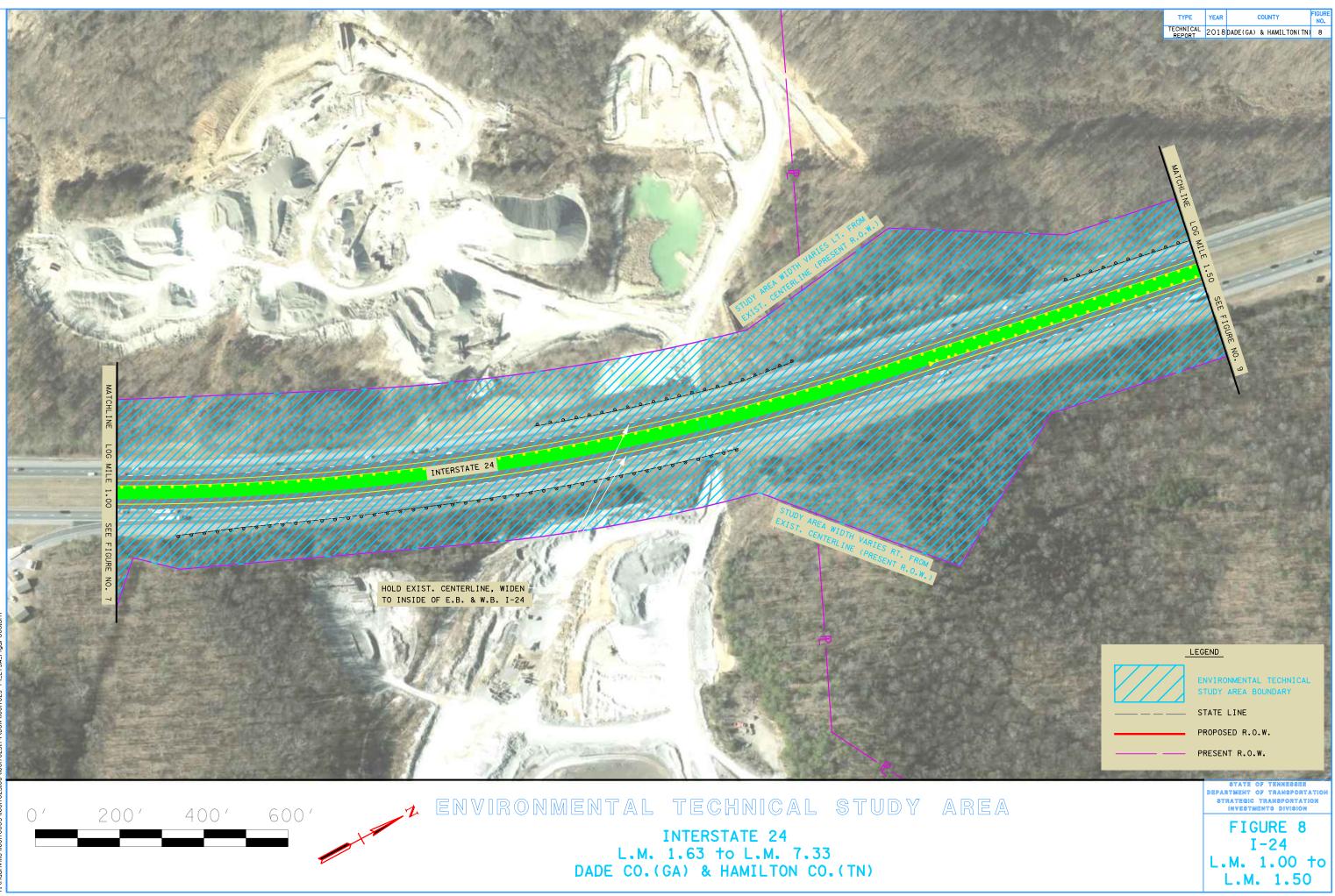
WIDEN EXISTING STRUCTURES INTERSTATE 24 🛃 HOLD EXIST. CENTERLINE, WIDEN TO INSIDE OF E.B. & W.B. I-24 ENVIRONMENTAL TECHNICAL STUDY AREA 600′ 2001  $4 \cap 0$ **INTERSTATE 24** L.M. 1.63 to L.M. 7.33 DADE CO.(GA) & HAMILTON CO.(TN)

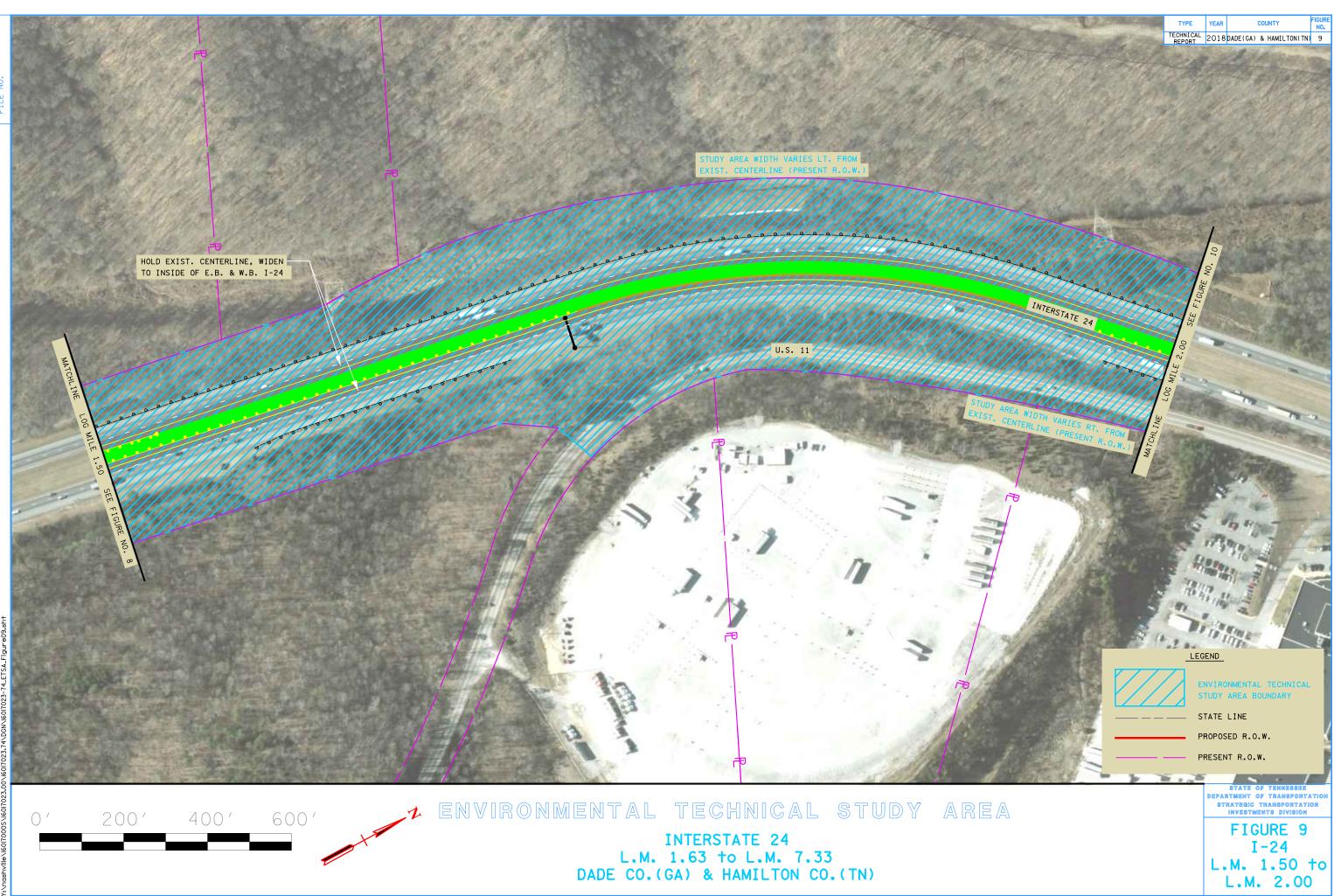


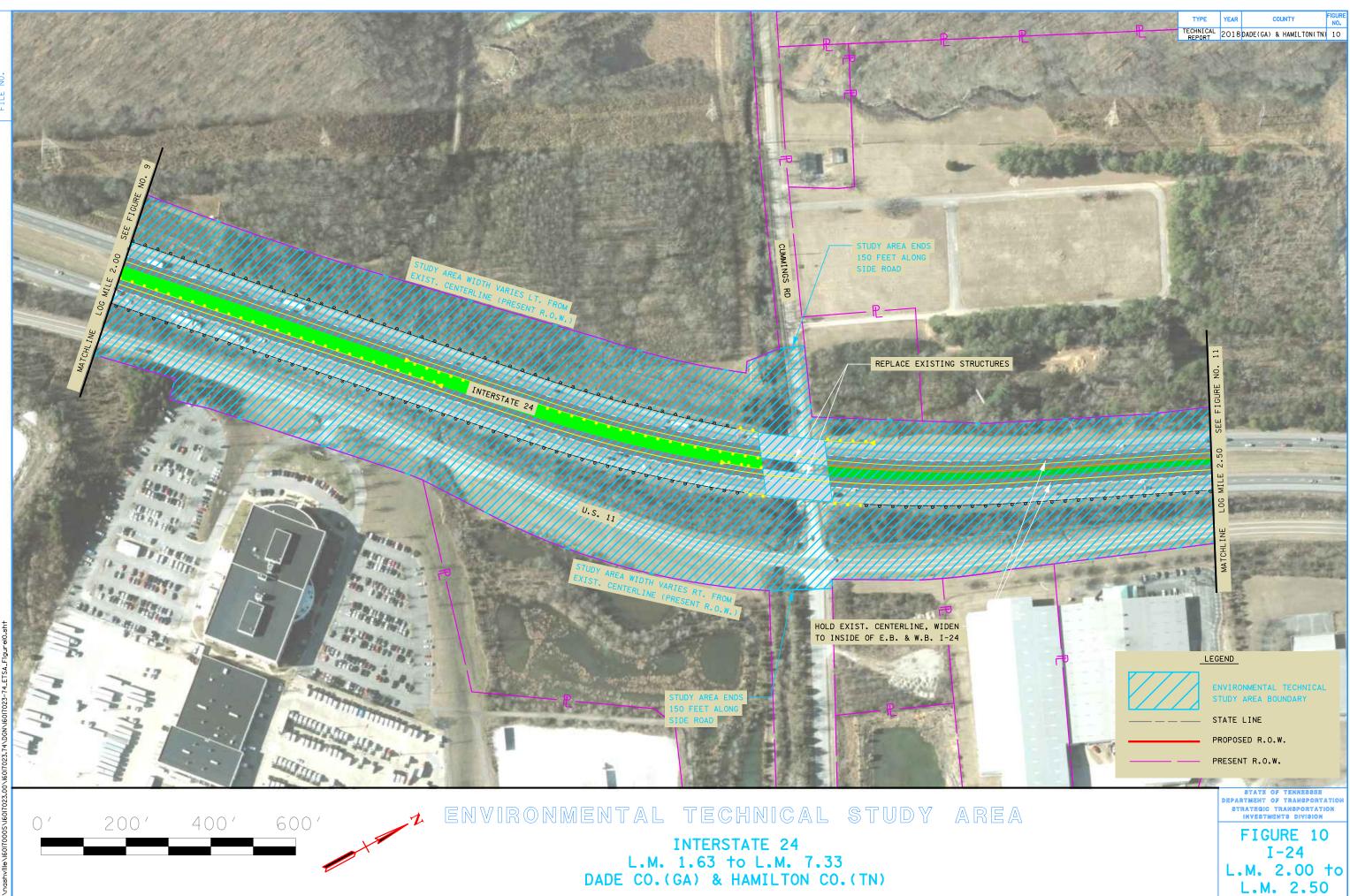
TENNESSEE D.O.T STRATEGIC TRANSPORTAT INVESTMENTS DIVISIO

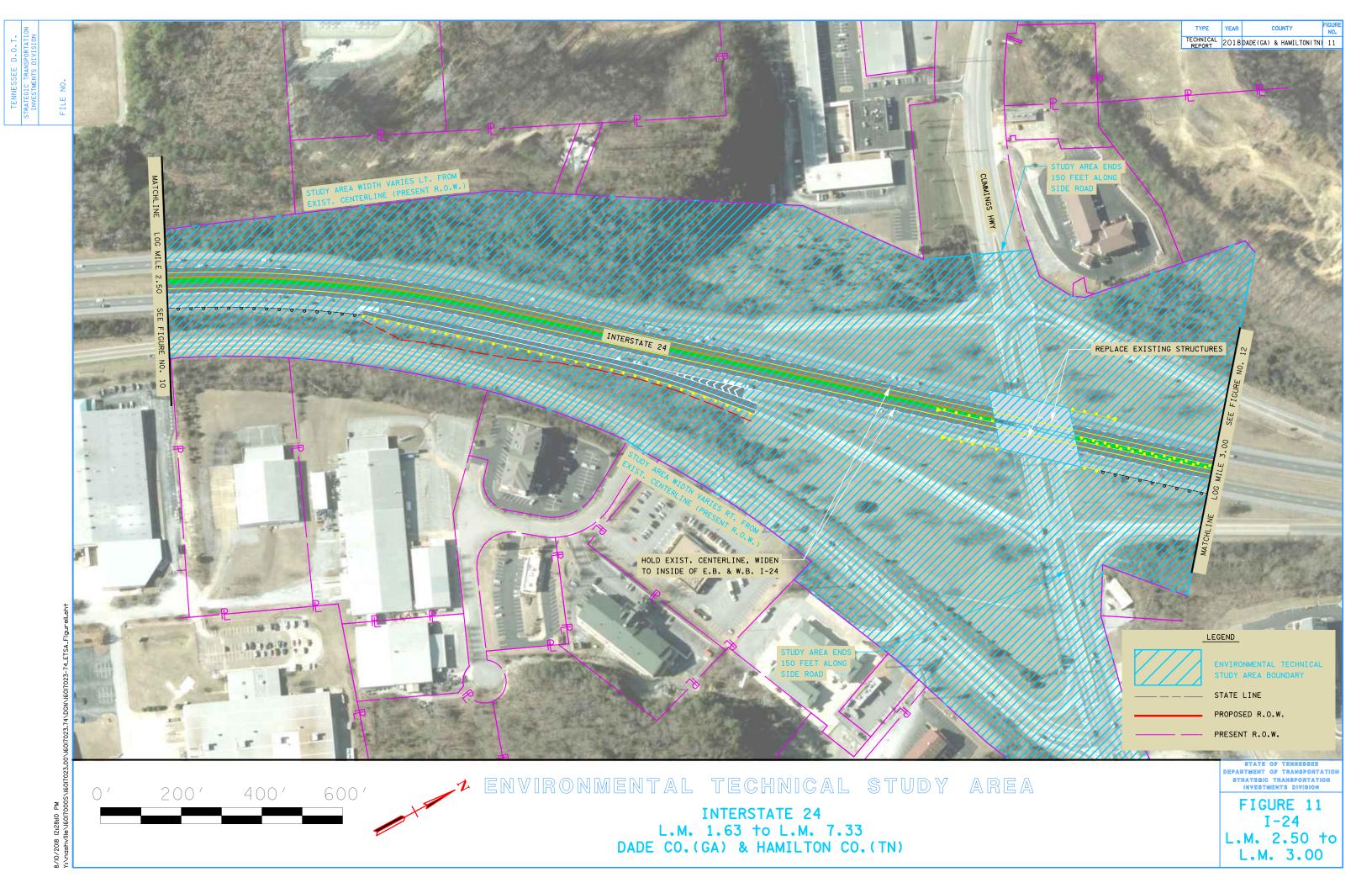


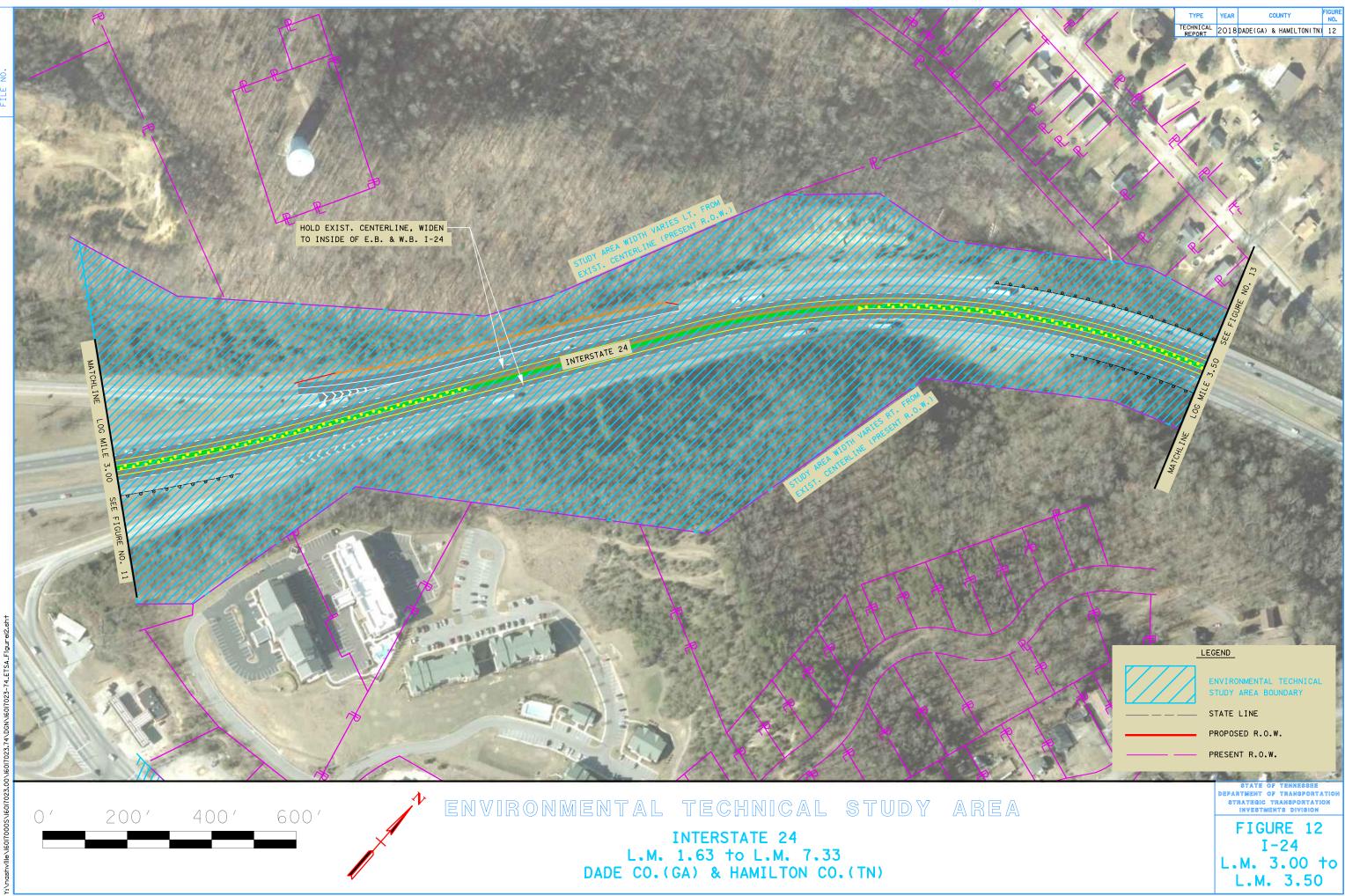


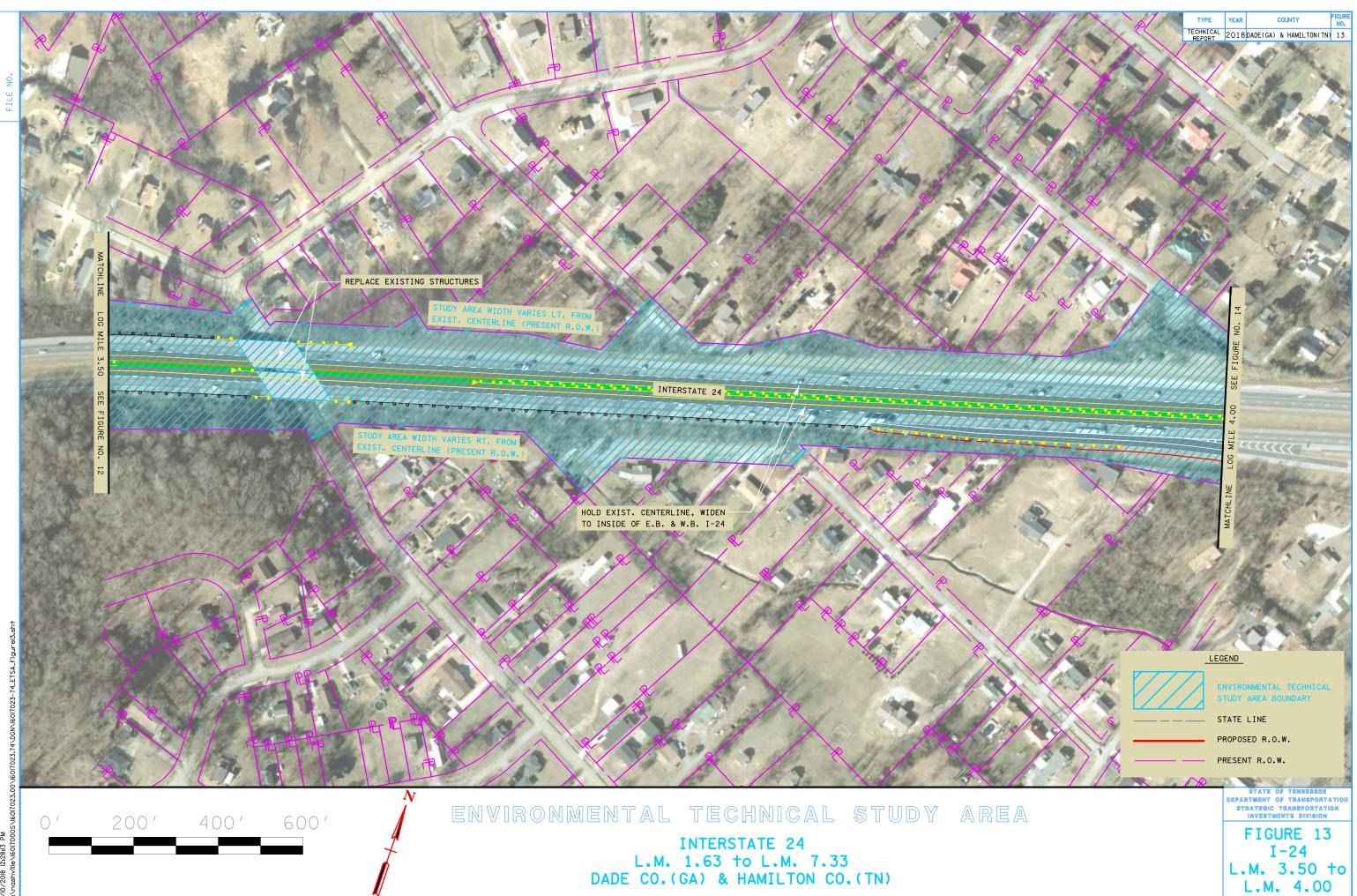


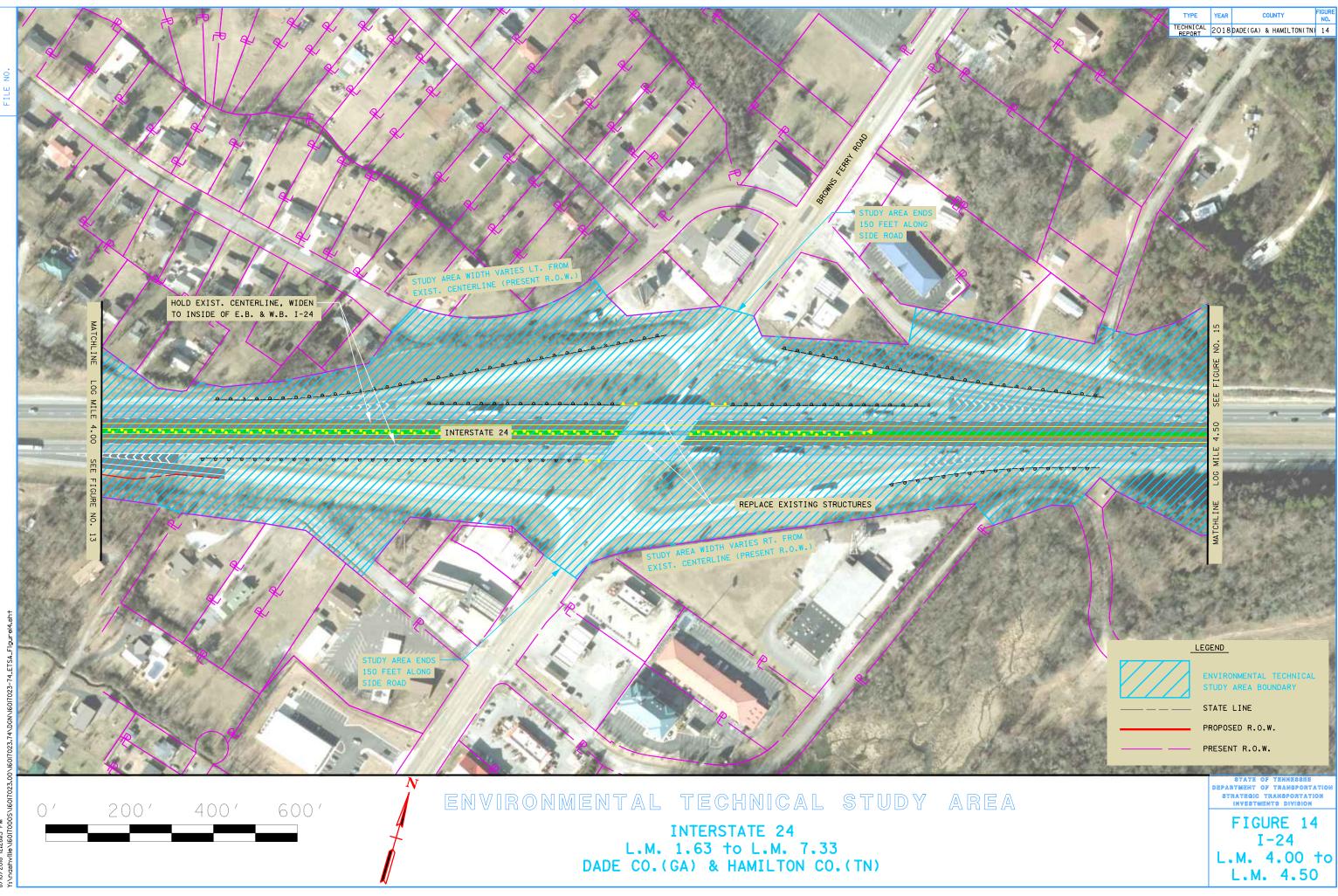


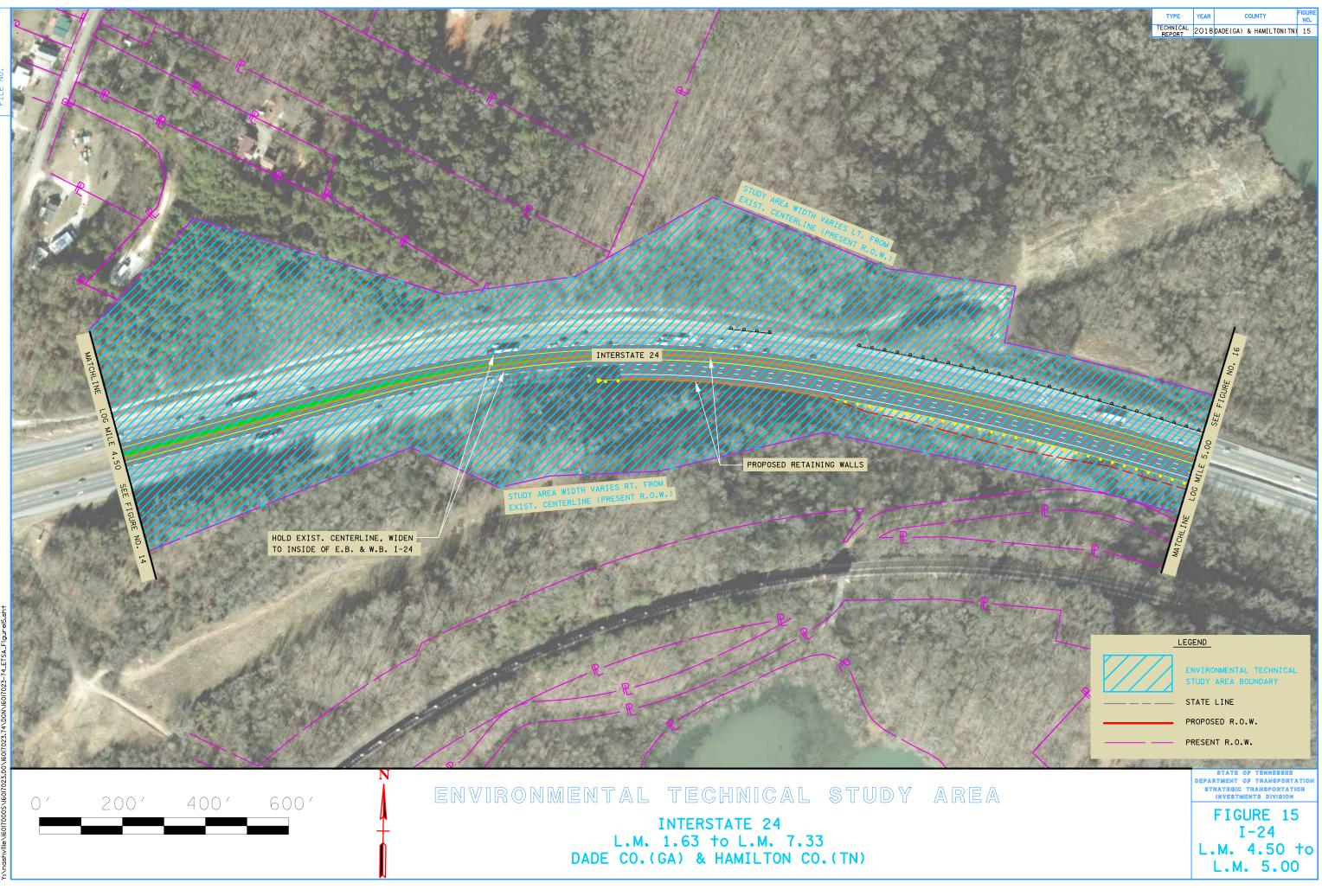




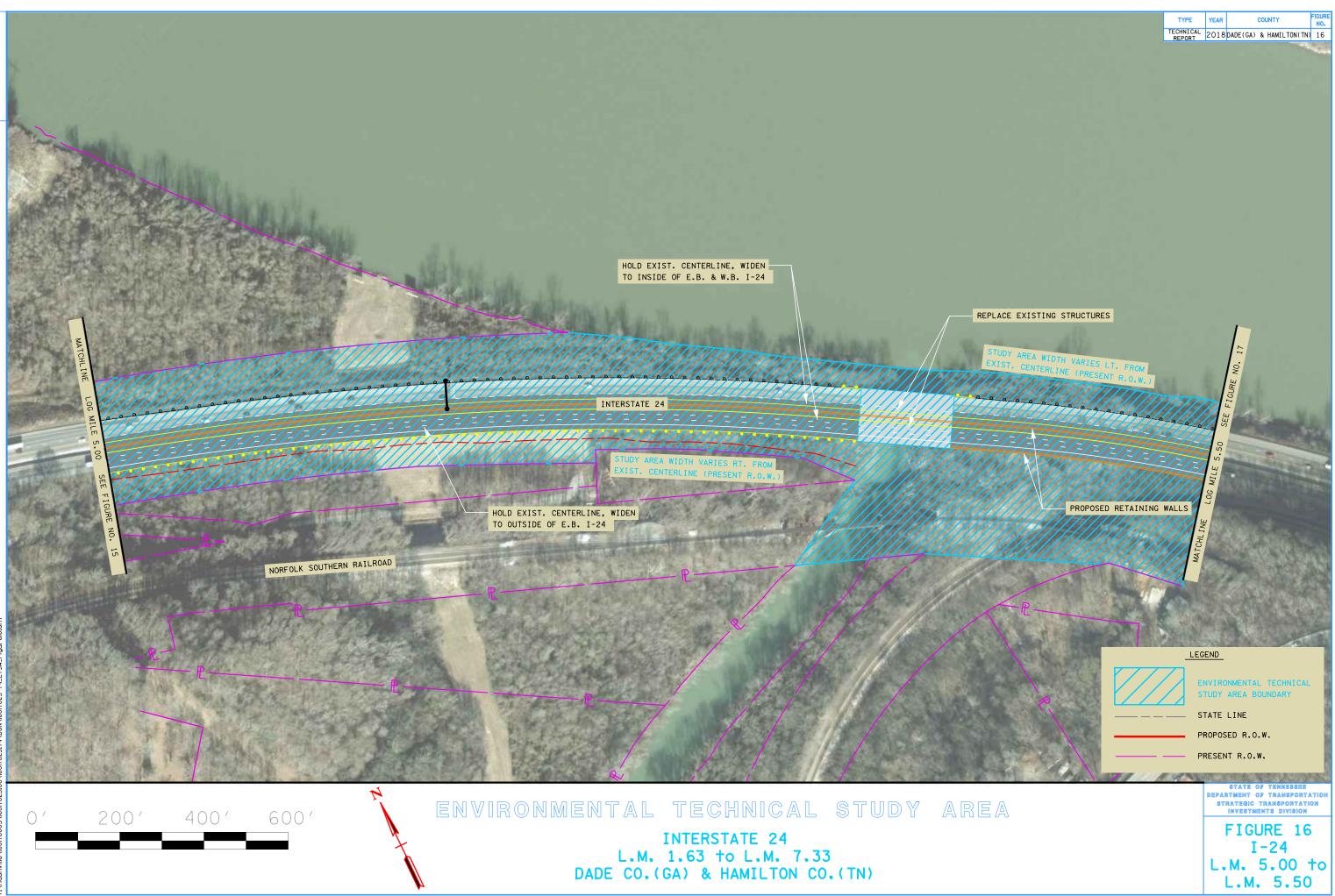


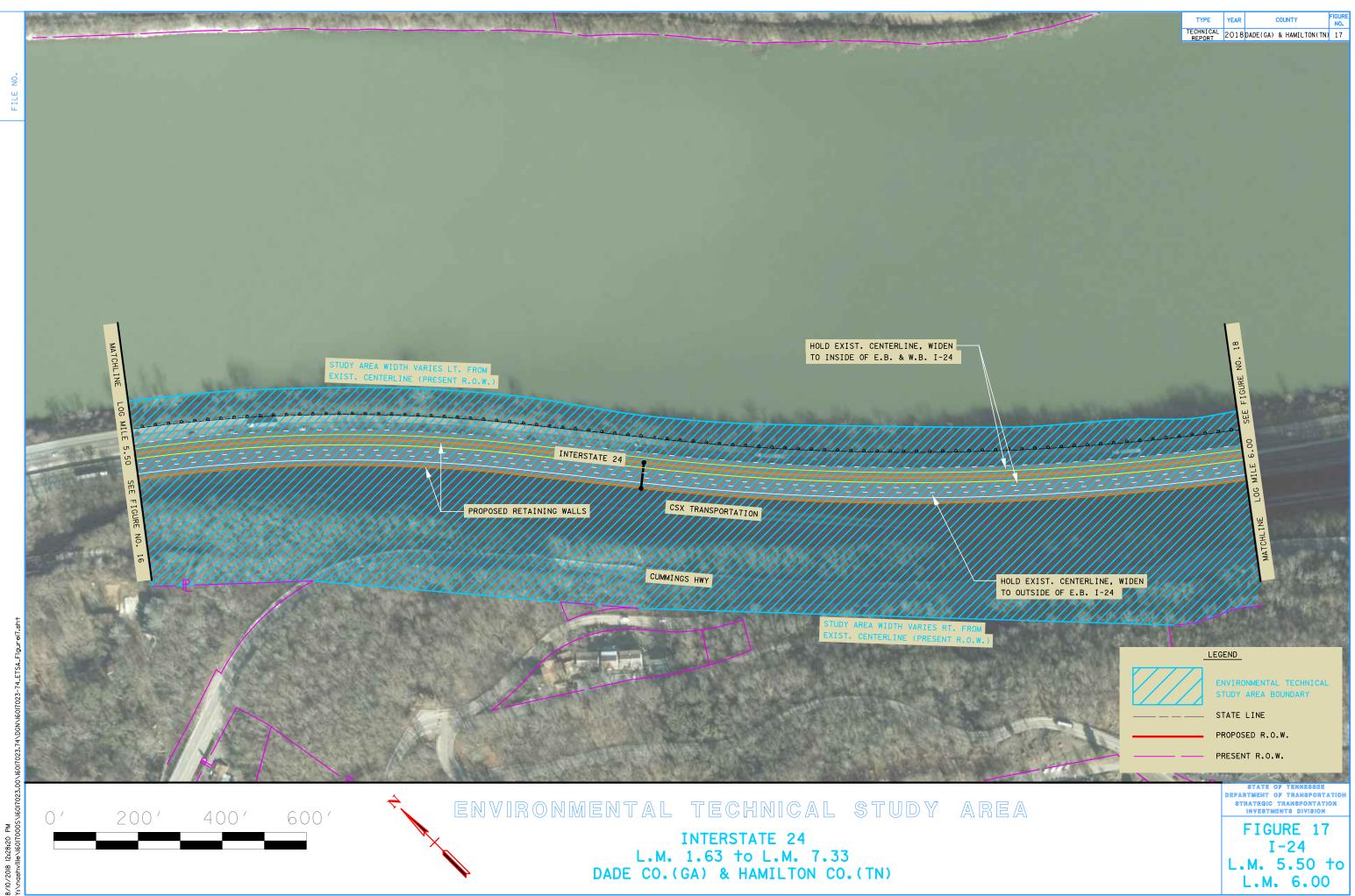


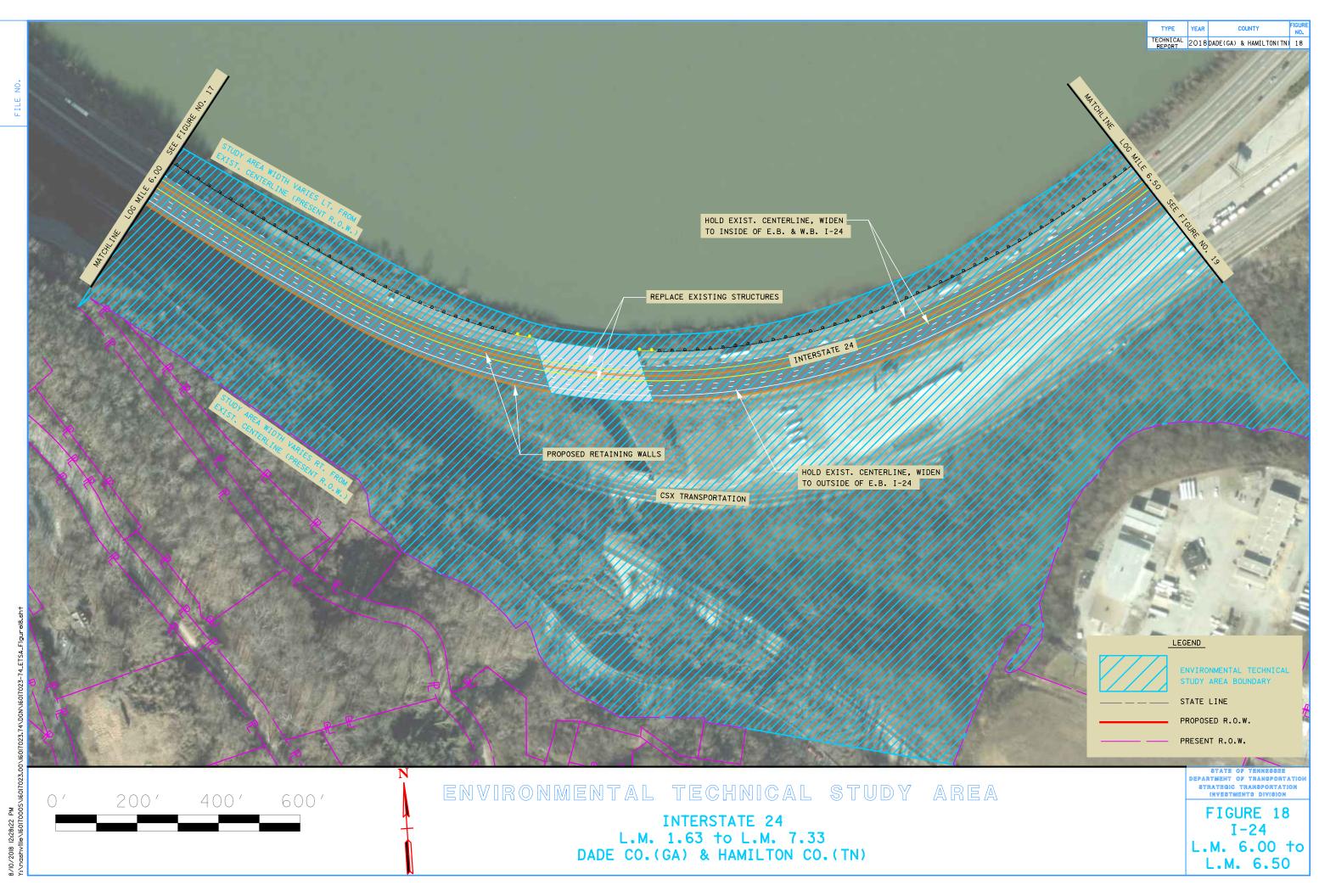


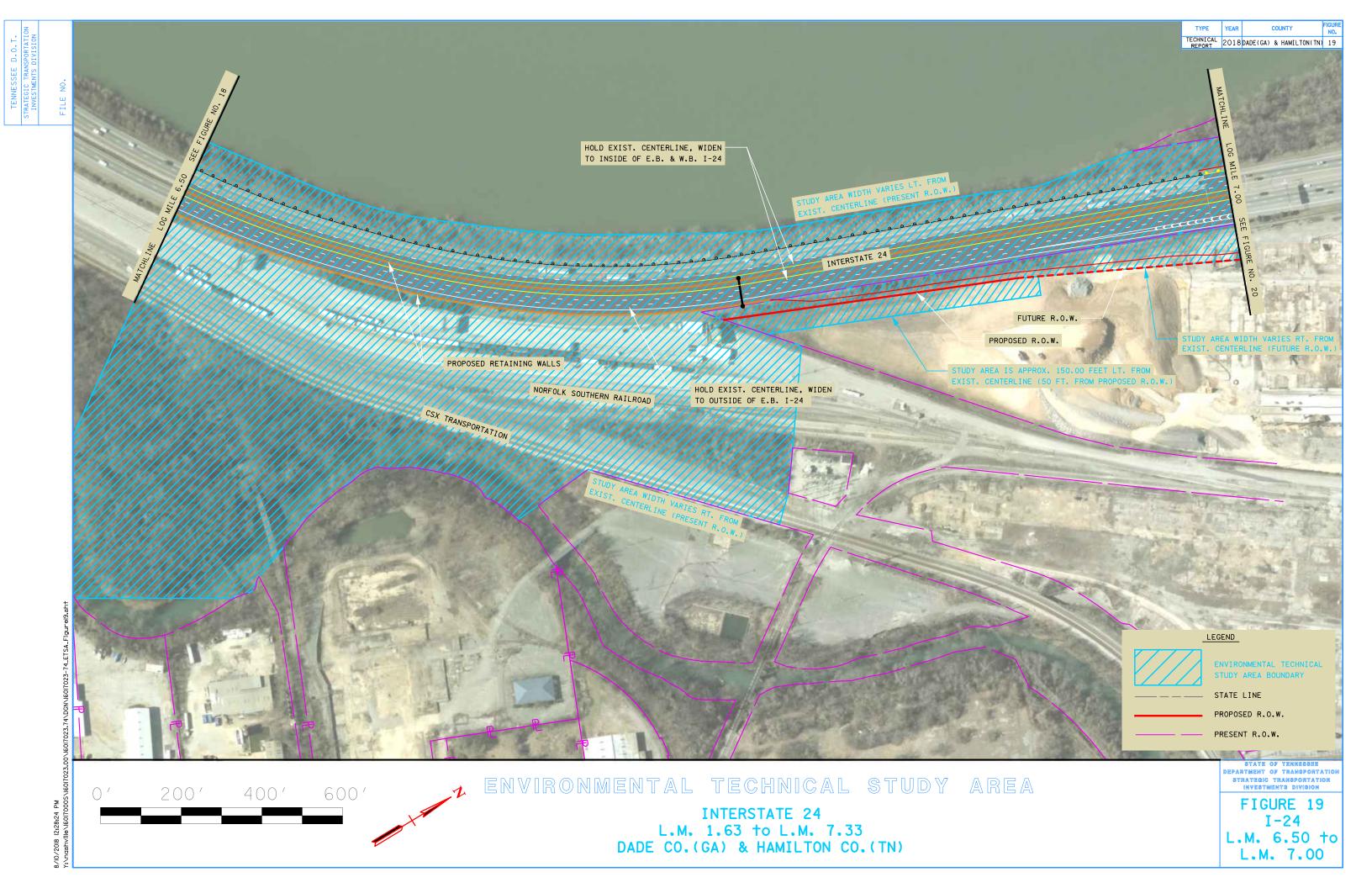


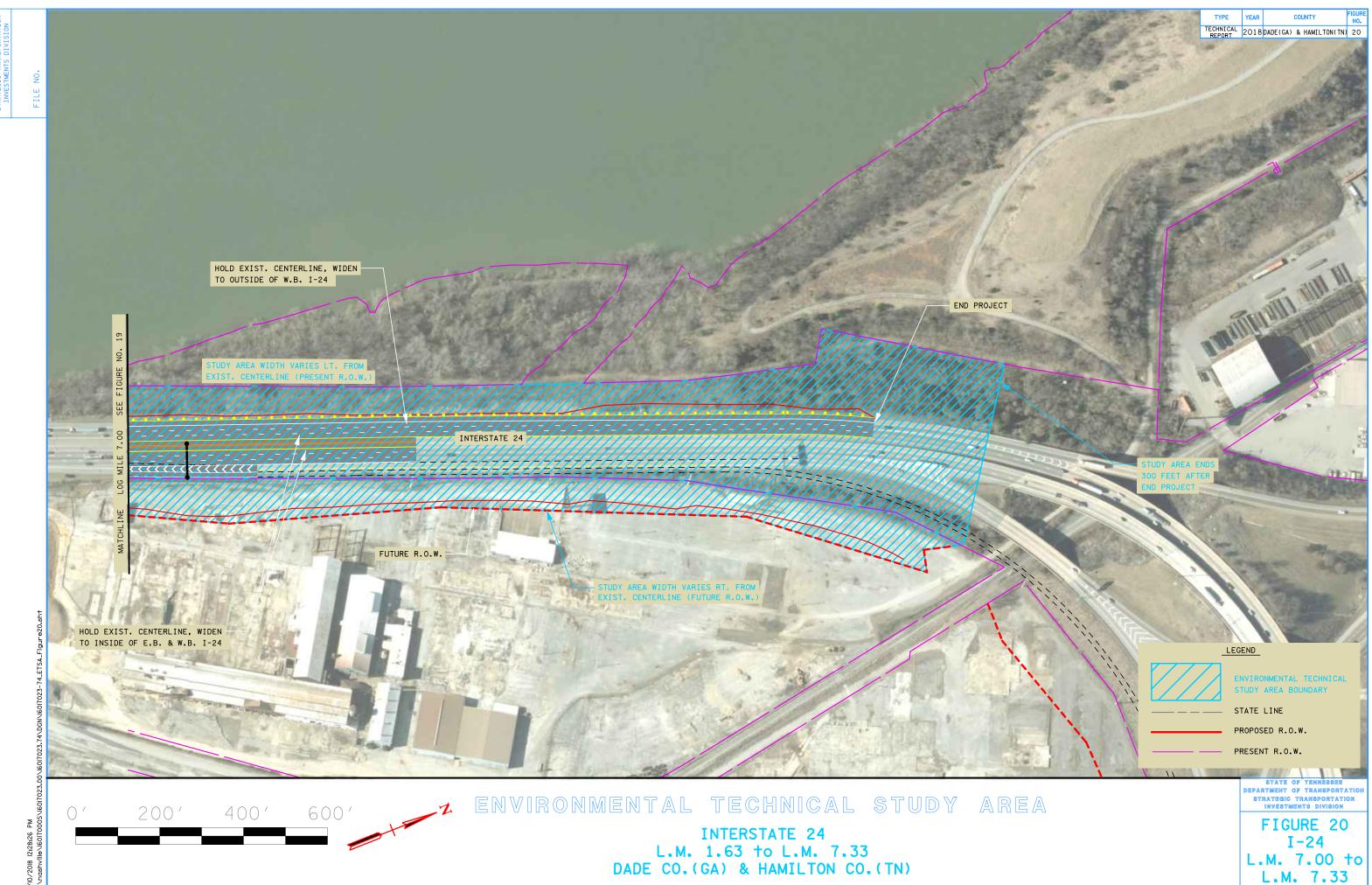












## **5.2 Proposed Alternative Costs**

The total estimated planning level cost required for preliminary engineering, right-of-way and utilities, and construction for this alternative is presented in Tables 7-10 for each segment and grand total.

#### **Table 7: Preliminary Cost Estimates**

Segment	Description	Length (Miles)	PE	ROW & UTIL.	CONST	Preliminary Cost
Segment 1	From I-59 to GA State Line	2.47	\$2,406,000	\$0	\$33,691,000	\$36,097,000
Segment 2	From GA State Line to East of Browns Ferry Rd.	4.73	\$3,564,000	\$94,000	\$82,112,000	\$85,770,000
Segment 3	From East of Browns Ferry Rd. to I-124 (US-27)	2.60	\$3,555,000	\$250,000	\$83,591,000	\$87,396,000
Totals			\$9,525,000	\$344,000	\$199,394,000	\$209,263,000

Approximately 0.40 acres of ROW acquisition in Segment 3 is anticipated, but there will likely need to be temporary construction easements to accommodate the proposed widening. Table 7, 8 & 9 on the following pages show the cost estimate summaries for each segment. See appendix for detailed itemization of cost estimates

### Table 8: Segment 1 Preliminary Cost Estimate Summary

Route: Ir	terstate 24 (Section 1	)				
F F	rom Interstate 59 (L.M	. 1.63)				
Description: T	o the Tennessee State	and a monthly a				
County: D	ade	TN TDOT				
	.47 Miles			Department of Transportation		
	ugust 10, 2018	Transportation				
DECOUDTION	LOCAL	STATE	FEDERAL	TOTAL		
DESCRIPTION	0%	0%	0%	TOTAL		
Construction Items						
Pavement Removal	\$(	) \$0	\$0	\$809,700		
Asphalt Paving	\$(	\$0	\$0	\$7,762,800		
Concrete Pavement	\$0	\$0	\$0	\$0		
Drainage	\$(	\$0	\$0	\$721,100		
Appurtenances	\$(	\$0	\$0	\$0		
Structures	\$(	\$0	\$0	\$4,190,200		
Fencing	\$0	\$0	\$0	\$0		
Signalization	\$(	\$0	\$0	\$19,500		
Railroad Crossing or Separation	n \$0	\$0	\$0	\$600,000		
Earthwork	\$0	) \$0	\$0	\$1,456,000		
Clearing and Grubbing	\$(	\$0	\$0	\$79,400		
Seeding & Sodding	\$(	\$0	\$0	\$131,800		
Rip-Rap or Slope Protection	\$0	\$0	\$0	\$45,600		
Guardrail	\$0	\$0	\$0	\$325,400		
Signing	\$0	\$0	\$0	\$165,400		
Pavement Markings	\$(		\$0	\$126,200		
Maintenance of Traffic	\$(	\$0	\$0	\$2,147,700		
Mobilization (10%)	\$(	\$0	\$0	\$1,858,100		
Other Items =	20% \$(	\$0	\$0	\$4,087,800		
Const. Contingency =	30% \$(	\$0	\$0	\$6,101,000		
Construction Estimate	\$0	\$0	\$0			
Interchanges & Unique						
Intersections						
Roundabouts	\$0	\$0	\$0	\$0		
Interchanges	\$0	\$0	\$0	\$0		
Dight of Mov 8 Litilities	LOCAL	STATE	FEDERAL	TOTAL		
Right-of-Way & Utilties	0%	0%	0%	IOTAL		
Right-of-Way	\$0	\$0	\$0	\$0		
Utilities	\$0					
Preliminary & Construction Engineering and Inspection						
	8% \$(	-	\$0	\$2,406,000		
Const. Eng. & Inspec.	10% \$(					
Total Project Cos						

### Table 9: Segment 2 Preliminary Cost Estimate Summary

Route:	Inter	state 24 (Section 2)				
Description	From	the Georgia State				
Description: -	To Ea	ast of Browns Ferry	The the second s			
	Hami		TN TDOT			
-	4.73	Miles			Department of Transportation	
-	Augu	ist 10, 2018				
-						
DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL	
DESCRIPTION		0%	0%	0%	TOTAL	
Construction Items						
Pavement Removal		\$0	\$0	\$0	\$1,238,200	
Asphalt Paving		\$0	\$0	\$0	\$14,156,900	
Concrete Pavement		\$0	\$0	\$0	\$0	
Drainage		\$0	\$0	\$0	\$1,404,300	
Appurtenances		\$0	\$0	\$0	\$0	
Structures		\$0	\$0	\$0	\$22,740,600	
Fencing		\$0	\$0	\$0	\$0	
Signalization		\$0	\$0	\$0	\$319,000	
Railroad Crossing or Separat	ion	\$0	\$0	\$0	\$0	
Earthwork		\$0	\$0	\$0	\$2,559,100	
Clearing and Grubbing		\$0	\$0	\$0	\$198,300	
Seeding & Sodding		\$0	\$0	\$0	\$181,800	
Rip-Rap or Slope Protection		\$0	\$0	\$0	\$76,500	
Guardrail		\$0	\$0	\$0	\$494,400	
Signing		\$0	\$0	\$0	\$220,000	
Pavement Markings		\$0	\$0	\$0	\$189,800	
Maintenance of Traffic		\$0	\$0	\$0	\$3,692,700	
Mobilization (10%)		\$0	\$0	\$0	\$4,747,200	
Other Items =	20%	\$0	\$0	\$0	\$10,443,800	
Const. Contingency =	30%	\$0	\$0	\$0	\$11,976,600	
Construction Estimate		\$0	\$0	\$0	\$74,639,200	
Interchanges & Uniqu	ie				. , ,	
Intersections						
Roundabouts		\$0	\$0	\$0	\$0	
Interchanges		\$0	\$0	\$0	\$0	
	-	LOCAL	STATE	FEDERAL	TOTAL	
Right-of-Way & Utiltie	S	0%	0%	0%	TOTAL	
Right-of-Way		\$0	\$0	\$0	\$0	
Utilities		\$0	\$0		\$94,000	
Preliminary & Construction Engineering and Inspection						
Prelim. Eng.	5%	so	\$0	\$0	\$3,564,000	
Const. Eng. & Inspec.	10%	\$0	\$0		\$7,473,000	
Total Project Co		\$0 \$0	\$0 \$0			
	•	**	**		,	

### Table 10: Segment 3 Preliminary Cost Estimate Summary

	nterstate 24 (Sect					
Pescription:	rom East of Brov	_				
Description:	o I-124 (US-27) (L	a thread a second second				
County:	lamilton	TN TDOT				
Length: 2	.60 Miles				Department of Transportation	
-	ugust 10, 2018					
DECODIDITION	LOCAL		STATE	FEDERAL	TOTAL	
DESCRIPTION	0%		0%	0%	TOTAL	
Construction Items						
Pavement Removal		\$0	\$0	\$0	\$561,400	
Asphalt Paving		\$0	\$0	\$0	\$9,314,900	
Concrete Pavement		\$0	\$0	\$0	\$0	
Drainage		\$0	\$0	\$0	\$2,054,200	
Appurtenances		\$0	\$0	\$0	\$2,191,200	
Structures		\$0	\$0	\$0	\$31,043,900	
Fencing		\$0	\$0	\$0	\$9,400	
Signalization		\$0	\$0	\$0	\$291,900	
Railroad Crossing or Separation	on	\$0	\$0	\$0	\$750,000	
Earthwork		\$0	\$0	\$0	\$1,488,100	
Clearing and Grubbing		\$0	\$0	\$0	\$92,600	
Seeding & Sodding		\$0	\$0	\$0	\$107,800	
Rip-Rap or Slope Protection		\$0	\$0	\$0	\$45,600	
Guardrail		\$0	\$0	\$0	\$163,900	
Signing		\$0	\$0	\$0	\$628,700	
Pavement Markings		\$0	\$0	\$0	\$159,700	
Maintenance of Traffic		\$0	\$0	\$0	\$3,161,300	
Mobilization (10%)		\$0	\$0	\$0	\$2,603,200	
Other Items =	20%	\$0	\$0	\$0	\$10,933,600	
Const. Contingency =	30%	\$0	\$0	\$0	\$10,367,300	
Construction Estimate		\$0	\$0	\$0		
Interchanges & Unique	9					
Intersections						
Roundabouts		\$0	\$0	\$0	\$0	
Interchanges		\$0	\$0	\$0	\$0	
Right-of-Way & Utilties	LOCAL		STATE	FEDERAL	TOTAL	
Right-Ol-Way & Othles	0%		0%	0%	IOTAL	
Right-of-Way		\$0	\$0	\$0	\$250,000	
Utilities		\$0	\$0			
Preliminary & Construction Engineering and Inspection						
Prelim. Eng.	5%	\$0		\$0	\$3,555,000	
Const. Eng. & Inspec.	10%	\$0	\$0			
Total Project Cos	t	\$0	\$0	\$0	\$ 87,396,000	

## **5.3 Proposed Alternatives Traffic Benefit Analysis**

The segments of I-24 were analyzed with the HCS2010 software for the proposed build alternative detailed previously. The LOS for both existing and proposed conditions are summarized in the table below:

### Table 11: LOS Comparison

Level of Service Comparison							
Segment	Year	Peak Hour	LOS (No Build)	LOS (Build)			
	2022	AM	D	С			
I-24 from I-59 to GA State Line	2022	PM	D	С			
1-24 from 1-59 to GA State Line	2042	AM	F	С			
	2042	PM	F	С			
	2022	AM	D	С			
1 24 from CA State Line to S. D. 2	2022	PM	E	С			
I-24 from GA State Line to S.R. 2	2042	AM	F	D			
		PM	F	D			
	2022	AM	E	С			
1 24 from C. D. 2 to Browns Form, Dd	2022	PM	E	С			
I-24 from S.R. 2 to Browns Ferry Rd.	2042	AM	F	D			
	2042	PM	F	D			
	2022	AM	F	D			
1 24 from Browns Form, Bd. to 116, 27	2022	PM	PM F				
I-24 from Browns Ferry Rd. to U.S. 27	2042	AM	F	F*			
	2042	PM	F	F**			

\* LOS E in 2031, LOS F in 2040

\*\* LOS E in 2032, LOS F in 2041

By adding one (1) travel lane in each direction (eastbound and westbound) on I-24, the LOS improves throughout most of the route and only the 2042 peak hours for the segment between Browns Ferry Road and U.S. 27 are worse than a LOS D. It is important to note that a LOS D is maintained in this segment

until the year 2031 and a LOS E until 2040. These results indicate that the additional lane allows vehicles to travel much closer to the base free flow speed and the route will experience less congestion.

### **5.4 Proposed Alternatives Safety Implications**

### HSM PART C PREDICTIVE METHOD CONSIDERATION FOR FREEWAYS

Although safety is not included in the purpose and need for this study, Highway Safety Manual (HSM) methodology for freeways was reviewed to help better understand the safety implications of the preferred alternative and help mitigate overall crash risk and crash severity.

"The *Highway Safety Manual* (HSM) is a resource that provides safety knowledge and tools in a useful form to facilitate improved decision making based on safety performance. The focus of the HSM is to provide quantitative information for decision making. The HSM assembles currently available information and methodologies on measuring, estimating and evaluating roadways in terms of crash frequency (number of crashes per year) and crash severity (level of injuries due to crashes)." [HSM – Preface to the Highway Safety Manual, pg. xxiii]

Because the HSM does not account for jurisdiction-specific differences, it contains calibration techniques to modify tools for local use. This is necessary because of differences in factors, such as: driver populations, local roadway roadside conditions, traffic composition, typical geometrics, and traffic control measures. There are also variations in how each state or jurisdiction reports crashes and manages crash data. The HSM calibration method should be applied to each individual facility type. Examples of facility types associated with this project are freeway segments, ramp segments, and ramp terminals (i.e. where the ramp intersects with the surface street).

Since local calibration factors were unavailable for the various facility types associated with freeway analysis at the time this report was developed, it was determined that a cumulative HSM Part C predictive method analysis comparing the existing conditions to the proposed alternative would not yield accurate results.

However, a preliminary investigation of the number of crashes and severity distribution was completed for freeway segments being widened from four (4) to six (6) travel lanes [three (3) in each direction] to help understand the safety implications for the proposed alternative. It should be noted that this investigation does not account for the influence of ramps and weaving areas within the project limits. Also, this investigation is not intended to be a substitute for cumulative project HSM Part C predictive method procedures to quantify overall safety performance. The safety performance investigated is a function of the AADT, geometric design features, traffic control features, and site characteristics for isolated freeway segments. Tables found in the appendix demonstrate crashes per mile per year based on varying AADTs and typical section types which derive the key findings shown below.

# Key Findings of Investigation using Interstate Safety Analysis Tool enhance (ISATe) for Isolated Freeway Segments:

- <u>Overall</u>: Safety performance calculations using ISATe for widening projects that meet TDOT design standards will predict an overall reduction in crashes and the percent reduction is a function of the AADT, geometric design features, traffic control features, and site characteristics.
- <u>Widening with a Reduction in Median Width</u>: Assuming that the horizontal alignment and clear zones do not change, there will be a small increase in fatal and serious injury crashes if the depressed grass median width is reduced for median widths less than 90 feet.
- <u>Changing Median Type</u>: Assuming that the horizontal alignment and clear zones do not change, there will be a small increase in fatal and serious injury crashes when widening to the inside from a standard 48 foot depressed grass median to a standard 26 foot barrier wall separated median.
- <u>Increasing Inside Shoulder Width for Barrier Wall Separated Medians</u>: Assuming that the horizontal alignment and clear zones do not change when widening from four (4) travel lanes with barrier wall separation to six (6) travel lanes with barrier wall separation, and the inside shoulder width is improved, then it is predicted that there will be a small decrease in fatal and serious injury crashes.

Note: The HSM is not a legal standard. Instead, the HSM provides analytical tools and techniques for quantifying the potential effects of decisions made in planning, design, operations and maintenance.

Crash rate statistics were analyzed within the study areas.

Crash Modification Factors (CMF's) are defined as "an index of how much crash experience is expected to change following a modification in design or traffic control. CMF is the ratio between the number of crashes per unit of time expected after a modification or measure is implemented and the number of crashes per unit of time estimated if the change does not take place." The CMF Clearinghouse (www.cmfclearinghouse.org) provides a quantitative basis for estimating how a given CMF might improve safety. The CMF Clearinghouse is a website funded by the U.S. Department of Transportation Federal Highway Administration and is maintained by the University of North Carolina Highway Safety Research Center. The website provides a database of CMFs to assist in selecting appropriate improvements based on safety.

According to the CMF Clearinghouse, extending Off Ramp deceleration lanes along I-24 by approximately 100 feet is predicted to improve safety with a crash reduction factor (CRF) of 7.0 percent for all crash types as shown in the table below:

Table 12: CMFs

Crash Modi	fication Facto	ors that	Apply to	o the Co	onceptua	al Alterr	natives
Source	Treatment	Setting	Star Rating	Crash Type	CMF	CRF	Std. Error
CMF Clearinghouse, CMF ID: 475	Extend deceleration lane by approx. 100 ft	Principal Arterial Interstate	3/5	All	0.93	7.0%	0.06

A CRF is a way to represent the expected effect of a countermeasure in terms of percentage decrease in crashes based on the CMF. This CRF had a three (3) / five (5) star rating with an unadjusted standard error of 0.06. See Table 12 on the following page for an explanation on the CMF clearinghouse star ratings.

#### **Table 13: CMF Star Ratings**

Relative Rating	Excellent	Fair	Poor
Study	Statistically rigorous study design with reference	Cross sectional study or other coefficient based analysis	Simple before / after
Design	group or randomized experiment and control		study
Sample	Large sample, multiple years, diversity of sites	Moderate sample size, limited years,	Limited homogeneous
Size		and limited diversity of sites	sample
Standard	Small compared to CRF	Relatively large SE, but confidence	Large SE and confidence
Error		interval does not include zero	interval includes zero
Potential	Controls for all sources of known potential bias	Controls for some sources of potential	No consideration of potential bias
Bias	<u>*See below for a list of potential biases</u>	bias	
Data Source	Diversity in States representing different geographies	Limited to one State, but diversity in geography within State (e.g., CA)	Limited to one jurisdiction in one State

To provide a more quantitative translation from these categories to the star rating, a point-based system was developed. Points are assigned to each CMF characteristic based on the level of rigor (excellent = 2 points, fair = 1 point, or poor = 0 points). While the points decrease from excellent to poor, not all characteristics receive equal weight. For example, the study design is more important than the data source. Therefore, the final quality rating is based on a weighted score. Study design and sample size categories receive twice the weight of the other characteristics (see equation below).

#### Score = (2 \* study design) + (2 \* sample size) + standard error + potential bias + data source

The star rating is assigned based on the score and the ranges in the table below. It should be noted that information may be missing from a study report for specific characteristics such as sample size. In these cases, the rating is based on available information and the CMF will likely receive a lower rating due to the lack of information.

Score	Star Rating
14 (max possible)	5 Stars
11 - 13	4 Stars
7 - 10	3 Stars
3 - 6	2 Stars
1 - 2	1 Star
0	0 Stars

## **5.5 Proposed Alternatives Geometric Benefit Analysis**

As there were no current geometric (horizontal and vertical alignment) deficiencies noted, the only anticipated geometric benefits from the proposed build alternatives are the additional lanes and shoulder widening along the route.

## **6.0 Recommendations**

The proposed improvements will improve congestion, mobility, and increase capacity along the study corridor. The ultimate build alternative should improve operations by:

- Increasing travel speed and reducing congestion along I-24
- Reducing crashes by up to 7.0% for Ramp merge/diverge areas based on the CMF Clearinghouse

The construction of the proposed widening is essential in the overall transportation network.

Based on the information and analyses contained in this report, it is recommended to complete the proposed Build Alternative, which includes the addition of one (1) travel lane in both the eastbound and westbound directions along I-24, replace twelve (12) bridges in Tennessee, widen two (2) bridges in Georgia and replace ITS equipment as needed.

# 7.0 Appendix

7.1 Cost Estimates

# 7.2 Background Data

# 7.3 Project Traffic

# 7.4 Traffic Analysis

# 7.5 Crash Analysis

# 7.0 Appendix

7.1 Cost Estimates

# **COST ESTIMATE SUMMARY**

Route:	Inters	tate 24 (Section 1)				
Noute.		Interstate 59 (L.M. 1.	63)		-	
Description:		e Tennessee State Li	/		The second se	
County:	Dade		TN TDOT			
Length:	2.47 N	Ailes		Department of Transportation		
Date:	Augu	st 10, 2018				
		,			-	
DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL	
Construction Items		0%	0%	0%		% Contribution
Construction Items Pavement Removal		\$0	03	\$0	\$809,700	
Asphalt Paving		\$0	\$0 \$0	\$0 \$0	\$809,700	4.36% 41.78%
Concrete Pavement			\$0 \$0	\$0 \$0		0.00%
Drainage		\$0 \$0	\$0	\$0	\$0 \$721,100	
-						3.88%
Appurtenances		\$0	\$0	\$0	\$0	0.00%
Structures		\$0	\$0	\$0	\$4,190,200	22.55%
Fencing		\$0	\$0	\$0	\$0	0.00%
Signalization		\$0	\$0	\$0	\$19,500	0.10%
Railroad Crossing or Separat	tion	\$0	\$0	\$0	\$600,000	3.23%
Earthwork		\$0	\$0	\$0	\$1,456,000	7.84%
Clearing and Grubbing		\$0	\$0	\$0	\$79,400	0.43%
Seeding & Sodding		\$0	\$0	\$0	\$131,800	0.71%
Rip-Rap or Slope Protection		\$0	\$0	\$0	\$45,600	0.25%
Guardrail		\$0	\$0	\$0	\$325,400	1.75%
Signing		\$0	\$0	\$0	\$165,400	0.89%
Pavement Markings		\$0	\$0	\$0	\$126,200	0.68%
Maintenance of Traffic		\$0	\$0	\$0	\$2,147,700	11.56%
Mobilization (10%)		\$0	\$0	\$0	\$1,858,100	
Other Items :	= 20%	\$0	\$0	\$0	\$4,087,800	
Const. Contingency :	= 30%	\$0	\$0	\$0	\$6,101,000	
Construction Estimate		\$0	\$0	\$0	\$30,627,700	
Interchanges & Uniq Intersections	ue				, , , , , , , , , , , , , , , , , , , ,	
Roundabouts	_	\$0	\$0	\$0	\$0	
Interchanges		\$0	\$0	\$0	\$0	
Interchanges		LOCAL	STATE	FEDERAL		
Right-of-Way & Utilti	ies	0%	0%	0%	TOTAL	
Diskt of Max						
Right-of-Way		\$0	\$0	\$0	\$0	
Utilities		\$0	\$0	\$0	\$0	
Preliminary & Constructi						
Prelim. Eng.	8%	\$0	\$0	\$0	\$2,406,000	
Const. Eng. & Inspec.	10%	\$0	\$0	\$0	\$3,063,000	Per Mile Cost
Total Project Co	st	\$0	\$0	\$0	\$ 36,097,000	\$ 14,614,170.04

# **PAY ITEM SUMMARY**

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	ADDITIONAL QUANTITI	TOOL QUANTITIE ADDITIONAL ES QUANTITIES		Statewide JNIT COST	TOTAL COST
Pavment Removal 411-12.01	Scoring Shoulders (Cont. 16")	L.M.		4.94	5	\$	616.22 \$	3
415-01.02	Cold Planning Bituminous Pavement		69555	70000	139555 PAVEMENT F	\$	5.78 \$ DTAL (ROUNDED) \$	800
					PAVEMENT	LINOVAL IC		
Asphalt Roads 303-01	Mineral Aggregate, Type A Base, Grading I	TON	148153		148153	\$	18.13 \$	2,68
307-02.01 307-02.02	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A Asphalt Cement (PG70-22)(BPMB-HM) Grading A-5	TON TON	15998 176	13331	29329 176	\$ \$	62.92 \$ 723.66 \$	1,84
307-02.03	Aggregate (BPMB-HM) Grading A-S Mix	TON	5693		5693	\$	66.80 \$	38
307-02.08 402-01	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2 Bituminous Material For Prime Coat (PC)	TON TON	11790 145	3275	15065 145	\$ \$	78.66 \$ 609.86 \$	1,18
402-02 403-01	Aggregate For Cover Material (PC) Bituminous Material For Tack Coat (TC)	TON TON	522 74	9	522 83	\$	44.10 \$ 732.41 \$	2
411-01.07	ACS (PG64-22) GR "E"	TON	5608		5608	\$ \$	86.18 \$	48
411-02.10	ACS Mix(PG70-22) Grading D	TON	6912	1920	8832	\$ PAVING TO	99.98 \$ DTAL (ROUNDED) \$	88
Concrete Roads				CONCE	ETE RAMPS AND RC	ADWAYS TO	DTAL (ROUNDED) \$	
Drainage 209-05	Sediment Removal	СҮ		5000	5000	\$	10.12 \$	5
209-08.03	Temporary Silt Fence (Without Backing)	LF		1950	1950	\$	1.53 \$	
209-08.07 209-08.08	Rock Check Dam Enhanced Rock Check Dam	EACH EACH		100	100 50	\$ \$	223.69 \$ 391.19 \$	2
607-05.02 611-07.01	24" Concrete Pipe Culvert (Class III) Class A Concrete (Pipe Endwalls	LF CY	4817 80		4817 80	\$ \$	69.58 \$ 943.70 \$	33
611-07.02	Steel Bar Reinforcement (Pipe Endwalls	LB	7558		7558	\$	2.18 \$	1
710.02 740-11.03	Aggregate Underdrains (with pipe TEMPORARY SEDIMENT TUBE 18IN (DESCRIPT)	LF LF	26083	18000	26083 18000	\$ \$	5.46 \$ 3.13 \$	14
Appurtenances					D	RAINAGE TO	DTAL (ROUNDED) \$	
				ROADWAY AND	PAVEMENT APPURT	ENANCES TO	DTAL (ROUNDED) \$	
Earthwork & Mineral 105-01	Constrction Stakes, Lines, and Grades	LS	1		1	\$	112,407.96 \$	11
203-01 203-03	Road & Drainage Excavation (Unclassified Borrow Excavation (Unclassified)	CY CY	173888 144907	-134000 -100000	39888 44907	\$ \$	16.48 \$ 14.76 \$	65 66
303-10.01	Mineral Aggregate (Size 57)		144507	800	800	\$	29.27 \$	2
					EARTHWORK &	MINERAL TO	DTAL (ROUNDED) \$	1,
Structures N/A	New Bridge (Steel Girder)	SF	10660		10660	\$	300.00 \$	3,19
					STR	UCTURES TO	DTAL (ROUNDED) \$	4,
Lighting & Signalization 714-01.32	Structural Lighting	LS		INTERCHANGES	AND UNIQUE INTER	Ş	9,743.29 \$	1
Lighting & Signalization 714-01.32 Guardrail			300	2	2 LIGHTING & SIGNA	\$ LIZATION TO	9,743.29 \$ DTAL (ROUNDED) \$	
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02	Guardrail at Bridge Ends Single Guardrail (Type 2)	LF	200 7173	2 -92 11560	2 LIGHTING & SIGNA 108 18732.88	\$ LIZATION TO \$ \$	9,743.29 \$ DTAL (ROUNDED) \$ 73.34 \$ 16.56 \$	310
Lighting & Signalization 714-01.32 Guardrail 705-01.01	Guardrail at Bridge Ends	LF LF EA		-92	2 LIGHTING & SIGNA 108	\$ LIZATION TO \$	9,743.29 \$ DTAL (ROUNDED) \$ 73.34 \$	31
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, T13)	LF LF EA	7173 13	-92 -11560 -11	2 LIGHTING & SIGNA 108 18732.88 2 2	\$ LIZATION TO \$ \$ \$ \$ \$	9,743.29 \$ DTAL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354.25 \$	311
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.09 Seeding and Sodding	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment	LF LF EA EA	7173 13 13	-92 -11560 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 2 3 6 L 3 3 4 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5	\$ LIZATION TO \$ \$ \$ \$ \$ UARDRAIL TO	9,743.29 \$ DTAL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ DTAL (ROUNDED) \$	31
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.09	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch)	LF LF EA EA	7173 13	-92 -11560 -11	2 LIGHTING & SIGNA 108 18732.88 2 2	\$ LIZATION TO \$ \$ \$ \$ \$	9,743.29 \$ DTAL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$	31
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 5eeding and Sodding 801-01	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch)	LF LF EA EA UNIT	7173 13 13 1793	-92 -11560 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 3 4 3 4 1793 1345	\$ S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 073.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 077AL (ROUNDED) \$ 38.91 \$	31 6 3 3 2
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01.07	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3 Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch)	LF EA EA UNIT UNIT UNIT	7173 13 13 13 1793 1345	-92 -11560 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 3 4 3 4 1793 1345	\$ S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 773.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 0,714. (ROUNDED) \$ 38.91 \$ 2.645 \$ 1.95 \$	66332
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.07 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (With Mulch) Traffic Control	LF EA EA UNIT UNIT UNIT LS	7173 13 13 1793 1345 1345 1345	2 -92 11560 -11 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 2 CL GL 1793 1345 1345 3	S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 977AL (ROUNDED) \$ 73.34 \$ 16.56 \$ 1,291.67 \$ 1,291.67 \$ 77AL (ROUNDED) \$ 38.91 \$ 2.6.45 \$ 19.59 \$ 77AL (ROUNDED) \$	31 31 6 3 3 2 56
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01	Guardrail at Bridge End Single Guardrail (Type 2; Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pavement Marking Line	LF LF EA EA UNIT UNIT UNIT UNIT LS LS LF LF	7173 13 13 1793 1793 1345 1345	2 -92 11560 -11 -11 -11 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 3 109 1793 1345 1345 1345 1345 1345 1345 1345 134	S LIZATION TO S S S S S S S S S S S S S D D ING TO S S S S S D D ING TO S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 9,743.29 \$ 77.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.41 (ROUNDED) \$ 38.91 \$ 26.64 \$ 19.59 \$ 77.41 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.09 \$	311 6 3 3 2 56 822 211
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (With Mulch) Traffic Control Interconnected Portable Barrier Rai	LF LF EA EA UNIT UNIT UNIT UNIT LS LS LF LF	7173 13 13 1793 1345 1345 1345	2 -92 11560 -11 -11 -11 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 3 4 2 4 2 4 3 4 1345 1345 1345 3 26652	S LIZATION TO S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 77.1 (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.1 (ROUNDED) \$ 77.1 (ROUNDED) \$ 77.1 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.09 \$ 3.377 \$	6 6 3 2 56 822 211 53
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-04.07 705-04.07 705-04.07 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Witho Mulch) Seeding (Withou Mulch) Traffic Control Interconnected Portable Barrier Kai Removable Pavement Marking Line Removable Pavement Marking (å" Barrier Line)	LF EA EA UNIT UNIT UNIT LS LF LF LF	7173 13 13 1793 1345 1345 1345	2 -92 11560 -11 -11 -11 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 2 3 4 1793 1345 1793 1345 1345 3 26652 105000	S S S S S S S S S S S S S S D D ING TO S S S S S S S S S S S S S S S S S S S	9,743,29 \$ 07AL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354 15 1,291.67 \$ 1,291.67 \$ 1,291.67 \$ 0,2645 \$ 19.59 \$ 07AL (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.09 \$ 3.107 \$ 0.07 \$ 0.0	6 6 3 2 2 566 822 211 53 2,
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.01	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, Ta3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pavement Marking (S* Barrier Line) Steel Overhead Sign Structure	LF LF EA EA UNIT UNIT UNIT LS LF LF LF EA	7173 13 13 1793 1345 1345 1345	2 -92 11560 -11 -11 -11 -11	2 LIGHTING & SIGNA 108 18732.88 2 2 2 3 4 1793 1345 1793 1345 1345 3 26652 105000	S LIZATION TO S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 77.1 (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.1 (ROUNDED) \$ 77.1 (ROUNDED) \$ 77.1 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.09 \$ 3.377 \$	31 6 3 2 2 566 82 21 536 22 21 53 3 2
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 801-01 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Witho Mulch) Seeding (Withou Mulch) Traffic Control Interconnected Portable Barrier Kai Removable Pavement Marking Line Removable Pavement Marking (å" Barrier Line)	LF LF EA EA UNIT UNIT UNIT LS LF LF LF EA	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 3 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 9,743.29 \$ 77.34 \$ 7.334 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 38.91 \$ 26.64 \$ 19.59 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.09 \$ 3.57 \$ 77.4 (ROUNDED) \$	31 6 3 2 56 82 21 53 2 13 13
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 801-01 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, Ta3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pavement Marking (S* Barrier Line) Steel Overhead Sign Structure	LF LF EA EA UNIT UNIT UNIT LS LF LF LF EA	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 3 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 77.3.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.34 \$ 1,291.67 \$ 1,291.67 \$ 77.14 (ROUNDED) \$ 77.14 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 2.04 \$ 3.57 \$ 77.14 (ROUNDED) \$ 133,120.00 \$ 15,100.00 \$	6 6 3 2 2 2 2 1 5 3 2, 2 1 3 2, 1 3
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings	Guardrail at Bridge End Single Guardrail (Type 2 Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pavement Marking Line Removable Pavement Marking (å" Barrier Line) Steel Overhead Sign Structure Signs (Construction)	LF LF EA EA UNIT UNIT UNIT UNIT LS LF LF LF LF LF LF LF EA EA	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 GU 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S	9,743,29 \$ 07AL (ROUNDED) \$ 7.3.4 \$ 16.56 \$ 2,354,25 \$ 1,29167 \$ 1,2916	6 6 3 2 566 822 211 533 2, 13 13 11 11
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 712-09.06 Not Listed Pavement Markings 716-01.23	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 28 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pawement Marking (8" Barrier Line) Steel Overhead Sign Structure Signs (Construction) Simplivble Pvmt Mrkrs (Bi-Dirl/2 Color)	LF LF EA EA UNIT UNIT UNIT UNIT LS LF LF LF LF LF LF LF EA EA	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 GU 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S S S S S S	9,743,29 \$ 9,743,29 \$ 77,34 \$ 16,56 \$ 2,354,25 \$ 1,291,67 \$ 1,291,	31 6 3 3 2 2 21 53 556 82 21 53 53 2 13 13 11
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-01.23 716-12.02 Fencing	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 28 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pawement Marking (8" Barrier Line) Steel Overhead Sign Structure Signs (Construction) Simplivble Pvmt Mrkrs (Bi-Dirl/2 Color)	LF LF EA EA UNIT UNIT UNIT UNIT LS LF LF LF LF LF LF LF EA EA	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 GU 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S S S S S S	9,743,29 \$ 07AL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2,354,15 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 0,7AL (ROUNDED) \$ 38.91 \$ 2,645 \$ 31.07 \$ 2,09 \$ 31.00 \$ 507AL (ROUNDED) \$ 133,120.00 \$ 507AL (ROUNDED) \$ 30.11 \$ 4,681,46 \$ 5	31 6 3 3 2 2 21 53 556 82 21 53 53 2 13 13 11
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Interconnected Portable Barking Line Removable Pavement Marking (6" Barrier Ital Removable Pavement Marking (6" Barrier Line) Steel Overhead Sign Structure Signs (Construction) Snwplwble Pvmt Mirkrs (8i-Dir)(2 Color) Enhanced Flat Thermo P.M. (6" Smuplwble Piat Thermo P.M. (6"	LF LF EA EA EA UNIT UNIT UNIT UNIT LS LF LF EA LS EA LM	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 3 GU 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S	9,743,29 \$ 07AL (ROUNDED) \$ 73.34 \$ 16.56 \$ 2.354,25 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,291,67 \$ 1,191,59 307AL (ROUNDED) \$ 133,120,00 \$ 14,681,46 \$ 14,681,46 \$ 14,680,400 \$ 14,600,400 \$ 14,680,400	6 6 3 3 2 5 5 6 8 2 2 1 3 2 1 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 712-09.06 Not Listed Pavement Markings 716-01.23 716-01.23 716-12.02 Fencing Rip-Rap	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (INCHRP, 350, T.3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Steel Overhead Sign Structure Signs (Construction) Sinwplwble Pvmt Mrkrs (Bi-Dir)(2 Color; Enhanced Flat Thermo P.M. (67)	LF LF EA EA EA UNIT UNIT UNIT UNIT LS LF LF EA LS EA LM	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 3 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S S S S S S	9,743.29 \$ 9,743.29 \$ 77.34 \$ 16,56 \$ 2,354.25 \$ 1,291.67 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 3.645 \$ 1.07 \$ 3.67	311 6 3 2 56 822 21 53 2, 13 13 11 11 11 11 11 11 11 11
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.07 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05	Guardrail at Bridge End: Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, T.3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without	LF LF EA EA UNIT UN	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 CL 1793 1345 1350 1050000 105000 105000 1050000 1050000 1050000 1050000 10500000 1050000000000	S Control of the second	9,743,29 \$ 9,743,29 \$ 77,34 \$ 16,56 \$ 2,354,25 \$ 1,291,67 \$ 1,291,	31 6 3 2 566 82 212 533 2 113 13 11 11 11 2 2 2
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01.07 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-12.3 716-12.3 716-12.3 716-12.02 Rio-Rap 709-05.05 709-05.05 709-05.08	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, T.3) Earth Pad for Type 28 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rat Removable Pavement Marking Line Removable Pavement Marking (8° Barrier Line) Steel Overhead Sign Structure Signs (Construction) Signs (Construction) Signs (Construction) Enhanced Flat Thermo P.M. (6° Enhanced Flat Thermo P.M. (6° Machined Rip-Rap (Class A-3) Machined Rip-Rap (Class A-3)	LF LF EA EA UNIT UN	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 3 1345 1345 1345 1345 1345 1345 1345 13	S Control of the second	9,743,29 \$ 9,743,29 \$ 77,34 \$ 16,56 \$ 2,354,25 \$ 1,291,67 \$ 1,291,	31 6 3 2 566 82 212 533 2 113 13 11 11 11 2 2 2
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05 709-05.08 709-05.08 709-05.09	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, T.3) Earth Pad for Type 28 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rat Removable Pavement Marking Line Removable Pavement Marking (8° Barrier Line) Steel Overhead Sign Structure Signs (Construction) Signs (Construction) Signs (Construction) Enhanced Flat Thermo P.M. (6° Enhanced Flat Thermo P.M. (6° Machined Rip-Rap (Class A-3) Machined Rip-Rap (Class A-3)	LF           LF           EA           EA           UNIT           UNIT           UNIT           UNIT           UNIT           UNIT           LF           EA           LF           TON           TON           TON	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 GL 1793 1345 1345 1345 1345 1345 1345 1345 134	S S S S S S S S S S S S S S	9,743,29 \$ 9,743,29 \$ 77,34 \$ 16,56 \$ 2,354,25 \$ 1,291,67 \$ 1,291,	31 6 3 3 2 5 5 8 2 2 1 3 2 1 3 2 1 3 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 2 1 3 2 2 2 1 3 2 2 2 2 1 3 3 2 2 2 2 1 3 3 2 2 2 2 1 3 3 2 2 2 2 1 3 3 2 2 2 2 1 3 3 2 2 2 1 3 3 2 2 2 1 3 3 2 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 1 3 2 2 2 1 3 2 2 2 1 3 2 2 2 1 3 2 2 2 2 2 1 3 2 2 2 2 2 2 2 2 2 2 2 2 2
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05 709-05.05 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.09 Clearing and Grubing 201-01	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, T.3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (With Mulc	LF         LF           LF         EA           UNIT         UNIT           UNIT         UNIT           UNIT         UNIT           LS         LF           EA         LF           LF         LF           LF         LF           EA         LS           EA         LS           TON         TON           TON         TON           LS         LS	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 1793 1345 1350 10500 105000 10500 105000 10500 10500 10500 10500 10500 10500 10500 105	S S S S S S S S S S S S S S	9,743,29 \$ 9,743,29 \$ 77,34 \$ 16,56 \$ 2,354,25 \$ 2,354,25 \$ 2,354,25 \$ 1,291,67 \$ 34,91 \$ 34,9	311 6 3 2 566 822 21 533 2 13 13 11 11 11 11 11 11 11 11
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01.07 801-01.07 801-01.07 801-02 Maintenace of Traffic N/A 712-02.02 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05 709-05.08 709-05.09 Clearing and Grubing 201-01	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (INCHRP, 350, T.3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (Without Mulch) Seeding (Without Mulch) Traffic Control Interconnected Portable Barrier Rai Removable Pavement Marking (G* Barrier Line) Steel Overhead Sign Structure Signs (Construction) Steel Overhead Sign Structure Signs (Construction) Signs (Construction) Signs (Construction) Signs (Construction) Signs (Construction) Machined Rip-Rap (Class A-1) Machined Rip-Rap (Class A-1) Machined Rip-Rap (Class C)	LF         LF           LF         EA           UNIT         UNIT           UNIT         UNIT           UNIT         UNIT           LS         LF           EA         LF           LF         LF           LF         LF           EA         LS           EA         LS           TON         TON           TON         TON           LS         LS	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 1793 1345 1350 15000 150 0 300 150 15	S S S S S S S S S S S S S S	9,743.29 \$ 9,743.29 \$ 77.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 38.91 \$ 2.6.45 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 77.4 (ROUNDED) \$ 133,120.00 \$ 16,100.00 \$ 16,100.00 \$ 16,100.00 \$ 30.11 \$ 4,681.46 \$ 77.4 (ROUNDED) \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 30.1	
Lighting & Signalization 714-01.32 Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs 713-09.06 Not Listed Pavement Markings 716-01.23 716-01.23 716-12.02 Fencing Rip-Rap 709-05.05 709-05.05 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.08 709-05.09 Clearing and Grubing 201-01	Guardrail at Bridge End Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, T.3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch) Seeding (With Mulc	LF         LF           LF         EA           UNIT         UNIT           UNIT         UNIT           UNIT         UNIT           LS         LF           EA         LF           LF         LF           LF         LF           EA         LS           EA         LS           TON         TON           TON         TON           LS         LS	7173 13 13 1793 1345 1345 1345 1345	2 -92 11560 -11 -11 -11 -11 -11 -11 -11 -1	2 LIGHTING & SIGNA 108 18732.88 2 2 1793 1345 1350 10500 105000 10500 105000 10500 10500 10500 10500 10500 10500 10500 105	S S S S S S S S S S S S S S	9,743.29 \$ 9,743.29 \$ 77.34 \$ 16.56 \$ 2,354.25 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 38.91 \$ 2.6.45 \$ 1,291.67 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 77.4 (ROUNDED) \$ 188,178.18 \$ 31.07 \$ 77.4 (ROUNDED) \$ 133,120.00 \$ 16,100.00 \$ 16,100.00 \$ 16,100.00 \$ 30.11 \$ 4,681.46 \$ 77.4 (ROUNDED) \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 30.11 \$ 4,681.46 \$ 37.74 (ROUNDED) \$ 30.11 \$ 30.1	31 6 3 2 566 822 21 13 13 1 1 1 1 1 1 1 1 1 1 1 1 1

# **COST ESTIMATE SUMMARY**

Route:	Inters	tate 24 (Section 2)								
		the Georgia State Li	ine (L.M. 0.00)							
Description:		st of Browns Ferry (			the second se					
County:		Hamilton TDOT								
Length:	4.73 N		Department of Transportation							
Date:		st 10, 2018			Transportation					
24101	<u></u>									
DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL					
DESCINI NON		0%	0%	0%	TOTAL					
Construction Items						% Contribution				
Pavement Removal		\$0	\$0	\$0	\$1,238,200	2.61%				
Asphalt Paving		\$0	\$0	\$0	\$14,156,900	29.82%				
Concrete Pavement		\$0	\$0	\$0	\$0	0.00%				
Drainage		\$0	\$0	\$0	\$1,404,300	2.96%				
Appurtenances		\$0	\$0	\$0	\$0	0.00%				
Structures		\$0	\$0	\$0	\$22,740,600	47.90%				
Fencing		\$0	\$0	\$0	\$0	0.00%				
Signalization		\$0	\$0	\$0	\$319,000	0.67%				
Railroad Crossing or Sepa	ration	\$0	\$0	\$0	\$0	0.00%				
Earthwork		\$0	\$0	\$0	\$2,559,100	5.39%				
Clearing and Grubbing		\$0	\$0	\$0	\$198,300	0.42%				
Seeding & Sodding		\$0	\$0	\$0	\$181,800	0.38%				
Rip-Rap or Slope Protection	on	\$0	\$0	\$0	\$76,500	0.16%				
Guardrail		\$0	\$0	\$0	\$494,400	1.04%				
Signing		\$0	\$0	\$0	\$220,000	0.46%				
Pavement Markings		\$0	\$0	\$0	\$189,800	0.40%				
Maintenance of Traffic		\$0	\$0	\$0	\$3,692,700	7.78%				
Mobilization (10%)		\$0	\$0	\$0	\$4,747,200	,				
Other Iten	ns= 20%	\$0	\$0	\$0	\$10,443,800					
Const. Contingen		\$0	\$0	\$0	\$11,976,600					
Construction Estimate	.y - 0070	\$0	\$0	\$0	\$74,639,200					
Interchanges & Ur	nique	40	ψŪ	40	ψ7 <del>4</del> ,035,200					
Intersections										
Roundabouts		\$0	\$0	\$0	\$0					
Interchanges		\$0	\$0	\$0	\$0					
Right-of-Way & Ut	iltios	LOCAL	STATE	FEDERAL	TOTAL					
Right-or-Way & Or	intes	0%	0%	0%	IOTAL					
Right-of-Way		\$0	\$0	\$0	\$0					
Utilities		\$0	\$0	\$0	\$94,000					
Preliminary & Constru	ction Engi	neering and Inspection	on							
Prelim. Eng.	5%	\$0	\$0	\$0	\$3,564,000					
Const. Eng. & Inspec.	10%	\$0	\$0	\$0	\$7,473,000	Per Mile Cost				
Total Project C	Cost	\$0	\$0	\$0		\$ 18,133,192.39				

# **PAY ITEM SUMMARY**

				ADDITIONAL	TOOL QUANTITIES + ADDITIONAL	Statewide	
TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	QUANTITIES	QUANTITIES	UNIT COST	TOTAL COST
Pavment Removal 411-12.01	Scoring Shoulders (Cont. 16")	L.M.		9.46	9	\$ 616.22 \$	5,829.47
415-01.02	Cold Planning Bituminous Pavement	SY	133197	80000	213197	\$ 5.78 \$	1,232,277.50
					PAVEMENT REMO	OVAL TOTAL (ROUNDED) \$	1,238,200
Asphalt Roads 303-01	Mineral Aggregate, Type A Base, Grading D	TON	283709	1	283709	\$ 18.13 \$	5,145,016.20
307-02.01	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A	TON	30635	25529	56164	\$ 62.92 \$	3,533,613.15
307-02.02 307-02.03	Asphalt Cement (PG70-22)(BPMB-HM) Grading A-S Aggregate (BPMB-HM) Grading A-S Mix	TON TON	337 10901		337 10901	\$ 720.36 \$ \$ 59.87 \$	242,871.50 652,650.56
307-02.08	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2	TON	22577	6271	28848	\$ 69.73 \$	2,011,633.54
402-01 402-02	Bituminous Material For Prime Coat (PC) Aggregate For Cover Material (PC)	TON TON	277 999		277 999	\$ 514.58 \$ \$ 23.89 \$	142,421.62 23,862.50
403-01 411-01.07	Bituminous Material For Tack Coat (TC) ACS (PG64-22) GR "E"	TON TON	141 10739	17		\$ 687.73 \$ \$ 78.53 \$	108,846.61 843,332.27
411-02.10	ACS (FGG4-22) GR E ACS Mix(PG70-22) Grading D	TON	13236	3677	16913	\$ 85.88 \$	1,452,589.46
					PA	/ING TOTAL (ROUNDED) \$	14,156,900
Concrete Roads							
				CONCRE	TE RAMPS AND ROADW	/AYS TOTAL (ROUNDED) \$	•
Drainage				7040	724.0	A 4943 A	70.004.00
209-05 209-08.03	Sediment Removal Temporary Silt Fence (Without Backing)	CY LF		7310 10000	7310 10000	\$ 10.12 \$ \$ 1.53 \$	73,994.98 15,296.02
209-08.07 209-08.08	Rock Check Dam Enhanced Rock Check Dam	EACH EACH		200	200 100	\$ 223.69 \$ \$ 391.19 \$	44,738.15 39,118.54
209-09.03	Sediment Filter Bag (15' x15')	EACH		2	2	\$ 515.07 \$	1,030.15
209-40.41 209-40.42	Catch Basin Filter Assembly (Type 1) Catch Basin Filter Assembly (Type 2)	EACH EACH		15 15	15 15	\$ 490.37 \$ \$ 507.43 \$	7,355.60 7,611.43
606-24.10	Sheet Piles	SF		500	500	\$ 36.18 \$	18,090.00
607-05.02 611-07.01	24" Concrete Pipe Culvert (Class III) Class A Concrete (Pipe Endwalls)	LF CY	9514 152		9514 152	\$ 65.21 \$ \$ 840.10 \$	620,421.14 127,951.98
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)	LB	14474		14474	\$ 2.06 \$	29,807.39
611-41.02 611-51.02	Catch Basins, Type 41, > 4' - 8' Depth Catch Basins, Type 51, > 4' - 8' Depth	EA EA		10 5	10 5	\$ 4,729.22 \$ \$ 7,235.77 \$	47,292.19 36,178.85
710.02	Aggregate Underdrains (with pipe)	LF	49949		49949	\$ 5.46 \$	272,720.45
740-11.03	TEMPORARY SEDIMENT TUBE 18IN (DESCRIPT)	LF		20000	20000 DRAIN	\$ 3.13 \$ AGE TOTAL (ROUNDED) \$	62,675.42 1,404,300
Appurtenances				ROADWAY AND P	AVEMENT APPURTENAM	ICES TOTAL (ROUNDED) \$	
Earthwork & Mineral 105-01	Constrction Stakes, Lines, and Grades	LS	1		1	\$ 112,407.96 \$	112,407.96
203-01 203-03	Road & Drainage Excavation (Unclassified) Borrow Excavation (Unclassified)	CY CY	339816 283180	-265576 -199683		\$ 16.20 \$ \$ 14.52 \$	1,202,428.25 1,212,050.54
303-10.01	Mineral Aggregate (Size 57)	TON	205100	1100	1100	\$ 29.27 \$	32,192.50
					EARTHWORK & MINI	ERAL TOTAL (ROUNDED) \$	2,559,100
Structures							
N/A N/A	Removal of Bridge New Bridge (Concrete Girder):	SF SF	52111 18848		52111	\$ 30.00 \$ \$ 200.00 \$	1,563,324.00
					18848		3,769,600.00
N/A	New Bridge (Steel Girder):	SF	53692		53692	\$ 300.00 \$	16,107,600.00
N/A 604-07.01					53692 13000		
604-07.01	New Bridge (Steel Girder):	SF	53692		53692 13000	\$ 300.00 \$ \$ 100.00 \$	16,107,600.00 1,300,000.00
	New Bridge (Steel Girder):	SF	53692	INTERCHANGES A	53692 13000 STRUCTO	\$ 300.00 \$ \$ 100.00 \$	16,107,600.00 1,300,000.00
604-07.01 Interchanges and Unique Intersections	New Bridge (Steel Girder):	SF	53692	INTERCHANGES A	53692 13000 STRUCTO	\$ 300.00 \$ \$ 100.00 \$ JRES TOTAL (ROUNDED) \$	16,107,600.00 1,300,000.00
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32	New Bridge (Steel Girder): Retaining Wall Structural Lighting	SF SF LS	53692	8	53692 13000 STRUCTI IND UNIQUE INTERSECTI 8	\$ 300.00 \$ \$ 100.00 \$ JRES TOTAL (ROUNDED) \$ ONS TOTAL (ROUNDED) \$ \$ 9,743.29 \$	16,107,600.00 1,300,000.00 22,740,600 - 77,946.32
604-07.01 Interchanges and Unique Intersections Lighting & Signalization	New Bridge (Steel Girder): Retaining Wall	SF SF	53692	-	53692 13000 STRUCTI IND UNIQUE INTERSECTI 8	\$         300.00         \$           \$         100.00         \$           JRES TOTAL (ROUNDED)         \$	16,107,600.00 1,300,000.00 22,740,600 -
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TLT & ZOOM) DYNAMIC MESSAGE SIGN (MULT-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE	SF SF LS EA EA EA	53692	8 3 1 1	53692 13000 STRUCTI ND UNIQUE INTERSECTI 8 3 1 1	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         10,000.00         \$           \$         10,000.00         \$           \$         20,0000.00         \$	16,107,600.00 1,300,000.00 22,740,600 77,946.32 30,000.00 145,000.00 20,000.00
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TLT & 200M) DYNAMIC MESSAGE SJON (MULT-COLOR)	SF SF LS EA EA	53692	8 3 1 1 1	53692 13000 STRUCTI ND UNIQUE INTERSECTI 8 3 1 1 1	\$ 300.00 \$ \$ 100.00 \$ \$ res total (ROUNDED) \$ ons total (ROUNDED) \$ \$ 9,743.29 \$ \$ 10,000.00 \$ \$ 145,000.00 \$	16,107,600.00 1,300,000.00 22,740,600 - 77,946.32 30,000.00 145,000.00
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TLT & ZOOM) DYNAMIC MESSAGE SIGN (MULT-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE	SF SF LS EA EA EA	53692	8 3 1 1 1	53692 13000 STRUCTI ND UNIQUE INTERSECTI 8 3 1 1 1	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         20,000.00         \$           \$         46,000.00         \$	16,107,600.00 1,300,000.00 22,740,600 77,946.32 30,000.00 145,000.00 46,000.00
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrall 705-01.01	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TLT & ZOOM) DYNAMIC MESSAGE SIGN (MULT-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends	SF SF LS EA EA LS LF	\$3692 13000 800	8 3 1 1 1	53692 13000 STRUCTU ND UNIQUE INTERSECTI 8 1 1 1 1 1 1 1 1 1 1 1 1 1	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         14,000.00         \$           \$         145,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         45,300.00         \$           \$         45,300.00         \$           \$         45,300.00         \$           \$         45,300.00         \$	16,107,600.00 1,300,000.00 22,740,600 - 77,946.32 30,000.00 145,000.00 20,000.00 46,000.00 319,000 42,661.82
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrall 705-01.01 705-02.02	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & ZOOM) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail (Type 2)	SF SF EA EA LS LS LF LF	\$3692 13000 800 13736	8 3 1 1 1 1 1 10000	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           23735.92	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9.743.29         \$           \$         10.000.00         \$           \$         10.000.00         \$           \$         145,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         45,333         \$           \$         15.95         \$	16,107,600.00 1,300,000.00 22,740,600 77,946.32 30,000.00 145,000.00 145,000.00 319,000 42,661.82 378,496.22
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrall 705-01.01	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TLT & ZOOM) DYNAMIC MESSAGE SIGN (MULT-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends	SF SF LS EA EA LS LF	\$3692 13000 800	8 3 1 1 1	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           1           1           1           1           1           23735.92           20	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         14,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         46,000.00         \$           \$         13,93         \$           \$         13,93         \$           \$         13,93,36         \$           \$         1,319.83         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 30,000.00 145,000.00 20,000.00 46,000.00 319,000 42,661.82 378,496.22 46,787,26 26,396,55
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.06 N/A Guardrall 705-01.01 705-01.01 705-02.02 705-04.07	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & 200M) DYNAMIC MESSAGE SIGN (MULT-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail at Bridge Ends Single Guardrail (Type 2) Tan Energy Absg Ferm (NCHRP, 350, TL3)	SF SF EA EA EA LS LS LF LF EA	\$3692 13000 800 13736 42	8 3 1 1 1 1 1 1 0000 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           1           1           1           1           1           23735.92           20	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         5         5,333         \$           \$         53.33         \$         \$           \$         15.95         \$         2,339.36         \$	16,107,600.00 1,300,000.00 22,740,600 - 77,946.32 30,000.00 145,000.00 20,000.00 46,000.00 315,000 42,661.82 378,496.22 46,787.26
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & ZOOM) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment	SF SF EA EA EA LS LS LF LF EA EA	\$3692 13000 800 13736 42 42 42	8 3 1 1 1 1 1 1 0000 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           10           1           1           1           1           1           20           20           GUARD	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         15.95         \$           \$         1.595         \$           \$         1.319.83         \$           \$         1.319.83         \$	16,107,600.00 1,300,000.00 22,740,600 77,946.32 30,000.00 145,000.00 145,000.00 40,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 494,400
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrail 705-01.01 705-04.01 705-04.07 705-04.09	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & ZOOM) DYNAMIC MESSAGE SIGN (MULTI-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch)	SF SF EA EA EA LS LF LF EA	\$3692 13000 800 13736 42	8 3 1 1 1 1 1 1 0000 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           1           1           1           1           1           1           1           1           1           1           1           10           23735.92           20           GUARD           3626	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         16,000.00         \$           \$         16,000.00         \$           \$         1595         \$           \$         1393.31         \$           \$         1,339.36         \$           \$         1,319.83         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 30,000.00 145,000.00 20,000.00 46,000.00 319,000 42,661.82 378,496.22 46,787,26 26,396,55
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.06 N/A Guardrall 705-01.01 705-04.07 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & ZOOM) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail at Bridge Ends Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch)	SF SF EA EA EA LS LF EA EA EA UNIT	\$3692 13000 800 13736 42 42 42 3626	8 3 1 1 1 1 1 1 0000 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           20           3626           2719           2719	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           NRES TOTAL (ROUNDED)         \$           ONS TOTAL (ROUNDED)         \$           \$         9.743.29         \$           \$         10.000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         46,000.00         \$           \$         13.93         \$           \$         15.95         \$           \$         2.339.36         \$           \$         1.319.83         \$           \$         2.248         \$           \$         22.85         \$           \$         1.239.83         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 30,000.00 145,000.00 145,000.00 46,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 495,400 81,500.04 62,130.30 38,088.46
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.02 725-21.06 N/A Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02	New Bridge (Steel Girder): Retaining Wall Structural Lighting CCTV CAMERA SYSTEM (PAN, TILT & ZOOM) DYNAMIC MESSAGE SIGN (MULTI-COLOR) DYNAMIC MESSAGE SIGN REMOVE AND REPLACE ITS Installation Guardrail at Bridge Ends Single Guardrail (Type 2) Tan Energy Absg Term (NCHRP, 350, TL3) Earth Pad for Type 38 GR End Treatment Seeding (With Mulch) Temporary Seeding (With Mulch)	SF SF EA EA EA LS LF LF EA EA UNIT UNIT	\$3692 13000 800 13736 42 42 42 42 3626 2719	8 3 1 1 1 1 1 1 0000 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           20           3626           2719           2719	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         13,333         \$           \$         13,39.36         \$           \$         1,319.83         \$           \$         2,24.8         \$           \$         22.48         \$	16,107,600.00 1,300,000.00 22,740,600 27,946,32 30,000.00 145,000.00 145,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30
604-07.01 Interchanges and Unique Intersections Lighting & Signalization 714-01.32 725-20.91 725-21.06 N/A Guardrail 705-01.01 705-02.02 705-04.07 705-04.09 Seeding and Sodding 801-01 801-01 801-01 801-02 Maintenace of Traffic	New Bridge (Steel Girder):           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 3B GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (Without Mulch)	SF SF EA EA EA EA LS UNIT UNIT UNIT	\$3692 13000 800 13736 42 42 42 3626 2719 2719	8 3 1 1 1 1 1 1 1 0000 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         9,743.29         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         46,000.00         \$           \$         46,000.00         \$           \$         139.31         \$           \$         139.93         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         22.85         \$           \$         22.48         \$           \$         22.48         \$           \$         14.01         \$	16,107,600.00 1,300,000.00 22,740,600 77,946.32 30,000.00 145,000.00 145,000.00 42,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 181,800
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization 714-01.32 725-22.091 725-21.02 725-21.06 N/A  Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09  Seeding and Sodding 801-01 801-01.07 801-01 801-01.07 801-02 Maintenace of Traffic N/A 712-02.02	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Traffic Control           Interconnected Portable Barrier Rail	SF SF LS EA EA EA EA EA EA UNIT UNIT UNIT	\$3692 13000 800 13736 42 42 42 42 3626 2719	8 3 1 1 1 1 0000 -22 -22 -22 -22 -22 -22 -22 -22 -2	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           3626           2719           2719           3           49949	S         300.00         S           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9.743.29         \$           \$         10.000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         145,000.00         \$           \$         15.95         \$           \$         1.319.83         \$           \$         1.319.83         \$           \$         22.48         \$           \$         22.85         \$           \$         1.401         \$           \$         401.475.42         \$           \$         401.475.42         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 46,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization  714-01.32 725-20.91 725-21.02 725-21.06 N/A  Guardrall  705-04.07 705-04.07 705-04.07 705-04.09  Seeding and Sodding  801-01 801-01 801-01 801-01 801-01 801-01 801-02  Maintenace of Traffic N/A 712-02.02 712-09.01	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           OYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Traffic Control           Interconnected Portable Barrier Rail           Removable Pavement Marking Line	SF SF SF EA EA EA EA EA EA EA EA UNIT UNIT UNIT UNIT UNIT UNIT UNIT	\$3692 13000 13000 13736 42 42 42 42 3626 2719 2719 2719	8 3 1 1 1 1 1 1 0000 -22 -22 -22 -22 -22 -22 -22 -22 -2	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           1           3           3           4           125000	S         300.00         S           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           \$         9.743.29         \$           \$         9.743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         40,000.00         \$           \$         139.33         \$           \$         2,339.36         \$           \$         2,339.36         \$           \$         2,239.36         \$           \$         2,239.36         \$           \$         2,239.36         \$           \$         2,239.36         \$           \$         2,248         \$           \$         2,248         \$           \$         14.01         \$           \$         30.29         \$           \$         30.29         \$           \$         30.29         \$	16,107,600.00 1,300,000.00 22,740,600 - 77,946.32 30,000.00 145,000.00 145,000.00 42,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 131,800 1,204,426.26 1,512,850.10 26,1673.87
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization 714-01.32 725-22.091 725-21.02 725-21.06 N/A  Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09  Seeding and Sodding 801-01 801-01.07 801-01 801-01.07 801-02 Maintenace of Traffic N/A 712-02.02	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Traffic Control           Interconnected Portable Barrier Rail	SF SF LS EA EA EA EA EA EA UNIT UNIT UNIT	\$3692 13000 13000 13736 42 42 42 42 3626 2719 2719 2719	8 3 1 1 1 1 0000 -22 -22 -22 -22 -22 -22 -22 -22 -2	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           3626           2719           2719           2719           3           49949           125000           200000	S         300.00         S           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9.743.29         \$           \$         10.000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         145,000.00         \$           \$         15.95         \$           \$         1.319.83         \$           \$         1.319.83         \$           \$         22.48         \$           \$         22.85         \$           \$         1.401         \$           \$         401.475.42         \$           \$         401.475.42         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 46,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization  714-01.32 725-20.91 725-21.02 725-21.06 N/A  Guardrall  705-04.07 705-04.07 705-04.07 705-04.09  Seeding and Sodding  801-01 801-01 801-01 801-01 801-01 801-01 801-02  Maintenace of Traffic N/A 712-02.02 712-09.01	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Abg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Traffic Control           Interconnected Portable Barrier Rail           Removable Pavement Marking (8" Barrier Line)	SF SF SF EA EA EA EA EA EA EA EA UNIT UNIT UNIT UNIT UNIT UNIT UNIT	\$3692 13000 13000 13736 42 42 42 42 3626 2719 2719 2719	8 3 1 1 1 1 1 1 0000 -22 -22 -22 -22 -22 -22 -22 -22 -2	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           3626           2719           2719           2719           3           49949           125000           200000	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           RRES TOTAL (ROUNDED)         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         40,000.00         \$           \$         40,000.00         \$           \$         139.36         \$           \$         1.595         \$           \$         2.339.36         \$           \$         1.19.83         \$           \$         1.319.83         \$           \$         2.2.85         \$           \$         1.401         \$           \$         1.401         \$           \$         401,475.42         \$           \$         3.029         \$           \$         2.09         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 319,000 42,661.82 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 713,678.25 713,678.25 713,678.25 713,678.25 713,678.25
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization  714-01.32 725-20.91 725-21.06 N/A  Guardrall  705-01.01 705-02.02 705-04.09  Seeding and Sodding  801-01 801-01 801-01 801-01 801-01 801-02  Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.01 712-09.02  Signs  713-09.06	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (Without Mulch)           Traffic Control           Interconnected Portable Barrier Rail           Removable Pavement Marking [arrier Line]           Removable Pavement Marking Line           Removable Pavement Marking Line           Steel Overhead Sign Structure	SF SF LS EA EA EA EA LS UNIT UNIT UNIT LS LS LF LF LF EA	\$3692 13000 800 13736 42 42 42 42 3626 2719 2719 2719 1 1 1249	8 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 5000 2 200000	53692           13000           STRUCT           ND UNIQUE INTERSECT           1           3626           2719           5000           3           49949           125000           200000           MAINTENANCE OF TRAP	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         2,339.36         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         2,2.389.36         \$           \$         2,2.389.36         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         2,2.48         \$           \$         22.48         \$           \$         30.29         \$           \$         30.29         \$           \$         3,57         \$           \$         3,5,77         \$ <td>16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 42,661.82 378,496.22 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,884 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00</td>	16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 42,661.82 378,496.22 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,884 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization 714-01.32 725-22.091 725-21.02 725-21.06 N/A  Guardrail 705-01.01 705-02.02 705-04.07 705-04.07 705-04.09  Seeding and Sodding  801-01 801-01 801-01 801-02 Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02 Signs	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Abg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Traffic Control           Interconnected Portable Barrier Rail           Removable Pavement Marking (8" Barrier Line)	SF SF EA EA EA EA EA EA EA EA EA EA EA EA EA	\$3692 13000 13000 13736 42 42 42 42 3626 2719 2719 2719	8 3 1 1 1 1 1 1 1 1 1 1 1 1 1	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           2719           2719           3           49949           125000           20000           MAINTENANCE OF TRA           1           2	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         40,000.00         \$           \$         40,000.00         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         22.48         \$           \$         22.85         \$           \$         1,401         \$           \$         30.29         \$           \$         30.29         \$           \$         2.09         \$           \$         30.29         \$           \$         30.29         \$           \$         3.029         \$           \$         3.029         \$           \$         3.029         \$           \$         3.029         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 46,787.26 26,396.55 495,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10 251,673.87 713,678.23 3,692,700
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.01           712-09.02           Signs           713-09.06           Not Listed	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (Without Mulch)           Traffic Control           Interconnected Portable Barrier Rail           Removable Pavement Marking [arrier Line]           Removable Pavement Marking Line           Removable Pavement Marking Line           Steel Overhead Sign Structure	SF SF LS EA EA EA EA LS UNIT UNIT UNIT LS LS LF LF LF EA	\$3692 13000 800 13736 42 42 42 42 3626 2719 2719 2719 1 1 1249	8 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 5000 2 200000	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           2719           2719           3           49949           125000           20000           MAINTENANCE OF TRA           1           2	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           NRES TOTAL (ROUNDED)         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         145,000.00         \$           \$         40,000.00         \$           \$         1319.83         \$           \$         133,120.00         \$           \$         22.48         \$           \$         22.85         \$           \$         14.01         \$           \$         20.28         \$           \$         2.2.85         \$           \$         2.2.85         \$           \$         30.29         \$           \$         2.09         \$           \$         2.09         \$           \$         2.09         \$           \$         3.029         \$      >	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 42,661.82 378,496.22 46,787.26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-01.01           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.02           712-09.01           712-09.02           Signs           713-09.06           Not Listed           Pavement Markings           716-01.23	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           TS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (With Mulch)           Removable Pavement Marking [8" Barrier Rail           Removable Pavement Marking [1ing           Steel Overhead Sign Structure           Signs (Construction)           Snwplwble Pvmt Mrkrs (Bi-Dir)(2 Color)	SF SF LS EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT EA EA EA EA	\$3692 13000 800 13736 42 42 42 42 3626 2719 2719 2719 1 1 1249	8 3 1 1 1 1 10000 -22 -22 -22 -22 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           1           3626           2719           3000           3626           2719           SODU           3           49949           125000           200000           MAINTENANCE OF TRA           1           2           1           2           1           2           SIGN	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         1395         \$           \$         2,339.36         \$           \$         2,339.36         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         2,239.36         \$           \$         2,248         \$           \$         2,248         \$           \$         30.029         \$           \$         3.57         \$           \$         30,229         \$           \$         3,209         \$           \$         3,31,20.00         \$           \$         13,20.00         \$ <td>16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 183,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800 220,000</td>	16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 183,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800 220,000
604-07.01  Interchanges and Unique Intersections  Lighting & Signalization 714-01.32 725-22.091 725-21.02 725-21.06 N/A  Guardrail 705-01.01 705-02.02 705-04.07 705-04.09  Seeding and Sodding 801-01 801-01 801-01 801-01 801-01 801-02  Maintenace of Traffic N/A 712-02.02 712-09.01 712-09.02  Signs 713-09.06 Not Listed  Pavement Markings	New Bridge (Steel Girder):           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Seeding (With Mulch)           Seeding With Mulch)           Seeding (With Mulch)           Seeding With Mulch)           Seeding Removable Pavement Marking Line           Removable Pavement Marking (8" Barrier Line)           Steel Overhead Sign Structure           Signs (Construction)	SF SF LS EA EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT LF LF EA LS EA	\$3692 13000 800 13736 42 42 42 42 3626 2719 2719 2719 1 1 1249	8 3 1 1 1 1 1 1 1 1 1 1 1 1 1	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           2719           2719           3020           31           49949           125000           20000           MAINTENANCE OF TRA           1           2           SIGN           37	S         300.00         S           S         100.00         S           RRES TOTAL (ROUNDED)         S           ONS TOTAL (ROUNDED)         S           S         9,743.29         S           S         10,000.00         S           S         145,000.00         S           S         145,000.00         S           S         20,000.00         S           S         40,000.00         S           S         145,000.00         S           S         145,000.00         S           S         20,000.00         S           S         1319.83         S           S         2.248         S           S         2.248         S           S         14.19.83         S           S         14.01         S           S         14.01         S           S         2.248         S           S         2.09         S           S         2.09         S           S         2.09         S           S         2.09         S           S         3.029         S	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 319,000 42,661.82 378,496.22 46,787.25 26,396.55 494,400 81,500.04 62,130.30 38,088.46 131,800 141,678.73 3,692,700 133,120.00 86,800 220,000 16,559.34 173,214.10
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-01.01           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.02           712-09.01           712-09.02           Signs           713-09.06           Not Listed           Pavement Markings           716-01.23           716-12.02	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           TS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (With Mulch)           Removable Pavement Marking [8" Barrier Rail           Removable Pavement Marking [1ing           Steel Overhead Sign Structure           Signs (Construction)           Snwplwble Pvmt Mrkrs (Bi-Dir)(2 Color)	SF SF LS EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT EA EA EA EA	\$3692 13000 13000 800 13736 42 42 42 42 3626 2719 2719 1 1 1249	8 3 1 1 1 1 10000 -22 -22 -22 -22 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           2719           2719           3020           31           49949           125000           20000           MAINTENANCE OF TRA           1           2           SIGN           37	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         1395         \$           \$         2,339.36         \$           \$         2,339.36         \$           \$         1,319.83         \$           \$         1,319.83         \$           \$         2,239.36         \$           \$         2,248         \$           \$         2,248         \$           \$         30.029         \$           \$         3.57         \$           \$         30,229         \$           \$         3,209         \$           \$         3,31,20.00         \$           \$         13,20.00         \$ <td>16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 183,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800 220,000</td>	16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 46,787,26 26,396.55 494,400 81,500.04 62,130.30 38,088.46 183,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800 220,000
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-01.01           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.02           712-09.01           712-09.02           Signs           713-09.06           Not Listed           Pavement Markings           716-01.23	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           TS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (With Mulch)           Removable Pavement Marking [8" Barrier Rail           Removable Pavement Marking [1ing           Steel Overhead Sign Structure           Signs (Construction)           Snwplwble Pvmt Mrkrs (Bi-Dir)(2 Color)	SF SF LS EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT EA EA EA EA	\$3692 13000 13000 800 13736 42 42 42 42 3626 2719 2719 1 1 1249	8 3 1 1 1 1 10000 -22 -22 -22 -22 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           3626           2719           500           3           49949           125000           200000           MAINTENANCE OF TRA           1           2           550           37           PAVEMENT MARK	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         15.95         \$           \$         1.319.83         \$           \$         2.248         \$           \$         2.248         \$           \$         1.319.83         \$           \$         1.401         \$           \$         2.248         \$           \$         2.248         \$           \$         1.401         \$           \$         3.029         \$           \$         3.029         \$           \$         3.029         \$           \$         13.120.00         \$           \$         4.681.46         \$           \$         3.0.11         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 319,000 42,661.82 378,496.22 46,787.25 26,396.55 494,400 81,500.04 62,130.30 38,088.46 131,800 141,678.73 3,692,700 133,120.00 86,800 220,000 16,559.34 173,214.10
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-04.07           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.01           712-09.02           Signs           713-09.06           Not Listed           Pavement Markings           716-01.23           716-12.02	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           TS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (With Mulch)           Removable Pavement Marking [8" Barrier Rail           Removable Pavement Marking [1ing           Steel Overhead Sign Structure           Signs (Construction)           Snwplwble Pvmt Mrkrs (Bi-Dir)(2 Color)	SF SF LS EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT EA EA EA EA	\$3692 13000 13000 800 13736 42 42 42 42 3626 2719 2719 1 1 1249	8 3 1 1 1 1 10000 -22 -22 -22 -22 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           3626           2719           SODC           3           49949           125000           200000           MAINTENANCE OF TRA           1           2           SIGN           37           PAVEMENT MARK	S         300.00         S           S         100.00         S           RRES TOTAL (ROUNDED)         S           ONS TOTAL (ROUNDED)         S           S         9,743.29         S           S         10,000.00         S           S         145,000.00         S           S         145,000.00         S           S         20,000.00         S           S         40,000.00         S           S         145,000.00         S           S         145,000.00         S           S         20,000.00         S           S         1319.83         S           S         2.248         S           S         2.248         S           S         14.19.83         S           S         14.01         S           S         14.01         S           S         2.248         S           S         2.09         S           S         2.09         S           S         2.09         S           S         2.09         S           S         3.029         S	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 140,787.26 26,396.55 194,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 1133,120.00 86,800 220,000 16,559,34 173,214.10
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrall           705-01.01           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.02           712-09.01           712-09.02           Signs           713-09.06           Not Listed           Pavement Markings           716-01.23           716-12.02	New Bridge (Steel Girder):           Retaining Wall           Retaining Wall           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           TS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Temporary Seeding (With Mulch)           Seeding (With Mulch)           Removable Pavement Marking [8" Barrier Rail           Removable Pavement Marking [1ing           Steel Overhead Sign Structure           Signs (Construction)           Snwplwble Pvmt Mrkrs (Bi-Dir)(2 Color)	SF SF LS EA EA EA LS UNIT UNIT UNIT UNIT UNIT UNIT UNIT EA EA EA EA	\$3692 13000 13000 800 13736 42 42 42 42 3626 2719 2719 1 1 1249	8 3 1 1 1 1 10000 -22 -22 -22 -22 -22 -22 -22	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           3626           2719           SODC           3           49949           125000           200000           MAINTENANCE OF TRA           1           2           SIGN           37           PAVEMENT MARK	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9,743.29         \$           \$         10,000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         15.95         \$           \$         1.319.83         \$           \$         2.248         \$           \$         2.248         \$           \$         1.319.83         \$           \$         1.401         \$           \$         2.248         \$           \$         2.248         \$           \$         1.401         \$           \$         3.029         \$           \$         3.029         \$           \$         3.029         \$           \$         13.120.00         \$           \$         4.681.46         \$           \$         3.0.11         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 140,787.26 26,396.55 194,400 81,500.04 62,130.30 38,088.46 181,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 1133,120.00 86,800 220,000 16,559,34 173,214.10
604-07.01           Interchanges and Unique Intersections           Lighting & Signalization           714-01.32           725-20.91           725-21.02           725-21.06           N/A           Guardrail           705-04.07           705-04.09           Seeding and Sodding           801-01           801-01           801-02           Maintenace of Traffic           N/A           712-09.01           712-09.02           713-09.06           Not Listed           Pavement Markings           716-01.23           716-12.02           Fencing           Rip-Rap	New Bridge (Steel Girder):           Retaining Wall           Structural Lighting           CCTV CAMERA SYSTEM (PAN, TILT & ZOOM)           DYNAMIC MESSAGE SIGN (MULT-COLOR)           DYNAMIC MESSAGE SIGN REMOVE AND REPLACE           ITS Installation           Guardrail at Bridge Ends           Single Guardrail (Type 2)           Tan Energy Absg Term (NCHRP, 350, TL3)           Earth Pad for Type 38 GR End Treatment           Seeding (With Mulch)           Seeding (Seeding (With Mulch)           Seeding (Seeding (Seeding (Seeding Seeding Seedin	SF           SF           SF           SF           EA           EA           EA           LS           UNIT           UNIT           UNIT           LS           UNIT           LS           UNIT           LS           UNIT           LS           UNIT           LS           LF           EA           LS           EA           LM	\$3692 13000 13000 800 13736 42 42 42 42 3626 2719 2719 1 1 1249	8 3 1 1 1 1 1 1 1 1 1 1 1 2 4700 125000 200000 1 1 1 1 1 550 37	53692           13000           STRUCT           ND UNIQUE INTERSECT           8           3           1           1           1           1           1           1           1           1           1           20           20           20           3626           2719           201           3626           2719           201           3626           2719           200000           MAINTENANCE OF TRA           1           2           550           37           PAVEMENT MARK           FEN           1200           700	\$         300.00         \$           \$         100.00         \$           \$         100.00         \$           \$         100.00         \$           ONS TOTAL (ROUNDED)         \$           \$         9.743.29         \$           \$         10.000.00         \$           \$         145,000.00         \$           \$         20,000.00         \$           \$         40,000.00         \$           \$         145,000.00         \$           \$         145,000.00         \$           \$         20,900.00         \$           \$         136,000.00         \$           \$         145,000.00         \$           \$         13.19.83         \$           \$         13.19.83         \$           \$         1.31.19.83         \$           \$         22.48         \$           \$         22.48         \$           \$         22.48         \$           \$         3.029         \$           \$         3.029         \$           \$         3.120.00         \$           \$         3.120.00         \$	16,107,600.00 1,300,000.00 22,740,600 22,740,600 1,300,000.00 22,740,600 145,000.00 145,000.00 145,000.00 145,000.00 145,000.00 142,661.82 378,496.22 146,787,26 26,396.55 1494,400 131,800 1,204,426.26 1,512,850.10 261,673.87 713,678.23 3,692,700 133,120.00 86,800 220,000 16,559.34 173,214,10 189,800

# **PAY ITEM SUMMARY**

709-05.09	Machined Rip-Rap (Class C)	TON		110	11	D	\$	32.78	\$ 3,605.49
				RIP	RAP & SLOP	E PROTI	ECTION TO	TAL (ROUNDED)	\$ 76,500.00
Clearing and Grubing									
201-01	Clearing and Grubbing	LS		0.75	0.7	5	\$	264,380.06	\$ 198,285.05
					CLEAR A	ND GRU	BBING TO	TAL (ROUNDED)	\$ 198,300.00
Railroad At-Grade Crossing									
				RAILROAD	CROSSING O	R SEPAF	ATION TO	TAL (ROUNDED)	\$ •
Utilties									
N/A	Overhead Distribution	LM	0.25		0.2	5	\$	375,000	\$ 93,750
						UTIL	ITIES TOTA	L (ROUNDED)	\$ 93,800.00
Right-of-Way									
N/A	Right-of-Way	LS	1		1		\$	-	\$ -
					RIC	GHT-OF-	WAY TOTA	L (ROUNDED)	\$ •

# **COST ESTIMATE SUMMARY**

Route:	ntore	ate 24 (Section 3)				
		East of Browns Fer	m (I M 4 72)			
		24 (US-27) (L.M. 7.3				
	Hamilt		TN TDOT			
	2.60 N	iles		Department of Transportation		
		it 10, 2018			Iransportation	
		,				
DESCRIPTION		LOCAL	STATE	FEDERAL	TOTAL	
DESCRIPTION		0%	0%	0%	TOTAL	
Construction Items						% Contribution
Pavement Removal		\$0	\$0	\$0	\$561,400	1.08%
Asphalt Paving		\$0	\$0	\$0	\$9,314,900	17.89%
Concrete Pavement		\$0	\$0	\$0	\$0	0.00%
Drainage		\$0	\$0	\$0	\$2,054,200	3.95%
Appurtenances		\$0	\$0	\$0	\$2,191,200	4.21%
Structures		\$0	\$0	\$0	\$31,043,900	59.63%
Fencing		\$0	\$0	\$0	\$9,400	0.02%
Signalization		\$0	\$0	\$0	\$291,900	0.56%
Railroad Crossing or Separatio	n	\$0	\$0	\$0	\$750,000	1.44%
Earthwork		\$0	\$0	\$0	\$1,488,100	2.86%
Clearing and Grubbing		\$0	\$0	\$0	\$92,600	0.18%
Seeding & Sodding		\$0	\$0	\$0	\$107,800	0.21%
Rip-Rap or Slope Protection		\$0	\$0	\$0	\$45,600	0.09%
Guardrail		\$0	\$0	\$0	\$163,900	0.31%
Signing		\$0	\$0	\$0	\$628,700	1.21%
Pavement Markings		\$0	\$0	\$0	\$159,700	0.31%
Maintenance of Traffic		\$0	\$0	\$0	\$3,161,300	6.07%
Mobilization (10%)		\$0	\$0	\$0	\$2,603,200	
Other Items =	20%	\$0	\$0	\$0	\$10,933,600	
Const. Contingency =	30%	\$0	\$0	\$0	\$10,367,300	
Construction Estimate		\$0	\$0	\$0	\$75,969,000	
Interchanges & Unique Intersections	e			**	••••	
Roundabouts		\$0	\$0	\$0	\$0	
Interchanges		\$0	\$0	\$0	\$0	
5		LOCAL	STATE	FEDERAL		
Right-of-Way & Utilties	S	0%	0%	0%	TOTAL	
Right-of-Way		\$0	\$0	\$0	\$250,000	
Utilities	-	\$0 \$0	\$0	\$0	\$250,000	
Preliminary & Construction	1 Engi	7-		\$0	<b>\$</b> 0	
Prelim. Eng.	5%	teering and inspection \$0	\$0	\$0	\$3,555,000	
•	5% 10%	\$0 \$0	\$0 \$0	\$0 \$0	. , ,	Per Mile Cost
Const. Eng. & Inspec.	10%	\$0	\$0	\$0	\$7,622,000	Per Mile Cost
Total Project Cost	t	\$0	\$0	\$0	\$ 87,396,000	\$ 33,613,846.15

# **PAY ITEM SUMMARY**

ADDITIONAL     ADITIONAL		
411-12.01         Scoring Shoulders (Cont. 16")         L.M.         5.2         5         \$ 616.           415-01.02         Cold Planning Bituminous Pavement         SY         73216         100000         173216         \$ 3.	TOTAL COST	
415-01.02 Cold Planning Bituminous Pavement SY 73216 100000 173216 \$ 3.		
	22 \$ 3,204.36 22 \$ 558,183.19	
	ED) \$ 561,400	
Asphalt Roads		
303-01         Mineral Aggregate, Type A Base, Grading D         TON         199468         199468         \$ 18.           307-02.01         Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A         TON         16840         14033         30873         \$ 62.		
307-02.02         Asphalt Cement (PG70-22)(BPMB-HM) Grading A-S         TON         185         185         \$ 723.	47 \$ 134,079.25	
307-02.03         Aggregate (BPMB-HM) Grading A-S Mix         TON         5992         \$ 66.           307-02.08         Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2         TON         16547         3447         19994         \$ 69.		
402-01         Bituminous Material For Prime Coat (PC)         TON         203         \$         567.           402-02         Aggregate For Cover Material (PC)         TON         732         \$         35.		
403-01 Bituminous Material For Tack Coat (TC) TON 89 9 98 \$ 723.	55 \$ 70,724.58	
411-01.07         ACS (PG64-22) GR "E"         TON         8855         \$         78.           411-02.10         ACS Mix(PG70-22) Grading D         TON         7276         2021         9297         \$         99.	53 \$ 695,347.96 17 \$ 921,963.32	
PAVING TOTAL (ROUND	ED) \$ 9,314,900	
Concrete Roads		
CONCRETE RAMPS AND ROADWAYS TOTAL (ROUND	.D) \$ -	
Drainage         209-05         Sediment Removal         CY         5100         \$ 10.	12 \$ 51,624.40	
209-08.02 Temporary Silt Fence (With Backing) LF 2000 \$ 3.	74 \$ 7,487.88	
209-08.03         Temporary Silt Fence (Without Backing)         LF         67400         \$ 1.           209-08.07         Rock Check Dam         EACH         100         100         \$ 223.		
209-08.08 Enhanced Rock Check Dam EACH 50 \$ 391.	19 \$ 19,559.27	
209-09.03         Sediment Filter Bag (15'x15')         EACH         6         6         \$ 515.           209-40.41         Catch Basin Filter Assembly (Type 1)         EACH         35         35         \$ 490.		
209-40.42         Catch Basin Filter Assembly (Type 2)         EACH         35         35         \$ 507.	43 \$ 17,760.01	
607-05.02 24" Concrete Pipe Culvert (Class III) LF 18460 18460 \$ 65.	21 \$ 1,203,764.26	
611-07.01         Class A Concrete (Pipe Endwalls)         CY         84         \$ 937.           611-07.02         Steel Bar Reinforcement (Pipe Endwalls)         LB         7956         7956         \$ 2.		
611-41.02         Catch Basins, Type 41, > 4' - 8' Depth         EA         30         30         \$ 4,729.	22 \$ 141,876.58	
611-51.02         Catch Basins, Type 51, > 4' - 8' Depth         EA         5         5         7,235.           710.02         Aggregate Underdrains (with pipe)         LF         27456         27456         \$         5.	77 \$ 36,178.85 46 \$ 149,909.76	
740-11.03 TEMPORARY SEDIMENT TUBE 18IN (DESCRIPT) LF 30000 \$ 3.	13 \$ 94,013.13	
DRAINAGE TOTAL (ROUND	ED) \$ 2,054,200	
Appurtenances         202-08.28         Removal of Median Barrier         LF         1900         \$ 85.	00 \$ 161,500.00	
711-05.71         51" Single Slope Concrete Barrier Wall         LF         13728         5000         18728         \$ 108.	38 \$ 2,029,661.59	
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUND)	ED) \$ 2,191,200	
Earthwork & Mineral         Constrction Stakes, Lines, and Grades         LS         1         \$ 112,407.	96 \$ 112,407.96	
203-01         Road & Drainage Excavation (Unclassified)         CY         176939         -136131         40808         \$         16.	47 \$ 672,065.37	
203-03         Borrow Excavation (Unclassified)         CY         147449         -101552         45897         \$         14.           303-10.01         Mineral Aggregate (Size 57)         TON         900         900         \$         29.		
EARTHWORK & MINERAL TOTAL (ROUND	ED) \$ 1,488,100	
Structures		
N/A         Removal of Bridge         SF         37403         37403         \$ 30.           N/A         New Bridge (Concrete Girder):         SF         52824         52824         \$ 200.		
604-07.01 Retaining Wall SF 193570 193570 \$ 100. STRUCTURES TOTAL (ROUND		
	,043,300	
Interchanges and Unique Intersections		
Interchanges and unique intersections INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND	D)\$-	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND	ED) \$ -	
Lighting & Signalization         Structural Lighting         LS         4         4         \$ 9,743.	29 \$ 38,973.16	
Lighting & Signalization         Structural Lighting         LS         A         4         \$         9,743           714-01.38         Light Pole Relocation         EA         4         \$         9,745,155	29 \$ 38,973.16 78 \$ 6,247.12	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         Light Signalization         4         4         \$         9,743.           714-01.32         Structural Lighting         LS         4         4         \$         9,743.           714-01.38         Light Pole Relocation         EA         4         4         \$         1,561.           714-08.06         Light Standards (Steel)         EA         4         4         \$         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, TUL & ZOOM)         EA         2         2         \$         10,000.	29         \$         38,973.16           78         \$         6,247.12           00         \$         15,600.00           00         \$         20,000.00	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         Colspan="2">Colspan="2"           Light Pole Relocation         EA         4         4         5         9,743           714-01.32         Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2"         5         9,743           714-01.38         Light Pole Relocation         EA         4         4         5         3,900           714-01.38         Light Standards [Steel]         EA         4         4         5         3,900           712-52.09.1         CCTV CAMERA SYSTEM (PAN, TUL & ZOOM)         EA         2         2         5         10,000           725-21.02         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         5         20,000           725-21.06         DYNAMIC MESSAGE SIGN RENAVE AND REPLACE         EA         1         1         \$         20,000	29         \$         38,973.16           78         \$         6,247.12           00         \$         15,600.00           00         \$         20,000.00           00         \$         145,000.00           00         \$         20,000.00           00         \$         20,000.00	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         Colspan="2">Colspan="2"	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 46,000.00           00         \$ 46,000.00	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743.           714-01.32         Structural Lighting         LS         4         4         \$         9,743.           714-01.38         Light Pole Relocation         EA         4         4         \$         3,900.           714-08.06         Light Standards [Steel]         EA         4         4         \$         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, TIL'R 200M)         EA         2         2         \$         10,000.           725-21.02         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         \$         14/5.000.           725-21.06         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         46,000.           N/A         ITS Installation         LS         1         1         \$         46,000.	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 46,000.00           00         \$ 46,000.00	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743           714-01.32         Structural Lighting         LS         4         4         \$         9,743           714-01.32         Gardian (Light Pole Relocation (EA)         4         4         \$         9,743           714-01.38         Light Pole Relocation (EA)         4         4         \$         3,900           715-20.91         CCTV CAMERA SYSTEM (PAN, TIL'R 2,000M)         EA         2         2         \$         10,000           725-20.20         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         \$         145,000           725-21.06         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         4,4000         4         4,600,00           URIGHTURE & SIGNALIZATION TOTAL (ROUND AND REPLACE         EA         1         1         \$         4,600,00            URIGHTURE & SIGN REMOVE AND REPLACE         EA         1         1         \$         4,600,00          Light Not and (ROUND TOTAL STORT TO TOTAL (ROUND TOTAL (ROUND TOTAL (ROUND TOTAL STORT TO TOTAL (ROUND TOTAL STORT	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 46,000.00           01         \$ 291,900	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 46,000.00           101         \$ 291,900           221         \$ 24,885.29           22         \$ 115,288.55	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743           714-01.32         Structural Lighting         LS         4         4         \$         9,743           714-01.38         Light Pole Relocation         EA         4         4         \$         9,743           714-01.38         Light Standards (steel)         EA         4         4         \$         3,900.           715-20.91         CCTV CAMERA SYSTEM (PAN, TIL & 2,000M)         EA         2         2         \$         10,000.           725-21.02         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         \$         20,000.           725-21.06         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         46,000.           UEGHTARIA         TS Installation         LS         1         1         \$         46,000.           UEGNTARIA           Standards         1         1         \$         20,000.           N/A         1         1         \$         20,000.           UEGNTING & SIGNALIZATION TOTAL (ROUND <td colspan<="" td=""><td>29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 20,000.00           03         \$ 20,000.00           04         \$ 46,000.00           05         \$ 211,500           21         \$ 24,885.29           22         \$ 135,288.55           08         \$ 2,355.08           11         \$ 1,290.11</td></td>	<td>29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 20,000.00           03         \$ 20,000.00           04         \$ 46,000.00           05         \$ 211,500           21         \$ 24,885.29           22         \$ 135,288.55           08         \$ 2,355.08           11         \$ 1,290.11</td>	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 20,000.00           03         \$ 20,000.00           04         \$ 46,000.00           05         \$ 211,500           21         \$ 24,885.29           22         \$ 135,288.55           08         \$ 2,355.08           11         \$ 1,290.11
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         1         4         4         5         9,743.           714-01.32         Structural Lighting         LS         4         4         5         9,743.           714-01.38         Light Pole Relocation         EA         4         4         4         5         3,920.           714-01.38         Light Standards (Steel)         EA         4         4         5         3,920.           714-03.66         Light Standards (Steel)         EA         4         4         5         3,920.           725-20.91         CCTV CAMERA SYSTEM (PAN, TUR & 200M)         EA         2         2         \$         10,000.           725-21.06         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         20,000.           N/A         ITS Installation         LS         1         1         \$         46,000.           Guardrail           Guardrail at Bridge End         LF         400         \$         62.           705-01.01         Guardrail at Bridge End         LF         400         \$         62.           705-04.07         Tan Energ	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 20,000.00           03         \$ 20,000.00           04         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 20,000.00           05         \$ 21,500           05         \$ 21,528,55           05         \$ 2,355.08           05         \$ 2,355.08           05         \$ 2,355.08           05         \$ 2,355.08           05         \$ 2,355.08           05         \$ 2,355.08	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         1         4         4         5         9,743           714-01.32         Structural Lighting         LS         4         4         \$         9,743           714-01.38         Light Pole Relocation         EA         4         4         \$         3,904           714-01.38         Light Standards (Steel)         EA         4         4         \$         3,900           725-20.91         CCTCY CAMERA SYSTEM (PAN, TLT & 200M)         EA         2         2         \$         10,000           725-21.02         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         \$         20,000           725-21.06         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         20,000           0         TS Installation         LS         1         1         \$         46,000         UGHTING & SIGNALIZATION TOTAL (ROUND           Guardrail           Signile Guardrail to 1         1         \$         2,035         1         1         \$         2,000         1         1         \$         4,000         \$         6.22         1	29         \$         38,973.16           78         \$         6,247.12           00         \$         15,600.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         20,000.00           01         \$         20,000.00           02         \$         20,000.00           03         \$         20,000.00           04         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         20,000.00           05         \$         21,52,88.55           05         \$         2,355.08           05         \$         1,63,900	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743.           714-01.32         Structural Lighting         LS         4         4         5         9,743.           714-01.38         Light Pole Relocation         EA         4         4         4         5         3,900.           714-03.06         Light Standards (Steel)         EA         4         4         4         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, TIL'R 2,00M)         EA         2         2         \$         10,000.           725-21.06         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         \$         20,000.           N/A         ITIS Installation         LS         1         1         \$         44,000.           Guardrail           Guardrail (NUE)         1         1         \$         45,000.           INFORMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         20,000.           N/A         ITIS Installation         LS         1         1         \$         20,000.         \$         62.         705.01.0	29         \$ 38,973.16           78         \$ 6,247.12           00         \$ 15,600.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           00         \$ 20,000.00           01         \$ 20,000.00           02         \$ 46,000.00           03         \$ 20,000           04         \$ 46,000.00           05         \$ 21,900           21         \$ 24,885.29           22         \$ 135,288.55           08         \$ 2,355.08           11         \$ 1,290.11           05         \$ 163,900           06         \$ 62,529.41           05         \$ 24,880.15	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743.           714-01.32         Structural Lighting         LS         4         4         5         9,743.           714-01.38         Light Pole Relocation         EA         4         4         4         5         3,900.           714-03.06         Light Standards (Steel)         EA         4         4         4         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, TIL'R 2,00M)         EA         2         2         \$         10,000.           725-21.06         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         \$         20,000.           N/A         ITIS Installation         LS         1         1         \$         44,000.           Guardrail           Guardrail (NUE)         1         1         \$         45,000.           INFORMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         20,000.           N/A         ITIS Installation         LS         1         1         \$         20,000.         \$         62.         705.01.0	29         \$             38,973.16         R         \$             6,247.12         R         \$             6,247.12         R         \$             6,247.12         R         \$             6,247.12         R         \$             7         \$             15,600.00         R         \$             20,000.00         R         \$             46,000.00         R         \$             20,000.00         R         \$             46,000.00         R         \$             21,000         R         \$             15,000         R         \$             15,000         R         \$             21,000         R         \$             10,000         R         \$             10,000         R	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         4         4         5         9,743           714-01.32         1         1         5         4         4         5         9,743           714-01.33         Light Pole Relocation         EA         4         4         5         3,904           714-01.33         Light Standards (Steel)         EA         4         4         5         3,900           715-20.91         CCTC (AMRA SYTSEM (PAR) TIT & 2,00M)         EA         2         2         5         10,000           725-21.02         DYNAMIC MESSAGE SIGN (MULTI-COLOR)         EA         1         1         \$         20,000           725-21.06         DYNAMIC MESSAGE SIGN NEMOVE AND REPLACE         EA         1         1         \$         20,000           UGHT GARGE SIGN MEMOVE AND REPLACE         EA         1         1         \$         20,000           UGHT GARGE SIGN MEMOVE AND REPLACE         EA         1         1         \$         40,000         \$         6.02         1         1         \$         20,000         EA         1         1         \$         20,000         \$         6.02         1	29         \$         38,973.16           78         \$         6,247.12           00         \$         15,600.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         20,000.00           00         \$         46,000.00           10)         \$         24,1900           21         \$         24,885.29           22         \$         135,288.55           18         \$         2,355.08           11         \$         1,63,900           00         \$         6,5,229.41           62         \$         24,480.15           62         \$         24,880.35,28	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         1         4         4         5         9,743.           714-01.32         Structural Lighting         LS         4         4         5         9,743.           714-01.38         Light Pole Relocation         EA         4         4         5         3,920.           714-03.66         Light Standards (Steel)         EA         4         4         5         3,920.           725-20.91         CCTV CAMERA SYSTEM (PAN, TIL & ZOUM)         EA         2         2         \$         10,00.           725-21.06         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         \$         20,000.           N/A         ITS Installation         LS         1         1         \$         44,000.           Guardrall           Cardrali         1         1         \$         45,000.           N/A         IT         1         \$         20,000.           N/A         IT         1         \$         20,000.           N/A         IT         1         \$         20,000.           Colspan="2">Col	29         \$             38,973.16         78         \$             6,247.12         78         \$             6,247.12         78         \$             15,600.00         7	
INTERCHANGES AND UNQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization            714-01.32         Structural Lighting         LS         4         4         5         9,743.           714-01.33         Light Pole Relocation         EA         4         4         5         3,900.           714-01.32         CTV CAMERA SYSTEM (PAN, NIT & 200M)         EA         2         2         5         10,000.           725-20.91         CTV CAMERA SYSTEM (PAN, NIT & 200M)         EA         1         1         5         145,000.           725-21.02         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         5         20,000.           725-21.06         DYNAMIC MESSAGE SIGN NEMOYE AND REHALCE         EA         1         1         5         40,000         5         62,000.         1         1         1         5         40,000         5         62,000.         100,000         5         62,000.         100,000         5         62,000.         100,000         5         62,000.         100,000         5         62,000.         100,000         5         62,000.         100,000         5         62,000.         10,000         5         22,000.         10,000	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,600.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000         00         \$             20,000.00         00         \$             20,000         00         \$             20,000         00         \$             20,000         00         \$             20,000         \$             20,000         \$             20,000         00         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             20,000         \$             2	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         Structural Lighting         LS         4         4         5         9,743.           714-01.32         Structural Light Pole Relocation         EA         4         4         5         3,900.           714-01.33         Light Pole Relocation         EA         4         4         5         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, NTLR & ZOOM)         EA         2         2         5         10,000.           725-21.02         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         5         46,000.           725-21.05         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         5         46,000.           0.04         DYNAMIC MESSAGE SIGN VIDUT-COLORI         EA         1         1         5         46,000.           UIGHTING & SIGNALIZATION TOTAL (ROUND           UIGHTING & SIGNALIZATION TOTAL (ROUND           UIGHTING & SIGNALIZATION TOTAL (ROUND           Guardrail at Bridge Ends         6         6.2           OT 500.01         Guardrail at Bridge Ends         1         1         5         2,355.	29         \$             38,973.16         78         \$             6,247.12         78         \$             6,247.12         78         \$             6,247.12         78         \$             15,500.00         70         \$             20,000.00         70,800         75         \$             20,000.00         70,800         70,800         75         \$             20,000.00         70,800         70,800         70,800         70,7004.32         \$             20,52.99,9	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         2         4         4         5         9,743           714-01.32         Structural Lighting         LS         4         4         4         5         1,561           714-01.38         Light Pole Relocation         EA         4         4         5         3,900           725-20.91         CCTV CAMERA SYSTEM (PAN, TIT & ZOOM)         EA         2         2         \$         10,000           725-21.02         DYNAMIC MESSAGE SIGN (MULT-COURD, EA         1         1         \$         20,000           0.725-21.05         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         \$         46,000           N/A         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         \$         20,000           UGHTING & Signalization         LS         1         \$         20,000           UGHTING & Signalization         LS         1         \$         2,000           UGHTING & Signalization         LS         1         \$         2,000           CUTY CAMERA SYSTEM PAN, TIT & Signalization         LS         1         \$         2,000	29         \$             38,973.16         78         \$             6,247.12         78         \$             6,247.12         78         \$             6,247.12         78         \$             15,500.00         70         \$             20,000.00         70,800         75         \$             20,000.00         70,800         70,800         75         \$             20,000.00         70,800         70,800         70,800         70,7004.32         \$             20,52.99,9	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         Structural Lighting         LS         4         4         5         9,743.           714-01.32         Structural Light Pole Relocation         EA         4         4         5         3,900.           714-01.33         Light Pole Relocation         EA         4         4         5         3,900.           725-20.91         CCTV CAMERA SYSTEM (PAN, NTLR & ZOOM)         EA         2         2         5         10,000.           725-21.02         DYNAMIC MESSAGE SIGN (MULT-COLOR)         EA         1         1         5         46,000.           725-21.05         DYNAMIC MESSAGE SIGN REMOVE AND REPLACE         EA         1         1         5         46,000.           0.04         DYNAMIC MESSAGE SIGN VIDUT-COLORI         EA         1         1         5         46,000.           UIGHTING & SIGNALIZATION TOTAL (ROUND           UIGHTING & SIGNALIZATION TOTAL (ROUND           UIGHTING & SIGNALIZATION TOTAL (ROUND           Guardrail at Bridge Ends         6         62.           705-00.10         Guardrail at Bridge Ends         F         400         400         5         62.	29         \$             38,973.16         R         \$             6,247.12         R         \$             6,247.12         R         \$             6,247.12         R         \$             15,600.00         R         \$             15,600.00         R         \$             74,500.00         R         \$             20,000.00         R         \$             20,100         R         \$             20,110         \$             15,128,553         R         \$             20,315,28         \$             20,135,28         \$             20,135,28         \$             20,135,28         \$             20,135,28         \$             20,135,28         \$             20,135,28         \$             20,135,28         \$             20,135,2	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND Upting & Signalization           T44-01.32         Structural lighting         LS         4         4         5         74.4           714-01.33         Light Pole Relocation         EA         4         4         4         5         74.6           714-01.33         Light Standards (Steel)         EA         4         4         4         5         3.900.           725-20.91         CCTV CAMERA SYSTEM (PAN, TIL & ZION)         EA         1         1         5         145.000.           725-21.02         DYNAMIC MESSAGE SIGN (RULT)-COLOR)         EA         1         1         5         20.00.           N/A         DYNAMIC MESSAGE SIGN (RULT)-COLOR)         EA         1         1         5         20.00.           N/A         DYNAMIC MESSAGE SIGN (RULT)-COLOR)         EA         1         1         5         20.00.           N/A         DYNAMIC MESSAGE SIGN (RULT)-COLOR)         EA         1         1         5         20.00.           Structural Light Signalization         LS         1         1         5         22.00.00.         20.0         \$         22.0         21         1         5         22.55.5         27.55.0         27.55	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,60.00         00         \$             15,60.00         00         \$             15,60.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             46,000.00         00         \$             46,000.00         00         \$             44,800.15         00         \$             12,90.11         \$             12,1240.11         \$             12,01.15         \$             163,900         \$             163,900         \$             163,900         \$             162,529.41         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,800,729.97         \$             5             50,20,239.729.97         \$             3,161,300         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         EA         4         4         5         7743           714 01.32         Structural Lighting         IS         4         4         5         7743           714 01.38         Light Pole Relocation         EA         4         4         5         7530           717 0000         CTV CAMERA SYSTEM (PAN, TIT & ZOOM)         EA         2         2         5         10000           725 20.91         CCTV CAMERA SYSTEM (PAN, TIT & ZOOM)         EA         1         1         5         20.000         7252.102         DYNAMIC MESSAGE SIGN MULT-COORD         EA         1         1         1         5         20.000         N/A         TS         1         1         1         2         20.000         1         2         1         1         2         2         1 <td>29         \$             38,973.16         78         \$             6,247.12         00         \$             15,60.00         00         \$             15,60.00         00         \$             15,60.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             46,000.00         00         \$             46,000.00         00         \$             44,800.15         00         \$             12,90.11         \$             12,1240.11         \$             12,01.15         \$             163,900         \$             163,900         \$             163,900         \$             162,529.41         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,800,729.97         \$             5             50,20,239.729.97         \$             3,161,300         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$</td>	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,60.00         00         \$             15,60.00         00         \$             15,60.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             46,000.00         00         \$             46,000.00         00         \$             44,800.15         00         \$             12,90.11         \$             12,1240.11         \$             12,01.15         \$             163,900         \$             163,900         \$             163,900         \$             162,529.41         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,7800         \$             10,800,729.97         \$             5             50,20,239.729.97         \$             3,161,300         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$             00         \$             522,480.00         \$	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND Lighting & Signalization           Lighting & Signalization         Structural Lighting         LS         4         4         4         5         7,7,7,7,7,7,3,3,3,3,3,3,3,3,3,3,3,3,3,3	29         \$             38,973.16         78         \$             6,247.12         78         \$             6,247.12         78         \$             6,247.12         78         \$             6,247.12         78         \$             6,247.12         78         \$             5,20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,000,00         70         \$             20,100         70         \$             20,100         70         \$             20,11         \$             12,1290,11         \$             12,1290,11         \$             12,235,28         \$             10,500         \$             162,529,41         \$             12,24,880,15         \$             7,5         \$             20,335,28         \$             10,500         \$             10,500         \$             7,500         \$             3,553,28         \$             7,5         \$             20,335,28         \$             7,500         \$             7,500         \$             5,52,480,00         \$             5,532,480,00         \$             5,532,480,00	
INTERCHANGES AND UNQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         5         4         4         5         7.7.4           7.7.4-01.32         Light Pole Relocation         E.A         4         4         5         9.7.3           7.7.4-03.06         CUTV CAMERA SYSTEM (FAN, TLT & ZOOM)         E.A         4         4         5         3.0000           7.725-0.01         DTNAMIC MESSAGE SIGN NULT-COLOR, FA         1         1         5         1.5         4.6         0.0         5         5.2         7.00.00         0.0         5         5.2         7.7         7.50.0.0         5         5.2         7.7         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,00.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             44,600.00         E             20,000.00         00         \$             201,900         20         \$             211.50         20,850.80         10,255.08         11         \$             1,290.11         10         \$             163,900         5             52,529.41         162         \$             20,355.28         ED)         \$             107,800         5             517,000         5             517,000         5             517,000.432         \$             5             532,480.00         00         \$             59,526.98         5             52,24,800.00         00         \$             59,526.99         \$             517,004.32         \$             53,161,300         5             59,200         \$             50,52,480.00         00         \$             59,200         \$             50,52,480.00         00	
INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,00.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             44,600.00         E             20,000.00         00         \$             201,900         20         \$             211.50         20,850.80         10,255.08         11         \$             1,290.11         10         \$             163,900         5             52,529.41         162         \$             20,355.28         ED)         \$             107,800         5             517,000         5             517,000         5             517,000.432         \$             5             532,480.00         00         \$             59,526.98         5             52,24,800.00         00         \$             59,526.99         \$             517,004.32         \$             53,161,300         5             59,200         \$             50,52,480.00         00         \$             59,200         \$             50,52,480.00         00	
INTERCHANGES AND UNQUE INTERSECTIONS TOTAL (ROUND           Lighting & Signalization         5         4         4         5         7.7.4           7.7.4-01.32         Light Pole Relocation         E.A         4         4         5         9.7.3           7.7.4-03.06         CUTV CAMERA SYSTEM (FAN, TLT & ZOOM)         E.A         4         4         5         3.0000           7.725-0.01         DTNAMIC MESSAGE SIGN NULT-COLOR, FA         1         1         5         1.5         4.6         0.0         5         5.2         7.00.00         0.0         5         5.2         7.7         7.50.0.0         5         5.2         7.7         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.75.0.0         7.	29         \$             38,973.16         78         \$             6,247.12         00         \$             15,000.00         00         \$             15,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,000.00         00         \$             20,900         00         \$             20,900         00         \$             20,000         00         \$             20,035,28         00         \$             107,800         00         \$             20,035,28         00         \$             107,800         00         \$             20,92,92,68         00         \$             107,800         00         \$             20,92,97,97         00         \$             3,161,300         00         \$             92,92,68         00         \$             92,92,68         00         \$             92,92,92,92         00         \$	

# PAY ITEM SUMMARY

				FE	NCE TOTAL (ROUNDED)		9,400
2. 2							
Rip-Rap							
709-05.05	Machined Rip-Rap (Class A-3)		800	800		4 \$	27,79
709-05.06	Machined Rip-Rap (Class A-1)		300	300	\$ 32.4		9,73
709-05.08	Machined Rip-Rap (Class B)		150	150	\$ 33.7	) \$	5,05
709-05.09	Machined Rip-Rap (Class C)	TON	90	90	\$ 32.7	3 \$	2,94
			RIP-	RAP & SLOPE PROTE	CTION TOTAL (ROUNDE	D)\$	45,60
Clearing and Grubing							
201-01	Clearing and Grubbing	LS	0.35	0.35	\$ 264,380.0	5 \$	92,5
				CLEAR AND GRU	BBING TOTAL (ROUNDE	D) \$	92,6
Railroad At-Grade Crossing							
N/A		DAVE	750	750			
	Railroad Coordination and Construction Flagger				S 1.000.0	1 \$	750.0
19/0	Railroad Coordination and Construction Flagger	DATS			\$ 1,000.0 ATION TOTAL (ROUNDE		
1/0	Railroad Coordination and Construction Flagger	DATS			\$ 1,000.0 ATION TOTAL (ROUNDE		
	Railroad Coordination and Construction Hagger	DATS					
Utilties	Railroad Coordination and Construction Hagger	DATS		ROSSING OR SEPAR	ATION TOTAL (ROUNDE	D) \$	
	Railroad Coordination and Construction Hagger	DATS		ROSSING OR SEPAR		D) \$	
Utilties	Railroad Coordination and Construction Hagger	DAIS		ROSSING OR SEPAR	ATION TOTAL (ROUNDE	D) \$	
	Railroad Coordination and Construction Hagger			ROSSING OR SEPAR	ATION TOTAL (ROUNDE	D) \$ \$	750,00 750,00 250,00

# 7.2 Background Data



## Photograph 1

L.M. 7.40

View looking west along Interstate 24 near ramp from Interstate 124 (U.S. 27).



## Photograph 2

L.M. 6.00

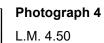
View looking west along Interstate 24. River is visible to the right and the grade separation is visible to the left.



## Photograph 3

L.M. 4.85

View looking west along Interstate 24. Overhead dynamic message sign visible.



View looking west along Interstate 24 at exit ramp to Browns Ferry . Road.





## Photograph 5

L.M. 0.00

View looking east along Interstate 24. Grass median with grade separation visible.



## Photograph 6

L.M. 4.45

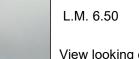
View looking east along Interstate 24. Monument near R.O.W. east of Browns Ferry Road.



# Photograph 7

L.M. 5.90

View looking east along Interstate 24. Railroad and cliffs visible.



Photograph 8

View looking east along Interstate 24. Railroad yard is visble.



COUNTY		nilton County (33) - Route: I0024, Special Case: 0-None , County Sequence: 2, Lo ON	og Mile 0 to 9 COUNTY NO: 33
ROUTE	10024	SPECIAL CASE: 0-NONE	CTY SEQ: 2
LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
0.000	1	TENNESSEE-GEORGIA STATE LINE	110
0.000	1	ENTER CHATTANOOGA CITY LIMITS	130
0.000	0	BEGIN I-24	920
0.000	9	BEGIN 65 MPH	932
0.000	9	TRUCK 55 MPH	932
0.030	9	CULVERT: C036	980
0.400	9	EMBEDDED DETECTION LOOPS [CYCLE COUNT # 186] WB	969
0.480	9	EMBEDDED DETECTION LOOPS [CYCLE COUNT # 186] EB	969
0.500	9	ITS CAMERA # 24-1 / EB LNS.	967
0.710	0	ENTRANCE TO REST AREA & WELCOME CENTER RT.	943
0.900	0	REST AREA & WELCOME CENTER RT.	943
0.919	9	TRAFFIC COUNT STATION 524	959
0.970	0	MILE POST # 172	963
1.000	0	EXIT FROM REST AREA & WELCOME CENTER RT. [REST AREA ATR]	943
1.270	2	OVERHEAD: ROCK QUARRY RD.	205
1.280	9	ITS CAMERA # 24-2 / EB LNS.	967
1.417	9	TRAFFIC COUNT STATION 186	959
1.820	9	ITS CAMERA # 24-3 / WB LNS.	967
1.990	0	MILE POST # 173	963
2.300	2	PARALLEL BRIDGES [33100240001] [33100240002]: BLACK CREEK	211
2.300	2	PARALLEL OVERHEADS [33100240001] [33100240002]: 5000 CUMMINGS RD.	211
2.340	9	ITS CAMERA # 24-4 / WB LNS.	967
2.730	0	EXIT 174: US-11 / 41 / 64 / TIFTONIA / LOOKOUT MOUNTAIN	990
2.730	7	RAMP 174-A TO SR-2 CUMMINGS HWY. RT.	711
2.730	7	RAMP 174-D FROM SR-2 CUMMINGS HWY. LT.	715
2.880	9	ITS CAMERA # 24-5 / EB LNS.	967
2.900	2	PARALLEL OVERHEADS [33100240003] [33100240004]: SR-2 CUMMINGS HWY.	241
2.900	0	INTERCHANGE 0174	939

COUNTY:		nilton County (33) - Route: I0024, Special Case: 0-None , County Sequence: 2, Log Mile 0 ON <b>CO</b>	to 9 <b>UNTY NO:</b> 33
ROUTE:	10024	SPECIAL CASE: 0-NONE	CTY SEQ: 2
LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
3.000	0	MILE POST # 174	963
3.130	7	RAMP 174-B FROM SR-2 CUMMINGS HWY. RT.	714
3.130	7	RAMP 174-C TO SR-2 CUMMINGS HWY. LT.	712
3.361	9	TRAFFIC COUNT STATION 183	959
3.400	9	ITS CAMERA # 24-6 / WB LNS.	967
3.570	2	PARALLEL OVERHEADS [33100240005] [33100240006]: C037 KELLYS FERRY RD.	231
3.960	0	MILE POST # 175	963
3.960	0	EXIT 175: BROWNS FERRY RD. / LOOKOUT MOUNTAIN	990
3.960	7	RAMP 175-A TO 3622 BROWNS FERRY RD. RT.	721
4.090	7	RAMP 175-D FROM 3622 BROWNS FERRY RD. LT.	725
4.220	2	PARALLEL OVERHEADS [33100240007] [33100240008]: 3622 BROWNS FERRY RD.	231
4.220	9	ITS CAMERA # 24-7 / EB LNS.	967
4.220	0	INTERCHANGE 0175	939
4.400	7	RAMP 175-B FROM 3622 BROWNS FERRY RD. RT.	724
4.430	7	RAMP 175-C TO 3622 BROWNS FERRY RD. LT.	722
4.770	9	ITS CAMERA # 24-8 / WB LNS.	967
4.970	0	MILE POST # 176	963
5.220	9	ITS CAMERA # 24-9 / WB LNS.	967
5.330	2	PARALLEL BRIDGES [33100240009] [33100240010]: LOOKOUT CREEK	261
5.980	0	MILE POST # 177	963
6.190	2	PARALLEL BRIDGES [33I00240011] [33I00240012]: CHATTANOOGA CREEK	261
6.250	9	BEGIN 55 MPH	932
6.520	9	EMBEDDED DETECTION LOOPS [CYCLE COUNT # 182]	969
6.530	9	ITS CAMERA # 24-10 / EB LNS.	967
6.800	9	BEGIN ILLUMINATION	930
7.060	0	MILE POST # 178	963
7.090	9	TRAFFIC COUNT STATION 182	959
7.330	0	EXIT 178: US-11 / 41 / 64 / LOOKOUT MOUNTAIN / BROAD ST. / US-27 NORTH / DOWNTOWN CHATTAN	OOGA 990
This rong	rt was a	anarated by E-TRIMS	

COUNTY		nilton County (33) - Route: I0024, Special Case: 0-None , County Sequence: 2, Log N ON	Aile 0 to 9 COUNTY NO: 33
ROUTE	10024	SPECIAL CASE: 0-NONE	CTY SEQ: 2
LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
7.330	3	I-124 WB LNS. RT.	360
7.340	3	I-124 EB LNS. LT.	360
7.410	2	PARALLEL OVERHEADS [33100240013] [33100240014]: CSXT [350085U]	205
7.520	2	OVERHEAD [33100240015]: I-124 NB LNS. / RT. LNS. ONLY	241
7.530	2	OVERHEAD [33100240016]: I-124 NB LNS. / LT. LNS. ONLY	241
7.530	9	ITS CAMERA # 24-11 / WB LNS.	967
7.570	0	PICK UP US-27 DESIGNATION	992
7.610	9	END OF OVERHEAD	983
7.630	2	PARALLEL OVERHEADS [33100240017] [33100240018]: A660 CHESTNUT ST. / CSXT [350052G]	205
7.710	7	RAMP 178-E FROM A643 WILLIAMS ST. LT. / LT. LNS. ONLY	735
7.740	9	END OF OVERHEADS	983
7.780	0	INTERCHANGE 0178	939
7.780	2	PARALLEL OVERHEADS [33100240021] [33100240022]: SR-2 BROAD ST.	251
7.840	7	RAMP 178-A FROM I-124 SB LNS. / RT. LNS. ONLY	705
7.910	2	PARALLEL OVERHEADS [33100240023] [33100240024]: A643 WILLIAMS ST.	251
8.010	0	MILE POST # 179	963
8.030	2	PARALLEL OVERHEADS [33100240025] [33100240026]: A642 LONG ST.	251
8.100	2	PARALLEL OVERHEADS [33100240027] [33100240028]: SR-58 MARKET ST.	251
8.130	3	SR-58 MARKET ST. / CENTER OF OVERHEAD	370
8.230	7	RAMP 178-B FROM SR-58 MARKET ST. & A642 LONG ST. RT.	714
8.380	7	RAMP 178-C FROM SR-58 MARKET ST. RT.	714
8.430	7	RAMP 178-D TO I-124 NB LNS. LT. / LT. LNS. ONLY	703
8.520	9	EMBEDDED DETECTION LOOPS [CYCLE COUNT # 154]	969
8.533	9	TRAFFIC COUNT STATION 154	959
8.550	9	ITS CAMERA # 24-12 / WB LNS.	967
8.560	2	PARALLEL OVERHEADS [33100240029] [33100240030]: NS [736869S]	241
8.740	2	PARALLEL OVERHEADS [33100240031] [33100240032]: RAMP TO SR-2 E. 23RD ST.	251
8.740	0	INTERCHANGE 180A	939
This ropo	rt was a	anarated by E-TRIMS	

	Ham	nilton County (33) - Route: 10024, Special Case: 0-None , County	Sequence: 2, Log Mile 0 to 9
COUNTY:	HAMILT	ON	COUNTY NO: 33
ROUTE:	10024	SPECIAL CASE: 0-NONE	CTY SEQ: 2
LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
8.820	0	EXIT 180A: SR-8 NORTH / ROSSVILLE BLVD. / CENTRAL AVE.	990
8.820	7	RAMP 180A-A TO SR-2 E. 23RD ST. RT.	711
8.910	9	AUTOMATIC TRAFFIC RECORDER [ATR # 30] WB	960
8.920	9	AUTOMATIC TRAFFIC RECORDER [ATR # 30] EB	960
8.940	2	OVERHEAD [33100240033]: B631 BURNETT ST.	251
8.968	9	TRAFFIC COUNT STATION 990	959
8.980	0	MILE POST # 180	963

# **Road Segment Report**

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2

### **COUNTY: HAMILTON**

BEG

END

**COUNTY NO: 33** 

ROUTE NBR	SPEC CASE	-	LOG MILE	LOG MILE	SP SY	-	SP SY3	US RTE	US RTE2	FUNCTIONAL CLASS	ADM SYS	URB AREA	INC AREA	GOV CON	ROAD NAME	HPMS SEC_ID
10024	0	2	0.000	1.830	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240000
10024	0	2	1.830	2.900	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	
10024	0	2	2.900	4.090	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240291
10024	0	2	4.090	4.220	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240419
10024	0	2	4.220	4.430	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	
10024	0	2	4.430	6.750	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	330210240464
10024	0	2	6.750	7.330	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	
10024	0	2	7.330	7.520	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	330210240738
10024	0	2	7.520	7.570	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	330210240752
10024	0	2	7.570	7.780	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240752
10024	0	2	7.780	8.100	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	
10024	0	2	8.100	8.360	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330110240821
10024	0	2	8.360	8.560	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	AGENCY	I-24	330110240851
10024	0	2	8.560	8.820	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240862
10024	0	2	8.820	9.120	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	
10024	0	2	9.120	9.290	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210240922
10024	0	2	9.290	9.320	08	11		27		U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	
10024	0	2	9.320	9.351	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	
10024	0	2	9.351	11.422	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	
10024	0	2	11.422	12.088	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	89	STATE HWAY AGENCY	I-24	
10024	0	2	12.088	12.590	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	
10024	0	2	12.590	12.950	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	330210241259
10024	0	2	12.950	13.340	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	1-24	330210241317
10024	0	2	13.340	13.746	08	11	26			U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24	330210241334

11/7/2017

# **Road Segment Report**

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2

COUN	ТΥ: Η/	AMIL	ΓΟΝ											COUNTY NO: 33	3		
ROUTE NBR	SPEC CASE	-	BEG LOG MILE	END LOG MILE	-	SP SY2	-	US RTE	US RTE2	FUNCTIONAL CLASS	ADM SYS	URB AREA	INC AREA	GOV CON		ROAD NAME	HPMS SEC_ID
10024	0	2	13.746	14.710	08	11				U / INTERSTATE	02-INTERSTATE URBAN	52	52	STATE HWAY AGENCY	I-24		330210241334

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Туре	Width	Composition
wine	Mile	ROW	Control		ination	Lint	Lint	Lint	Terrain	Land Use	Lanes	Lanes	Seq. #	Type	wiath	Composition
0.000	0.710	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	5	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	6	DRAINAGE		DITCH
		300									4	4	7	MEDIAN	70.0	GRASS PLOT
		300									4	4	8	DRAINAGE		DITCH
		300									4	4	9	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	12	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	13	DRAINAGE		DITCH
0.710	1.310	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	3	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	5	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	7	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	DRAINAGE		DITCH
		300									4	4	11	MEDIAN	70.0	GRASS PLOT
		300									4	4	13	DRAINAGE		DITCH
		300									4	4	15	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum- ination	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr Lanes	Seq. #	Туре	Width	Composition
0.710	1.310	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	17	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	19	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	21	DRAINAGE		DITCH
1.310	1.670	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
1.670	1.990	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Туре	Width	Composition
INITE	WITE	NOW	Control	2-TWO	ination	Lint	Lint	Lint	Terrain	Land Use	Lanes	Lanes	3eq. #	Type	wiath	-
1.670	1.990	300	2-FULL	WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
1.990	2.190	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER LT.
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum- ination	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr Lanes	Seq. #	Туре	Width	Composition
2.190	2.340	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
2.340	3.130	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	4	7	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Turne	Width	Composition
WITE	Mile	ROW	Control	•	ination	Lint	Lint	Lint	renam	Lanu Use	Lanes	Lanes	Seq. #	Туре	wiath	-
2.340	3.130	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
3.130	3.280	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	6	1	DRAINAGE		DITCH
		300									4	6	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	6	3	ACCELERATION/ DECELERATION LANE	16.0	ASPHALT CONCRETE
		300									4	6	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	6	5	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	6	6	DRAINAGE		DITCH
		300									4	6	7	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	6	8	DRAINAGE		DITCH
		300									4	6	9	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	6	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	6	11	ACCELERATION/ DECELERATION LANE	16.0	ASPHALT CONCRETE
		300									4	6	12	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	6	13	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Tuno	Width	Composition
wine	Mile	ROW	Control	Operation	ination	Lint	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	wiath	Composition
3.280	3.920	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
3.920	4.090	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	5	1	DRAINAGE		DITCH
		300									4	5	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	5	3	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		300									4	5	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	5	5	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	5	6	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum- ination	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr Lanes	Sea. #	Туре	Width	Composition
			Control		ination				Torrain		Lance	Lanco		1900		GRASS PLOT
3.920	4.090	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	5	7	MEDIAN	70.0	W/ CABLE BARRIER RT.
		300									4	5	8	DRAINAGE		DITCH
		300									4	5	9	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	5	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	5	11	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	5	12	DRAINAGE		DITCH
4.090	4.400	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
4.400	4.620	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	6	1	DRAINAGE		CURB AND GUTTER

This report was generated by E-TRIMS

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

*Route No.* 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log	Log		Access		Illum-	Spd	Spd	Spd			Thru	Nbr				
Mile	Mile	ROW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	Width	Composition
4.400	4.620	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	6	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	6	3	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		300									4	6	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	6	5	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	6	6	DRAINAGE		DITCH
		300									4	6	7	MEDIAN	70.0	GRASS PLOT W/ CABLE BARRIER RT.
		300									4	6	8	DRAINAGE		DITCH
		300									4	6	9	SHOULDER (INSIDE)	4.0	ASPHALT CONCRETE
		300									4	6	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	6	11	ACCELERATION/ DECELERATION LANE	16.0	ASPHALT CONCRETE
		300									4	6	12	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	6	13	DRAINAGE		DITCH
4.620	4.930	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	5	1	DRAINAGE		CURB AND GUTTER
		300									4	5	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	5	3	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		300									4	5	4	PAVEMENT	24.0	ASPHALT CONCRETE

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log	Log	<b>D</b> 014	Access	• "	Illum-	Spd	Spd	Spd	<b>_</b> .		Thru	Nbr	• "	_		• • • •
Mile	Mile	ROW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	Width	Composition
4.620	4.930	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	5	5	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	5	6	DRAINAGE		DITCH
		300									4	5	7	MEDIAN	26.0	GRASS PLOT
		300									4	5	8	DRAINAGE		DITCH
		300									4	5	9	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	5	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	5	11	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	5	12	DRAINAGE		DITCH
4.930	6.250	300	2-FULL	2-TWO WAY	NO		65	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	26.0	GRASS PLOT
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr	Seq. #	Туре	Width	Composition
		_		2-TWO	ination	Lint					Lanes	Lanes	<b>Зе</b> ц. <i>#</i>		width	-
6.250	6.640	300	2-FULL	WAY	NO		55	55	2-ROLLING	0-RURAL	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	3	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	4	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	4	5	DRAINAGE		DITCH
		300									4	4	6	MEDIAN	26.0	GRASS PLOT
		300									4	4	7	DRAINAGE		DITCH
		300									4	4	8	SHOULDER (INSIDE)	6.0	ASPHALT CONCRETE
		300									4	4	9	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	10	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	11	DRAINAGE		DITCH
6.640	6.760	300	2-FULL	2-TWO WAY	NO		55	55	2-ROLLING	4-FRINGE (MIX RES. COMM.)	4	4	1	DRAINAGE		DITCH
		300									4	4	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	5	SHOULDER (INSIDE)	18.0	ASPHALT CONCRETE
		300									4	4	6	DRAINAGE		CURB AND GUTTER
		300									4	4	7	MEDIAN	2.0	CONCRETE BARRIER
		300									4	4	8	DRAINAGE		CURB AND GUTTER

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	า
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr	Seq. #	Туре	Width	Composition
WIIE	WITE	NOW	Control	·	ination	Lint	Lint	Lint	Terrain		Lanes	Lanes	Seq. #		width	•
6.640	6.760	300	2-FULL	2-TWO WAY	NO		55	55	2-ROLLING	4-FRINGE (MIX RES. COMM.)	4	4	9	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		300									4	4	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	4	12	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		300									4	4	13	DRAINAGE		DITCH
6.760	6.770	300	2-FULL	2-TWO WAY	NO		55	55	2-ROLLING	4-FRINGE (MIX RES. COMM.)	4	5	1	DRAINAGE		DITCH
		300									4	5	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	5	4	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	5	5	SHOULDER (INSIDE)	18.0	ASPHALT CONCRETE
		300									4	5	6	DRAINAGE		CURB AND GUTTER
		300									4	5	7	MEDIAN	2.0	CONCRETE BARRIER
		300									4	5	8	DRAINAGE		CURB AND GUTTER
		300									4	5	9	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		300									4	5	10	PAVEMENT	24.0	ASPHALT CONCRETE
		300									4	5	11	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		300									4	5	12	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									4	5	13	DRAINAGE		DITCH
6.770	6.800	200	2-FULL	2-TWO WAY	NO		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	5	1	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Tyme	Width	Composition
wine	wille	ROW	Control	Operation	ination	Lmt	Lint	Lmt	Terrain		Lanes	Lanes	Seq. #	Туре	wiath	Composition
6.770	6.800	200	2-FULL	2-TWO WAY	NO		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	5	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	4	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	5	5	SHOULDER (INSIDE)	18.0	ASPHALT CONCRETE
		200									4	5	6	DRAINAGE		CURB AND GUTTER
		200									4	5	7	MEDIAN	2.0	CONCRETE BARRIER
		200									4	5	8	DRAINAGE		CURB AND GUTTER
		200									4	5	9	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	10	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	5	11	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		200									4	5	12	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	13	DRAINAGE		DITCH
6.800	7.000	200	2-FULL	2-TWO WAY	YES		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	5	1	DRAINAGE		DITCH
		200									4	5	2	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	4	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	5	5	SHOULDER (INSIDE)	18.0	ASPHALT CONCRETE
		200									4	5	6	DRAINAGE		CURB AND GUTTER

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum-	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru	Nbr	Seq. #	Tyme	Width	Composition
wille	wille	RUW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain		Lanes	Lanes	Seq. #	Туре	wiath	Composition
6.800	7.000	200	2-FULL	2-TWO WAY	YES		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	5	7	MEDIAN	2.0	CONCRETE BARRIER
		200									4	5	8	DRAINAGE		CURB AND GUTTER
		200									4	5	9	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	10	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	5	11	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		200									4	5	12	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	5	13	DRAINAGE		DITCH
7.000	7.330	200	2-FULL	2-TWO WAY	YES		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	7	1	DRAINAGE		DITCH
		200									4	7	3	SHOULDER (OUTSIDE)	12.0	ASPHALT CONCRETE
		200									4	7	5	ACCELERATION/ DECELERATION LANE	12.0	ASPHALT CONCRETE
		200									4	7	6	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	7	7	SHOULDER (INSIDE)	18.0	ASPHALT CONCRETE
		200									4	7	8	DRAINAGE		CURB AND GUTTER
		200									4	7	9	MEDIAN	2.0	CONCRETE BARRIER
		200									4	7	10	DRAINAGE		CURB AND GUTTER

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Int	formatio	n
Log	Log		Access		Illum-	Spd	Spd	Spd			Thru	Nbr				
Mile	Mile	ROW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	Width	Composition
7.000	7.330	200	2-FULL	2-TWO WAY	YES		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	7	11	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		200									4	7	12	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	7	13	ACCELERATION/ DECELERATION LANE	24.0	ASPHALT CONCRETE
		200									4	7	14	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	7	15	DRAINAGE		DITCH
7.330	7.340	200	2-FULL	2-TWO WAY	YES		55		2-ROLLING	5-INDUSTRIAL (FACTORIES, WAREHOUSES)	4	4	1	DRAINAGE		CURB AND GUTTER
		200									4	4	3	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	4	5	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	4	7	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		200									4	4	9	DRAINAGE		CURB AND GUTTER
		200									4	4	11	MEDIAN	2.0	CONCRETE BARRIER
		200									4	4	13	DRAINAGE		CURB AND GUTTER
		200									4	4	15	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		200									4	4	17	PAVEMENT	24.0	ASPHALT CONCRETE
		200									4	4	19	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		200									4	4	21	DRAINAGE		DITCH

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum- ination	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr Lanes	Seq. #	Туре	Width	Composition
7.340	7.410	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	4	4	1	DRAINAGE		CURB AND GUTTER
		500									4	4	3	SHOULDER (OUTSIDE)	10.0	ASPHALT
		500									4	4	5	PAVEMENT	24.0	ASPHALT CONCRETE
		500									4	4	7	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		500									4	4	9	DRAINAGE		CURB AND GUTTER
		500									4	4	11	MEDIAN	2.0	CONCRETE BARRIER
		500									4	4	13	DRAINAGE		CURB AND GUTTER
		500									4	4	15	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		500									4	4	17	PAVEMENT	24.0	ASPHALT CONCRETE
		500									4	4	19	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		500									4	4	21	DRAINAGE		DITCH
7.410	7.780	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	4	4	1	DRAINAGE		CURB ONLY
		500									4	4	2	SHOULDER (OUTSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									4	4	4	PAVEMENT	24.0	PORTLAND CEMENT CONCRETE
		500									4	4	5	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									4	4	6	DRAINAGE		CURB AND GUTTER

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature In	formatio	n
Log Mile	Log Mile	ROW	Access Control	Operation	Illum- ination	Spd Lmt	Spd Lmt	Spd Lmt	Terrain	Land Use	Thru Lanes	Nbr Lanes	Seq. #	Туре	Width	Composition
7.410	7.780	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	4	4	7	MEDIAN	2.0	CONCRETE BARRIER
		500									4	4	8	DRAINAGE		CURB ONLY
		500									4	4	9	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									4	4	10	PAVEMENT	24.0	PORTLAND CEMENT CONCRETE
		500									4	4	12	SHOULDER (OUTSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									4	4	13	DRAINAGE		CURB AND GUTTER
7.780	7.830	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	6	6	1	DRAINAGE		CURB AND GUTTER
		500									6	6	3	SHOULDER (OUTSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	6	5	PAVEMENT	24.0	PORTLAND CEMENT CONCRETE
		500									6	6	7	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	6	9	DRAINAGE		CURB AND GUTTER
		500									6	6	11	MEDIAN	2.0	CONCRETE BARRIER
		500									6	6	13	DRAINAGE		CURB ONLY
		500									6	6	15	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log	Log	DOW	Access	0	Illum-	Spd	Spd	Spd	<b>-</b>		Thru	Nbr	0 #	<b>-</b>	A.C. 141.	0
Mile	Mile	ROW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	Width	Composition
7.780	7.830	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	6	6	17	PAVEMENT	24.0	PORTLAND CEMENT CONCRETE
		500									6	6	19	SHOULDER (OUTSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	6	21	DRAINAGE		CURB ONLY
7.830	8.140	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	6	8	1	DRAINAGE		CURB AND GUTTER
		500									6	8	2	SHOULDER (OUTSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	8	3	ACCELERATION/ DECELERATION LANE	12.0	PORTLAND CEMENT CONCRETE
		500									6	8	4	PAVEMENT	36.0	PORTLAND CEMENT CONCRETE
		500									6	8	5	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	8	6	DRAINAGE		CURB AND GUTTER
		500									6	8	7	MEDIAN	2.0	CONCRETE BARRIER
		500									6	8	8	DRAINAGE		CURB AND GUTTER
		500									6	8	9	SHOULDER (INSIDE)	10.0	PORTLAND CEMENT CONCRETE
		500									6	8	10	PAVEMENT	36.0	PORTLAND CEMENT CONCRETE

Hamilton County (33) - Route: 10024, Special Case: 0-None , County Sequence: 2, Log Mile 0 to 9

County: HAMILTON (33)

Route No. 10024

Special Case 0-NONE

County Sequence 2

Beg	End					School		Truck						Feature Inf	ormatio	n
Log	Log Mile	ROW	Access	Oneration	Illum-	Spd	Spd	Spd	Torroin	Land Use	Thru	Nbr	Saa #	Turne	\ <b>A</b> /; al4 la	Composition
Mile	MIIe	ROW	Control	Operation	ination	Lmt	Lmt	Lmt	Terrain	Land Use	Lanes	Lanes	Seq. #	Туре	Width	Composition
7.830	8.140	500	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	6	8	11	COLLECTOR/DIS TRIBUTOR LANE	12.0	PORTLAND CEMENT CONCRETE
		500									6	8	12	SHOULDER (OUTSIDE)	12.0	PORTLAND CEMENT CONCRETE
		500									6	8	13	DRAINAGE		DITCH
8.140	9.000	300	2-FULL	2-TWO WAY	YES		55		2-ROLLING	2-COMMERCIAL	6	8	1	DRAINAGE		DITCH
		300									6	8	3	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									6	8	5	COLLECTOR/DIS TRIBUTOR LANE	12.0	ASPHALT CONCRETE
		300									6	8	6	PAVEMENT	36.0	ASPHALT CONCRETE
		300									6	8	7	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		300									6	8	8	DRAINAGE		CURB AND GUTTER
		300									6	8	9	MEDIAN	2.0	CONCRETE BARRIER
		300									6	8	10	DRAINAGE		CURB AND GUTTER
		300									6	8	11	SHOULDER (INSIDE)	10.0	ASPHALT CONCRETE
		300									6	8	12	PAVEMENT	36.0	ASPHALT CONCRETE
		300									6	8	13	COLLECTOR/DIS TRIBUTOR LANE	12.0	ASPHALT CONCRETE
		300									6	8	14	SHOULDER (OUTSIDE)	10.0	ASPHALT CONCRETE
		300									6	8	15	DRAINAGE		DITCH

# Gaffney, Brian

From:	Caiafa, Thomas <tcaiafa@dot.ga.gov></tcaiafa@dot.ga.gov>
Sent:	Tuesday, July 3, 2018 8:49 AM
То:	Gaffney, Brian
Cc:	Shaun Armstrong (Shaun.Armstrong@tn.gov)
Subject:	RE: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

Good morning Brian,

I'm doing pretty well. We've actually just received the requested information on each of the I-24 bridges from our Bridge Office. A summary of that information is below:

Structures/Bridges	Bridge ID	Length (feet)	Number Spans	Super Type	Sub Type	Width (feet)	Max Span (feet)
Slygo Road @ I-24	083-0016- 0	427	6	Steel Beams	Con Bents	32.25	90
I-24 EB @ Pope Creek	083-0043- 0	124	3	Reinforced Concrete	Con Bents	56.5	51
I-24 WB @ CSX	083-0045- 0	189	3	Steel Beams	Con Bents	40.33	66
I-24 EB @ CSX	083-0044- 0	221	3	Steel Beams	Con Bents	40.33	77
SR 299 @ I-24	083-0020- 0	201'-7"	2	PSC Beam	Con Bents	43.25	103'-10"

As far as the widening/replacement of the bridges is concerned, that determination would most likely be made during the PE phase. However, given the higher sufficiency ratings of the bridges on I-24 itself, we would most likely prefer to widen them.

In addition, as discussed in our telephone conversation on June 12<sup>th</sup>, our GEARS software can only retrieve the requested additional crash information at the countywide level. That information (for Dade County) is summarized in the below chart:

Crash Information (Countywide)	2014	2015	2016		
Total Non-Private Crashes	396	433	438		
				Percenta	age o
Manner of Collision	2014	2015	2016	2014	2
Non-collision with Motor Vehicle	138	154	143	34.79%	35
Rear End	109	145	133	27.58%	33
Head On	9	77	14	2.32%	17
Sideswipe-Same Direction	39	33	51	9.79%	7.
Sideswipe-Opposite Direction	10	9	10	2.58%	2
Angle	91	77	86	22.94%	17
Light Condition	2014	2015	2016	2014	2
Daylight	288	310	329	72.68%	71

Dark Lighted	7	12	11	1.80%	2.
Dark Not Lighted	87	101	85	21.91%	23
Dawn	10	6	7	2.58%	1.
Dusk	4	4	5	1.03%	0.
Weather Conditions	2014	2015	2016	2014	2
Clear	189	195	258	47.68%	44
Cloudy	117	128	123	29.64%	29
Fog	6	31	3	1.55%	7.
Rain	76	101	49	19.07%	23
Snow	8	6	1	2.06%	1.
Sleet	N/A	N/A	4	N/A	1

As always, if you need any additional information, feel free to ask. Have a great 4<sup>th</sup> as well!

Thanks, Tom

Tom

**Tom Caiafa** *Branch Chief* 

GDQT Georgia Department of Transportation

Office of Planning 600 West Peachtree Street, NW 5<sup>th</sup> Floor Atlanta, GA 30308 404.631.1749 office

From: Gaffney, Brian [mailto:BGaffney@benesch.com]
Sent: Tuesday, July 3, 2018 9:23 AM
To: Caiafa, Thomas <tcaiafa@dot.ga.gov>
Cc: Shaun Armstrong (Shaun.Armstrong@tn.gov) <Shaun.Armstrong@tn.gov>
Subject: RE: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

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Tom,

I hope your holiday week is going well and the weather holds off for a decent 4<sup>th</sup>! I wanted to check in with you to see if you have heard anything else from your structural group about the requested bridge information in my previous email?

Thanks!

Brian Gaffney, PE, CPESC, CPSWQ | Project Manager II

From: Gaffney, Brian
Sent: Wednesday, June 6, 2018 3:33 PM
To: 'tcaiafa@dot.ga.gov' <<u>tcaiafa@dot.ga.gov</u>>
Cc: 'cyvandyke@dot.ga.gov' <<u>cyvandyke@dot.ga.gov</u>>; 'rsimpson@dot.ga.gov' <<u>rsimpson@dot.ga.gov</u>>; Shaun
Armstrong (<u>Shaun.Armstrong@tn.gov</u>) <<u>Shaun.Armstrong@tn.gov</u>>
Subject: RE: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

Tom,

Good afternoon! I am working with Shaun Armstrong (TDOT) on a report for I-24, from I-59 in Georgia to I-124 in Tennessee. He forwarded me the information you provided recently and it is very much appreciated. As I started working the data into our report, I ran into a few areas where I'd love to get more information, if at all possible. Those areas are listed below:

- Bridges would it be possible to get length/width/# of spans/max span length/material? Could I also get the Bridge ID for the recently replaced bridge at the State Route 299 interchange?
- I noticed that you mentioned that none of the bridges on I-24 in Georgia were currently slated for replacement or widening. Since we are going to impact the 2 structures over CSX due to the additional travel lane, is the preference to widen the existing structures or to replace?
- Crash Data Do you have any additional information available on Lighting Condition (Daylight, Dark, etc...), Manner of Collision (Rear-End, Sideswipe, etc...) and weather conditions?

If there is a way for me to get any of this information myself through a website or something along those lines, please let me know and we can hopefully limit any impacts on your time. If you need any more information from me or would like to chat about any of the items, please feel free to contact me.

Thank you in advance,

Brian Gaffney, PE, CPESC, CPSWQ | Project Manager II Alfred Benesch & Company P 615-370-6079 Ext. 884 | C 615-473-1816

From: Shaun Armstrong [mailto:Shaun.Armstrong@tn.gov]
Sent: Friday, June 1, 2018 4:11 PM
To: Gaffney, Brian <<u>BGaffney@benesch.com</u>>
Subject: Fwd: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

Sent from my iPad

Begin forwarded message:

From: "Caiafa, Thomas" <<u>tcaiafa@dot.ga.gov</u>>
Date: June 1, 2018 at 2:09:31 PM CDT
To: 'Shaun Armstrong' <<u>Shaun.Armstrong@tn.gov</u>>
Cc: "VanDyke, Cindy" <<u>cyvandyke@dot.ga.gov</u>>, "Simpson, Radney" <<u>rsimpson@dot.ga.gov</u>>
Subject: RE: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

\*\*\* This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. \*\*\*

Good afternoon Shaun,

Regarding your questions on the subject corridor:

1. **Structures:** Of the four structures along the I-24 corridor (aside from the Wildwood bridge), none of them are currently slated for full replacement or widening in our Construction Work Program. As a guide, below are the Bridge IDs and current sufficiency ratings for each of the structures (going west to east):

Structures/Bridges	Bridge ID	Sufficiency Rating
Slygo Road @ I-24	083-0016-0	50.8
I-24 EB @ Pope Creek	083-0043-0	94.7
I-24 WB @ CSX	083-0045-0	83.7
I-24 EB @ CSX	083-0044-0	83.7

- 2. Linear Referencing: GDOT uses a linear referencing system consisting of a unique RCLINK and milepoint. Each individual RCLINK consists of a 10-digit code that is comprised of the county code, route type, route number, and route suffix. Both the point and linear feature can be represented using the RCLINK and milepoint.
  - a. For the segment of I-24 from I-59 to the GA/TN state line, the RCLINK designation is **0831040900** with the breakdown as:
    - i. County Code: 083 (Dade County)
    - ii. Route Type: **1** (Interstate)
    - iii. Route Number: **0409** (Georgia State Route 409, which is our state route designation for I-24)
    - iv. Route Suffix: **00** (no route suffix in this case)
  - b. The milepoints for this segment of I-24 are **1.63** (at the eastern edge of the I-59 interchange ramps) and **4.1** (at the GA/TN state line)
- 3. Crash Data: For the period from 2014 to 2016 (which are the latest full years available), there have been 192 crashes along the corridor, with the breakdown as follows:

Crash Information (east of I-59)	# of PDO Crashes	# of Injury Crashes	# of F
2014	45	13	
2015	52	20	
2016	41	18	
3 Year Total	138	51	

PDO=Property Damage Only crash

If you need any additional information about the corridor, feel free to ask us. Have a good weekend.

Thanks, Tom

Tom Caiafa

Branch Chief Georgia DOT – Office of Planning 600 West Peachtree Street, NW – 5th Floor Atlanta, GA 30308 Phone: 404-631-1749 tcaia<u>fa@dot.ga.gov</u>

From: VanDyke, Cindy
Sent: Thursday, May 24, 2018 10:49 AM
To: 'Shaun Armstrong' <<u>Shaun.Armstrong@tn.gov</u>>
Cc: Simpson, Radney <<u>rsimpson@dot.ga.gov</u>>; Caiafa, Thomas <<u>tcaiafa@dot.ga.gov</u>>
Subject: RE: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

Shaun, we'll pull this information together and get this to you as soon as possible. Tom Caiafa is the point-of-contact for this. I've cc'd him on this response.

Thanks and enjoy the long weekend.

Cindy VanDyke State Transportation Planning Administrator Georgia Department of Transportation One Georgia Center 600 W. Peachtree St, NW Atlanta, GA 30308 404-631-1987(office) 404-895-4974 (cell)

From: Shaun Armstrong [mailto:Shaun.Armstrong@tn.gov]
Sent: Thursday, May 24, 2018 10:14 AM
To: VanDyke, Cindy
Subject: TDOT Project - I-24, From I-59 to I-124 in Chattanooga Information

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Cindy,

Good morning and greetings to our neighbors to the south. Hope all is well in Atlanta and enjoying the summertime weather like we are here in Nashville. TDOT is in the process of conducting Technical Reports for multiple projects statewide, one of which is the reason I am reaching out to you. I-24, from the I-59 interchange to I-124 in Chattanooga was identified within legislation for capacity improvements. Due to logical termini, we are extending into Georgia to I-59. We are under contract with a firm to assist us in conducting the study, which is primarily adding an additional lane in each direction.

As we work through this report, we have a few questions regarding the Georgia piece. Please see below:

 Structures – Within our technical report, we will identify structures for widening or replacement. There is a stream crossing on the eastbound side, an overpass, and a dual structure over a railroad. Of these, which would be set for full replacement or widening only? The Wildwood interchange bridge we know has recently been completed. This will help us not only identify these in the functional layouts, but also with costing them appropriately.

- 2. Linear referencing TDOT uses a log mile per county, and we would like to utilize the appropriate linear system GDOT has in place for the Georgia segment. Can you provide a begin and end point from I-59 to the TN State Line?
- Crash information Our report provides a summary of crash data for the segments. Is
  information available for this segment? We have typically done the past 3-years of data in our
  reports.

Thank you in advance, and please feel free to contact me anytime for any additional questions. If I need to reach out to anyone else, please let me know that as well.



Shaun Armstrong |Transportation Manager 1 Strategic Transportation Investments Division James K. Polk Building, 10<sup>th</sup> Floor 505 Deaderick Street, Nashville, TN 37243 p. 615-253-5327 c. 615-339-7371 Shaun.Armstrong@tn.gov tn.gov/tdot

**There's road work ahead**. And roadway work zones are hazardous for workers and the public. In fact, most victims in work zone crashes are drivers or passengers. Work zone safety is everybody's responsibility - pay attention – slow down – watch for workers - expect the unexpected. And whenever you drive, always **Drive Alert Arrive Alive** - buckle up; stay off the phone and no texting. Visit <u>www.dot.ga.gov</u>.

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# 7.3 Project Traffic

#### **TENNESSEE DEPARTMENT OF TRANSPORTATION** STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO .:	33002-017	75-04	ROUTE:	I-24
COUNTY:	HAMILTO	ON	CITY:	CHATTANOOGA
PROJECT PIN N	UMBER:	124072.00		
PROJECT DESCI	RIPTION:	FROM THE GEORIGA STA	TE LINE TO	D THE S.R. 29 INTERCHANGE.

#### [1] AVERAGE TRAFFIC DATA.

#### **DIVISION REQUESTING:**

		PAVEMENT DESIGN	
MAINTENANCE		STRUCTURES	
S.T.I.D.	$\boxtimes$	SURVEY & ROADWAY DESIGN	
PROG. DEVELOPMENT & ADM.		TRAFFIC SIGNAL DESIGN	
PUBLIC TRANS. & AERO.		OTHER	
YEAR PROJECT PROGRAMMED FOR	<b>CONSTRUCTION</b>	10	
PROJECTED LETTING DATE:			

#### **TRAFFIC ASSIGNMENT:**

	BASE Y	EAR		DES	IGN Y	'EAR		ROAI	SIGN DWAY UCKS	DES AVEI DAILY	RAGE
	AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
[1]	69,630	2022	89,230	7,915	9	2042	51-49	18	27		

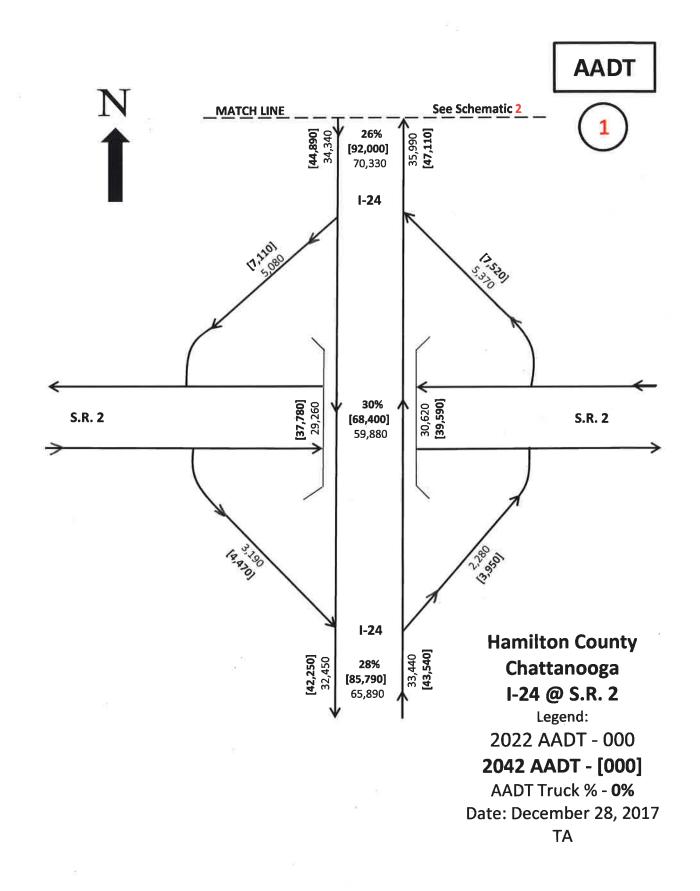
<b>REQUESTED BY:</b>	NAME	SHAUN ARMSTRONG	DATE <u>7/27/17</u>
	DIVISION	S.T.I.D.	
	ADDRESS	1000 J. K. POLK BUILDING	
		NASHVILLE TN 37243	
<b>REVIEWED BY:</b>	TONY ARMS		DATE 12.28.17
		ATION MANAGER 1	
	SUITE 1000, .	JAMES K. POLK BUILDING	1/2/10
APPROVED BY:	JIM WATERS		DATE $\frac{1}{3}/18$
	ASSISTANT		
	SUITE 1000, .	IAMES K. POLK BUILDING	
COMMENTS.			

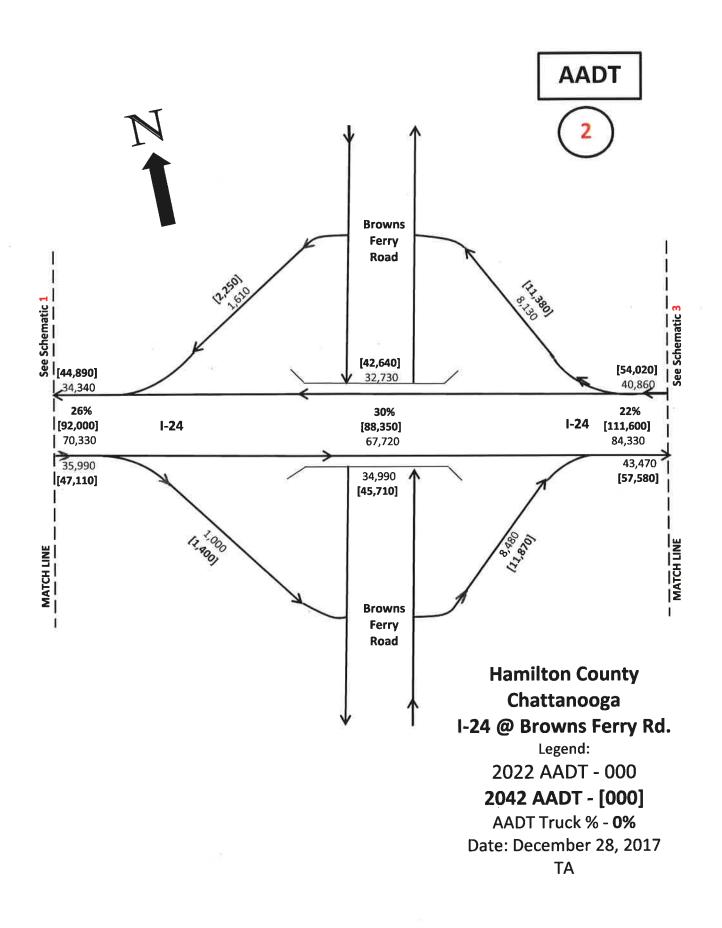
#### COMMENTS:

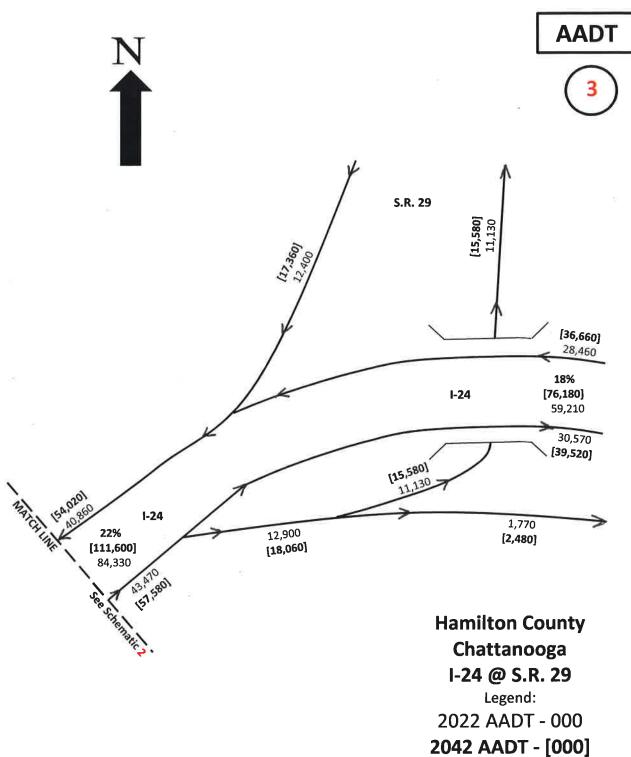
THIS TRAFFIC IS BASED ON 2017 CYCLE AND RAMP COUNTS. THE DESIGN YEAR TRAFFIC IS BASED ON GROWTH RATE FROM THE CHATTANOOGA TPO COMPUTER ASSIGNMENT MODEL. AADT'S AND BOTH YEAR DHV'S ARE INCLUDED.

Cc: MIKE GILBERT, S.T.I.D.

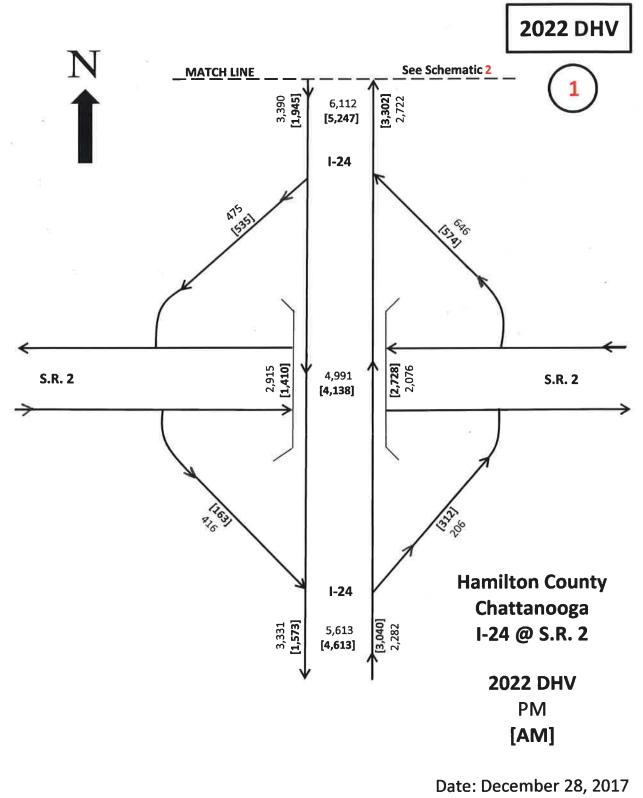
#### DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT. NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLS ARE NOT REQUIRED FOR ADTS OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS. (REV. 2/22/17) SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.



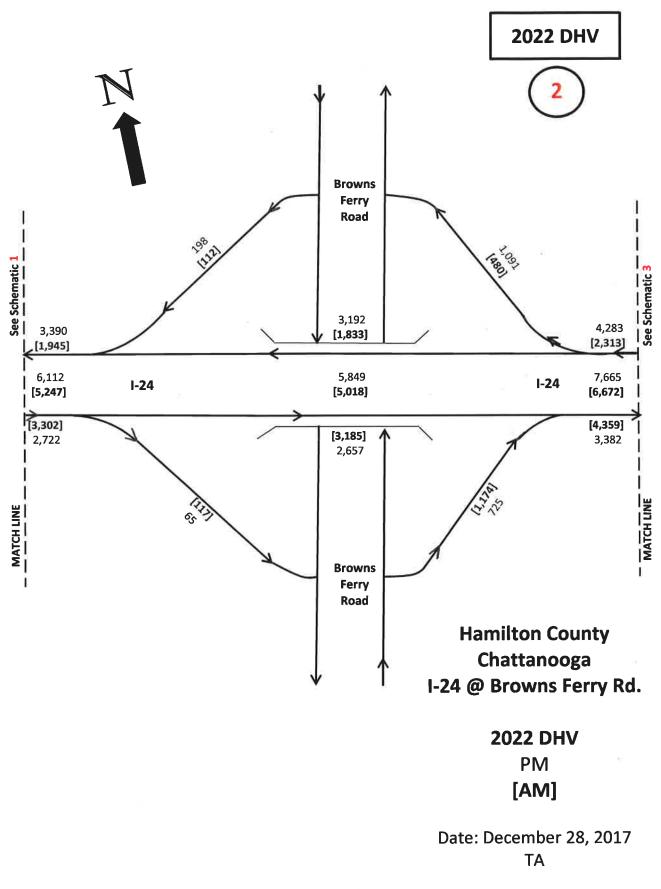


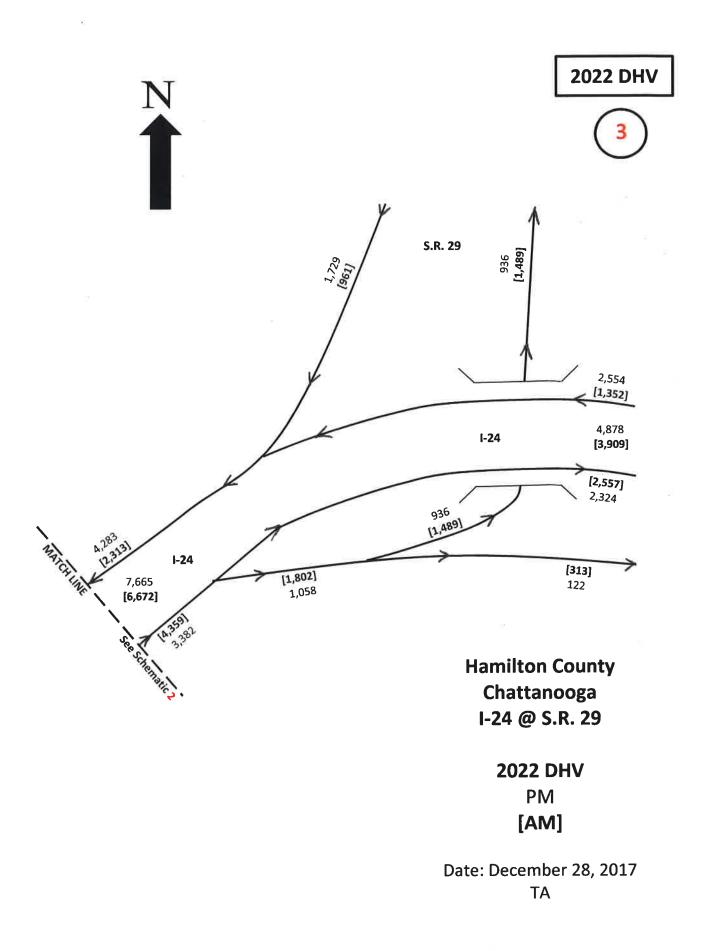


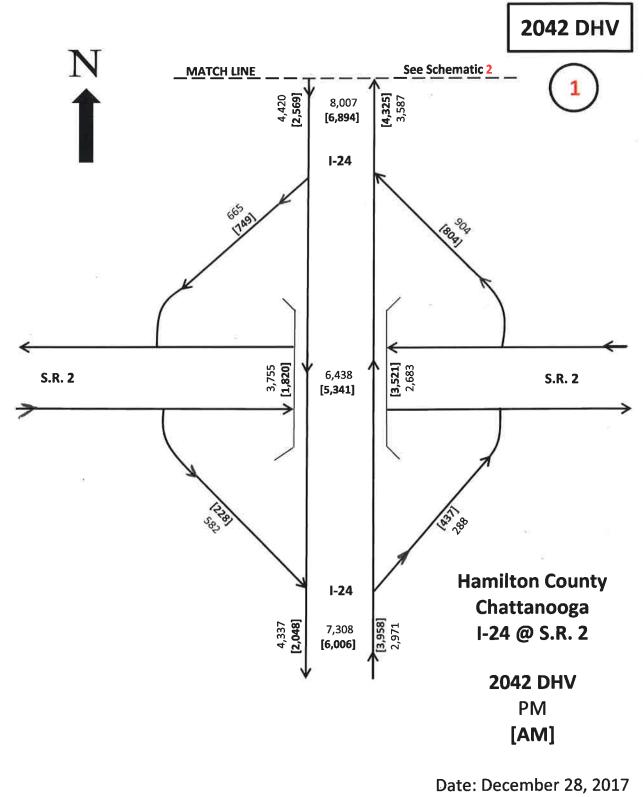
AADT Truck % - **0%** Date: December 28, 2017 TA



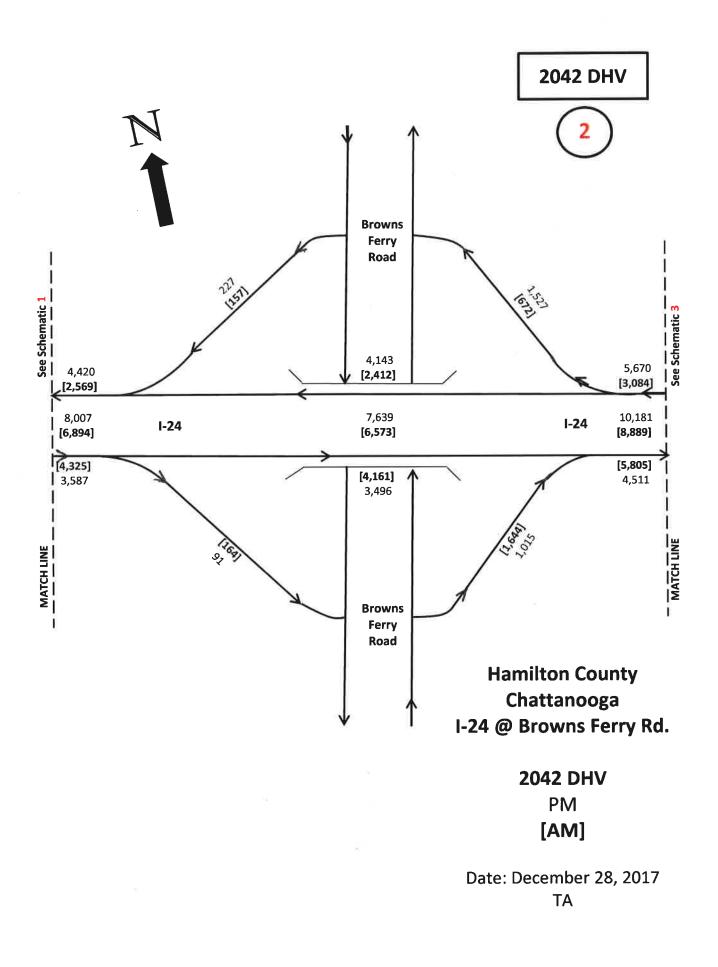
ΤA

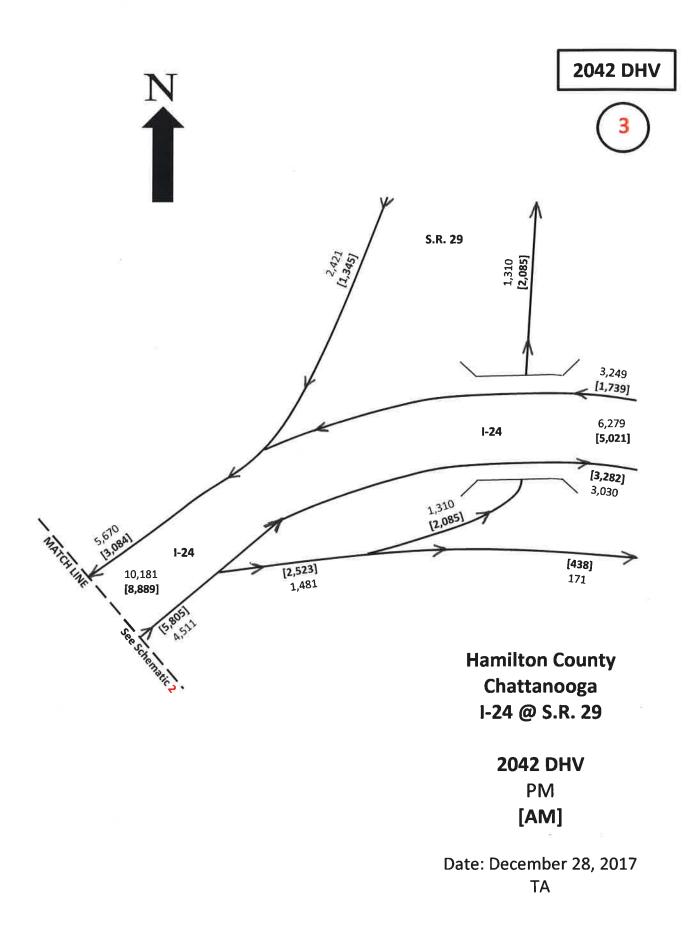






ΤA





# 7.4 Traffic Analysis

	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information	Drive Coffee		Site Information		
Analyst	Brian Gaffney Alfred Beneso	, ch &	Highway/Direction of Trave		
Agency or Company	Company		From/To		A State Line
Date Performed Analysis Time Period	6/6/18 Existing AM		Jurisdiction	Georgia 2022	
Project Description 1-24 7		rt	Analysis Year	2022	
✓ Oper.(LOS)	eennear Kepol		es.(N)		ning Data
Flow Inputs			63.(11)		
Volume, V	2970	veh/h	Peak-Hour Factor, PHF	0.94	
AADT	2070	veh/day	%Trucks and Buses, $P_T$	18	
Peak-Hr Prop. of AADT, K		· · · · · · · · · · · · · · · · · · ·	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and I	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		12.1	mpn
LOS and Performanc	e Measures		Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x I)$	<sup>N X 1</sup> HV 2006	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S	63.8	mph	S		mph
$D = v_p / S$	31.4	pc/mi/ln	$D = v_p / S$		, pc/mi/ln
LOS	D		Required Number of Lanes	s, N	P
Glossary			Factor Location		
N - Number of lanes	S - Speed	d			f F
V - Hourly volume	D - Densi		E <sub>R</sub> - Exhibits 11-10, 11-12	44.40	f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Brian Gaffney	/	Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Alfred Benes		From/To		A State Line
Date Performed	Company 6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing AM		Analysis Year	2022	
	Technical Repo				
Oper.(LOS)			es.(N)	Plan	ining Data
Flow Inputs	(050				
Volume, V AADT	1352	veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
		veh/day	1		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			%RVs, P <sub>R</sub> General Terrain:	0 Rolling	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	I)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	, mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		, 2.,	mpn
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
$v_p = (V \text{ or } DDHV) / (PHF x)$	N x f <sub>HV 012</sub>	no/h/ln	Design LOS	Nvf	
x f <sub>p</sub> )	913	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	HV	pc/h/ln
s	75.0	mph	x f <sub>p</sub> )		mah
$D = v_p / S$	12.2	pc/mi/ln	S D = v / S		mph
LOS	В		$D = v_p / S$	- N	pc/mi/ln
			Required Number of Lanes	5, IN	
Glossary			Factor Location		
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Densi	-	E <sub>T</sub> - Exhibits 11-10, 11-11,		f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	BFFS - Ba	se free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	5
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freem		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	sch &	From/To	GA State Lii	ne to SR-2
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing AM		Analysis Year	2022	
	Technical Repo				
✓ Oper.(LOS)			Des.(N)	Planning 🗌	g Data
Flow Inputs					
Volume, V	3040	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0 De llin ri	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade    %     Length	Rolling mi	
		VOIII	Up/Down %		
Calculate Flow Adjus	stments		· · · · · ·		
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	, FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph		17.1	mpri
LOS and Performanc		3	Design (N)		
		-			
Operational (LOS)			Design (N)		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV oor (</sub>	·····	Design LOS	Nyf	
x f <sub>p</sub> )	2054	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	IN X I <sub>HV</sub>	pc/h/In
4 1			x f <sub>p</sub> )		

<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> 2054 62.7 32.8 D	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N x f_{HV})$ x f <sub>p</sub> ) S D = $v_p / S$ Required Number of Lanes, N	pc/h/ln mph pc/mi/ln
Glossary			Factor Location	
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design h	BFFS - Bas	ty -flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trave		
Agency or Company	Company	ch d	From/To	GA Stat	te Line to SR-2
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing AM	1	Analysis Year	2022	
	Fechnical Repo				
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT	1573	veh/h	Peak-Hour Factor, PHF	0.94	
		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			%RVs, P <sub>R</sub> General Terrain:	0 Dolling	
DDHV = AADT x K x D		veh/h	Grade % Length	Rolling mi	
		VOII/II	Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
	2.5				
			$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]0.787$		
Speed Inputs			Calc Speed Adj and	FF5	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	;	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV 1063</sub>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	Nxf	
x f <sub>p</sub> )	1005	p6/11/11	F	HV	pc/h/ln
S	75.0	mph	x f <sub>p</sub> )		mph
$D = v_p / S$	14.2	pc/mi/ln	S D-y/S		mph
LOS	В		$D = v_p / S$		pc/mi/ln
			Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	E <sub>T</sub> - Exhibits 11-10, 11-11		f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	f <sub>p</sub> - Page 11-18	,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, $v_p$ - Exhibits	11_2	The Taye II-II
speed	hourvelume		11-3	· · · <sup>-</sup> ∠,	
DDHV - Directional design	nour volume				

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General Information

RKSHEET			Page 1 of 1		
BASIC F	REEWAY	SEGMENTS WORKSHEE	ET		
		Site Information			
		Highway/Direction of Trav	el <i>I-24 EB</i>		
Alfred Ber Company	nesch &	From/To	SR-2 to Browns Ferry Rd		
1/4/2018 Existing A	М	Jurisdiction Analysis Year	2022		
Technical Re	eport				
		Des.(N)	Planning Data		
3302	veh/h	Peak-Hour Factor, PHF	0.94		
0001			0.01		

Analyst	Greg Freeman		Highway/Direction of Travel I-24 EB		
Agency or Company	Alfred Benes Company	ch &	From/To	SR-2 to	Browns Ferry Rd
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2022	
Project Description I-24 7	Technical Repo	ort			
✓ Oper.(LOS)		es.(N)	Planning Data		
Flow Inputs					
Volume, V AADT	3302	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x	N x fux		<u>Design (N)</u> Design LOS		
$x f_p$ )		pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )	κ Ν x f <sub>HV</sub>	pc/h/ln
e e e e e e e e e e e e e e e e e e e	57.7	mph	S		mph
D = v <sub>p</sub> / S LOS	38.7 E	pc/mi/ln	D = v <sub>p</sub> / S		pc/mi/ln
LU3	E		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
			1		

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General Information

RKSHEET		Page 1 of 1
BASIC FREEWAY	SEGMENTS WORKS	HEET
	Site Information	
Greg Freeman	Highway/Direction of	Travel I-24 WB
Alfred Benesch & Company	From/To	SR-2 to Browns Ferry Rd
1/4/2018 Existing AM	Jurisdiction Analysis Year	2022
Technical Report		
	Des.(N)	Planning Data

		Highway/Direction of Travel I-24 WB		
		From/To	SR-2 to	Browns Ferry Rd
1/4/2018		Jurisdiction		
		Analysis Year	2022	
echnical Repo				
✓ Oper.(LOS) □ De Flow Inputs			Plar	nning Data
1945				
	ven/day	1		
	veh/h		-	
	Voli/II	•		
tments				
1.00		E <sub>R</sub>	2.0	
2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T)]$	<sub>R</sub> - 1)] <i>0.787</i>	
Speed Inputs			d FFS	
12.0	ft			
6.0	ft	f <sub>LW</sub>	0.0	mph
2			0.0	mph
1.55	ramps/mi		4.7	mph
	mph	-	70 7	mph
75.4	mph		10.1	mpri
e Measures	;	Design (N)		
		Design (N)		
NI		Design LOS		
<sup>N X T</sup> HV 1314	pc/h/ln	$v_{p} = (V \text{ or } DDHV) / (PHF)$	= x N x f <sub>HV</sub>	
				pc/h/ln
69.8	mph	1 '		mph
		0		
18.8	pc/mi/ln			pc/mi/ln
	pc/mi/ln	$D = v_p / S$	nes, N	pc/mi/ln
18.8	pc/mi/ln	D = v <sub>p</sub> / S Required Number of La	nes, N	pc/mi/ln
18.8 C		D = v <sub>p</sub> / S Required Number of La <b>Factor Location</b>		
18.8 C S - Spee	d	D = v <sub>p</sub> / S Required Number of La <b>Factor Location</b> E <sub>R</sub> - Exhibits 11-10, 11-	12	f <sub>LW</sub> - Exhibit 11-8
18.8 C S - Spee D - Densi	d ity	D = v <sub>p</sub> / S Required Number of La <b>Factor Location</b> E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11-	12	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9
18.8 C S - Spee D - Densi FFS - Free	d ity e-flow speed	D = v <sub>p</sub> / S Required Number of La <b>Factor Location</b> E <sub>R</sub> - Exhibits 11-10, 11-	12	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9
18.8 C S - Spee D - Densi FFS - Free	d ity	D = v <sub>p</sub> / S Required Number of La <b>Factor Location</b> E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11-	12 11, 11-13	pc/mi/ln f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	Alfred Beness Company 1/4/2018 Existing AM echnical Repo 1945 1945 1945 1.00 2.5 12.0 6.0 2 1.55 75.4	Alfred Benesch & Company 1/4/2018 Existing AM echnical Report 1945 veh/h veh/day veh/h tments 1.00 2.5 12.0 ft 6.0 ft 2 1.55 ramps/mi mph 75.4 mph e Measures $N \times f_{HV} 1314$ pc/h/ln	Alfred Benesch & From/To Company 1/4/2018 Jurisdiction Existing AM Analysis Year Technical Report Technical Report Des.(N) 1945 veh/h veh/day %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: veh/h Grade % Length Up/Down G tments 1.00 E <sub>R</sub> 2.5 $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1) + $	Alfred Benesch & Company 1/4/2018From/ToSR-2 to1/4/2018Jurisdiction Analysis Year2022echnical ReportDes.(N)Plar1945veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, PT %Trucks and Buses, PT 18 %RVs, PR Grade0 General Terrain: Up/Down %1.00ER (add %)2.0 (add %)2.5ft fLC0.0 fLC12.0ft 6.0ft fLW0.0 fLC1.55ramps/mi mphrmph75.4mphPesign (N) Design LOSN x f_HV 69.8mphDesign (N) S

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	BASIC FRE	EEWAY SE	GMENTS WORKSH	EET	
General Information			Site Information		
Analyst	Greg Freema	n	Highway/Direction of Tra	avel <i>I-24 EB</i>	
Agency or Company	Alfred Beneso Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2022	
	echnical Repo	rt			
✓ Oper.(LOS)			es.(N)	🗌 Plar	ning Data
Flow Inputs					
Volume, V AADT	4359	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down 9	0 Rolling mi %	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Е <sub>т</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T)]$	<sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj an	d FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		70.2	
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 2806	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF	<sup>–</sup> x N x f <sub>HV</sub>	pc/h/ln
S	38.9	mph	x f <sub>p</sub> )		pomm
D = v <sub>p</sub> / S	72.1	pc/mi/ln	S		mph
LOS	F	pointin	D = v <sub>p</sub> / S Required Number of La	nes, N	pc/mi/ln
Glossary			Factor Location	·	
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design l	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhib 11-3	11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Trave	el <i>I-24 WB</i>	}
Agency or Company	Alfred Benes		From/To		Ferry Rd to SR 29
Date Performed	Company 1/4/2018		Jurisdiction	21011110	
Analysis Time Period	Existing AM		Analysis Year	2022	
	echnical Repo	ort	-		
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	2313	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	14	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
	1 1 -		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS		
Base free-flow Speed,	75.4		FFS	73.2	mph
BFFS	-	mph			
LOS and Performanc	e Measures	6	Design (N)		
0			<u>Design (N)</u>		
Operational (LOS)	NI f		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N X <sup>T</sup> HV <i>1489</i>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S	72.4	mph	S		mph
D = v <sub>p</sub> / S	20.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	s N	P 0/111/11
Glossany			Factor Location	o, 11	
Glossary					
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	•	E <sub>T</sub> - Exhibits 11-10, 11-11,	, 11-13	f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	вгго - ва	ise free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
			1		
General Information			Site Information		
Analyst			Highway/Direction of Travel I-24 EB		
Agency or Company	Alfred Benesch & F Company		From/To	I-59 to 0	GA State Line
Date Performed	6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing PM		Analysis Year	2022	
	Technical Repo	ort			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V	2052	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Coloulate Flour Adius	4				
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	- 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	
FFS (measured)		mph	-		mph
Base free-flow Speed,	/		FFS	72.7	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
			Design (N)		
<u> Operational (LOS)</u>			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 1,386	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF	x N x fui	
x f <sub>p</sub> )	1000	p 6/1/11	$x f_p$	HV	pc/h/ln
S	73.4	mph	S		mph
D = v <sub>p</sub> / S	18.9	pc/mi/ln			mph
LOS	С		$D = v_p / S$	. NI	pc/mi/ln
-			Required Number of Land	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-1	2	f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{T}$ - Exhibits 11-10, 11-1		f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	$f_{\rm p}$ - Page 11-18	.,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	ase free-flow	P	e 11 0	IND - Faye II-II
speed			LOS, S, FFS, v <sub>p</sub> - Exhibit 11-3	5 11-∠,	
DDHV - Directional design	hour volume				

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Brian Gaffne		Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Alfred Benes Company	ch &	From/To	I-59 to G	GA State Line
Date Performed	6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing PM		Analysis Year	2022	
	Technical Repo				
Oper.(LOS)			es.(N)	Plar	ning Data
Flow Inputs					
Volume, V	3022	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18 0	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			%RVs, P <sub>R</sub> General Terrain:	0 Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	
Base free-flow Speed, BFFS	75.4	mph		12.1	mph
LOS and Performanc	e Measures	5	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f		Design LOS		
x f <sub>p</sub> )	<sup>11</sup> 2041	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	63.0	mph	x f <sub>p</sub> )		·
$D = v_p / S$	32.4	pc/mi/ln	S		mph
LOS	D	F	D = v <sub>p</sub> / S		pc/mi/ln
	_		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm R} = E_{\rm X} + 10, 11 - 12$ $E_{\rm T} = E_{\rm X} + 10, 11 - 11$		$f_{LW} = Exhibit 11-9$
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	$f_p - Page 11-18$	,0	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, $v_p$ - Exhibits	11_2	Taye 11-11
	hourvolume		11-3	· ۱-۲,	
DDHV - Directional design	nour volume				

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	DASIC FR	EEWAT SE	GMENTS WORKSHEE	- 1	
General Information			Site Information		
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trave		
Agency or Company Date Performed Analysis Time Period	Company 1/4/2018 Existing PM		From/To Jurisdiction Analysis Year	GA State Lin 2022	e to SR-2
Project Description I-24 T	echnical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Planning	Data
Flow Inputs					
Volume, V AADT	2282	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			·
LOS and Performance	e Measures	;	Design (N)		
Operational (LOS)	l v f		<u>Design (N)</u> Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x M x f <sub>p</sub> )	1542 <sup>HV</sup>	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )	N x f <sub>HV</sub>	pc/h/ln
S	71.7	mph	S		mph
$D = v_p / S$	21.5	pc/mi/ln	$D = v_p / S$		pc/mi/l
LOS	С		Required Number of Lane	s, N	P0/111/1
Glossary			Factor Location		

N - Number of lanes S - Speed E<sub>R</sub> - Exhibits 11-10, 11-12 V - Hourly volume D - Density E<sub>T</sub> - Exhibits 11-10, 11-11, 11-13 v<sub>p</sub> - Flow rate FFS - Free-flow speed f<sub>p</sub> - Page 11-18 BFFS - Base free-flow LOS - Level of service LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2, speed 11-3 DDHV - Directional design hour volume

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f<sub>LW</sub> - Exhibit 11-8

f<sub>LC</sub> - Exhibit 11-9

TRD - Page 11-11

	BASIC FR	EEWAY SE	GMENTS WORKSHE	T	
General Information			Site Information		
Analyst	Greg Freeman H		Highway/Direction of Travel <i>I-24 WB</i>		
Agency or Company	Alfred Benes Company	sch &	From/To	GA Stat	e Line to SR-2
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2022	
Project Description I-24 7	echnical Rep	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	3331	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length	Rolling mi	
		ven/n	Up/Down %	1111	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and	FFS	
_ane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	-
Base free-flow Speed,	75.4	mph		74.1	mph
BFFS		-			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
	Nxf		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x   x f )	<sup>HV</sup> 2250	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	κ Ν x f <sub>HV</sub>	pc/h/ln
x f <sub>p</sub> ) S	<b>57 7</b>	mph	x f <sub>p</sub> )		po/II/III
	57.7 20.0	mph ng/mi/ln	S		mph
$D = v_p / S$	39.0 E	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	E		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12	,	f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	sity			
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ase free-flow	f <sub>p</sub> - Page 11-18	44.0	TRD - Page 11-1
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	5 11-2,	

DDHV - Directional design hour volume

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	T		
<b>O</b>						
General Information			Site Information			
Analyst	Alfred Benesch &		Highway/Direction of Trave			
Agency or Company	Company	n œ	From/To	SR-2 to	Browns Ferry Rd	
Date Performed	1/4/2018		Jurisdiction	2022		
Analysis Time Period Project Description <i>I-24</i> 7	Existing PM	+	Analysis Year	2022		
Oper.(LOS)			Des.(N)	Plan	nning Data	
Flow Inputs			Jes.(IN)		Ining Data	
Volume, V	2722	veh/h	Peak-Hour Factor, PHF	0.94		
AADT	2122	veh/day	%Trucks and Buses, $P_T$	0.94 18		
Peak-Hr Prop. of AADT, K		· · · · /	%RVs, P <sub>R</sub>	0		
Peak-Hr Direction Prop, D			General Terrain:	o Rolling		
DDHV = AADT x K x D		veh/h	Grade % Length	mi		
			Up/Down %			
Calculate Flow Adjus	stments					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0		
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.787</i>		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width	12.0	ft				
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph	
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph	
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph	
FFS (measured)		mph	-			
Base free-flow Speed,	75.4		FFS	70.7	mph	
BFFS	73.4	mph				
LOS and Performanc	e Measures		Design (N)			
Onerational (LOC)			Design (N)			
Operational (LOS)	NI £		Design LOS			
v <sub>p</sub> = (V or DDHV) / (PHF x	<sup>IN X I</sup> HV 1839	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>		
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln	
S D = w / C	65.3	mph	s		mph	
$D = v_p / S$	28.2	pc/mi/ln	$D = v_p / S$		pc/mi/ln	
LOS	D		Required Number of Lane	s, N	•	
Glossary			Factor Location			
N - Number of lanes	S - Speed				<u> </u>	
V - Hourly volume	D - Densit		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8	
v - Flow rate	FFS - Free-	-	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9	
			f <sub>p</sub> - Page 11-18		TRD - Page 11-1	

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2, speed 11-3 DDHV - Directional design hour volume

BFFS - Base free-flow

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LOS - Level of service

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f<sub>p</sub> - Page 11-18

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TRD - Page 11-11

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 WB</i>		
Agency or Company	Alfred Benes Company	ch &	From/To	SR-2 to	Browns Ferry Rd
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2022	
	Technical Repo				
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V	3390	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	
Base free-flow Speed,	75 /		гго	70.7	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	\$	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	Nxf		Design LOS		
v <sub>p</sub> (vorbbinv)/(inix) vf)	2290	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	k N x f <sub>HV</sub>	pc/h/ln
x f <sub>p</sub> )	50.0		x f <sub>p</sub> )		pc/n/m
S D = v / C	56.2	mph	S		mph
D = v <sub>p</sub> / S	40.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	E		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed			
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		e-now speed ase free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	Di i C - Da		LOS, S, FFS, v <sub>p</sub> - Exhibits	s 11-2,	
DDHV - Directional design	hour volume		11-3		
5	-				

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 EB</i>		
Agency or Company	Alfred Benes Company		From/To		Ferry Rd to SR 29
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
,,	Technical Repo				
✓ Oper.(LOS)			Des.(N)	Plar	ning Data
Flow Inputs					
Volume, V	4511	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	14	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length	Rolling	
		ven/n	Grade % Length Up/Down %	mi	
Calaulata Elaw Adiua	tmonto				
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <b>0.826</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS		
Base free-flow Speed,	75 4		FF5	73.2	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
	Nyf		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	<sup>N X I</sup> HV 2903	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	··· - //- //
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S ( C	34.9	mph	S		mph
D = v <sub>p</sub> / S	83.2	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lane	s, N	·
Glossary			Factor Location		
N - Number of lanes	S - Spee	d			
V - Hourly volume	D - Densi		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
,		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	, 11-13	f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> -Flow rate LOS -Level of service		se free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	DI FO - Da		LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	EET	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 WB</i>		
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2022	
	Fechnical Repo				
Oper.(LOS)			Des.(N)	Plar	ning Data
Flow Inputs					
Volume, V AADT	4283	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi %	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F)]$	<sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj an	d FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph	110	10.2	трп
LOS and Performanc	e Measures	3	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 2757	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF	<sup>=</sup> x N x f <sub>HV</sub>	pc/h/ln
S P	40.8	mph	x f <sub>p</sub> )		1
D = v <sub>p</sub> / S	67.5	pc/mi/ln	S		mph
LOS	F	P	D = v <sub>p</sub> / S Required Number of La	nes, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed			E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhib	11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Brian Gaffne		Highway/Direction of Trav	/el <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	icn &	From/To	I-59 to G	GA State Line
Date Performed	6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing AM		Analysis Year	2042	
	Technical Repo	ort			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V	3861	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D		v a b /b	General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Coloulata Elour Adiua	tmonto				
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	
FFS (measured)		mph	-		mph
Base free-flow Speed,	/		FFS	72.7	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	5	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 2608	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	x N x f	
x f <sub>p</sub> )	2000	po/1/11	1'	HV	pc/h/ln
S	46.4	mph	x f <sub>p</sub> )		mph
D = v <sub>p</sub> / S	56.2	pc/mi/ln	S D = X / S		mph
LOS	F		$D = v_p / S$		pc/mi/ln
			Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12	2	f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm R}$ - Exhibits 11-10, 11-1		f <sub>IC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	1	, 11-10	
LOS - Level of service	BFFS - Ba	ase free-flow	f <sub>p</sub> - Page 11-18	. 11 0	TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	5 1 1-2,	
DDHV - Directional design	hour volume		11-3		

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BASIC FRE	EWAY SE	GMENTS WORKSHEE	Т	
		Site Information		
Brian Gaffney	,		el <i>I-24 WB</i>	
Alfred Beneso		From/To	I-59 to G	GA State Line
6/6/18		Jurisdiction Analysis Year	Georgia 2042	
_	rt	· · · · · · <b>j</b> - · - · · · · ·		
•		es.(N)	Plan	ning Data
		× /		-
1758	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
	veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
tments				
1.00		E <sub>R</sub>	2.0	
2.5			1)] <i>0.</i> 787	
		Calc Speed Adj and	FFS	
12.0	ft			
6.0	ft	f	0.0	mph
2			0.0	mph
0.81	ramps/mi		2.7	mph
	mph	FFS	72.7	mph
75.4	mph			
e Measures		Design (N)		
N x f <sub>HV</sub> 1188	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
74.6	mph	x f <sub>p</sub> )		pc/h/ln
15.9	pc/mi/ln			mph
В			s, N	pc/mi/ln
		Factor Location		
D - Densi FFS - Free BFFS - Bas	ty -flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
	Brian Gaffney Alfred Beneso Company 6/6/18 Existing AM echnical Report 1758 1758 1758 12.0 6.0 2.5 12.0 6.0 2 0.81 75.4 <b>E Measures</b> N x f <sub>HV</sub> 1188 74.6 15.9 B S - Speet D - Densir FFS - Free	Brian Gaffney         Alfred Benesch &         Company         6/6/18         Existing AM         echnical Report         1758       veh/h         1758       veh/h         1758       veh/h         1758       veh/h         1758       veh/h         100       2.5         12.0       ft         6.0       ft         2       0.81         ramps/mi       mph         75.4       mph         Pemeasures       N x f <sub>HV</sub> 1188         N x f <sub>HV</sub> 1188       pc/h/ln         74.6       mph         B       S - Speed         D - Density       FFS - Free-flow speed         BFFS - Base free-flow	Site InformationBrian Gaffney Alfred Benesch & Company 6/6/18Highway/Direction of Trave From/To Jurisdiction Analysis YearExisting AMAnalysis Yearechnical ReportDes.(N)1758veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: Grade % Length Up/Down %1758veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: Grade % Length Up/Down %100ER 2.51.00ER 2.51.00ER (LC TRD Adjustment mph12.0ft fLC TRD Adjustment mph75.4mphPesign (N)e MeasuresDesign (N) Design LOS vp = (V or DDHV) / (PHF x x fp) S D = vp / S Required Number of Lane\$ - Speed D - Density FFS - Free-flow speed BFFS - Base free-flowER - Exhibits 11-10, 11-12 ET - Exhibits 11-10, 11-11 fp - Page 11-18 LOS, S, FFS, vp - Exhibits	Brian Gaffney Alfred Benesch & Company 6/6/18Highway/Direction of Travel I-24 WB From/ToAlfred Benesch & Company 6/6/18From/ToI-59 to G 6/6/18Jurisdiction Existing AMGeorgia 2042echnical ReportDes.(N)Plan1758veh/h veh/dayPeak-Hour Factor, PHF Nucks and Buses, PT 0.94 %Trucks and Buses, PT 0.94 %Trucks and Buses, PT 0.94 %Trucks and Buses, PT 0.94 

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	BASIC F	<b>REEWAY S</b>	EGMENTS WORKSHE	ĒT
General Information			Site Information	
Analyst	Greg Free	man	Highway/Direction of Trav	el <i>I-24 EB</i>
Agency or Company	Alfred Ber Company	esch &	From/To	GA State Line to SR-
Date Performed Analysis Time Period	1/4/2018 Existing A	M	Jurisdiction Analysis Year	2042
Project Description I-24	Technical Re	eport		
✓ Oper.(LOS)			Des.(N)	Planning Data
Flow Inputs				
Volume, V	3958	veh/h	Peak-Hour Factor, PHF	0.94
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0
Peak-Hr Direction Prop, D			General Terrain:	Rolling
DDHV = AADT x K x D		veh/h	Grade % Length	mi
			Up/Down %	
Calculate Flow Adjus	stments			
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0
Ē <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>
Speed Inputs			Calc Speed Adj and	FFS
ane Width	12.0	ft		
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0 mph
Number of Lanes, N	2		f <sub>L</sub>	0.0 mph

AADT	0000	veh/day	%Trucks and Buses, $P_{T}$	0.34 18	
Peak-Hr Prop. of AADT, K		von/day	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	tments		00/20011	<u>,</u>	
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R)]$	- 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph		,	p.i
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$ x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2674 44.0 60.8 F	pc/h/ln mph pc/mi/ln	Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x f <sub>p</sub> ) S D = v <sub>p</sub> / S Required Number of Lar		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Bas		E <sub>R</sub> - Exhibits 11-10, 11-1 E <sub>T</sub> - Exhibits 11-10, 11-1 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibi 11-3	1, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Alfred Beneso Company	ch &	From/To	GA State Line	e to SR-2
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing AM		Analysis Year	2042	
	echnical Repo				
Oper.(LOS)			Des.(N)	Planning	Data
Flow Inputs	00.40			0.04	
Volume, V AADT	2048	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K		von/day	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	。 Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph		7 1.1	mpri
LOS and Performanc	e Measures		Design (N)		
			Design (N)		

FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			mpn
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1383 73.4 18.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / ( x f <sub>p</sub> ) S D = v <sub>p</sub> / S Required Number of		pc/h/ln mph pc/mi/ln
Glossary			Factor Location	1	
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	ly -flow speed	E <sub>R</sub> - Exhibits 11-10, E <sub>T</sub> - Exhibits 11-10, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Ex 11-3	11-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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x f<sub>p</sub>)

LOS

speed

D = v<sub>p</sub> / S

Glossary

N - Number of lanes

LOS - Level of service

V - Hourly volume

v<sub>p</sub> - Flow rate

S

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Alfred Benesch & Company 1/4/2018		Highway/Direction of Trav	el <i>I-24 EB</i>	
Agency or Company			From/To	SR-2 to Bro	wns Ferry Ra
Date Performed			Jurisdiction		
Analysis Time Period			Analysis Year	2042	
Project Description I-24 7	Fechnical Repo	ort			
Oper.(LOS)			Des.(N)	🗌 Plannin	g Data
Flow Inputs					
Volume, V	4325	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Coloulate Flow Adius	4				
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	, FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph	110	70.7	трп
LOS and Performanc	e Measures	6	Design (N)		
			Design (N)		
<u> Operational (LOS)</u>			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 2022</sub>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	Nxf	
v f )	LJLL	P0/11/11		··· · · HV	nc/h/ln

Required Number of Lanes, N

E<sub>R</sub> - Exhibits 11-10, 11-12

E<sub>T</sub> - Exhibits 11-10, 11-11, 11-13

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2,

Factor Location

f<sub>p</sub> - Page 11-18

11-3

pc/mi/ln

mph

35.6

82.1

S - Speed

D - Density

FFS - Free-flow speed

BFFS - Base free-flow

F

x f<sub>p</sub>)

D = v<sub>p</sub> / S

S

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DDHV - Directional design hour volume

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pc/h/ln

pc/mi/ln

mph

f<sub>LW</sub> - Exhibit 11-8

f<sub>IC</sub> - Exhibit 11-9

TRD - Page 11-11

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Company		From/To	SR-2 to	Browns Ferry Rd
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing AM		Analysis Year	2042	
	echnical Repo				·
✓ Oper.(LOS)			Des.(N)	Pian	ning Data
Flow Inputs	0500	l. /l.		0.04	
Volume, V AADT	2569	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K		ven/day	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	0 Rolling	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed,	75.4	mph		10.1	прп
BFFS					
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x fuy		Design LOS		
x f <sub>p</sub> )	<sup>nv</sup> 1735	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	pc/h/ln
S	66.7	mph	x f <sub>p</sub> )		F
$D = v_p / S$	26.0	pc/mi/ln	S		mph
LOS	D	p 0/111/11	D = v <sub>p</sub> / S		pc/mi/ln
	D		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Densi	ty	$E_{\rm R}$ - Exhibits 11-10, 11-11, E <sub>T</sub> - Exhibits 11-10, 11-11,	11_13	=
v <sub>p</sub> - Flow rate	FFS - Free	-flow speed	1 ·	11-10	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service	BFFS - Ba	se free-flow	f <sub>p</sub> - Page 11-18	11 0	TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	ı <b>I-</b> ∠,	
DDHV - Directional design	nour volume				

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	BASIC FRI	EEWAY SE	GMENTS WORKSH	IEET	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of T	ravel <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2042	
Project Description I-24 7	echnical Repo	rt			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	ning Data
Flow Inputs					
Volume, V AADT	5805	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	E <sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs	ed Inputs		Calc Speed Adj ar	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		10.2	mpn
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 3736	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>n</sub> = (V or DDHV) / (PH	IF x N x f <sub>□v</sub>	
x f <sub>p</sub> )		P	x f <sub>p</sub> )	ΠV	pc/h/ln
S		mph	S		mph
$D = v_p / S$		pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of La	anes, N	P
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11 E <sub>T</sub> - Exhibits 11-10, 11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhil 11-3	-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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General Information Analyst Agency or Company Date Performed Analysis Time Period Project Description <i>I-24 T</i> ✓ Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3084 tments 1.00	ch &	Site Information Highway/Direction of Tr From/To Jurisdiction Analysis Year Des.(N) Peak-Hour Factor, PHF %Trucks and Buses, Pa %RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down	Browns 2042 Plar Plar 0.94 T 14 0 Rolling m	Ferry Rd to SR 29
Agency or Company Date Performed Analysis Time Period Project Description 1-24 T © Oper.(LOS) <b>Flow Inputs</b> Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	Alfred Beness Company 1/4/2018 Existing AM echnical Repo 3084 3084 tments 1.00	ch & ort veh/h veh/day	From/To Jurisdiction Analysis Year Des.(N) Peak-Hour Factor, PHF %Trucks and Buses, P- %RVs, P <sub>R</sub> General Terrain: Grade % Length	Browns 2042 Plar Plar 0.94 T 14 0 Rolling m	Ferry Rd to SR 29
Date Performed Analysis Time Period Project Description <i>I-24 Tr</i> ✓ Oper.(LOS) <b>Flow Inputs</b> Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	Company 1/4/2018 Existing AM echnical Repo 3084 3084 tments 1.00	veh/h veh/day	Jurisdiction Analysis Year Des.(N) Peak-Hour Factor, PHF %Trucks and Buses, P %RVs, P <sub>R</sub> General Terrain: Grade % Length	2042 Plar 0.94 T 14 0 Rolling mi	
Analysis Time Period Project Description <i>I-24 Tr</i> ✓ Oper.(LOS) <b>Flow Inputs</b> Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	1/4/2018 Existing AM echnical Repo 3084 3084 tments 1.00	veh/h veh/day	Analysis Year Des.(N) Peak-Hour Factor, PHF %Trucks and Buses, P- %RVs, P <sub>R</sub> General Terrain: Grade % Length	☐ Plar = 0.94 T 14 0 Rolling n mi	nning Data
✓ Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3084 tments 1.00	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P %RVs, P <sub>R</sub> General Terrain: Grade % Length	- 0.94 T 14 0 Rolling n mi	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	<b>tments</b> 1.00	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P %RVs, P <sub>R</sub> General Terrain: Grade % Length	- 0.94 T 14 0 Rolling n mi	nning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	<b>tments</b> 1.00	veh/day	%Trucks and Buses, P %RVs, P <sub>R</sub> General Terrain: Grade % Length	T 14 0 Rolling N mi	
AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	<b>tments</b> 1.00	veh/day	%Trucks and Buses, P %RVs, P <sub>R</sub> General Terrain: Grade % Length	T 14 0 Rolling N mi	
Peak-Hr Direction Prop, D DDHV = AADT x K x D	1.00	veh/h	General Terrain: Grade % Length	Rolling mi	
DDHV = AADT x K x D	1.00	veh/h	Grade % Length	n <i>mi</i>	
<u></u>	1.00				
Calculate Flow Adjust	1.00				
f <sub>p</sub>			E <sub>R</sub>	2.0	
Ê <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	E <sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj ar	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		75.2	mpn
LOS and Performance	e Measures	5	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N	N x f <sub>HV</sub> 1985	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PH	F x N x f <sub>LN</sub> ,	
x f <sub>p</sub> )			x f <sub>p</sub> )	ΠV	pc/h/ln
S	64.3	mph	S p		mph
D = v <sub>p</sub> / S	30.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		P Required Number of La	anes, N	F
Glossary			Factor Location		
N - Number of lanes	S - Spee	d		10	f
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11		f <sub>LW</sub> - Exhibit 11-8
v <sub>n</sub> - Flow rate		-flow speed	E <sub>T</sub> - Exhibits 11-10, 11	-11, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhil	bits 11-2,	TRD - Page 11-1
, DDHV - Directional design h	nour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Brian Gaffne	v	Highway/Direction of Trav	el <i>I-24 EB</i>	
Agency or Company	Alfred Benes		From/To		GA State Line
Date Performed	Company 6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description 1-24 7	Technical Repo				
Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs					
Volume, V AADT	2668	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
		ven/uay	%RVs, P <sub>R</sub>	0	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			General Terrain:	u Rolling	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed,	75.4	mph		12.1	mpn
BFFS		-			
LOS and Performanc	e measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f		Design LOS		
x f <sub>p</sub> )	<sup>HV</sup> 1802	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	: N x f <sub>HV</sub>	pc/h/ln
S P	67.9	mph	x f <sub>p</sub> )		F
D = v <sub>p</sub> / S	26.5	pc/mi/ln	S		mph
LOS	D	P 0/11/11	D = v <sub>p</sub> / S		pc/mi/ln
200	2		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E <sub>R</sub> - Exhibits 11-10, 11-12	2	f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm R}$ - Exhibits 11-10, 11-11		$f_{\rm LC}$ - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	$f_{p}$ - Page 11-18	,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, $v_p$ - Exhibits	11-2	ine rage ii-II
speed	hourvolume		11-3	· · · · <b>∠</b> ,	
DDHV - Directional design	nour volume				

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Brian Gaffney	/	Highway/Direction of Trave	el <i>I-24 WB</i>	1
Agency or Company	Alfred Benes		From/To		GA State Line
Date Performed	Company 6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Existing PM		Analysis Year	2042	
	Fechnical Repo				
Oper.(LOS)			es.(N)	Plar	nning Data
Flow Inputs				0.04	
Volume, V AADT	3929	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K		ven/udy	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed,	75.4	mph		,	mpri
BFFS LOS and Performanc		-	Decign (N)		
LOS and Performanc	e measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV and (</sub>		Design LOS	Nucl	
x f <sub>p</sub> )	2654	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N X I <sub>HV</sub>	pc/h/ln
ร์	44.7	mph	x f <sub>p</sub> )		
$D = v_p / S$	59.4	pc/mi/ln	S D = v / C		mph
LOS	F		$D = v_p / S$		pc/mi/ln
			Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Densi	-	$E_{T}$ - Exhibits 11-10, 11-11,		f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	BFFS - Ba	se free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	0
DDHV - Directional design	hour volume		11-3		

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	Т	
			1		
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Benese Company	ch &	From/To	GA State	e Line to SR-2
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 T	echnical Repo				
✓ Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs					
Volume, V	2971	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0 Dolling	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length	Rolling mi	
		Volim	Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and I		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f	0.0	mph
Number of Lanes, N	2	i.	f <sub>LW</sub>		mph
Total Ramp Density, TRD	0.35	ramps/mi	f <sub>LC</sub>	0.0	mph
FFS (measured)	0.55		TRD Adjustment	1.3	mph
Base free-flow Speed,		mph	FFS	74.1	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures		Design (N)		
			Design (N)		
Operational (LOS)	1		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x I	N X <sup>f</sup> HV 2007	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>нv</sub>	
x t <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S	63.8	mph	S		mph
D = v <sub>p</sub> / S	31.5	pc/mi/ln	$D = v_p / S$		, pc/mi/ln
LOS	D		Required Number of Lanes	5. N	
Glossary			Factor Location	,	
N - Number of lanes	S - Spee	d			
V - Hourly volume	D - Densi		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	2 O Du		LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Alfred Benes		From/To		e Line to SR-2
Date Performed	Company 1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 7	Technical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Plan	ining Data
Flow Inputs					
Volume, V	4337	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			%RVs, P <sub>R</sub> General Terrain:	0 Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	ri mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
ÉT	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed,	75.4	mph		74.1	mpri
BFFS		-			
LOS and Performanc	e measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x fui		Design LOS		
x f <sub>p</sub> )	<sup>HV</sup> 2930	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	pc/h/ln
S p	33.8	mph	x f <sub>p</sub> )		F
D = v <sub>p</sub> / S	86.8	pc/mi/ln	S		mph
LOS	F	P 0/11/11	D = v <sub>p</sub> / S		pc/mi/ln
200			Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>I W</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm T}$ - Exhibits 11-10, 11-11,		$f_{\rm LC}$ - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	$f_{n} - Page 11-18$	,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, $v_p$ - Exhibits	11-2	ind - rage in-II
speed	hourvolume		11-3	· · ∠,	
DDHV - Directional design	nour volume				

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v<sub>p</sub> - Flow rate

speed

LOS - Level of service

1					
General Information			Site Information		
Analyst	Greg Freemar		Highway/Direction of Trav	el <i>I-24 EB</i>	
Agency or Company	Alfred Benesc Company	h &	From/To	SR-2 to I	Browns Ferry Rd
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 7	Fechnical Repor				
✓ Oper.(LOS)			Des.(N)	Plan	ning Data
Flow Inputs					
Volume, V	3587	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub> General Terrain:	0 Polling	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	Grade % Length	Rolling mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
É <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed,	75.4	mph		70.7	прп
BFFS		трп			
LOS and Performanc	e Measures		Design (N)		
			<u>Design (N)</u>		
Operational (LOS)			Docian LOS		
<u>Operational (LOS)</u> v <sub>n</sub> = (V or DDHV) / (PHF x	N x f <sub>LN/</sub>		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub> 2423	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x	: N x f <sub>HV</sub>	pc/h/ln
v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )			v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )	αΝ x f <sub>HV</sub>	pc/h/ln
v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S	52.6	mph	v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S	αΝ x f <sub>HV</sub>	mph
$v_p = (V \text{ or DDHV}) / (PHF x)$ x f <sub>p</sub> ) S D = v <sub>p</sub> / S	52.6 46.0		v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )	αΝ x f <sub>HV</sub>	•
v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S	52.6	mph	v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S		mph
$v_p = (V \text{ or DDHV}) / (PHF x)$ x f <sub>p</sub> ) S D = v <sub>p</sub> / S	52.6 46.0	mph	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$ S D = $v_p / S$		mph
$v_p = (V \text{ or DDHV}) / (PHF x)$ x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	52.6 46.0	mph pc/mi/ln	v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S Required Number of Lane	s, N	mph

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DDHV - Directional design hour volume

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f<sub>p</sub> - Page 11-18

11-3

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2,

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f<sub>LC</sub> - Exhibit 11-9

TRD - Page 11-11

FFS - Free-flow speed

BFFS - Base free-flow

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
Conorol Information			Site Information		
General Information	Crog Erooma	2	Site Information		,
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trav		
Agency or Company	Company		From/To	SR-2 to	Browns Ferry Rd
Date Performed	1/4/2018		Jurisdiction	2042	
Analysis Time Period Project Description <i>I-24</i> 7	Existing PM	Nrt	Analysis Year	2042	
	echnical Repu				ning Data
✓ Oper.(LOS)			Des.(N)		nning Data
Flow Inputs	4400	v o b /b	Deels Heurs Feeter, DHF	0.04	
Volume, V AADT	4420	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
		ven/uay	1		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D			%RVs, P <sub>R</sub> General Terrain:	0 Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
fp	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed,	75.4	mph		70.7	прп
BFFS		-			
LOS and Performanc	e Measures	•	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
V = (V  or  DDHV) / (PHE x)	Nvf		Design LOS		
$v_p = (V \text{ or } DDHV) / (PHF x)$	<sup>HV</sup> 2986	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	no/h/ln
x f <sub>p</sub> )	22.0		x f <sub>p</sub> )		pc/h/ln
S D = y / S	33.0	mph	S		mph
$D = v_p / S$	90.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d		,	f Eyhihit 44.0
V - Hourly volume	D - Densi		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Company	CITA	From/To	Browns	Ferry Rd to SR 29
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
	Fechnical Repo				
Oper.(LOS)			es.(N)	Plar	nning Data
Flow Inputs					
Volume, V	4511	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	14	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0 De #/a	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length	Rolling mi	
		Ven/II	Up/Down %		
Calculate Flow Adjus	tments		•F/= - ···· ··		
	1.00		E <sub>R</sub>	2.0	
f <sub>p</sub>					
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed,	75.4	mph		10.2	mpri
BFFS		-			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$\frac{Operational (LOS)}{(DUE )}$	Nyf		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	<sup>N X I</sup> HV 2903	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	·· - //- //
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S ( C	34.9	mph	S		mph
$D = v_p / S$	83.2	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lanes	s, N	·
Glossary			Factor Location		
N - Number of lanes	S - Spee				
			E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	•	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate LOS - Level of service		e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	DEL9 - D9	ise free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		
<u> </u>					

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema	n	Highway/Direction of Trave	el <i>I-24 WB</i>	}
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2042	
	echnical Repo				
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT	5670	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>HV 3649</sub>	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	Nxf	
x f <sub>p</sub> )	0040		$x f_p$ (v or <i>DDTTV</i> )/(1111 x	HV	pc/h/ln
S		mph	S S		mph
D = v <sub>p</sub> / S		pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Brian Gaffney	V	Highway/Direction of Trave	- 1-24 FR	
Agency or Company	Alfred Benes		From/To	I-59 to GA State Line	
Date Performed	Company 6/6/18		Jurisdiction		
Analysis Time Period	Proposed AN	1	Analysis Year	Georgia 2022	
	echnical Repo		5		
✓ Oper.(LOS)			es.(N)	🗌 Plar	ining Data
Flow Inputs					
Volume, V	2970	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		v e b /b	General Terrain:	Rolling	
DDHV = AADT X K X D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tmonts				
	1.00			2.0	
f <sub>p</sub>			E <sub>R</sub>		
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		,	p.i
LOS and Performance	e Measures	;	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
$\frac{Operational (LOS)}{V} = (V \text{ or } DDHV) / (DHE v N)$	l v f		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x N	<sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> / <sub>1</sub> 338	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	pc/h/ln
x f <sub>p</sub> ) S	73.7	mph	x f <sub>p</sub> )		pe/n/m
$D = v_p / S$	18.1	pc/mi/ln	S		mph
LOS	То. Т С	pc/m/m	D = v <sub>p</sub> / S		pc/mi/ln
103	C		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E Exhibite 11 10 11 12		f Eybibit 11.9
V - Hourly volume	D - Dens	ity	E <sub>R</sub> - Exhibits 11-10, 11-12	11 10	f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18	44.0	TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design l	nour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information	Prion Coffina		Site Information		
Analyst	Brian Gaffne Alfred Benes		Highway/Direction of Trave		
Agency or Company	Company		From/To		GA State Line
Date Performed Analysis Time Period	6/6/18 Proposed AN	Л	Jurisdiction Analysis Year	Georgia 2022	
	Technical Repo		Analysis Tea	2022	
✓ Oper.(LOS)			Des.(N)	Plar	ning Data
Flow Inputs					
Volume, V	1352	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	, FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		12.1	mpn
LOS and Performanc	e Measures	\$	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	Nyf		Design LOS		
$x_p = (v or DDriv) / (r rin x)$ x f <sub>p</sub> )	<sup>HV</sup> 609	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	pc/h/ln
s	75.0	mph	x f <sub>p</sub> )		
$D = v_p / S$	8.1	pc/mi/In	S ( C		mph
LOS	А	·	D = v <sub>p</sub> / S		pc/mi/ln
			Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>I w</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	sity	$E_{T}$ - Exhibits 11-10, 11-11		f <sub>IC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	f <sub>p</sub> - Page 11-18	,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	ase free-flow	LOS, S, FFS, $v_p$ - Exhibits	11-2	
speed	hourvolume		11-3	· · · <b>∠</b> ,	
DDHV - Directional design			-		

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	T		
General Information			Site Information			
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 EB</i>		
Agency or Company	Alfred Beneso Company	ch &	From/To	GA State Li	GA State Line to SR-2	
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2022		
Project Description I-24 7	Fechnical Repo	rt				
✓ Oper.(LOS)			Des.(N)	🗌 Plannin	g Data	
Flow Inputs						
Volume, V AADT	3040	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi		
Calculate Flow Adjus	tments					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0		
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <b>0.787</b>		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width	12.0	ft				
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph	
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph	
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph	
FFS (measured)		mph	FFS	74.1	mph	

			•		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	E <sub>R</sub> - 1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj ar	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	, FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			p.i
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1369 73.5 18.6 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PH x f <sub>p</sub> ) S D = v <sub>p</sub> / S Required Number of La		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	ume D - Density FFS - Free-flow speed f service BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11 E <sub>T</sub> - Exhibits 11-10, 11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhil 11-3	-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information	Crog Eroom		Site Information	101124 M/E	•
Analyst	Greg Freema Alfred Benes		Highway/Direction of Trav		
Agency or Company	Company		From/To	GA Stat	e Line to SR-2
Date Performed	1/4/2018 Evicting AM		Jurisdiction	2022	
Analysis Time Period Project Description <i>I-24</i> 7	Existing AM Fechnical Repo	ort	Analysis Year	2022	
Project Description 7-24 7 ✓ Oper.(LOS)	echnical Kept		Des.(N)		ning Doto
Flow Inputs			Jes.(IN)		nning Data
Volume, V	1573	veh/h	Peak-Hour Factor, PHF	0.94	
AADT	1575	ven/n veh/day	%Trucks and Buses, $P_T$	0.94 18	
Peak-Hr Prop. of AADT, K		ven/day	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	0 Rolling	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	£	0.0	mah
	3	it.	f <sub>LW</sub>	0.0	mph
Number of Lanes, N			f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
			Design (N)		
Operational (LOS)	NI £		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N X <sup>T</sup> HV 708	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	x N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S	75.0	mph	S		mph
D = v <sub>p</sub> / S	9.4	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	A		Required Number of Lane	es N	po/m/m
Glossary			Factor Location		
	<u> </u>	ad			
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12	2	f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	•	E <sub>T</sub> - Exhibits 11-10, 11-1 <sup>2</sup>	1, 11-13	f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	BFFS - Ba	ase free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibit	s 11-2,	-
DDHV - Directional design	hour volume		11-3		
Eliterational design					

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Project Description *I-24 Technical Report* 

✓ Oper.(LOS)

General Information

Agency or Company

Analysis Time Period

Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D

Date Performed

*Flow Inputs* Volume, V

AADT

Analyst

**BASIC FREEWAY** 

veh/h

veh/h

veh/day

Greg Freeman Alfred Benesch &

Company

1/4/2018 Existing AM

3302

	Page 1 of 1
SEGMENTS WORKSHEE	T
Site Information	
Highway/Direction of Trave	el I-24 EB
From/To	SR-2 to Browns Ferry Rd
Jurisdiction Analysis Year	2022
Des.(N)	Planning Data
Peak-Hour Factor, PHF	0.94
%Trucks and Buses, P <sub>T</sub>	18
%RVs, P <sub>R</sub>	0
General Terrain:	Rolling
Grade % Length	mi

			Up/Down		
Calculate Flow Adjus	tments		· .		
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	E <sub>R</sub> - 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj a	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph		, 0.,	mpri
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS <b>Glossary</b>	N x f <sub>HV</sub> 1487 69.0 21.5 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHx f_p)SD = v_p / SRequired Number of LaFactor Location$		pc/h/ln mph pc/mi/ln
N - Number of lanes	S - Speed	b	E <sub>R</sub> - Exhibits 11-10, 11	-12	f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhi 11-3	-11, 11-13	= • •

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Project Description *I-24 Technical Report* 

✓ Oper.(LOS)

General Information

Agency or Company

Analysis Time Period

Peak-Hr Prop. of AADT, K

Date Performed

Flow Inputs Volume, V

AADT

Analyst

RKSHEET			Page 1 of 1	
BASIC F	REEWAY S	EGMENTS WORKSHEE	ET	
		Site Information		
Greg Freeman		Highway/Direction of Travel I-24 WB		
Alfred Benesch & Company		From/To	SR-2 to Browns Ferry Rd	
1/4/2018 Existing A		Jurisdiction Analysis Year	2022	
Technical R		,		
		Des.(N)	Planning Data	
1945	veh/h	Peak-Hour Factor, PHF	0.94	
	veh/day	%Trucks and Buses, P <sub>T</sub>	18	
		%RVs, P <sub>R</sub>	0	
		General Terrain:	Rolling	
	veh/h	Grade % Length	mi	
		Up/Down %		

Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h		Rolling ength mi oown %		
Calculate Flow Adjus	stments					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0		
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1)]$	+ P <sub>R</sub> (E <sub>R</sub> - 1)] <i>0.787</i>		
Speed Inputs			Calc Speed A	dj and FFS		
Lane Width	12.0	ft		-		
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph	
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph	
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph	
FFS (measured)		mph	FFS	70.7	mph	
Base free-flow Speed, BFFS	75.4	mph		70.7	mpn	
LOS and Performanc	e Measures	3	Design (N)			
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 876 70.0 12.5 B	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV})$ $x f_p)$ $S$ $D = v_p / S$ Required Number		pc/h/ln mph pc/mi/ln	
Glossary			Factor Locatio	on		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-1 E <sub>T</sub> - Exhibits 11-1 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - 11-3	0, 11-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11	

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	BASIC FRI	EEWAY SE	GMENTS WORKSHE	EET	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 EB</i>		
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2022	
	echnical Repo				
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT	4359	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi %	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F)]$	<sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		70.2	
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 1870	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF	<sup>-</sup> x N x f <sub>HV</sub>	pc/h/ln
S	66.6	mph	x f <sub>p</sub> )		
D = v <sub>p</sub> / S	28.1	pc/mi/ln	S ( C		mph
LOS	D		D = v <sub>p</sub> / S Required Number of La	nes, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhib 11-3	11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 WB</i>		
Agency or Company	Alfred Benesch & Company		From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2022	
Project Description I-24 T	echnical Repo				
✓ Oper.(LOS)			Des.(N)	Plar	ning Data
Flow Inputs					
Volume, V AADT	2313	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>Τ</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x №	N x f <sub>HV</sub> 992	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	Nxfuy	
x f <sub>p</sub> )			x f <sub>p</sub> )	ΗV	pc/h/ln
S D = y / S	75.0	mph	S		mph
D = v <sub>p</sub> / S LOS	13.2 B	pc/mi/ln	$D = v_p / S$		pc/mi/ln
200	D		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design l	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Brian Gaffney		Highway/Direction of Travel <i>I-24 EB</i>		
Agency or Company	Alfred Benesch &		From/To	I-59 to GA State Line	
Date Performed	Company 6/6/18		Jurisdiction	Georgia	
Analysis Time Period	Proposed Pl	И	Analysis Year	2022	
Project Description I-24 7	Technical Repo	ort			
✓ Oper.(LOS)	)		Des.(N)	Planning Data	
Flow Inputs					
Volume, V	2052	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
	1		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	
Base free-flow Speed,	75.4		FF5	12.1	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
	Nvf		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	924	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	
x f <sub>p</sub> )	75.0		x f <sub>p</sub> )		pc/h/ln
S F ( )	75.0	mph	s		mph
$D = v_p / S$	12.3	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lane	s, N	·
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed			
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
$v_{p}$ - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ase free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	0 - 0		LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information	Prion Coffno		Site Information		)
Analyst	Brian Gaffney Alfred Benesch &		Highway/Direction of Trav	I-59 to GA State Line	
Agency or Company	Company		From/To		
Date Performed Analysis Time Period	6/6/18 Proposed PM		Jurisdiction Analysis Year	Georgia 2022	
	Technical Repo		Analysis real	2022	
✓ Oper.(LOS)			Des.(N)	Plar	ning Data
Flow Inputs					
Volume, V	3022	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
Coloulata Elaur Adius	4		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.</i> 787	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	, FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		12.1	mpn
LOS and Performanc	e Measures	3	Design (N)		
			Design (N)		
Operational (LOS)	NI £		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N X <sup>1</sup> HV 1361	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	1. A. A.
x f <sub>p</sub> )	=0.0		x f <sub>p</sub> )		pc/h/ln
S S	73.6	mph	s		mph
$D = v_p / S$	18.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed			4 E-111144.0
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
$v_{p}$ - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ase free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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speed

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freeman		Highway/Direction of Travel <i>I-24 EB</i>		
Agency or Company	Alfred Benesch & Company 1/4/2018		From/To		e Line to SR-2
Date Performed			Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2022	
Project Description I-24 7	echnical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	2282	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi			
FFS (measured)	0.00	mph	TRD Adjustment	1.3	mph
Base free-flow Speed,			FFS	74.1	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x I	N X <sup>†</sup> HV 1028	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>uv</sub>	
x f <sub>p</sub> )		·	x f <sub>p</sub> )	ĨĨV	pc/h/ln
S	75.0	mph	s <sup>P'</sup>		mph
D = v <sub>p</sub> / S	13.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lane	o N	portini
				5, 11	
Glossary			Factor Location		
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Density FFS - Free-flow speed		E <sub>T</sub> - Exhibits 11-10, 11-11		f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate			f <sub>n</sub> - Page 11-18		TRD - Page 11-1
LOS - Level of service	BFFS - Ba	ase free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2	
enood				· · · <b>~</b> ,	

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DDHV - Directional design hour volume

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11-3

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2,

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Tra	avel I-24 WB	}
Agency or Company	Alfred Benes Company	sch &	From/To		e Line to SR-2
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2022	
Project Description I-24 7	Fechnical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V AADT	3331	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi 6	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R)]$	- 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	d FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	, mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	, FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph		74.1	трп
LOS and Performanc	e Measures	S	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 4500</sub>		Design (N) Design LOS	v N v f	
x f <sub>p</sub> )	1500	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x f <sub>p</sub> )	X IN X I <sub>HV</sub>	pc/h/In
S	72.2	mph	S		mph
D = v <sub>p</sub> / S	20.8	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lar	nes, N	P0/111/11
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service			E <sub>R</sub> - Exhibits 11-10, 11-1 E <sub>T</sub> - Exhibits 11-10, 11-1 f <sub>p</sub> - Page 11-18	1, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
speed			LOS, S, FFS, v <sub>p</sub> - Exhibi	15 11-2,	

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DDHV - Directional design hour volume

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11-3

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	T	
<u> </u>					
General Information			Site Information		
Analyst	Greg Freemar Alfred Benesc		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Company	n œ	From/To	SR-2 to	Browns Ferry Rd
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2022	
Project Description I-24 7		t	Analysis real	2022	
✓ Oper.(LOS)			Des.(N)	Plan	ining Data
Flow Inputs					
Volume, V	2722	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed,	75.4	mph		70.7	прп
BFFS	-	mpn			
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$\frac{OPERALIONAL (200)}{V} = (V \text{ or } DDHV) / (PHE X)$	Nyf		Design LOS		
$v_p = (V \text{ or } DDHV) / (PHF x)$	1226 HV	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	nc/h/ln
x f <sub>p</sub> )	70.0	mph	x f <sub>p</sub> )		pc/h/ln
S D-v/S	70.0 17 5	mph	s		mph
$D = v_p / S$	17.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Speed				f Fulling AA O
V - Hourly volume	D - Densit		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v - Flow rate	FFS - Free-	-	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
			f <sub>p</sub> - Page 11-18		TRD - Page 11-12

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2, speed 11-3 DDHV - Directional design hour volume

BFFS - Base free-flow

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LOS - Level of service

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f<sub>p</sub> - Page 11-18

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TRD - Page 11-11

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BASIC FRE	EWAY SE	GMENTS WORKSHEE	T	
		Site Information		
		Highway/Direction of Trave	el I-24 WB	
	ch &	From/To	SR-2 to	Browns Ferry Rd
1/4/2018 Existing PM		Jurisdiction Analysis Year	2022	
echnical Repo	rt			
		es.(N)	🗌 Plar	ining Data
3390	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
	veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
tments				
1.00		E <sub>R</sub>	2.0	
2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <i>0.787</i>	
		Calc Speed Adj and	FFS	
12.0	ft			
6.0	ft	f <sub>LW</sub>	0.0	mph
3			0.0	mph
1.55	ramps/mi		4.7	mph
	mph	FFS	70.7	mph
75.4	mph			·
e Measures		Design (N)		
N x f <sub>HV ( = = =</sub>		Design (N) Design LOS	NL f	
		$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N X İ <sub>HV</sub>	pc/h/In
		S		mph
	pc/m/m	D = v <sub>p</sub> / S		pc/mi/ln
U		Required Number of Lane	s, N	
		Factor Location		
D - Densi FFS - Free	ty -flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-17
	Greg Freeman Alfred Beneso Company 1/4/2018 Existing PM echnical Report 3390 3390 3390 tments 1.00 2.5 12.0 6.0 3 1.55 75.4 <b>e Measures</b> N x f <sub>HV</sub> $1527$ 68.8 22.2 C N x f <sub>HV</sub> $1527$ 68.8 22.2 C	Greg Freeman         Alfred Benesch &         Company         1/4/2018         Existing PM         echnical Report         3390       veh/h         sisting PM         echnical Report         3390       veh/h         veh/h         veh/h         tments         1.00         2.5         12.0       ft         6.0       ft         3       ramps/mi         1.55       ramps/mi         mph       75.4         Mx f <sub>HV</sub> 1527       pc/h/ln         68.8       mph         22.2       pc/mi/ln         C       S         S       Speed         D       Density         FFS - Free-flow speed         BFFS - Base free-flow	Site InformationGreg Freeman Alfred Benesch & Company 1/4/2018 Existing PMHighway/Direction of Trave From/To Jurisdiction Analysis Yearindext colspan="2">Bees.(N)3390veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: Grade % Length Up/Down %1.00ER 2.51.00ER 2.5Calc Speed Adj and fLC1.00ft fLCfLC1.00ft fLCfLC1.55ramps/mi mphrRD Adjustment FFS75.4mphDesign (N)Design LOSN x f <sub>HV</sub> 1527pc/h/ln fp68.8mph 22.2pc/mi/ln CCFactor LocationSSSDensity FFS - Free-flow speed BFFS - Base free-flowFactor LocationERExhibits 11-10, 11-12ERCor	Greg Freeman Alfred Benesch & CompanyHighway/Direction of Travel I-24 WB From/ToAlfred Benesch & CompanyFrom/ToSR-2 to1/4/2018Jurisdiction Analysis Year2022echnical ReportDes.(N)Plar3390veh/h veh/dayPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT3390veh/h veh/hPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT3390veh/h veh/hPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT3390veh/hPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT100E R2.02.512.0ftft1.0012.0ftftft6.0ftftft1.55ramps/mi mphft0.01.55ramps/mi mphft0.01.55ramps/mi mphDesign (N)Design LOS Vp = (V or DDHV) / (PHF x N x fhv x fp)S0SS02.2.2pc/mi/ln CS68.8mph 22.2pc/mi/ln S0- Density FFS - Free-flow speed BFFS - Base free-flowFac Exhibits 11-10, 11-11, 11-13 fp - Page 11-

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General Information			Site Information		
Analyst	Greg Freem		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	sch &	From/To	Browns	Ferry Rd to SR 29
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24	Technical Rep	ort			
✓ Oper.(LOS)			es.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	4511	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	14	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
• • • · · · ·			Up/Down %		
Calculate Flow Adjus	stments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1	)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f	0.0	mph
Number of Lanes, N	3	it i	f <sub>LW</sub>		mph
Total Ramp Density, TRD	0.65	rompo/mi	f <sub>LC</sub>	0.0	mph
	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	<u> </u>	Design (N)		
		_	Design (N)		
<u> Operational (LOS)</u>			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 1026		-	Nvf	
x f <sub>p</sub> )	1930	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	IN X I <sub>HV</sub>	pc/h/ln
S	65.3	mph	x f <sub>p</sub> )		
D = v <sub>p</sub> / S	29.6	pc/mi/ln	S		mph
LOS	D	P	$D = v_p / S$		pc/mi/ln
200	D		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed			f Exhibit 44.0
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ase free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-1
speed	2 C D		LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		
Convright © 2012 University of Flori	da All Dighta Daga	med	HCS 2010 <sup>TM</sup> Version 6.3	Canar	ated: 2/28/2018 12:55 P

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_		GMENTS WORKSHE		
		Site Information		
Greg Freema	n		/el <i>I-24 WB</i>	}
Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
1/4/2018 Existing PM		Jurisdiction Analysis Year	2022	
echnical Repo				
		Des.(N)	🗌 Plar	nning Data
4283	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
	veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
tments				
1.00		E <sub>R</sub>	2.0	
2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	- 1)] <i>0.826</i>	
		Calc Speed Adj and	FFS	
12.0	ft			
6.0	ft	f <sub>LW</sub>	0.0	mph
3			0.0	mph
0.65	ramps/mi		2.2	mph
	mph			mph
75.4	mph		70.2	трп
e Measures		Design (N)		
N x f <sub>HV</sub> 1838	pc/h/ln	F .	x N x f <sub>HV</sub>	pc/h/ln
67.2	mph	1 ·		1
		S		mph
D	F	F	es, N	pc/mi/ln
D - Dens FFS - Free BFFS - Ba	ity e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-1 E <sub>T</sub> - Exhibits 11-10, 11-1 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibit	1, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
	Alfred Beness Company 1/4/2018 Existing PM echnical Repo 4283 4283 4283 1.00 2.5 12.0 6.0 3 0.65 75.4 e Measures N x f <sub>HV</sub> 1838 67.2 27.3 D S - Spee D - Dens FFS - Free	$\frac{1/4/2018}{Existing PM}$ $\frac{echnical Report}{\Box C}$ $\frac{100}{2.5}$ $\frac{12.0}{2.5}$ $\frac{12.0}{12.0}$ $\frac{12.0}{12.0}$ $\frac{12.0}{12.5}$ $\frac{12.0}{12$	Alfred Benesch & Company 1/4/2018From/To Jurisdiction Analysis Yearichnical Reportichnical Reportichnical Reportichnical Report4283veh/h veh/dayPeak-Hour Factor, PHF % Trucks and Buses, $P_T$ % RVs, $P_R$ General Terrain: Grade % Length up/Down %4283veh/h veh/dayPeak-Hour Factor, PHF % RVs, $P_R$ General Terrain: Grade % Length up/Down %1.00 $E_R$ $2.5$ 1.00 $E_R$ $L_C$ 2.5ft fLC TRD Adjustment mph6.0ft fLC TRD Adjustment FFS75.4mphe MeasuresDesign (N) Design LOS $v_p = (V or DDHV) / (PHF-x f_p)$ S $D = v_p / S$ Required Number of Land $FFS - Free-flow$ S- Speed D - Density FFS - Free-flow speed BFFS - Base free-flow $E_R - Exhibits 11-10, 11-12f_p - Page 11-18LOS, S, FFS, v_p - Exhibittable$	Greg Freeman Alfred Benesch & CompanyHighway/Direction of Travel I-24 WE From/ToAlfred Benesch & CompanyFrom/ToBrowns1/4/2018JurisdictionAnalysis Year2022echnical ReportDes.(N)Plar4283veh/h veh/dayPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT4283veh/hPeak-Hour Factor, PHF0.94 %Trucks and Buses, PT14 %RVS, PR % O0General Terrain: GradeRolling Grade1.00ER f_C2.0 f_L0.00 f_L30f_L0.00 f_L1.004f_L0.00 f_L1.001.00 f_L5ramps/mi mphmph2.2 FFS75.4mphDesign (N)67.2mph 

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information	Brian Coffna	,	Site Information		
Analyst	Brian Gaffney Alfred Benes		Highway/Direction of Trave		
Agency or Company	Company		From/To		GA State Line
Date Performed Analysis Time Period	6/6/18 Proposed AN	Λ	Jurisdiction Analysis Year	Georgia 2042	
	echnical Repo			2012	
Oper.(LOS)			es.(N)	Plar	nning Data
Flow Inputs					5
Volume, V	3861	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, $P_T$	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
Coloulate Flow Adjue	tmanta		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		12.1	mpn
LOS and Performance	e Measures	;	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 1739	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x fui	
x f <sub>p</sub> )		P -,	x f <sub>p</sub> )	ΠV	pc/h/ln
S	69.0	mph	S P'		mph
$D = v_p / S$	25.2	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	s, N	P 0//.
Glossary			Factor Location		
N - Number of lanes	S - Spee	d			
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11,	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		se free-flow	f <sub>p</sub> - Page 11-18	44.0	TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ĒT	
General Information			Site Information		
Analyst	Brian Gaffne	1/	Site Information	al 1-24 M/B	2
-	Alfred Benes				
Agency or Company	Company		From/To		GA State Line
Date Performed Analysis Time Period	6/6/18 Proposed AN	Л	Jurisdiction Analysis Year	Georgia 2042	
	echnical Repo			2072	
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					0
Volume, V	1758	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, $P_T$	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <b>0.787</b>	
Speed Inputs	eed Inputs			FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph		12.1	mpn
LOS and Performance	e Measures	5	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
V = (V  or  DDHV) / (BHE v)	N v f		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x f	<sup>₩</sup> <sup>₩</sup> 792	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	no/h/ln
x f <sub>p</sub> )	75.0	una un la	x f <sub>p</sub> )		pc/h/ln
S D=v /S	75.0	mph	S		mph
$D = v_p / S$	10.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	A		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E Exhibite 11 10 11 10		f Evhihit 11 0
V - Hourly volume	D - Dens	ity	E <sub>R</sub> - Exhibits 11-10, 11-12 E Exhibits 11 10, 11, 11		f <sub>LW</sub> - Exhibit 11-8 f Exhibit 11.9
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-11	, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ise free-flow	f <sub>p</sub> - Page 11-18	44.0	TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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Project Description *I-24 Technical Report* 

✓ Oper.(LOS)

General Information

Agency or Company

Analysis Time Period

Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D

Date Performed

*Flow Inputs* Volume, V

AADT

Analyst

**BASIC FREEWAY** 

veh/h

veh/day

Greg Freeman Alfred Benesch &

Company

1/4/2018 Existing AM

3958

		Page 1 of 1	
S	EGMENTS WORKSHEE	T	
	Site Information		
	Highway/Direction of Trave	el <i>I-24 EB</i>	
	From/To	GA State Line to SR-2	
	Jurisdiction Analysis Year	2042	
	Des.(N)	Planning Data	
	Peak-Hour Factor, PHF	0.94	
,	%Trucks and Buses, P <sub>T</sub>	18	
	%RVs, P <sub>R</sub>	0	
	General Terrain:	Rolling	
	Grade % Length	mi	

DDHV = AADT x K x D		veh/h	Grade % Length Up/Down		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	R - 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj ar	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> $v_p = (V \text{ or DDHV}) / (PHF x)$ x f <sub>p</sub> ) S D = $v_p / S$ LOS	N x f <sub>HV</sub> 1783 68.2 26.1 D	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PH x f_p)SD = v_p / SRequired Number of La$		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
<ul> <li>N - Number of lanes</li> <li>V - Hourly volume</li> <li>v<sub>p</sub> - Flow rate</li> <li>LOS - Level of service</li> <li>speed</li> <li>DDHV - Directional design</li> </ul>	D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11 E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhil 11-3	-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC F	REEWAY S	EGMENTS WORKSHE	ET
General Information			Site Information	
Analyst	Greg Free		Highway/Direction of Trav	el <i>I-24 WB</i>
Agency or Company	Alfred Ben Company	esch &	From/To	GA State Line to SR-2
Date Performed Analysis Time Period	1/4/2018 Existing Al	М	Jurisdiction Analysis Year	2042
Project Description I-24 7	Fechnical Re	port		
✓ Oper.(LOS)			Des.(N)	Planning Data
Flow Inputs				
Volume, V AADT	2048	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi
Calculate Flow Adjus	tments			
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0
É <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <b>0.787</b>
Speed Inputs			Calc Speed Adj and	FFS

DDHV = AADT x K x D		veh/h	Grade % Length Up/Down		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	<sub>R</sub> - 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj ar	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 922 75.0 12.3 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PH)$ x f <sub>p</sub> ) S D = $v_p / S$ Required Number of La		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11 E <sub>T</sub> - Exhibits 11-10, 11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhil 11-3	-11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11
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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Benese	ch &	From/To	SR-2 to	Browns Ferry Rd
Date Performed Analysis Time Period	Company 1/4/2018 Existing AM		Jurisdiction Analysis Year	2042	
Project Description I-24 7	Fechnical Repo	rt			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V AADT	4325	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <b>0.787</b>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph		70.7	трп
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 1948	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
x f <sub>p</sub> )	62.5	una un la	x f <sub>p</sub> )		pc/h/ln
S D=v /S	63.5 30.7	mph nc/mi/ln	s		mph
D = v <sub>p</sub> / S LOS	30.7 D	pc/mi/ln	$D = v_p / S$		pc/mi/ln
203	D		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema	n	Highway/Direction of Trav	el <i>I-24 W</i> B	
Agency or Company	Alfred Benes		From/To		Browns Ferry Rd
Date Performed	Company 1/4/2018		Jurisdiction	5/(-2 10	Biowns r eny rta
Analysis Time Period	Existing AM		Analysis Year	2042	
Project Description 1-24 7		ort	,		
✓ Oper.(LOS)			es.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	2569	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		la /la	General Terrain:	Rolling	
DDHV = AADT X K X D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments				
	1.00		E <sub>R</sub>	2.0	
f <sub>p</sub>					
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	o Mossuros	•	Design (N)		
		•			
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>		Design LOS		
x f <sub>p</sub> )	1157	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x$	IN X T <sub>HV</sub>	pc/h/ln
S	70.0	mph	x f <sub>p</sub> )		
D = v <sub>p</sub> / S	16.5	pc/mi/ln	S S		mph
LOS	В		$D = v_p / S$		pc/mi/ln
			Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12	<u>)</u>	f <sub>I w</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	•	$E_{T}$ - Exhibits 11-10, 11-11		f <sub>IC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		e-flow speed	f <sub>p</sub> - Page 11-18	,	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, $v_p$ - Exhibits	11-2	
speed DDHV - Directional design	hourvolume		11-3	· · · <i>-</i> ,	

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	BASIC FR	EEWAY SE	GMENTS WORKSH	EET	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Tr	avel <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2042	
Project Description I-24 7	Fechnical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	ning Data
Flow Inputs					
Volume, V AADT	5805	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>1</sub>		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down <sup>6</sup>		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	<sub>R</sub> - 1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj an	d FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	, FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		70.2	mpn
LOS and Performanc	e Measures	5	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 2491	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHI	F x N x f <sub>HV</sub>	pc/h/ln
S	50.4	mph	x f <sub>p</sub> )		P
D = v <sub>p</sub> / S	49.4	pc/mi/ln	S		mph
LOS	F	P 0/11//11	D = v <sub>p</sub> / S Required Number of La	nes N	pc/mi/ln
Glossary			Factor Location	nes, n	
Glossary	C C====	.d			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service			E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18	11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
speed DDHV - Directional design	hour volume		LOS, S, FFS, v <sub>p</sub> - Exhib 11-3	DITS 11-2,	

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	BASIC FRI	EEWAY SE	GMENTS WORKSH	EET	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Tr	avel <i>I-24 WB</i>	}
Agency or Company	Alfred Benes Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing AM		Jurisdiction Analysis Year	2042	
	echnical Repo				
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT	3084	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>1</sub>		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	<sub>R</sub> - 1)] <b>0.826</b>	
Speed Inputs			Calc Speed Adj an	Id FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	, FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		, 0.2	p.i
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 1323	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHI	F x N x f <sub>HV</sub>	pc/h/ln
S S	73.8	mph	x f <sub>p</sub> )		
$D = v_p / S$	17.9	pc/mi/ln	S / C		mph
LOS	В	·	D = v <sub>p</sub> / S Required Number of La	ines, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11- E <sub>T</sub> - Exhibits 11-10, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhib 11-3	11, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	Т	
General Information	<u> </u>		Site Information		
Analyst	Brian Gaffney Alfred Beneso		Highway/Direction of Trave		
Agency or Company	Company		From/To	I-59 to G	A State Line
Date Performed Analysis Time Period	6/6/18 Proposed PM		Jurisdiction Analysis Year	Georgia 2042	
	echnical Repor		Analysis real	2042	
✓ Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs					ing Data
Volume, V	2668	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, $P_{T}$	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tmonts				
	1.00			2.0	
f <sub>p</sub>					
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and I	-FS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performance	e Measures		Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x N	N x f <sub>HV</sub> 1202	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x fuv	
x f <sub>p</sub> )		P	x f <sub>p</sub> )	ΠV	pc/h/ln
S	74.5	mph	S		mph
$D = v_p / S$	16.1	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lanes	5. N	P - / /
Glossary			Factor Location	<u> </u>	
N - Number of lanes	S - Speed	4			6 = 1 = 1 = 1 + 1 + 0
V - Hourly volume	D - Densi		E <sub>R</sub> - Exhibits 11-10, 11-12	44.40	f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate	FFS - Free	•	E <sub>T</sub> - Exhibits 11-10, 11-11,	11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service	BFFS - Bas		f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed			LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design I	nour volume		11-3		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ΞT	
0					
General Information	Prion Coffno	.,	Site Information		<u>,                                     </u>
Analyst	Brian Gaffne		Highway/Direction of Trav		
Agency or Company	Company		From/To		GA State Line
Date Performed Analysis Time Period	6/6/18 Proposed PN	Л	Jurisdiction Analysis Year	Georgia 2042	
-	Technical Repo			2012	
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					<u> </u>
Volume, V	3929	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, $P_T$	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tmonts		00/2001 /0		
	1.00		F	2.0	
f <sub>p</sub>					
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.81	ramps/mi	TRD Adjustment	2.7	mph
FFS (measured)		mph	FFS	72.7	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f		Design LOS		
$x f_p$	<sup>HV</sup> 1769	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	κ Ν x f <sub>HV</sub>	pc/h/ln
S	68.5	mph	x f <sub>p</sub> )		pomm
$D = v_p / S$	25.8	pc/mi/ln	S		mph
LOS	20.0 C	po/m/m	$D = v_p / S$		pc/mi/ln
200	Ũ		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E <sub>R</sub> - Exhibits 11-10, 11-12	)	f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm R}$ - Exhibits 11-10, 11-11		$f_{LC}$ - Exhibit 11-9
v <sub>p</sub> - Flow rate	FFS - Free	e-flow speed	$f_{p}$ - Page 11-18	, 11-10	TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	11	11_2	IND - Faye II-II
	hourvolume		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	∍ । । <b>-</b> ∠,	
DDHV - Directional design	nour volume				

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	T	
Conorol Information					
General Information		-	Site Information		
Analyst	Greg Freema Alfred Beneso		Highway/Direction of Trave		
Agency or Company	Company		From/To	GA State	e Line to SR-2
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2042	
	echnical Repo	rt			
✓ Oper.(LOS)			es.(N)	🗌 Plan	ning Data
Flow Inputs					
Volume, V AADT	2971	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K		-	%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjust	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N v f )	√x f <sub>HV</sub> 1338	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
x f <sub>p</sub> ) S	73.7	mph	x f <sub>p</sub> )		pc/11/11
	18.1	mph pc/mi/ln	S		mph
D = v <sub>p</sub> / S LOS	Тө. Т С	po/m/m	D = v <sub>p</sub> / S		pc/mi/ln
103	C		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design h		ty	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Trav	/el /-24 WB	
Agency or Company	Alfred Benes		From/To		e Line to SR-2
Date Performed	Company 1/4/2018		Jurisdiction	0/10/01	
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 7		ort	,		
✓ Oper.(LOS)			es.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	4337	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, $P_T$	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
Coloulate Flour Adius	4		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>Τ</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	- 1)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.35	ramps/mi	TRD Adjustment	1.3	mph
FFS (measured)		mph	FFS	74.1	mph
Base free-flow Speed,	75.4	mph	IFF <b>J</b>	/ 4. /	тірі
BFFS		-			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
<u>Operational (LOS)</u>	NI £		Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	<sup>N X I</sup> HV 1953	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	x N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S / C	64.9	mph	S		mph
$D = v_p / S$	30.1	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		Required Number of Land	es, N	·
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed			
V - Hourly volume	D - Dens		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate		e-flow speed	E <sub>T</sub> - Exhibits 11-10, 11-1	1, 11-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service		ise free-flow	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
speed	2.10 00		LOS, S, FFS, v <sub>p</sub> - Exhibit	s 11-2,	
	hour volume		11-3		

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Glossary

N - Number of lanes

LOS - Level of service

V - Hourly volume

v<sub>p</sub> - Flow rate

speed

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Benes Company	ch &	From/To	SR-2 to Brow	vns Ferry Ro
Date Performed	1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 7	Fechnical Repo	ort			
✓ Oper.(LOS)			Des.(N)	🗌 Planning	j Data
Flow Inputs					
Volume, V	3587	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	18	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
<u></u>			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
Ε <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	
FFS (measured)		mph			mph
Base free-flow Speed,	75 /		FFS	70.7	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	5	Design (N)		
			Design (N)		
<u> Operational (LOS)</u>			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 1615	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f	
κ f <sub>p</sub> )		F =	$x f_p$	ΠV	pc/h/ln
S	68.0	mph	S		mph
D = v <sub>p</sub> / S	23.7	pc/mi/ln	$D = v_p / S$		-
LOS	С		F F	- NI	pc/mi/ln
			Required Number of Lane	5, N	

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DDHV - Directional design hour volume

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Factor Location

f<sub>p</sub> - Page 11-18

11-3

E<sub>R</sub> - Exhibits 11-10, 11-12

E<sub>T</sub> - Exhibits 11-10, 11-11, 11-13

LOS, S, FFS, v<sub>p</sub> - Exhibits 11-2,

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f<sub>LW</sub> - Exhibit 11-8

f<sub>LC</sub> - Exhibit 11-9

TRD - Page 11-11

S - Speed

D - Density

FFS - Free-flow speed

BFFS - Base free-flow

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General Information			Site Information		
Analyst	Greg Freema	n	Highway/Direction of Trave	el <i>I-24 WB</i>	
Agency or Company	Alfred Beneso Company		From/To		Browns Ferry Rd
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2042	
Project Description I-24 7	echnical Repo	rt			
✓ Oper.(LOS)			Des.(N)	🗌 Plan	ining Data
Flow Inputs					
Volume, V AADT	4420	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 18	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	I)] <i>0.787</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.55	ramps/mi	TRD Adjustment	4.7	mph
FFS (measured)		mph	FFS	70.7	mph
Base free-flow Speed, BFFS	75.4	mph			
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 1991	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x funz	
x f <sub>p</sub> )			$x f_p$	HV	pc/h/ln
S / C	62.7	mph	s		mph
$D = v_p / S$	31.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		Required Number of Lanes	s, N	•
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema		Highway/Direction of Trave	el <i>I-24 EB</i>	
Agency or Company	Alfred Beneso Company	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed Analysis Time Period	1/4/2018 Existing PM		Jurisdiction Analysis Year	2042	
Project Description I-24 7	echnical Repo	rt			
✓ Oper.(LOS)			Des.(N)	🗌 Plar	ining Data
Flow Inputs					
Volume, V AADT	4511	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.94 14	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Rolling mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	I)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS	73.2	mph
Base free-flow Speed, BFFS	75.4	mph		75.2	трп
LOS and Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 1936	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )	ΠV	pc/h/ln
S / C	65.3	mph	S		mph
$D = v_p / S$	29.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Greg Freema	an	Highway/Direction of Trave	el <i>I-24 WB</i>	}
Agency or Company	Alfred Benes	ch &	From/To	Browns	Ferry Rd to SR 29
Date Performed	Company 1/4/2018		Jurisdiction		
Analysis Time Period	Existing PM		Analysis Year	2042	
Project Description I-24 7	Fechnical Repo	ort			
Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V	5670	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	14	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D		<b> </b> . / .	General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjug	tmonto				
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.826</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	0.65	ramps/mi	TRD Adjustment	2.2	mph
FFS (measured)		mph	FFS		
Base free-flow Speed,	75.4		FF5	73.2	mph
BFFS	75.4	mph			
LOS and Performanc	e Measures	6	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x	N X <sup>T</sup> HV 2433	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f <sub>HV</sub>	
x f <sub>p</sub> )			x f <sub>p</sub> )		pc/h/ln
S	52.3	mph	S		mph
$D = v_p / S$	46.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lane	s N	Portini
Glossany			Factor Location		
Glossary	0 0				
N - Number of lanes	S - Spee		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
V - Hourly volume	D - Dens	•	E <sub>T</sub> - Exhibits 11-10, 11-11,	, 11-13	f <sub>LC</sub> - Exhibit 11-9
v <sub>p</sub> - Flow rate		e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	RLL2 - Ra	ase free-flow	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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# 7.5 Crash Analysis

Tables Below Represent Crashes/Mi/Year for Urban Environments					
Legend					
К:	K: Fatal				
A:	Incapacitating				
B:	Non-Incapcitating Evident				
C:	C: Possible Injury				
PDO:	PDO: No Injury / Property Damage				

4-lane Divided w/ 48' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO		
20000	26000	4.316	0.036	0.093	0.505	0.812	2.870		
30000	39000	7.374	0.059	0.151	0.818	1.314	5.032		
40000	52000	11.054	0.084	0.216	1.170	1.879	7.706		
50000	65000	15.698	0.102	0.268	1.446	2.973	10.908		
60000	78000	21.470	0.121	0.322	1.731	4.291	15.005		
70000	91000	28.265	0.141	0.380	2.036	5.756	19.951		
80000	104000	35.989	0.163	0.442	2.365	7.329	25.690		
90000	114000	47.437	0.195	0.531	2.833	9.511	34.368		
100000	124000	51.360	0.205	0.561	2.993	10.244	37.356		

4-lane Divided w/ 72' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO		
20000	26000	4.462	0.039	0.101	0.550	0.883	2.889		
30000	39000	7.579	0.063	0.162	0.879	1.411	5.064		
40000	52000	11.320	0.089	0.230	1.246	2.001	7.754		
50000	65000	16.030	0.108	0.283	1.526	3.137	10.976		
60000	78000	21.875	0.127	0.338	1.814	4.498	15.098		
70000	91000	28.749	0.148	0.396	2.125	6.007	20.074		
80000	104000	36.560	0.170	0.460	2.460	7.624	25.847		
90000	114000	44.022	0.191	0.519	2.771	9.094	31.447		
100000	124000	52.095	0.213	0.581	3.101	10.615	37.584		

4-lane Divided w/ >90' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO		
20000	26000	4.281	0.039	0.099	0.538	0.864	2.742		
30000	39000	7.252	0.061	0.158	0.855	1.372	4.806		
40000	52000	10.814	0.087	0.222	1.207	1.938	7.360		
50000	65000	15.291	0.104	0.273	1.472	3.025	10.417		
60000	78000	20.844	0.122	0.325	1.744	4.325	14.328		
70000	91000	27.373	0.142	0.380	2.038	5.762	19.051		
80000	104000	34.790	0.163	0.441	2.356	7.302	24.529		
90000	114000	41.875	0.182	0.496	2.651	8.701	29.844		
100000	124000	49.539	0.204	0.556	2.965	10.148	35.667		

Tables Be	Tables Below Represent Crashes/Mi/Year for Urban Environments								
	Legend								
К:	Fatal								
A:	Incapacitating								
B:	Non-Incapcitating Evident								
C:	Possible Injury								
PDO:	No Injury / Property Damage								

6-lane Divided w/ 26' Median and Barrier Wall									
Base Year	Design Year	Total	K	Α	В	С	PDO		
20000	26000	5.084	0.037	0.099	0.557	1.013	3.378		
30000	39000	8.526	0.060	0.159	0.894	1.628	5.785		
40000	52000	12.612	0.085	0.226	1.273	2.316	8.712		
50000	65000	17.329	0.113	0.299	1.687	3.070	12.159		
60000	78000	22.667	0.143	0.379	2.135	3.885	16.125		
70000	91000	29.134	0.165	0.442	2.483	5.343	20.701		
80000	104000	36.760	0.186	0.505	2.826	7.061	26.182		
90000	114000	44.230	0.205	0.562	3.136	8.689	31.639		
100000	124000	52.461	0.225	0.621	3.458	10.424	37.734		

6-lane Divided w/ 30' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO		
20000	26000	4.473	0.040	0.103	0.559	0.899	2.872		
30000	39000	7.474	0.064	0.165	0.893	1.434	4.918		
40000	52000	11.027	0.091	0.233	1.265	2.032	7.406		
50000	65000	15.121	0.120	0.308	1.672	2.685	10.336		
60000	78000	19.747	0.152	0.389	2.110	3.389	13.707		
70000	91000	25.360	0.175	0.455	2.460	4.673	17.596		
80000	104000	31.971	0.198	0.521	2.807	6.190	22.255		
90000	114000	38.441	0.219	0.580	3.120	7.629	26.893		
100000	124000	45.563	0.240	0.642	3.444	9.164	32.074		

	6-lane Divided w/ 48' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO			
20000	26000	3.919	0.035	0.090	0.486	0.781	2.527			
30000	39000	6.547	0.056	0.143	0.776	1.246	4.326			
40000	52000	9.659	0.079	0.202	1.098	1.764	6.515			
50000	65000	13.246	0.104	0.267	1.451	2.331	9.092			
60000	78000	17.300	0.132	0.338	1.831	2.942	12.058			
70000	91000	22.215	0.152	0.395	2.134	4.054	15.479			
80000	104000	28.005	0.172	0.452	2.435	5.369	19.577			
90000	114000	33.672	0.190	0.503	2.706	6.617	23.657			
100000	124000	39.912	0.208	0.557	2.987	7.947	28.214			

Tables Below Represent Crashes/Mi/Year for Urban Environments							
Legend							
К:	Fatal						
A:	Incapacitating						
B:	Non-Incapcitating Evident						
C:	Possible Injury						
PDO:	PDO: No Injury / Property Damage						

	6-lane Divided w/ 72' Depressed Median										
Base Year	Design Year	Total	K	Α	В	С	PDO				
20000	26000	4.069	0.038	0.098	0.533	0.856	2.543				
30000	39000	6.756	0.060	0.155	0.839	1.347	4.354				
40000	52000	9.926	0.085	0.217	1.177	1.891	6.557				
50000	65000	13.573	0.111	0.285	1.545	2.482	9.150				
60000	78000	17.689	0.139	0.358	1.941	3.117	12.133				
70000	91000	22.670	0.160	0.416	2.248	4.270	15.576				
80000	104000	28.532	0.180	0.474	2.553	5.628	19.698				
90000	114000	34.267	0.198	0.526	2.827	6.913	23.803				
100000	124000	40.579	0.217	0.580	3.113	8.282	28.387				

	6-lane Divided w/ >90' Depressed Median									
Base Year	Design Year	Total	K	Α	В	С	PDO			
20000	26000	3.912	0.038	0.096	0.523	0.841	2.414			
30000	39000	6.476	0.059	0.151	0.819	1.315	4.133			
40000	52000	9.497	0.082	0.211	1.144	1.837	6.223			
50000	65000	12.969	0.108	0.276	1.497	2.404	8.684			
60000	78000	16.885	0.135	0.346	1.876	3.013	11.516			
70000	91000	21.618	0.154	0.401	2.166	4.115	14.782			
80000	104000	27.188	0.173	0.456	2.454	5.411	18.694			
90000	114000	32.634	0.190	0.505	2.714	6.636	22.590			
100000	124000	38.628	0.208	0.556	2.984	7.939	26.940			

	8-lane Divided w/ 26' Median and Barrier Wall									
Base Year	Design Year	Total	K	Α	В	С	PDO			
20000	26000	4.794	0.037	0.099	0.559	1.017	3.082			
30000	39000	7.921	0.060	0.158	0.889	1.618	5.197			
40000	52000	11.589	0.084	0.223	1.257	2.288	7.738			
50000	65000	15.789	0.111	0.294	1.659	3.019	10.706			
60000	78000	20.512	0.140	0.371	2.092	3.807	14.101			
70000	91000	25.748	0.171	0.453	2.554	4.648	17.921			
80000	104000	31.491	0.204	0.540	3.043	5.539	22.165			
90000	114000	37.351	0.225	0.601	3.380	6.848	26.297			
100000	124000	43.973	0.245	0.661	3.704	8.373	30.991			

## **TENNESSEE DEPARTMENT OF TRANSPORTATION**

COUNTY = [	Dade County, C	Georgia			Date:	7/5/2018					
	nterstate 24	-									
	From I-59 Inter	change (L.M. 1.	63)								
		State Line (L.M.									
	4-Lane Divided	•	4.10)								
FUNCTIONAL CLAS Urban Interstate											
ADT YEARS USED=											
COMMENTS =	2010										
	AADT from GD	OT Station Cou	nte								
	BNG		1115								
SECTION = MORE T	HAN 0.10 MIL	E / SPOT = LES	S THAN OR EQUA	L TO 0.10 MILE							
BLM	ELM	Length	Average AADT	VMT							
1.630	4.100	2.470	66,900	165,243							
0.000		0.000		0							
0.000		0.000		0							
0.000	0.000	0.000	0	0							
0.000	0.000	0.000	0	0							
0.000	0.000	0.000	0	0							
0.000	0.000	0.000	0	0							
		2.470	66,900	165,243							
INTERSECTION				Leg	Traffic AADT						
Log Mile =	0			North =	0						
PRODUCED PU				East =	0						
PUBLIC RECORDS				South =	0						
This document is c	-		:	West =	0						
and its production	-	-		Entering AADT =	0						
document records	•			<b>#VALUE!</b>							
waive the provision	15 of §409		4-Lane Divided								
		:	2014-2016								
					*Severe	Other					
		Total	Fatal	Incap. Injury	Crashes	Injury					
No. of Crashes	=	192	3	0	3	51					
No. of Years	=	3									
SW avg. rate	=	1.828	0.009	0.048	0.057	0.365					
14-16 TN S/W Rates	5										
		400.0444									
Exposure (E)	=	180.9411	0.047	0.000	0.047	0.000					
Crash Rate (A)	=	1.061	0.017	0.000	0.017	0.282					
Critical Rate (C)	=	2.065									
Severity Index (SI)	=	0.3281									
Actual Rate/SW Avera	age =	0.58	1.84	0.00	0.29	0.77					
Ratio of A/C	=	0.50		0.00	0.20	0.11					
		0.01									
* Severe Crashes a	re the sum of	f fatal and inca	apacitating injur	v crashes							
				,							
						Revised 4/8/15					
T.D.O.T. Strategic Tra	nonortation Ir		alam/ Cafaty Data			Bng					

T.D.O.T. Strategic Transportation Investments Division/ Safety Data

## **TENNESSEE DEPARTMENT OF TRANSPORTATION**

COUNTY = H	amilton				Date:	12/5/2017
	nterstate 24				Duto.	12/0/2011
		State Line (L.M.	0.00)			
			ummings Hwy)			
	-Lane Divided	•	annings nwy)			
FUNCTIONAL CLAS						
	014-2017	ale				
ADT YEARS USED=						
COMMENTS =	2016					
		OT Station Cou	nts			
SECTION = MORE TH						
BLM	ELM	Length	Average AADT	VMT		
0.000	2.900	2.900	65,197	189,071		
0.000	2.900	0.000	05,197	109,071		
0.000		0.000				
	0.000		0	0		
0.000		0.000 0.000		0		
0.000	0.000		0	0		
0.000 0.000	0.000 0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
		2.900	65,197	189,071		
				Lee		
	0			Leg	Traffic AADT	
Log Mile =				North =	0	
PRODUCED PU				East =	0	
PUBLIC RECORDS				South =	0	
This document is co	-	-	=	West =	0	
and its production p				Entering AADT =	0	
document records r	-			#VALUE!		
waive the provisions	s of §409		4-Lane Divided			
			2014-2017			
					*Severe	Other
		Total	Fatal	Incap. Injury	Crashes	Injury
No. of Crashes	=	229	1	3	4	30
No. of Years	=	3				
SW avg. rate	=	1.828	0.009	0.048	0.057	0.365
14-16 S/W Rates						
		007 0004				
Exposure (E)	=	207.0331	0.007	0.044	0.040	0.4.5
Crash Rate (A)	=	1.106	0.005	0.014	0.019	0.145
Critical Rate (C)	=	2.049				
Severity Index (SI)	=	0.1747				
		0.01	0.54	0.00	0.01	0.40
Actual Rate/SW Avera	ige =	0.61	0.54	0.30	0.34	0.40
Ratio of A/C	=	0.54				
* Severe Crashes ar	e the sum o	f fatal and inca	apacitating injury	y crashes		
						Revised 4/8/15
T.D.O.T. Strategic Trai	asportation Ir	ivestments Divi	sion/ Safety Data			Bna

# Crash Summary Report

Page 1 of 1 Cnty Seq: 2

#### County: HAMILTON

 Route:
 10024
 SpcI Cse:
 0-NONE

 I og Milog:
 0.000 to 2.000
 Crash Dates:
 5/21/2014 to

Log Miles: 0.000 to 2.900 - Crash Dates: 5/31/2014 to 6/1/2017 Vehicle Filter: None - Other Factors Filter: None

		Crashes Involving ———		First Harmful Event	
Fatal Crashes:	1	Dedeatriane		Pedestrian:	0
Total Killed:	1	Pedestrians:	0	Pedalcycle:	0
Incap Injury Crashes:	3	Hazardous Cargo:	0	Railway Train:	0
Total Incap Injuries:	3	Work / Constr Zones:	0	Deer (Animal):	5
Other Injury Crashes:	30	Fixed Objects:	18	Other Animal:	1
Total Other Injuries:	50	Single Unit Trucks	18	Motor Vehicle in Transport:	160
Prop Damage Crashes:	195	Tractor - Trailer Trucks:	30	Motor Vehicle in Transport in	
Total Crashes:	229	Bicycles:	0	Other Roadway:	0
		Motorcycles:	2	Parked Motor Vehicle:	4
Crash Location Along Roadway:	209	Lane Departures:	27	Other Type Non-Motorist:	0
с .		Distracted Drivers:	14	Fixed Object:	18
At Intersection:	12	Dead Ora ditions		Other Object (Not Fixed):	8
Railroad Crossing:	0	Road Conditions	1	Non Collision:	1
Bridge:	1	Snow or Slush:	0	Overturn:	
Underpass:	0	Sand, Mud, Dirt or Oil:	0		1
Ramp:	6	Wet:	38	Jackknife:	1
Private Property:	1	Dry:	161	Cross Median:	0
Other:	0			Ran Off Road:	0
Manner of Collision ———		Light Conditions		Weather Conditions	
		-			
Rear End:	114	Dawn:	4	No Adverse Conditions:	171
Rear End: Head On:	114 1	Dawn: Daylight:	4 150	No Adverse Conditions: Rain:	171 30
Head On:	1	Daylight: Dusk:	150	Rain:	30
Head On: Rear-to-Side / Rear:	1 3	Daylight: Dusk: Dark / Lighted:	150 1 15	Rain: Sleet and Hail: Snow:	30 1
Head On: Rear-to-Side / Rear: Angle:	1 3 10	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	150 1 15 32	Rain: Sleet and Hail:	30 1 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir:	1 3 10 36	Daylight: Dusk: Dark / Lighted:	150 1 15	Rain: Sleet and Hail: Snow: Foggy:	30 1 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	1 3 10 36 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	150 1 15 32	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	30 1 0 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	1 3 10 36 0 1	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	150 1 15 32 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind:	30 1 0 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	1 3 10 36 0 1	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	150 1 15 32 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch:	30 1 0 0 0 2
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building:	1 3 10 36 0 1	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post	150 1 15 32 0 3 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment:	30 1 0 0 0 0 2 1
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator:	1 3 10 36 0 1 0 0 0 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support:	150 1 15 32 0 3 0 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence:	30 1 0 0 0 0 2 1 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Boulder: Building: Impact Attenuator: Overhead Structure:	1 3 10 36 0 1 0 0 0 0 0 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support:	150 1 15 32 0 3 0 0 1	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall:	30 1 0 0 0 0 2 1 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End:	1 3 10 36 0 1 0 0 0 0 0 0 0 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support:	150 1 15 32 0 3 0 0 1 0 1 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box:	30 1 0 0 0 0 2 1 0 0 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	1 3 10 36 0 1 0 0 0 0 0 0 0 0 0 0 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	150 1 15 32 0 3 0 1 0 1 0 1 0 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	30 1 0 0 0 0 2 1 0 0 0 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail: Guardrail:	1 3 10 36 0 1 0 0 0 0 0 0 0 0 0 0 4	Daylight: Dusk: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole: Other Post, Pole Supports:	150 1 15 32 0 3 0 1 0 1 0 1 0 1	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery: Tree:	30 1 0 0 0 0 2 1 0 0 0 0 0 0 0 0
Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	1 3 10 36 0 1 0 0 0 0 0 0 0 0 0 0 0	Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	150 1 15 32 0 3 0 1 0 1 0 1 0 0	Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	30 1 0 0 0 0 2 1 0 0 0 0 0 0

## **TENNESSEE DEPARTMENT OF TRANSPORTATION**

COUNTY = Ha	amilton				Date:	12/5/2017
	terstate 24					
		ute 2 (US 64, Cu	mminas Hwy)			
	o Browns Fe	-				
	Lane Divided	•				
FUNCTIONAL CLAS						
	)14-2017					
ADT YEARS USED=	2016					
COMMENTS =	2016					
		OT 04-41- 0	-4-			
	NG	OT Station Cou	nts			
SECTION = MORE TH	-	E / SPOT = LESS	S THAN OR EQUA	L TO 0.10 MILE		
BLM	ELM	Length	Average AADT	VMT		
2.900	4.220	1.320	68,905	90,955		
0.000		0.000		0		
0.000		0.000		0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
		1.320	68,905	90,955		
			,	,		
INTERSECTION				Leg	Traffic AADT	
Log Mile =	0			North =	0	
PRODUCED PUI	RSUANT TO			East =	0	
PUBLIC RECORDS				South =	0	
This document is co	-	USC §409		West =	0	
and its production p		-	=	Entering AADT =	0	
document records re				#VALUE!		
waive the provisions	-		4-Lane Divided			
			2014-2017			
					*Severe	Other
		Total	Fatal	Incap. Injury	Crashes	Injury
No. of Crashes	=	151	0	1	1	20
No. of Years	_	3	U			20
SW avg. rate	_	3 1.828	0.009	0.048	0.057	0.365
14-16 S/W Rates	_	1.020	0.009	0.040	0.057	0.303
14-10 J/W Rales						
Exposure (E)	=	99.5953				
Crash Rate (A)	=	1.516	0.000	0.010	0.010	0.201
Critical Rate (C)	=	2.148		0.0.0		0.201
Severity Index (SI)	=	0.1457				
		011407				
Actual Rate/SW Avera	ge =	0.83	0.00	0.21	0.18	0.55
Ratio of A/C	=	0.71				
		0.71				
* Severe Crashes are	e the sum of	f fatal and inca	apacitating injur	/ crashes		
						Revised 4/8/15
T.D.O.T. Strategic Trar	sportation Ir	vestments Divi	sion/ Safety Data			Bng

T.D.O.T. Strategic Transportation Investments Division/ Safety Data

#### Crash Summary Report

Route: 10024

Spcl Cse: 0-NONE

Log Miles: 2.900 to 4.220 - Crash Dates: 5/31/2014 to 6/1/2017 Vehicle Filter: None - Other Factors Filter: None

Fatal Crashes:	0	Crashes Involving		First Harmful Event	
Total Killed:	-	Pedestrians:	0	Pedestrian:	0
Incap Injury Crashes:	0	Hazardous Cargo:	0	Pedalcycle:	0
	1	Work / Constr Zones:	0	Railway Train:	0
Total Incap Injuries:	1	Fixed Objects:	23	Deer (Animal):	0
Other Injury Crashes:	20	Single Unit Trucks	7	Other Animal:	0
Total Other Injuries:	46	Tractor - Trailer Trucks:	17	Motor Vehicle in Transport:	105
Prop Damage Crashes: Total Crashes:	130 <b>151</b>	Bicycles:	0	Motor Vehicle in Transport in Other Roadway:	0
		Motorcycles:	0		
Crash Location		Lane Departures:	26	Parked Motor Vehicle:	0
Along Roadway:	144	Distracted Drivers:	9	Other Type Non-Motorist:	0
At Intersection:	0			Fixed Object:	23
Railroad Crossing:	0	Road Conditions	0	Other Object (Not Fixed):	2
Bridge:	1	Snow or Slush:		Non Collision:	2
Underpass:	0		1	Overturn:	2
Ramp:	6	Sand, Mud, Dirt or Oil:	0	Jackknife:	0
Private Property:	0	Wet:	32	Cross Median:	0
Other:	0	Dry:	101	Ran Off Road:	0
Manner of Collision		Light Conditions		Weather Conditions	
Manner of Collision ——— Rear End:	86	Light Conditions — Dawn:	2	Weather Conditions	105
	86 0	_	2 111		105 28
Rear End:		Dawn:		No Adverse Conditions:	
Rear End: Head On:	0	Dawn: Daylight:	111	No Adverse Conditions: Rain:	28
Rear End: Head On: Rear-to-Side / Rear:	0 0	Dawn: Daylight: Dusk:	111 2	No Adverse Conditions: Rain: Sleet and Hail:	28 0
Rear End: Head On: Rear-to-Side / Rear: Angle:	0 0 0	Dawn: Daylight: Dusk: Dark / Lighted:	111 2 8	No Adverse Conditions: Rain: Sleet and Hail: Snow:	28 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir:	0 0 0 19	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	111 2 8 11	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy:	28 0 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	0 0 19 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	111 2 8 11	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	28 0 0 0 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir:	0 0 19 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	111 2 8 11	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	28 0 0 0 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	0 0 19 0 1	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	111 2 8 11 1	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind:	28 0 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Boulder:	0 0 19 0 1	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	111 2 8 11 1 5	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch:	28 0 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building:	0 0 19 0 1	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post	111 2 8 11 1 5 1	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment:	28 0 0 1 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator:	0 0 19 0 1	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support:	111 2 8 11 1 5 1 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence:	28 0 0 1 0 1 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure:	0 0 19 0 1 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support:	111 2 8 11 1 5 1 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall:	28 0 0 1 0 1 0 1 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End:	0 0 19 0 1 0 0 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support:	111 2 8 11 1 5 1 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box:	28 0 0 1 0 1 0 1 0 0 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Boulder: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	0 0 19 0 1 0 0 0 0 0 0 0 0 0	Dawn: Daylight: Dusk: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	111 2 8 11 1 5 1 0 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	28 0 0 1 0 1 0 1 0 0 0 0 0

11/7/2017

County: HAMILTON

Page 1 of 1

Cnty Seq: 2

## **TENNESSEE DEPARTMENT OF TRANSPORTATION**

COUNTY = I	Hamilton				Date:	12/5/2017
	nterstate 24					
	From Browns	Ferry Rd				
	To I-124	onyna				
	4-Lane Divideo	I				
FUNCTIONAL CLAS						
	2014-2017	410				
ADT YEARS USED=	2014-2017					
COMMENTS =	2010					
		OT Station Cour	ato.			
	BNG	OT Station Cour	1115			
SECTION = MORE T	_	E / SPOT = LESS	S THAN OR EQUA	L TO 0.10 MILE		
BLM	ELM	Length	Average AADT	VMT		
4.220	7.330	3.110	70,994	220,791		
0.000		0.000	· · · ·	0		
0.000		0.000		0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	0	0		
0.000	0.000	0.000	Ŭ 0	0		
		3.110	70,994	220,791		
			- ,	-, -		
INTERSECTION				Leg	Traffic AADT	
Log Mile =	0			North =	0	
PRODUCED PU	JRSUANT TO			East =	0	
PUBLIC RECORDS	S REQUEST			South =	0	
This document is c		USC §409		West =	0	
and its production	-	-	=	Entering AADT =	0	
document records	-			#VALUE!		
waive the provision			4-Lane Divided			
			2014-2017			
					*Severe	Other
		Total	Fatal	Incap. Injury		Injury
No. of Crashes	=	357	2		8	
No. of Years	=	357	2	6	8	47
SW avg. rate	=	د 1.828	0.009	0.048	0.057	0.365
	-	1.020	0.009	0.048	0.057	0.365
14-16 S/W Rates						
Exposure (E)	=	241.7665				
Crash Rate (A)	=	1.477	0.008	0.025	0.033	0.194
Critical Rate (C)	=	2.032	0.000	0.020	0.000	0.134
Severity Index (SI)	=	0.1877				
		0.1077				
Actual Rate/SW Aver	age =	0.81	0.92	0.52	0.58	0.53
Ratio of A/C	=	0.73				
		0.75				
				_		
* Severe Crashes a	re the sum o	f fatal and inca	apacitating injur	v crashes		
* Severe Crashes a	re the sum o	<mark>f fatal and inca</mark>	apacitating injur	y crashes		
* Severe Crashes a	<mark>re the sum o</mark>	<mark>f fatal and inca</mark>	apacitating injur	y crashes		
* Severe Crashes a	<mark>re the sum o</mark>	<mark>f fatal and inca</mark>	apacitating injur	y crashes		
* Severe Crashes a	re the sum o	f fatal and inca	apacitating injur	y crashes		Revised 4/8/15

T.D.O.T. Strategic Transportation Investments Division/ Safety Data

# Crash Summary Report

Page 1 of 1 Cnty Seq: 2

Route: 10024

SpcI Cse: 0-NONE

Log Miles: 4.220 to 7.330 - Crash Dates: 5/31/2014 to 6/1/2017 Vehicle Filter: None - Other Factors Filter: None

Otatiatia a		One of the state o	Filter: Non		
Fatal Crashes:	2	Crashes Involving		First Harmful Event	
Total Killed:	2	Pedestrians:	0	Pedestrian:	0
Incap Injury Crashes:	6	Hazardous Cargo:	0	Pedalcycle:	0
Total Incap Injuries:	7	Work / Constr Zones:	1	Railway Train:	0
Other Injury Crashes:	47	Fixed Objects:	51	Deer (Animal):	2
Total Other Injuries:	94	Single Unit Trucks	25	Other Animal:	1
Prop Damage Crashes:	302	Tractor - Trailer Trucks:	45	Motor Vehicle in Transport:	249
Total Crashes:	357	Bicycles:	0	Motor Vehicle in Transport in Other Roadway:	0
Total Clashes.	557	Motorcycles:	4		
Crash Location		Lane Departures:	68	Parked Motor Vehicle:	1
Along Roadway:	347	Distracted Drivers:	22	Other Type Non-Motorist:	0
At Intersection:	0			Fixed Object:	51
Railroad Crossing:	0	Road Conditions	. ]	Other Object (Not Fixed):	4
Bridge:	0	Ice:	1	Non Collision:	7
Underpass:	0	Snow or Slush:	1	Overturn:	3
Ramp:	10	Sand, Mud, Dirt or Oil:	0	Jackknife:	0
Private Property:	0	Wet:	91	Cross Median:	0
Other:	0	Dry:	226	Ran Off Road:	0
Manner of Collision ———		Light Conditions		Weather Conditions	
- Manner of Collision	178	- Light Conditions	6	Weather Conditions —— No Adverse Conditions:	238
	178 2		6 249		238 78
Rear End:		Dawn:		No Adverse Conditions:	
Rear End: Head On:	2	Dawn: Daylight:	249	No Adverse Conditions: Rain:	78
Rear End: Head On: Rear-to-Side / Rear:	2 1	Dawn: Daylight: Dusk:	249 3	No Adverse Conditions: Rain: Sleet and Hail:	78 0
Rear End: Head On: Rear-to-Side / Rear: Angle:	2 1 9	Dawn: Daylight: Dusk: Dark / Lighted:	249 3 36	No Adverse Conditions: Rain: Sleet and Hail: Snow:	78 0 2
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir:	2 1 9 58	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	249 3 36 24	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy:	78 0 2 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	2 1 9 58 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	249 3 36 24	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	78 0 2 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	2 1 9 58 0 2	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	249 3 36 24 2	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind:	78 0 2 0 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	2 1 9 58 0 2	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	249 3 36 24 2 2	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch:	78 0 2 0 0 0 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building:	2 1 9 58 0 2 2 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post	249 3 36 24 2 2 19 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment:	78 0 2 0 0 0 0 2 2 2
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator:	2 1 9 58 0 2 2 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support:	249 3 36 24 2 2 19 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence:	78 0 2 0 0 0 0 2 2 2 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure:	2 1 9 58 0 2 2 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support:	249 3 36 24 2 2 19 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall:	78 0 2 0 0 0 0 2 2 1 1 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End:	2 1 9 58 0 2 2 0 0 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support:	249 3 36 24 2 19 0 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box:	78 0 2 0 0 0 0 2 2 1 1 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	2 1 9 58 0 2 2 0 0 0 0 0 0 0 2	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	249 3 36 24 2 2 19 0 0 0 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	78 0 2 0 0 0 0 2 2 1 1 0 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail: Guardrail:	2 1 9 58 0 2 2 0 0 0 0 0 0 0 2 18	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole: Other Post, Pole Supports:	249 3 36 24 2 19 0 0 0 0 0 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery: Tree:	78 0 2 0 0 0 0 2 2 1 1 0 1 4
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: Fixed Objects Building: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	2 1 9 58 0 2 2 0 0 0 0 0 0 0 2 18 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	249 3 36 24 2 2 19 0 0 0 0 0 0 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	78 0 2 0 0 0 0 2 2 1 1 0 1

County: HAMILTON

#### Page

## **Crash Summary Report**

Cnty Seq: 2

Route: 10024

Spcl Cse: 0-NONE

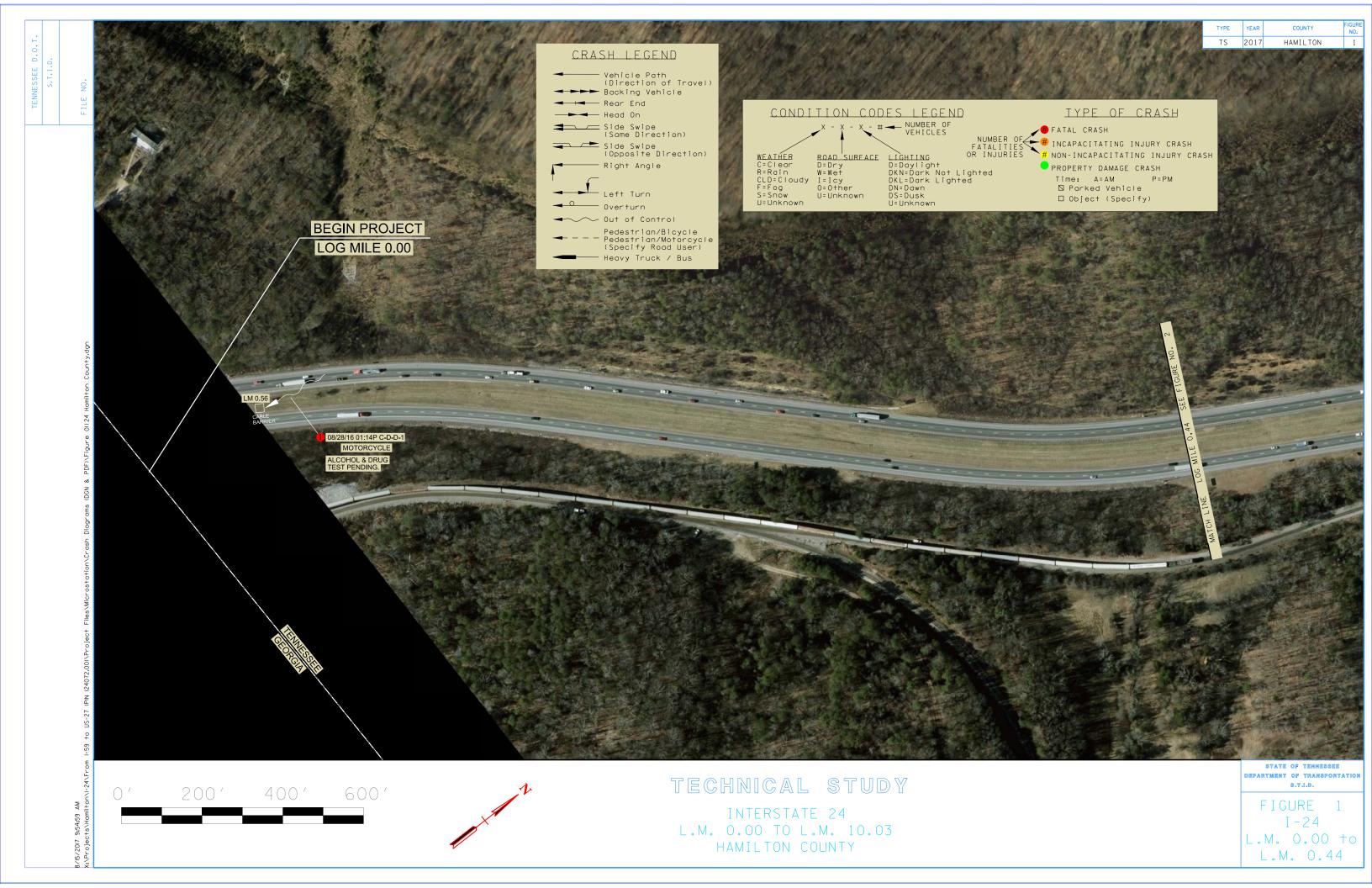
Log Miles: 0.000 to 7.330 - Crash Dates: 5/31/2014 to 6/1/2017 Vehicle Filter: None - Other Factors Filter: None

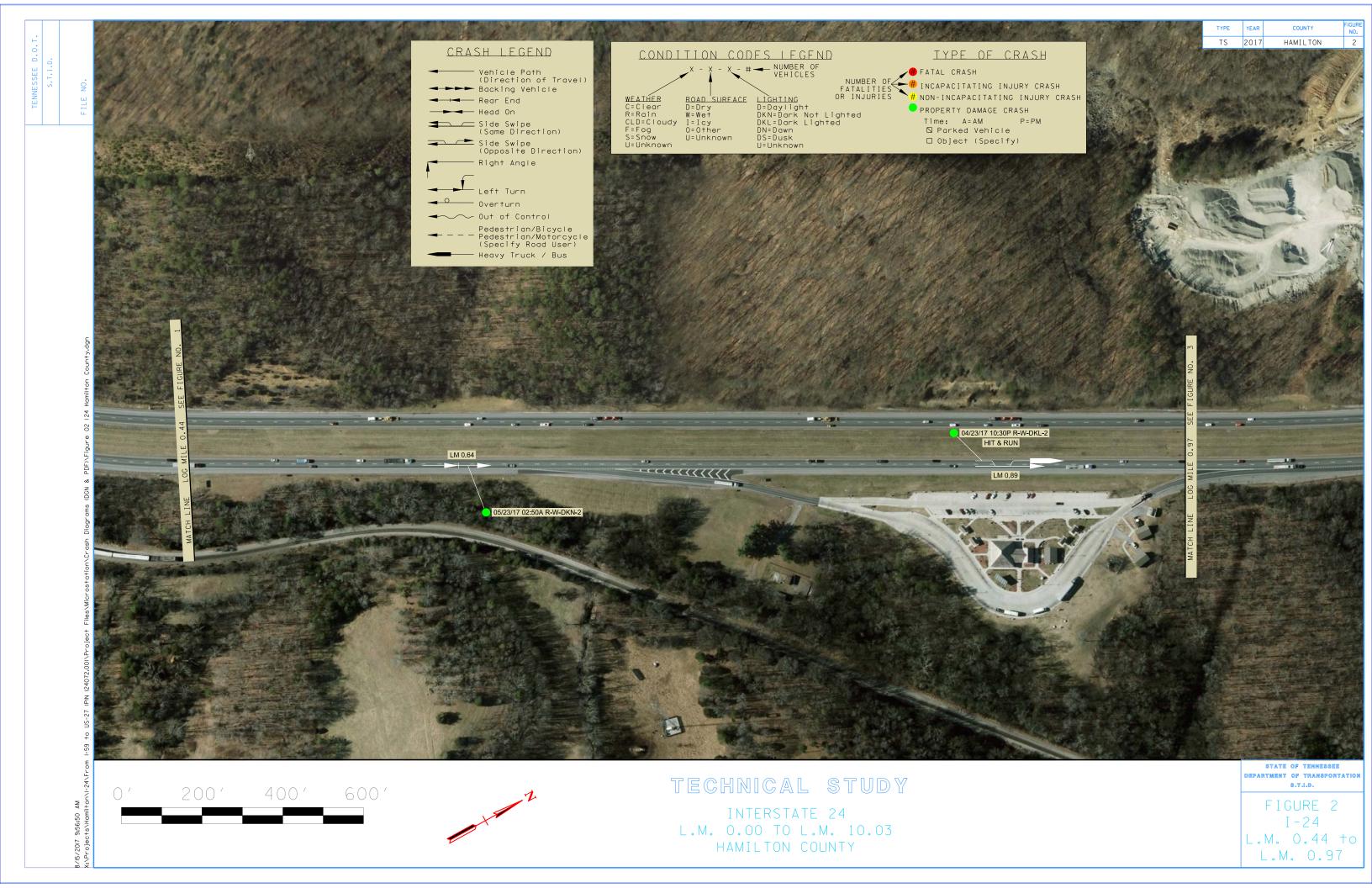
		Vehicle Filter: None - Other Factors			
Fatal Crashes:	3	Crashes Involving ———		First Harmful Event ———	
Total Killed:	3	Pedestrians:	0	Pedestrian:	0
Incap Injury Crashes:	10	Hazardous Cargo:	0	Pedalcycle:	0
Total Incap Injuries:	11	Work / Constr Zones:	1	Railway Train:	0
Other Injury Crashes:	97	Fixed Objects:	92	Deer (Animal):	7
Total Other Injuries:	190	Single Unit Trucks	50	Other Animal:	2
Prop Damage Crashes:	627	Tractor - Trailer Trucks:	92	Motor Vehicle in Transport:	514
Total Crashes:	737	Bicycles:	0	Motor Vehicle in Transport in Other Roadway:	0
		Motorcycles:	6	Parked Motor Vehicle:	5
Crash Location	700	Lane Departures:	121	Other Type Non-Motorist:	0
Along Roadway:	700	Distracted Drivers:	45		92
At Intersection:	12			Fixed Object:	
Railroad Crossing:	0	Road Conditions	2	Other Object (Not Fixed):	14
Bridge:	2	Snow or Slush:	2	Non Collision:	10
Underpass:	0	Sand, Mud, Dirt or Oil:	0	Overturn:	6
Ramp:	22	Wet:	161	Jackknife:	1
Private Property:	1	Dry:	488	Cross Median:	0
Other:	0	Diy.	100	Ran Off Road:	0
└─ Manner of Collision ────		Light Conditions		Weather Conditions	
- Manner of Collision	378	- Light Conditions	12	Weather Conditions     No Adverse Conditions:	514
	378 3	_	12 510		514 136
Rear End:		Dawn:		No Adverse Conditions:	
Rear End: Head On:	3	Dawn: Daylight:	510	No Adverse Conditions: Rain:	136
Rear End: Head On: Rear-to-Side / Rear:	3 4	Dawn: Daylight: Dusk:	510 6	No Adverse Conditions: Rain: Sleet and Hail:	136 1
Rear End: Head On: Rear-to-Side / Rear: Angle:	3 4 19	Dawn: Daylight: Dusk: Dark / Lighted:	510 6 59	No Adverse Conditions: Rain: Sleet and Hail: Snow:	136 1 2
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir:	3 4 19 113	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	510 6 59 67	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy:	136 1 2 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	3 4 19 113 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	510 6 59 67	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	136 1 2 0 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir:	3 4 19 113 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted:	510 6 59 67	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke:	136 1 2 0 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	3 4 19 113 0 4	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	510 6 59 67 3	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind:	136 1 2 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown:	3 4 19 113 0 4	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated:	510 6 59 67 3 27	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch:	136 1 2 0 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building:	3 4 19 113 0 4 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post	510 6 59 67 3 27 1	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment:	136 1 2 0 1 0 
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator:	3 4 19 113 0 4 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support:	510 6 59 67 3 27 1 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence:	136 1 2 0 1 0 4 4 4 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure:	3 4 19 113 0 4 0 0 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support:	510 6 59 67 3 27 1 0 1	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall:	136 1 2 0 1 0 4 4 4 1 1
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End:	3 4 19 113 0 4 0 0 0 0 0 0 0 0 0	Dawn: Daylight: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support:	510 6 59 67 3 27 1 0 1 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box:	136 1 2 0 1 0 4 4 1 1 0
Rear End: Head On: Rear-to-Side / Rear: Angle: Sideswipe Same Dir: Sideswipe Opp Dir: Unknown: <b>Fixed Objects</b> Boulder: Building: Impact Attenuator: Overhead Structure: Bridge Pier/Abutment/End: Bridge Rail:	3 4 19 113 0 4 0 0 0 0 0 0 0 0 2	Dawn: Daylight: Dusk: Dusk: Dark / Lighted: Dark / Not Lighted: Not Indicated: Other Barrier: Highway Traffic Sign Post Overhead Sign Support: Luminaire/Light Support: Traffic Signal Support: Utility Pole:	510 6 59 67 3 27 1 0 1 0 1 0	No Adverse Conditions: Rain: Sleet and Hail: Snow: Foggy: Smog, Smoke: Crosswind: Ditch: Embankment: Fence: Wall: Mail Box: Shrubbery:	136 1 2 0 1 0 4 4 1 1 0 1

11/7/2017

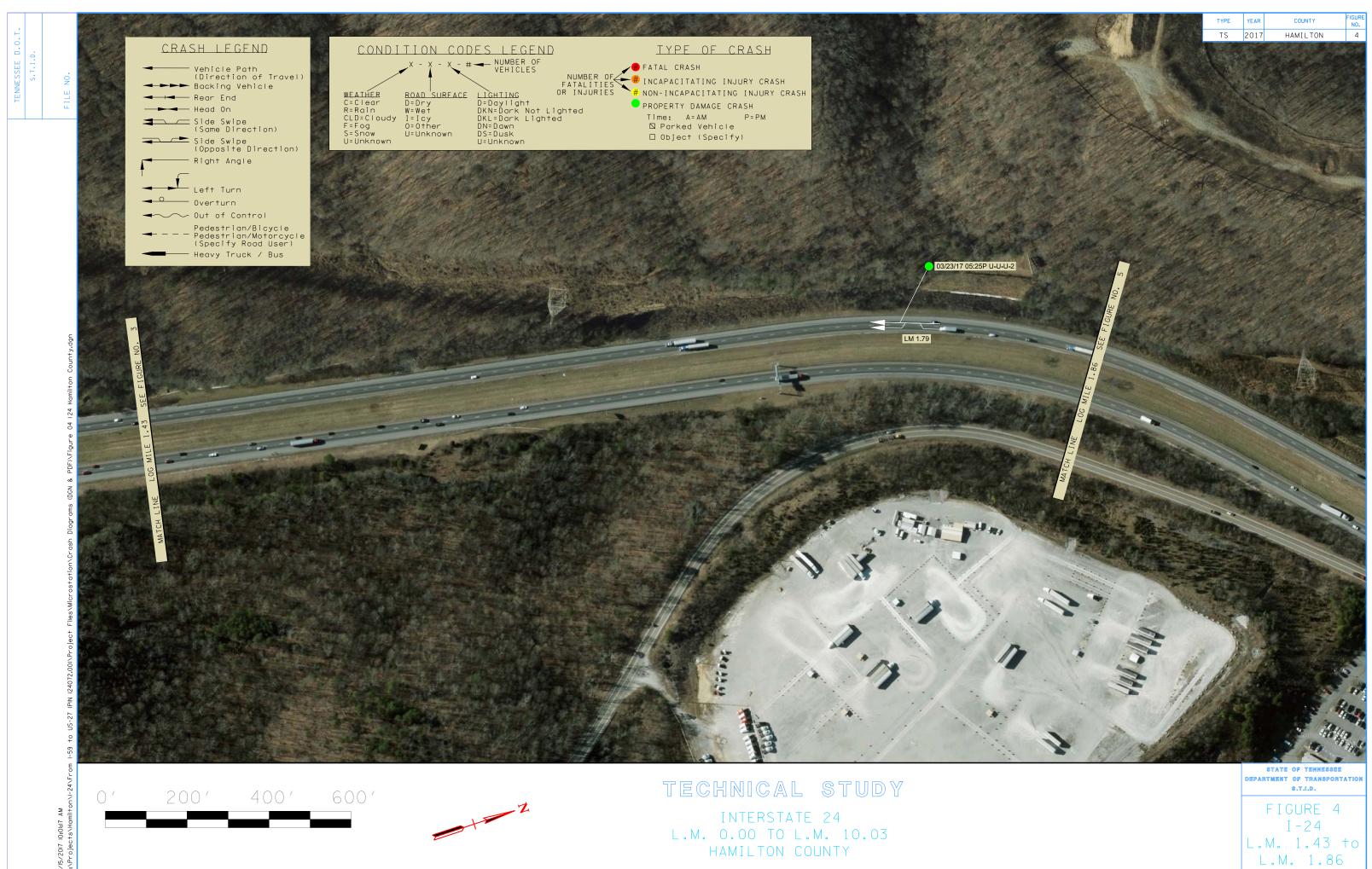
County: HAMILTON

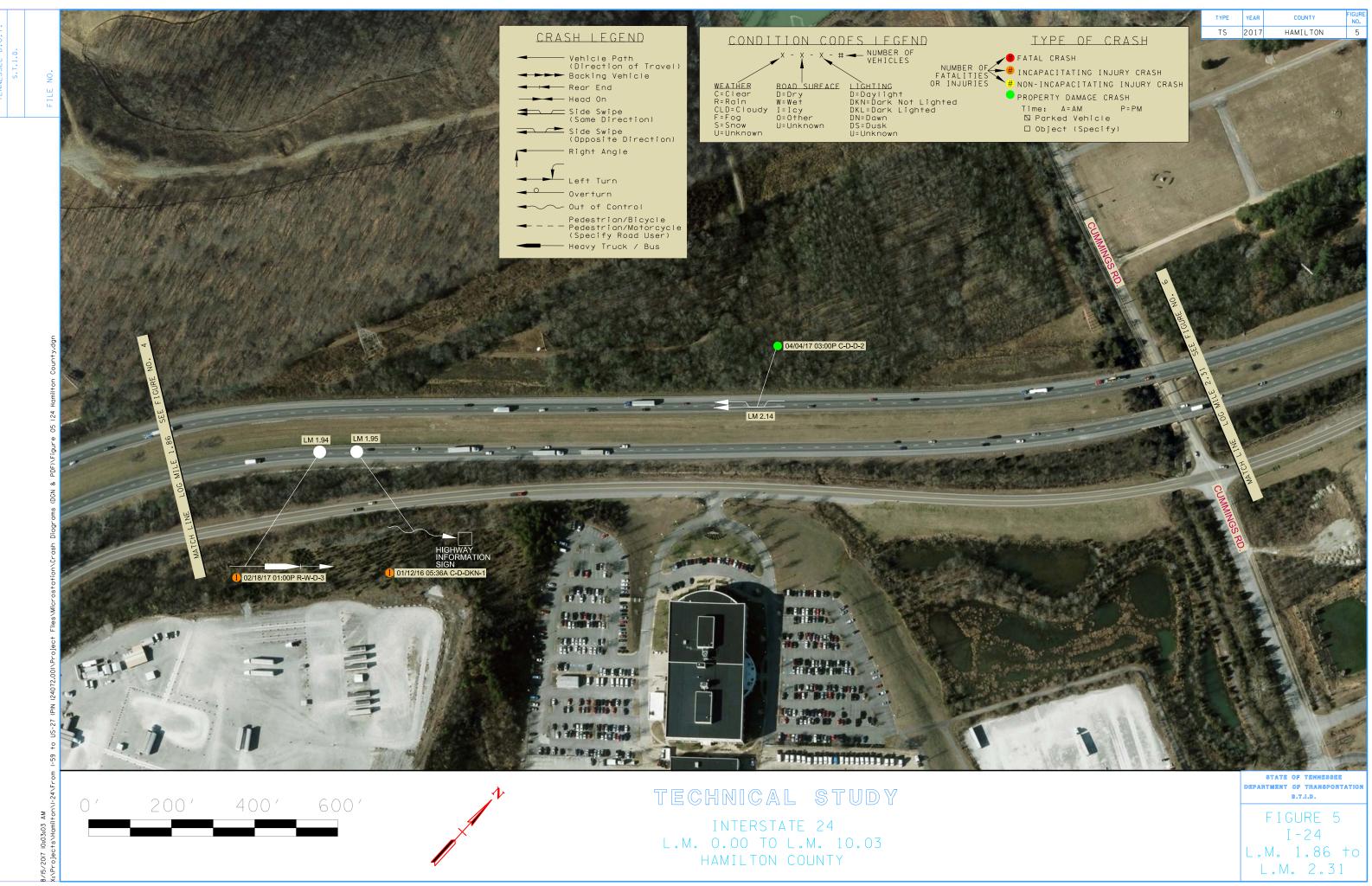
Page 1 of 1

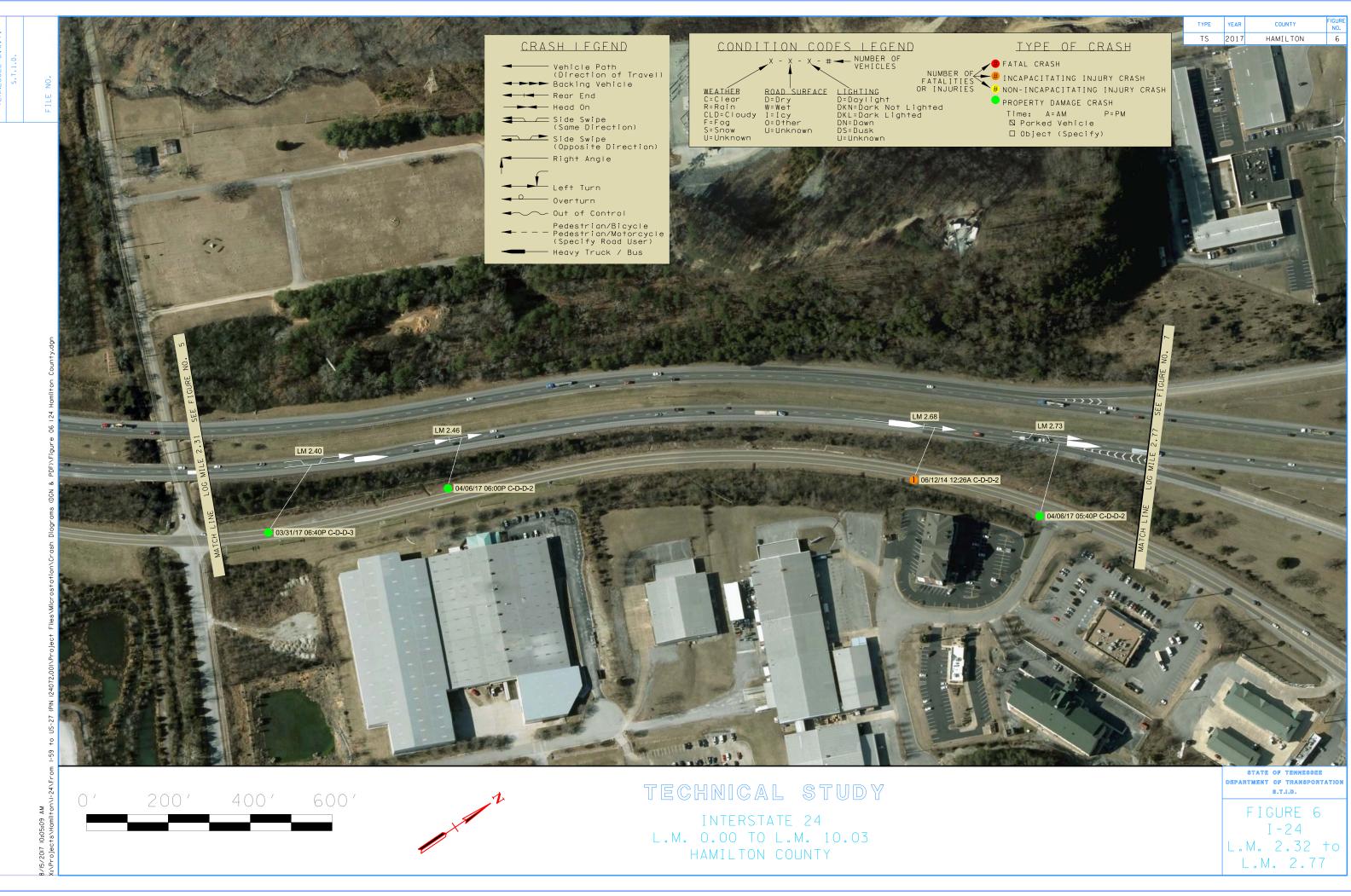


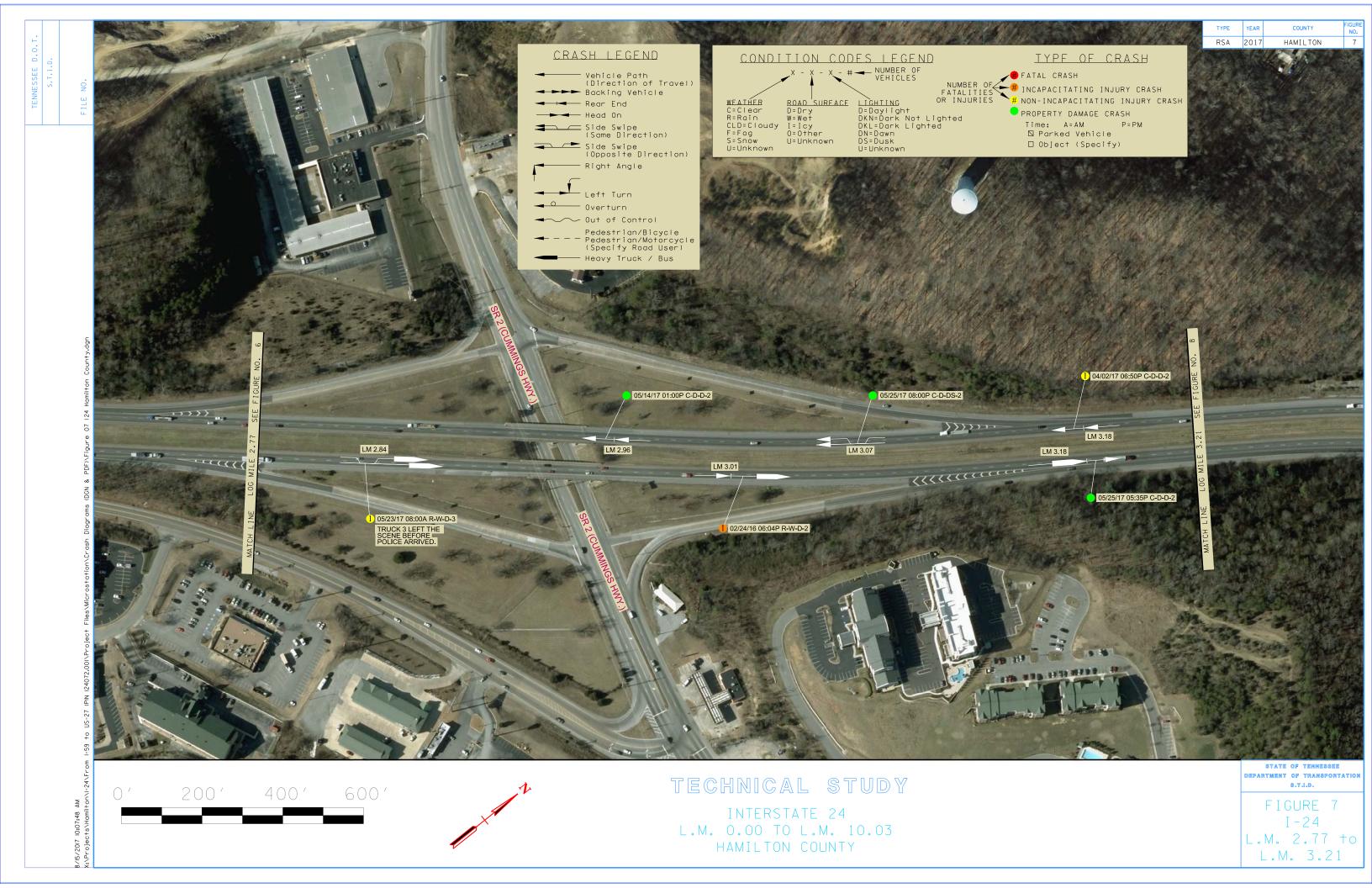


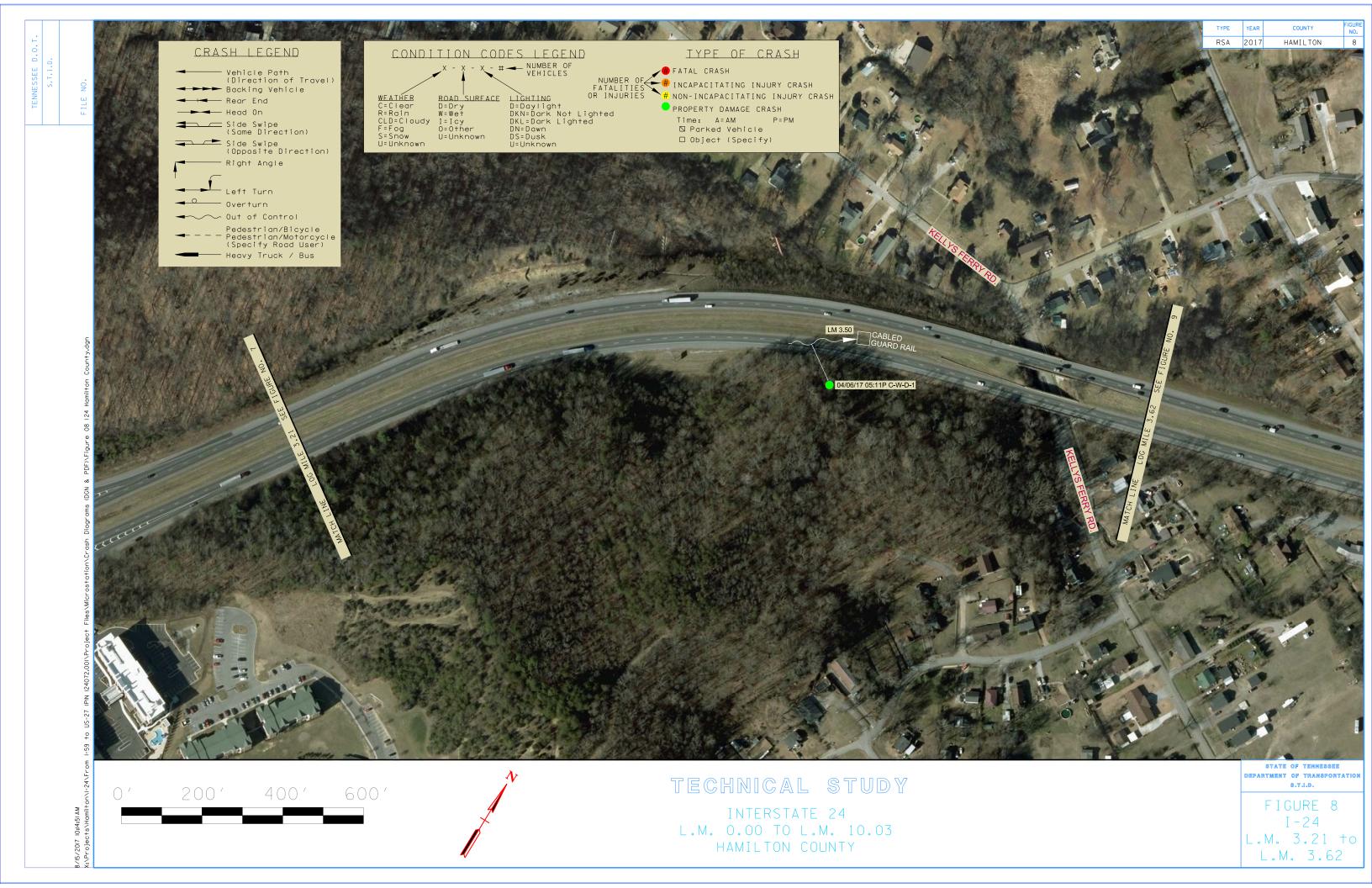


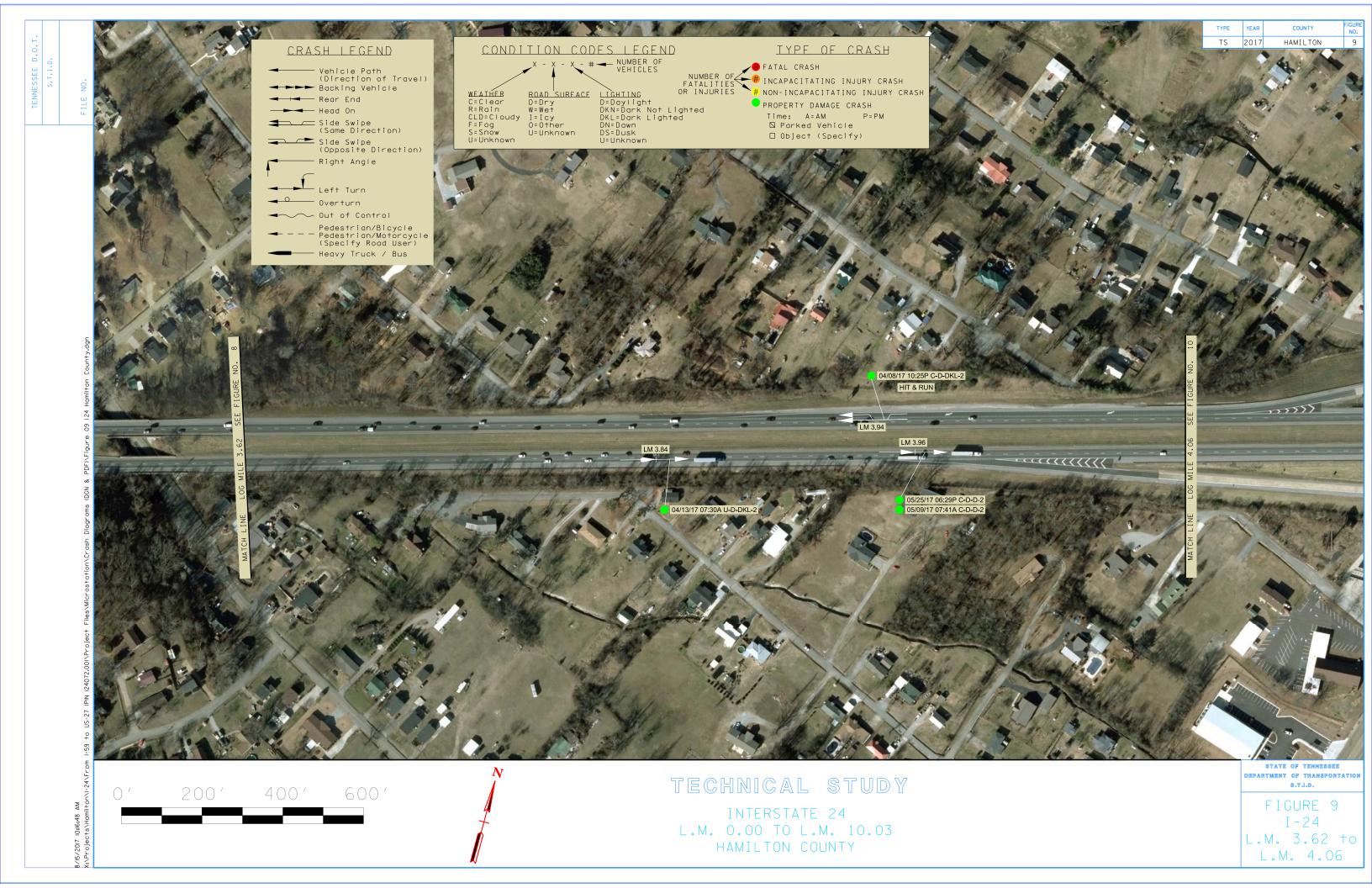


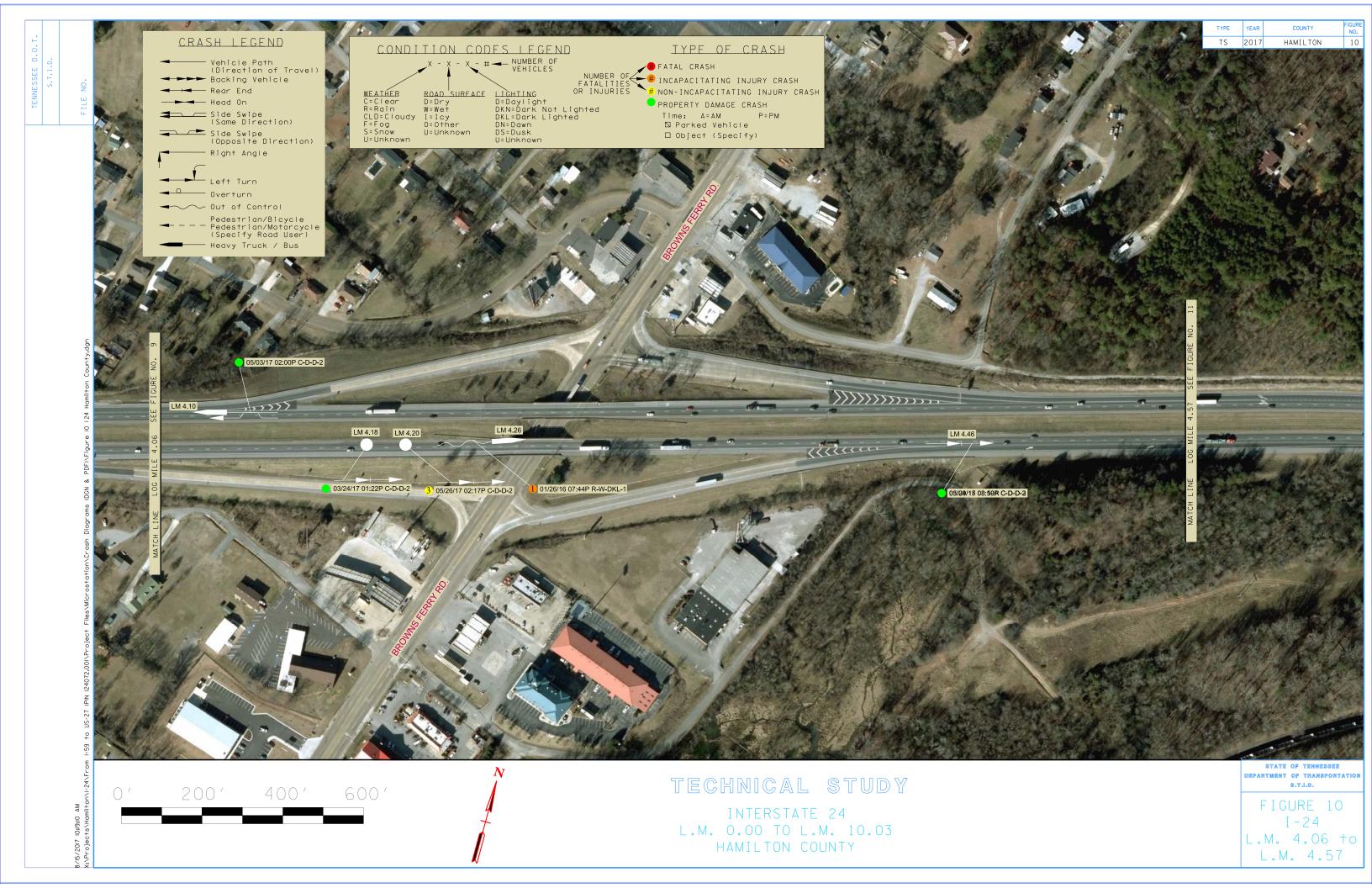


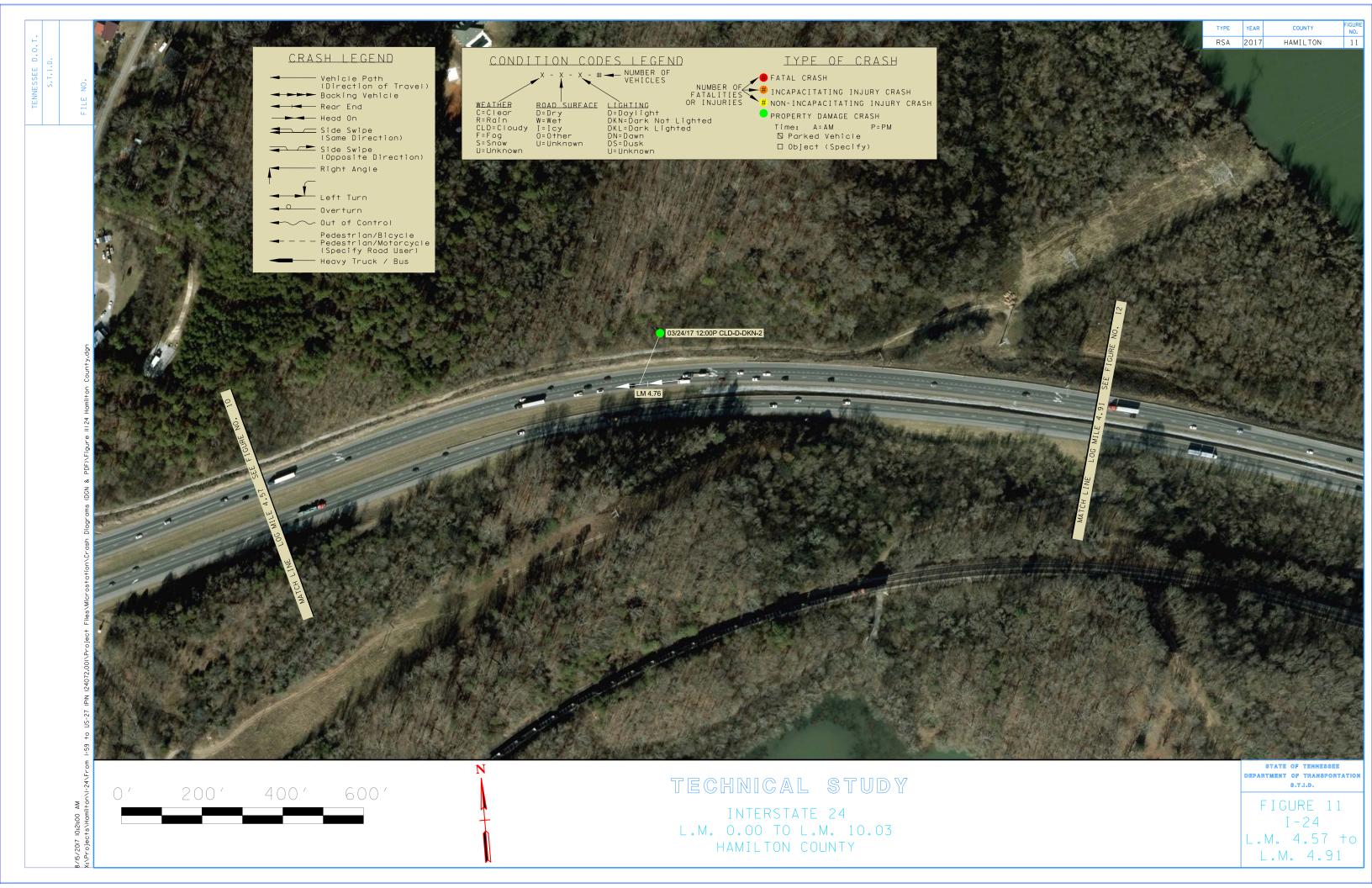


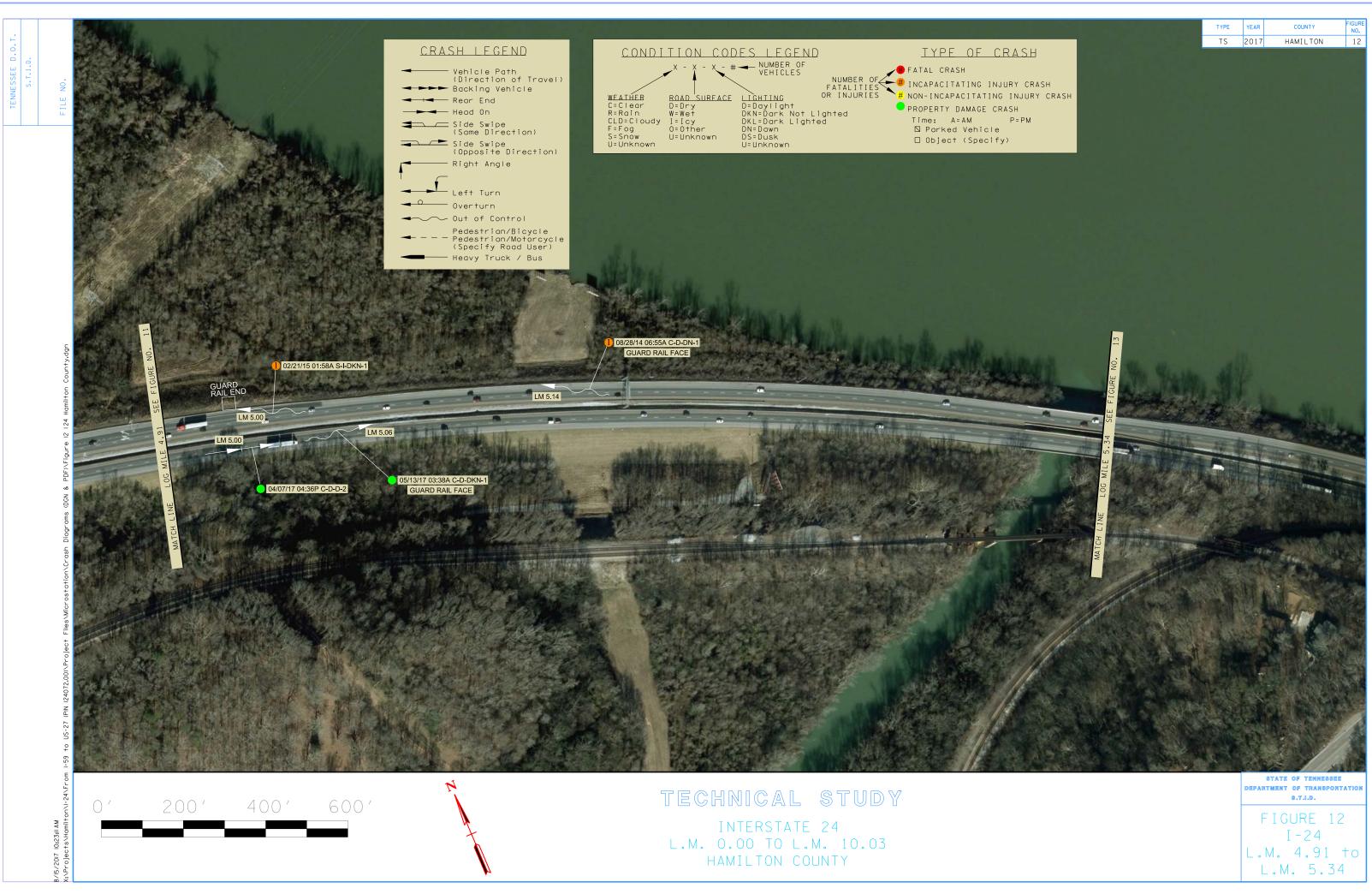


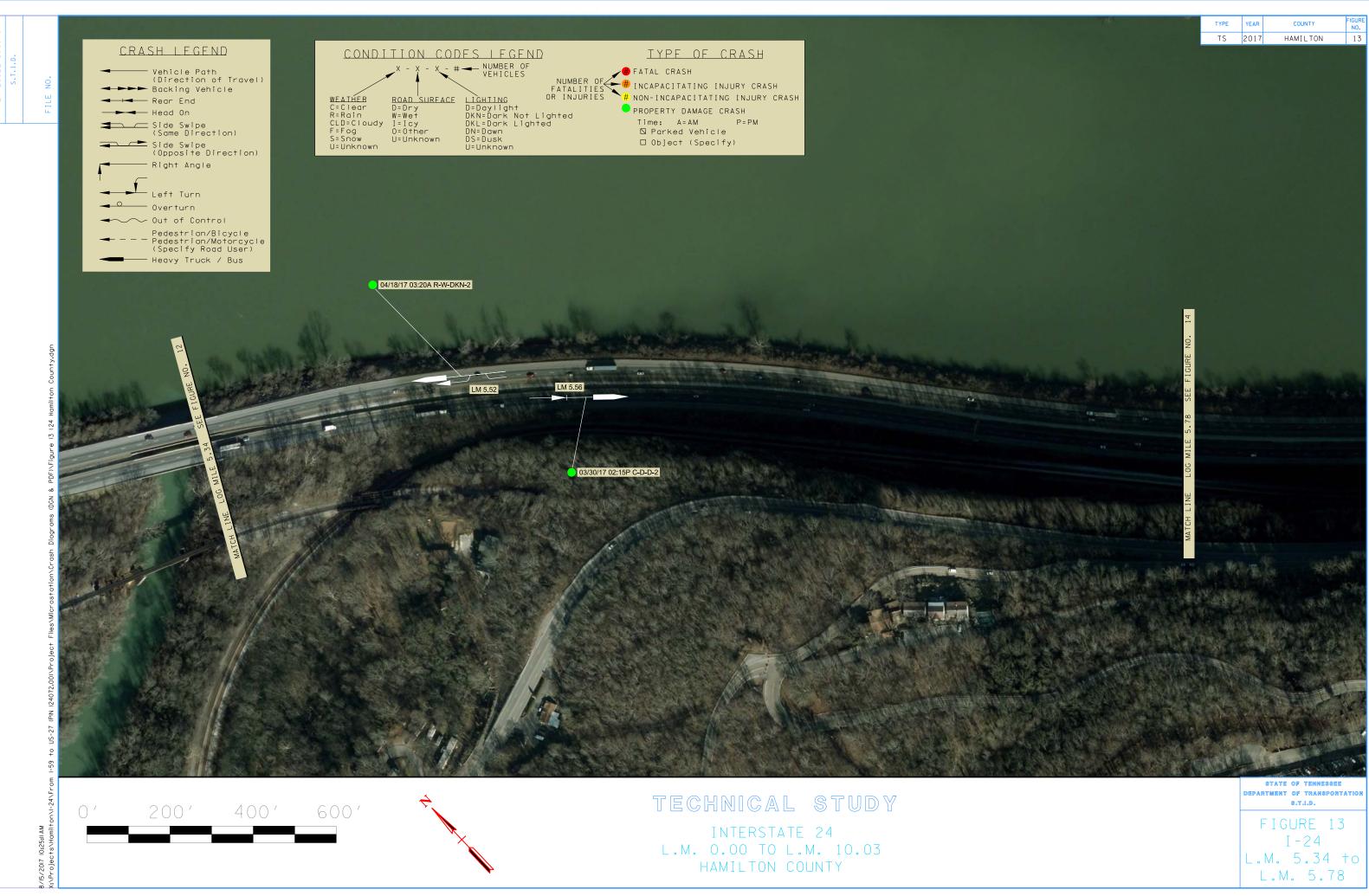


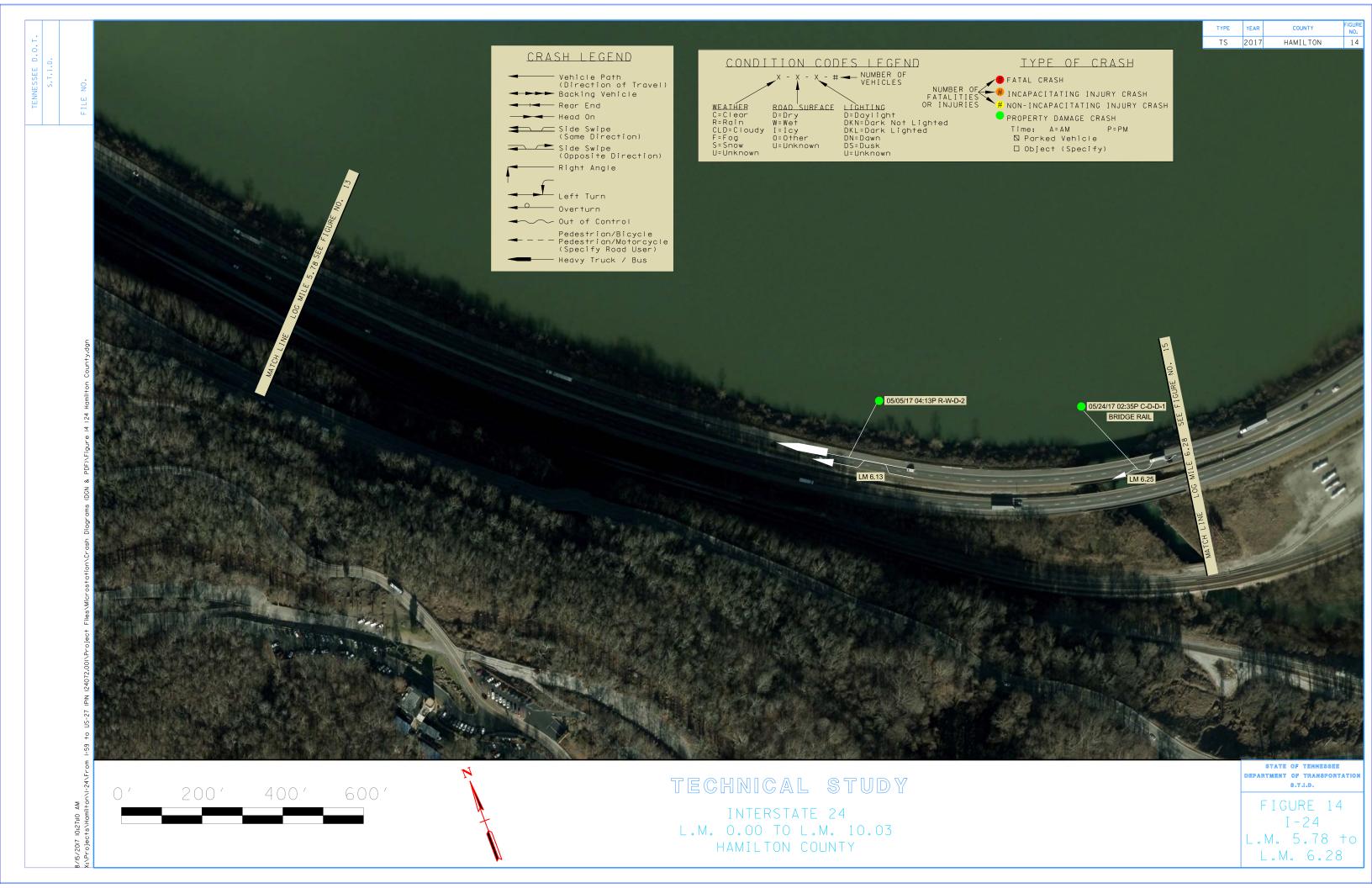


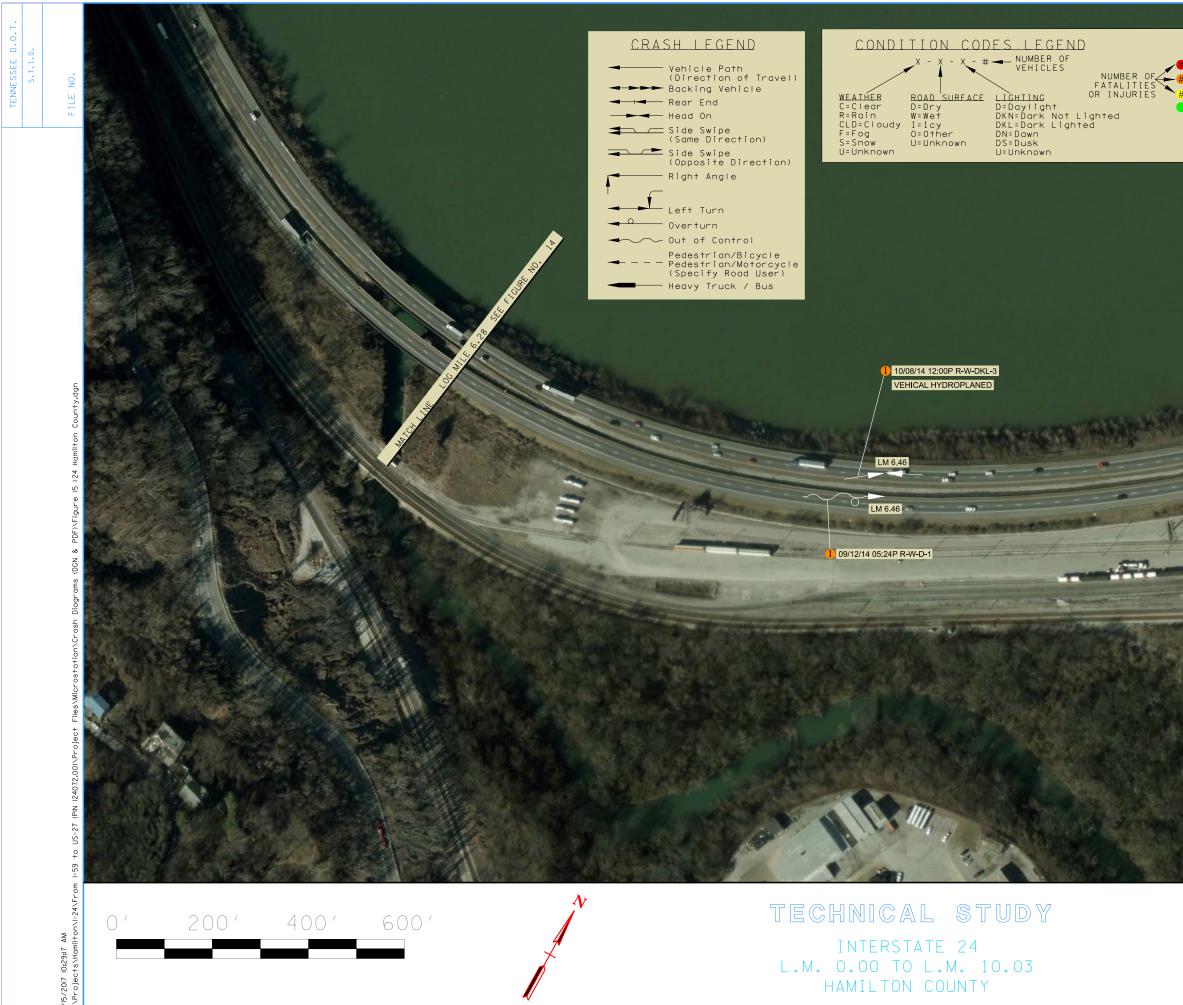












		ТҮРЕ	YEAR	COUNTY	FIGURI NO.
		TS	2017	HAMILTON	15
IYPE OF CRASH					
✓● FATAL CRASH ●● INCAPACITATING INJURY CR	ASH				
* NON-INCAPACITATING INJUR					
PROPERTY DAMAGE CRASH Time: A=AM P=PM					
⊠ Parked Vehicle □ Object (Specify)					
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INTERSTATE 24 L.M. 0.00 TO L.M. 10.03 HAMILTON COUNTY

FIGURE 17 I-24 L.M. 7.08 to L.M. 7.36

