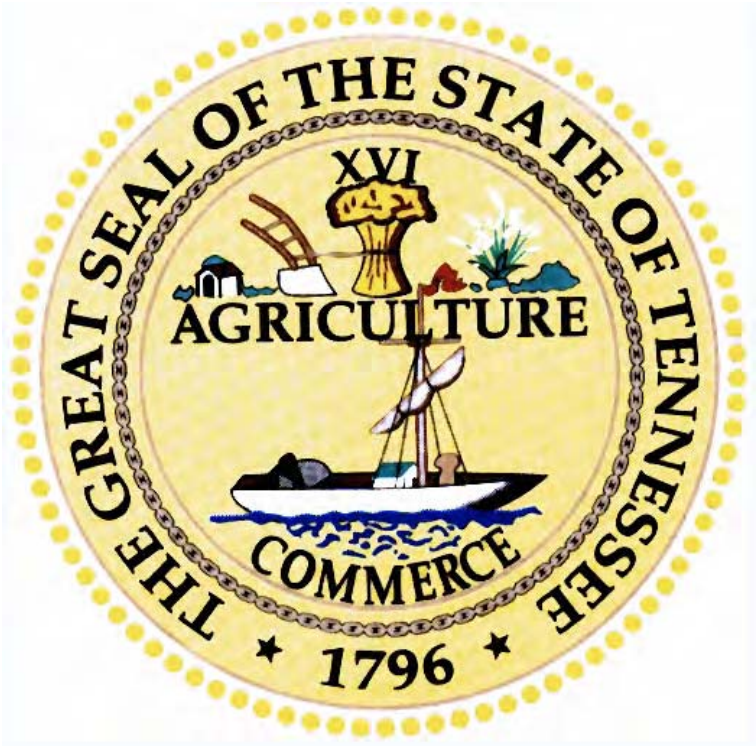
FEASIBILITY STUDY

State Route 222
From Interstate 40 to US 70/79 (State Route 1)
Fayette and Haywood Counties



PREPARED BY
LONG ENGINEERING, INC.
for the
TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

JULY 2009

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

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1.0 HISTORY AND BACKGROUND

1.1 Study Purpose

The Tennessee Department of Economic and Community Development (ECD), on behalf of the Tennessee Valley Authority (TVA), initiated a study of State Route 222 from Interstate 40 to US 70/79 (State Route 1) for improvements to the existing route. These improvements have been necessitated largely by a TVA-certified megasite adjacent to the study area in Haywood County. Known locally as the "Memphis-Jackson I-40 Advantage Megasite", this 1,720-acre property is slated for a potential large-scale development that will bring employment, income, and tax revenue to the area (most recently proposed as a solar power generation facility that would also serve as a demonstration, education, and research tool for the region and state). The existing State Route 222 is within the footprint of the megasite, requiring a relocation of the route in order to facilitate maximum development of the property, as well as to accommodate the increased traffic brought by such development.

The purpose of this feasibility study is to establish the immediate and long-term needs of the study area and assess various options for meeting these needs in the future. This report represents part of the planning process for improvements to the study corridor spurred by proposals for development in nearby areas. As part of the process, this report will consider several options intended to better meet the needs of the area.

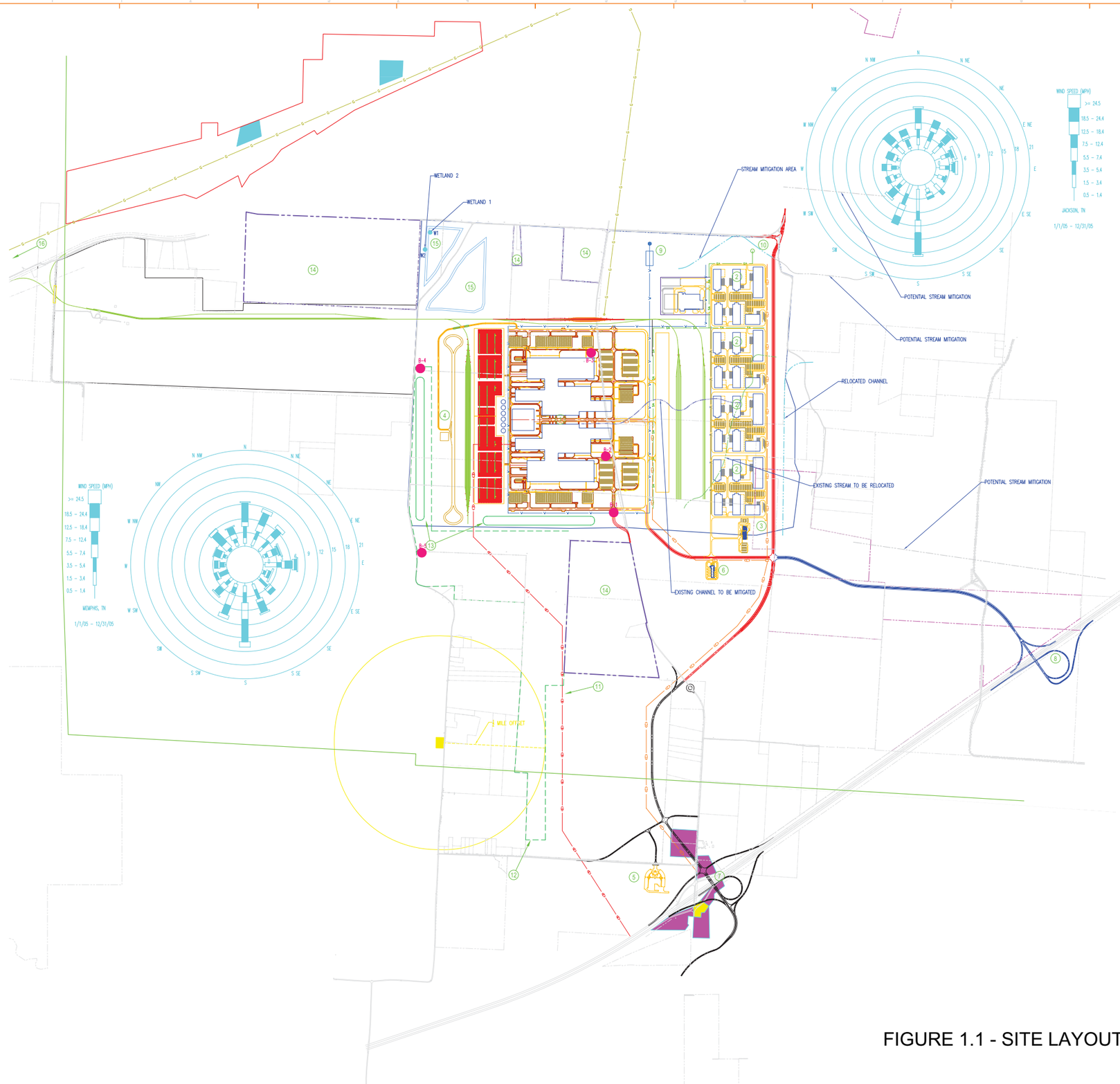
1.2 Study Area History

In early 2009, SSOE, Inc. presented a conceptual layout of development on the megasite and improvements to the surrounding infrastructure, including State Route 222 within the study area. The layout is shown in **Figure 1.1** and additional plan documents are attached in **Appendix A.** This concept serves as a basis for the improvement options discussed in this study.

This study is one of five planning initiatives pertaining to transportation infrastructure in the vicinity of the megasite. The companion initiatives include:

- an **Interchange Justification Study (IJS)** concerning a proposed interchange on Interstate 40 between State Route 222 (Exit 42) and State Route 179 (Exit 47);
- an **Interchange Modification Study (IMS)** regarding the interchange of Interstate 40 and State Route 222 (Exit 42);
- a **State Industrial Access (SIA)** road functional design and corresponding cost estimate regarding an access route from the proposed interchange on Interstate 40 directly to the megasite (see **Section 4.3**); and
- a **feasibility study** concerning a proposed railroad spur from a nearby CSX Transportation facility directly to the megasite.

Although these studies are separate initiatives, every effort has been made to integrate their features to ensure that future implementation of the recommendations occur in a coordinated and collaborative manner.



1. PHASE I AND II AUTOMOTIVE MANUFACTURING PLANTS
2. SUPPLIER BUILDINGS
3. TRAINING CENTER
4. TEST TRACK
5. WELCOME CENTER
6. FIRE DEPARTMENT
7. SEGMENT 1 INTERSTATE INTERCHANGE
8. SEGMENT 2 INTERSTATE INTERCHANGE
9. WATER TOWER AND WATER TREATMENT PLANT
10. SANITARY LIFT STATION
11. CONCEPTUAL POWER LINE (SUBJECT TO NEPA PROCESS)
12. FORESTED BUFFER
13. PROPOSED BERM LOCATIONS
14. SITE EXCLUDED
15. STORMWATER POND
16. 12 MILES TO TEXAS NATURAL GAS PIPELINE

LEGEND:

- OVERHEAD ELECTRICAL LINE
- SANITARY SEWER MAIN
- WATER MAIN
- STANTON CITY LIMITS
- PROPERTY LINES
- APPROXIMATE COUNTY LINE
- BOUNDARY FOR MEGASITE (AUTO PLANT CONSTRUCTION)

FAYETTE COUNTY

- ZONED B-2
- ZONED B-3

IF NOT SHADED OR OUTLINED THE PROPERTY IS R-1

HAYWOOD COUNTY

- ZONED C
- ZONED R-1

IF NOT SHADED OR OUTLINED THE PROPERTY IS FAR

NORTH

GRAPHIC SCALE: 1"= 1000'

0' 1000' 2000' 3000'

FIGURE 1.1 - SITE LAYOUT

SSOE, INC.
ARCHITECTS • ENGINEERS
www.ssoe.com

CONSULTANTS

THE SEAL ON THIS DOCUMENT WAS AUTHORIZED BY:

SEAL ID:
DATE:

MEMPHIS JACKSON MEGASITE
HAYWOOD COUNTY, TN

TVA
103 MARSHALL RD.
BRANDON, MS
39047

CLIENT PROJECT NO: 000-000-000

NO.	DATE	SUBJECT

REVISION OR ISSUE

PROJECT NO: 009-00269-00

PROJECT MANAGER:

DESIGNED:

CHECKED:

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DRAWING TITLE
OVERALL SITE INFORMATION PLAN

DRAWING NO:
C.000

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DATE: April 01, 2009 - 12:08am USER: 41433

1.3 Study Area Limits

The limits extend from log mile (LM) 7.83 at the Interstate 40 interchange with State Route 222 (Exit 42) in Fayette County to LM 5.30 at the intersection of State Route 222 and US 70/79 (State Route 1) in Haywood County (Stanton, Tennessee), a distance of 5.81 miles. **Figure 1.2** presents a map of the region, **Figure 1.3** shows the study area and related initiatives identified on the Fayette and Haywood County highway maps, and **Figure 1.4** details the study area on a United States Geological Survey (USGS) topographical map.

1.4 Community Description

The majority of the study area resides within Haywood County, with approximately 0.5 miles in Fayette County. **Table 1.1** presents geographic data for the area. **Table 1.2** presents historic population data for the two counties, as well as statewide values for comparison.

Table 1.1 — Geographic Data[1]

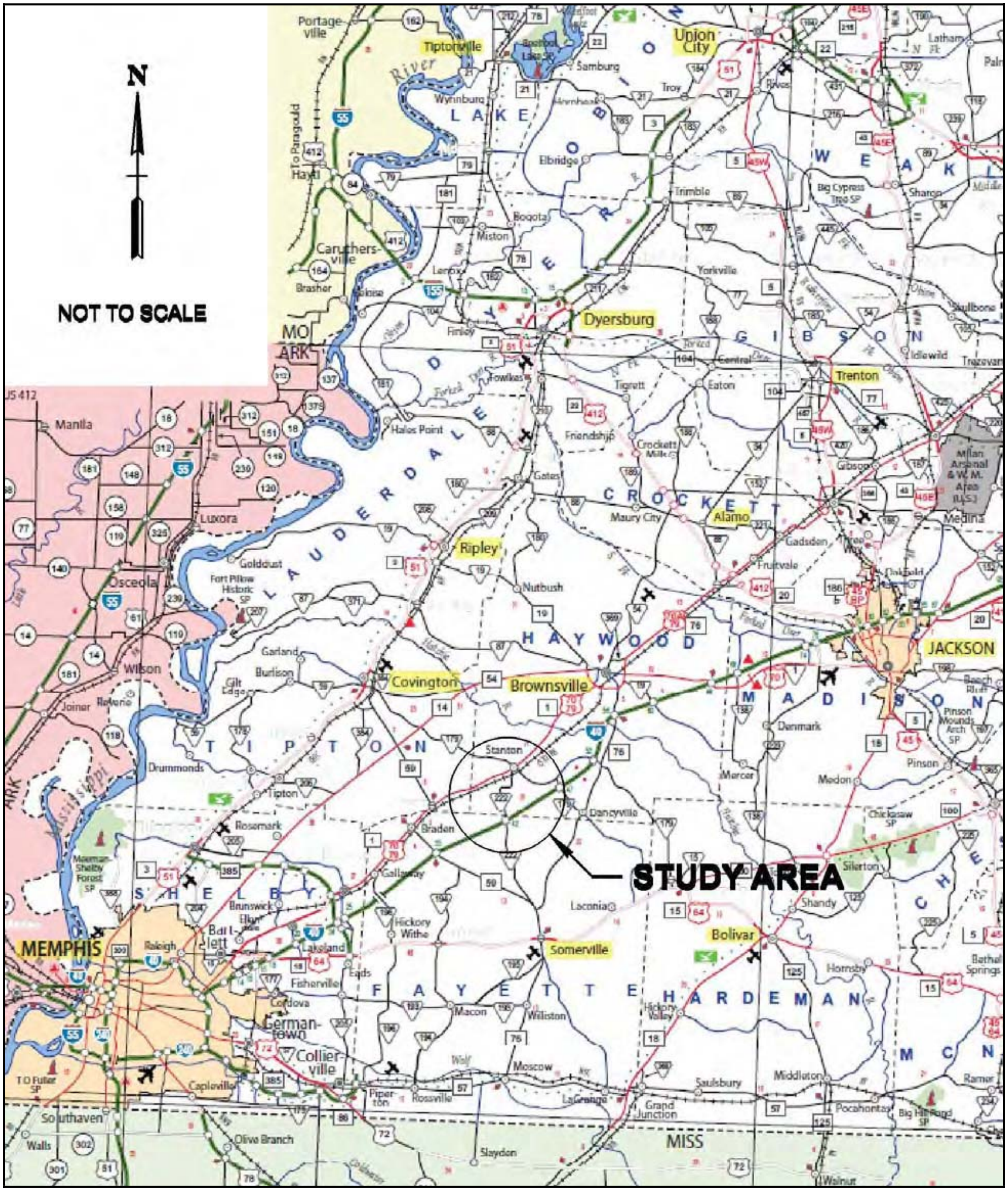
Category	Fayette County	Haywood County
Land Area (excl. Water Covered) (*mi.*^{2})	706	533
Persons per Square Mile	54	36
Housing Units per Square Mile	18	15

Table 1.2 — Population Data[2]

Jurisdiction	Category	Year		
		1990	2000	2008[3]
Fayette County	Population	25,559	28,806	38,173
	Percent Change	—	12.7%	32.5%
	Average Annual Growth Rate	—	1.2%	3.6%
Haywood County	Population	19,437	19,797	19,024
	Percent Change	—	1.9%	-3.9%
	Average Annual Growth Rate	—	0.2%	-0.5%
State of Tennessee	Population	4,877,185	5,689,283	6,214,888
	Percent Change	—	16.7%	9.2%
	Average Annual Growth Rate	—	1.6%	1.1%

[1] Source: United States Census Bureau
[2] Source: United States Census Bureau
[3] Population values for 2008 are United States Census Bureau estimates as of the time of publication of this study.

Figure 1.2 — Regional Map



FEASIBILITY STUDY

SR 222 FROM I-40 TO US 70/79 (SR 1)
FAYETTE AND HAYWOOD COUNTIES

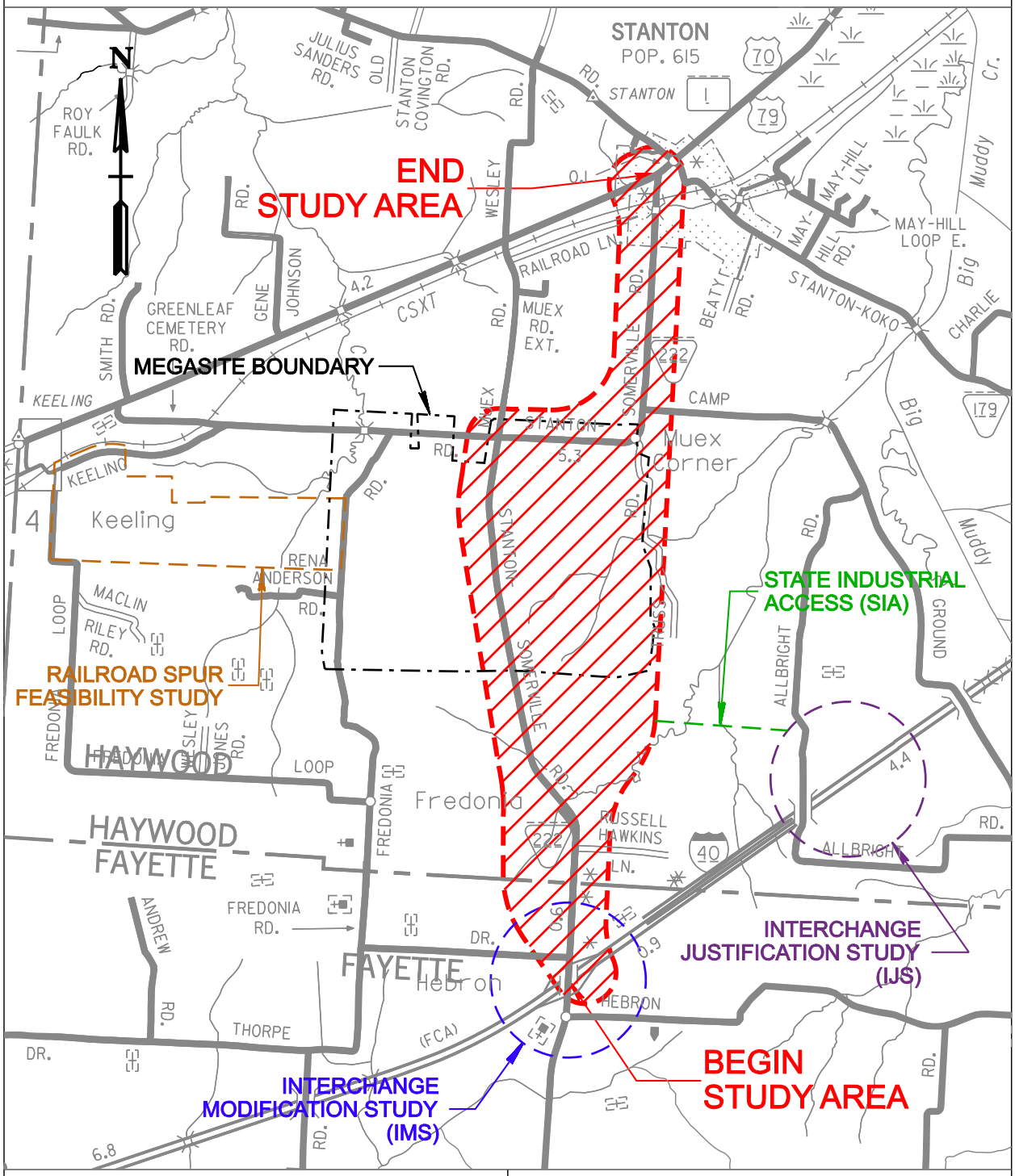


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FIGURE 1.3
STUDY AREA MAP
WITH COMPANION STUDIES

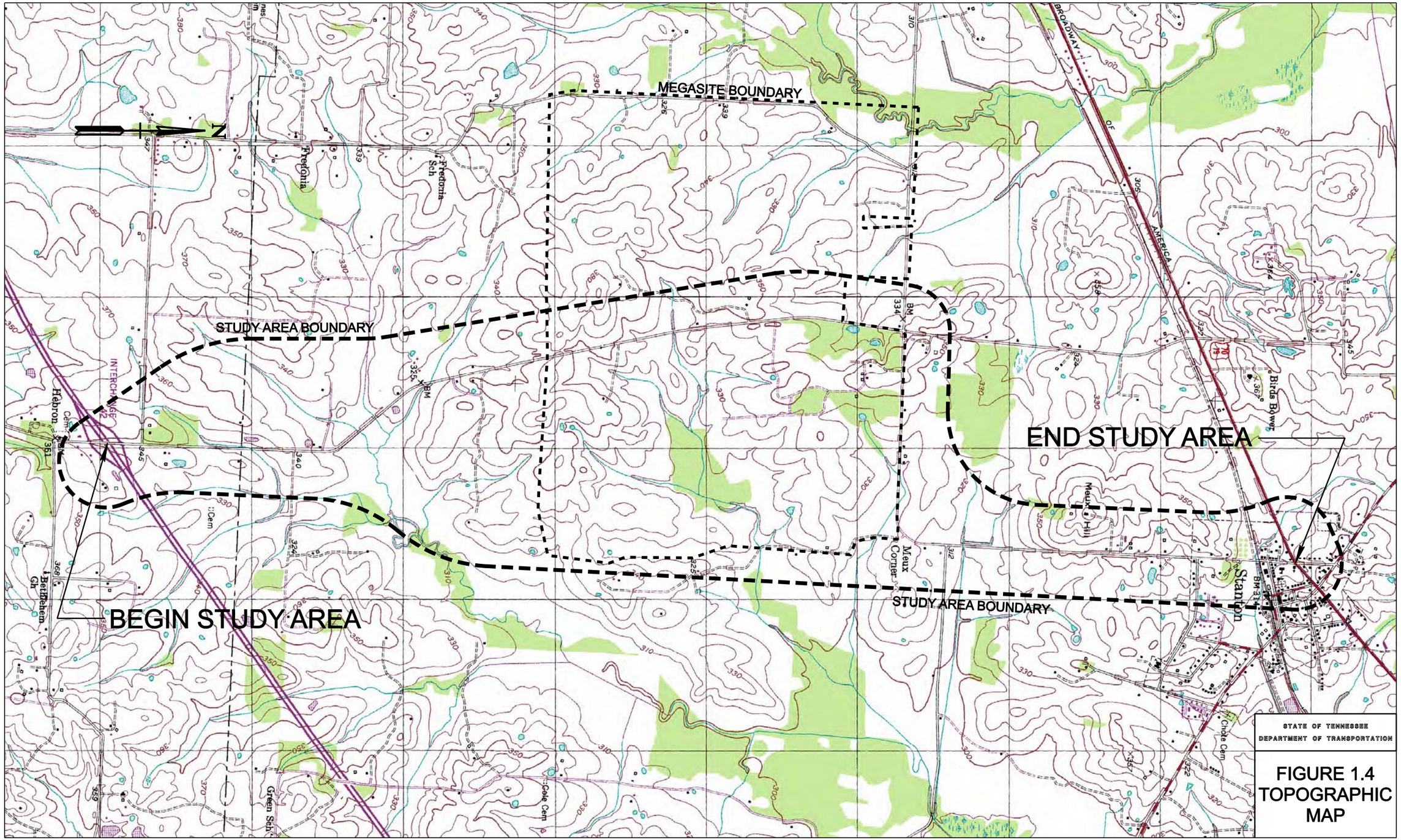

FIGURE 1.4
TOPOGRAPHIC MAP

2.0 EXISTING CONDITIONS

2.1 Description of Study Area

State Route 222 within the study area is a two-lane, major collector highway that serves as a link between Interstate 40 and the city of Stanton, Tennessee. Except for the segment within Stanton city limits, State Route 222 is surrounded mostly by level, rural farmland with few access points or side roads along the route. The alignment crosses several minor streams throughout its length and a CSX Transportation railroad near its northern terminus in Stanton.

There are currently no major traffic generators or large urban areas along State Route 222 within the study area, though traffic patterns will likely change with development related to the megasite. However, field observations note a high occurrence of slow-moving vehicles (such as farm equipment) on the roadway.

The study area begins in unincorporated Fayette County at the interchange of Interstate 40 and State Route 222 (Exit 42). State Route 222, in this section, is commonly referred to as Stanton Road and has an unsigned speed limit of 50 miles per hour that increases to 55 miles per hour after its intersection with Thorpe Drive. Though the route in general has few access points, there are several in the immediate vicinity of the interstate, as well as nearby commercial and residential buildings. This section also contains underground storage tanks (UST) and small ponds near the roadway. **Figure 2.1** presents a typical view of State Route 222, looking north from its intersection with Thorpe Drive.

Figure 2.1 — SR 222 North of Thorpe Dr.

Figure 2.2 — SR 222 East of Intersection

State Route 222, known as Stanton-Somerville Road in unincorporated Haywood County, reaches a four-way, stop-controlled intersection with Keeling Road and Muex Road approximately 2.8 miles north of the Fayette and Haywood county line. This intersection lacks sight distance and requires traffic on State Route 222 to stop and turn, hindering efficient flow. **Figure 2.2** exhibits a view of the intersection, looking west from State Route 222.

Approximately 4,500 feet east of the intersection with Keeling Road and Muex Road, the route makes a sweeping curve to the north at Meux Corner. This section has limited sight distance and includes an intersection with Truss Road in the middle of the curve. **Figure 2.3** presents a view of the curve, looking northeast from the intersection of State Route 222 and Truss Road.

Figure 2.3 — SR 222 at Meux Corner

Approximately 1.2 miles north of Meux Corner, State Route 222 enters Stanton city limits, known locally as Lafayette Street. In this section the speed limit is posted as 30 miles per hour, the number of access points is considerably higher, and clear zone distance is reduced. A number of existing buildings lie in close proximity to the roadway, including the Mount Zion Baptist Church and the Stanton Head Start Center. Both establishments could be considered to have cultural significance to the community.

Figure 2.4 — SR 222 Railroad Crossing

State Route 222 crosses a CSX Transportation railway approximately 1,400 feet north of the Stanton city limits. This crossing (Grade Crossing #348458R) with approximately 20 trains per day has both flashing-light signals and automatic gates. **Figure 2.4** shows a view of the railroad crossing, looking north from State Route 222.

The study area terminates at US 70/79 (State Route 1) approximately 850 feet north of the railroad crossing.

2.2 Crash History

The Tennessee Roadway Information Management System (TRIMS) provides data for use in calculating crash rates for comparison to statewide averages and identify roadway segment features.

Over the most recent three-year period (2005–2007), there were 22 documented crashes on State Route 222 from Interstate 40 to Keeling Road / Muex Road.[4] Of these, seven were injury

[4] TRIMS crash data for the section of State Route 222 from Keeling Road / Muex Road to US 70/79 (State Route 1) was unavailable at the time of publication of this study and is not included in the analysis or summary.

crashes, resulting in a total of seven injuries. No incapacitating injury or fatality crashes occurred during this period. **Table 2.1** presents a summary of crash types in this section of the study area.

Table 2.1 — Crash Data Summary (SR 222 from I-40 to Keeling Rd. / Muex Rd.)

Crash Type	2005	2006	2007	Total	Pct.
Angle	1	1	4	**6**	27.3%
Rear-End	2	0	2	**4**	18.3%
Sideswipe (Opposite Direction)	0	1	0	**1**	4.5%
Overturn	1	0	0	**1**	4.5%
Struck Bridge Rail	1	0	0	**1**	4.5%
Struck Animal (Not Deer)	1	0	0	**1**	4.5%
Ditch	3	1	2	**6**	27.3%
Embankment	1	1	0	**2**	9.1%
Total	**10**	**4**	**8**	**22**	**100.0%**

2.3 Geometrics

TRIMS provides geometric data for state routes, including information such as right-of-way (ROW) width, lane width, and shoulder width. **Table 2.2** exhibits a summary of the given data.

Table 2.2 — Geometric Data

County	SR 222 Segment	Log Miles	ROW Width *(feet)*	Lane Width *(feet)*	Shdr. Width *(feet)*	Spd. Limit *(MPH)*
Fayette	I-40 to Thorpe Dr.	7.83 – 7.93	60	10	0	50
	Thorpe Dr. to County Line	7.93 – 8.34	60	10	0	55
Haywood	County Line to Stanton City Limit	0.00 – 4.86	50	9	0	55
	Stanton City Limit to US 70/79 (SR 1)	4.86 – 5.30	40	9	0	30

State Route 222 is considered rural with level terrain for much of the route, except within Stanton city limits (where its land use is described as residential) and the segment within Fayette County (where the terrain is listed as rolling). The route is functionally classified as a major collector for its entire length.

2.4 Traffic

TDOT collects traffic data on a continuing basis at six count stations located on roads within or near the study area. Of these, two are located directly on State Route 222. **Table 2.3** presents 2008 annual average daily traffic (AADT) counts for the count stations. **Figure 2.5** depicts the locations of the count stations in the study area.

Table 2.3 — TDOT Traffic Count Stations

County	Station No.	Road (Location)	2008 AADT *(veh./day)*
Fayette	007	Thorpe Dr. (West of SR 222)	417
Haywood	054	Camp Ground Rd. (East of SR 222)	69
	056	SR 222 (Stanton City Limit)	483
	057	US 70/79 (SR 1) (West of SR 222)	1,578
	059	US 70/79 (SR 1) (East of SR 222)	1,666
	088	SR 222 (North of County Line)	573

2.5 Multi-Modal Facilities

The Delta Human Resource Agency (DHRA) and the Southwest Tennessee Human Resource Agency (SWHRA) provide curb-to-curb public transportation to Fayette and Haywood Counties, respectively. The service is provided in conjunction with TDOT and the Federal Transit Administration (FTA) and is available by reservation on weekdays (excluding holidays).

No facilities for pedestrians or bicycles currently exist along State Route 222. Additionally, the route is not listed as a current or proposed Tennessee Bicycle Route.

A CSX Transportation railroad intersects the northern portion of the study area, providing alternative modes for freight transportation in the area. A proposed railroad spur departing the main line south of Keeling (to the west of the study area) will provide freight access directly to the megasite. This railroad spur is addressed in a separate study.

FEASIBILITY STUDY
SR 222 FROM I-40 TO US 70/79 (SR 1)
FAYETTE AND HAYWOOD COUNTIES

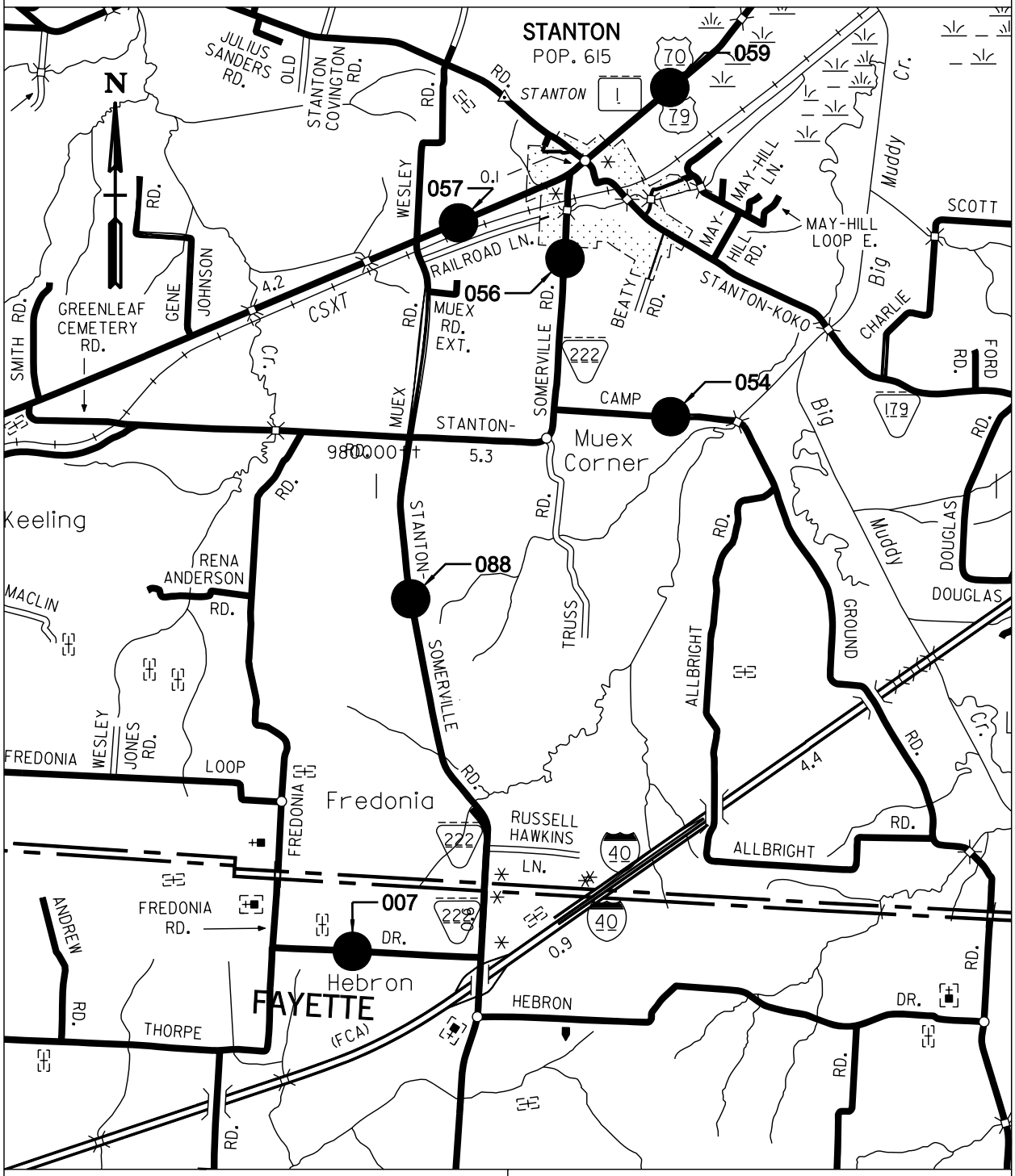

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FIGURE 2.5
COUNT STATIONS

2.6 Infrastructure

2.6.1 Utilities

The following presents the known utilities within the study area:

- **Water:** Water service in the rural portion of the study area is provided by private wells. In some areas, particularly those in which houses are in close proximity to the roadway, activity may impact water wells. Public water service is provided within the City of Stanton by the City of Brownsville Utility Department.
- **Wastewater:** As with many rural areas, houses within the corridor use septic systems to treat wastewater. In some areas, particularly those in which houses are close to the roadway, activity may impact septic systems. If they cannot be relocated to another area of the property, ROW costs may significantly increase. Public sewer service is provided within the City of Stanton by the City of Brownsville Utility Department.
- **Electric:** The study area is served by the Southwest Tennessee Electric Membership Corporation (STEMC) and the Chickasaw Electric Cooperative (CEC), both of whom are supplied by TVA. Electricity is provided via overhead wires through portions of the study area. Service in proximity to the roadway is currently limited to the populated areas of the route, including within Stanton city limits and areas adjacent to the Interstate 40 interchange. An estimated 60 utility poles could be impacted by activity in the vicinity of the existing route.
- **Telephone:** Telephone service is provided by AT&T Inc. via overhead wires through portions of the study area. Service in proximity to the roadway is currently limited to the populated areas of the route, including within Stanton city limits and areas adjacent to the Interstate 40 interchange. An estimated 60 utility poles could be impacted by activity in the vicinity of the existing route.
- **Gas:** Natural gas and propane services are provided within the City of Stanton by the City of Brownsville Utility Department.

2.6.2 Structures

Information provided by TRIMS and the National Bridge Inventory (NBI) reveal six major culverts and one bridge along the existing State Route 222. The bridge (Structure Number 38S81140001) is located immediately south of the CSX crossing, within Stanton city limits, and has a sufficiency rating of 66.2%. This structure, along with the culverts along the route, will likely need modification or replacement if significant improvements are made to the roadway.

2.7 Environmental Screening

2.7.1 Archaeological/Historic Architecture

A preliminary review of the National Register of Historic Places (NHRP) revealed 12 listed properties in Fayette County and 10 in Haywood County. The only listed property within the

study area is the Stanton Masonic Lodge and School (National Park Service [NPS] Reference Number 87001878). Improvements made to State Route 222 should not impact this property. If other properties are later identified as being eligible for the NRHP, they will need to be avoided to prevent adverse effects or potential 4(f) takes.

Though several cemeteries are located within or near the study area, no impact is anticipated. The Bethlehem Hebron Chapel and its associated cemetery is located south of the interchange of Interstate 40 and State Route 222 (Exit 42). Additionally, an unnamed cemetery lies approximately 1,300 feet east of State Route 222 just south of the Fayette-Haywood county line. None of these locations should be impacted by improvement of the study area.

An environmental impact on cemeteries in the study area may still result and necessitate an archaeological review as part of NEPA. A moderate level of environmental documentation and time will be required to proceed with improvement of the study area, including steps to result in no adverse effect and/or minimum impact to cemetery property.

2.7.2 Community Impacts

Several culturally significant buildings and sensitive populations are present within Stanton city limits. However, no impact is anticipated for options in which no improvements are made within Stanton.

2.7.3 Ecology

The study area resides immediately southwest of the Hatchie River, an important ecological concern in the region. The river is designated as a Class I (Natural River Area) Scenic River by the Tennessee Department of Environment and Conservation (TDEC), and contains large tracts of wetlands. Additionally, the Hatchie National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service (FWS), is located several miles east of the study area. No impact is anticipated on these locations, as they are located more than a mile away from the study area. However, streams from the study area flow into the Hatchie River and may require special permitting.

According to the FWS, there are no known endangered, threatened, proposed, or candidate species in Fayette or Haywood counties.

2.7.4 Hazardous Substances/Geology

There are abandoned underground storage tanks (UST) present in the southern portion of the study area, adjacent to the Interstate 40 interchange. These may be impacted by improvements to the existing route and may require special permitting.

2.7.5 Parks and Public Land

No impact is anticipated on any public land, parks, buildings, or WMA, as none of the above sites are located within or adjacent to the study area.

3.0 PURPOSE AND NEED FOR IMPROVEMENTS

The purpose of planned improvements to State Route 222 within the study area is to provide a transportation facility that improves safety and security, enhances mobility within the region, relieves potential congestion by increasing capacity, supports economic development, and corrects deficiencies in the existing route. Specifically, the improvements are intended to provide better access to the megasite and surrounding areas by providing a high-capacity, high-speed link between Interstate 40, US 70/79 (State Route 1), and the City of Stanton, while improving safety and efficiency throughout the route.

The existing route has several deficiencies that render it unsuitable for use in this manner. The roadway has narrow lanes and in several areas has insufficient clear zones and sight distance, as noted in **Section 2.3** and illustrated by the crash data detailed in **Section 2.2**. The alignment, given the topography and population density of the area, is overly circuitous and includes unnecessary hindrances to traffic flow. Relocation of the route to a new alignment would

Analyses of the existing conditions for the given design years indicate that suitable capacity exists on the current facility and additional lanes are not needed to accommodate forecasted traffic conditions, given recent growth rates. However, the advent of development on the megasite and elsewhere in the corridor dictate the need for increases in capacity. Additional lanes would not only account for escalated volumes but also facilitate additional economic growth along the corridor.

Based on the needs of the study area and the intent of improvements, the objectives of an improved State Route 222 facility include:

- **Correcting geometric, clear zone, and sight distance deficiencies** to improve safety and security throughout the area;
- **Improving traffic flow and efficiency along the route** by removing superfluous features that delay mainline traffic and providing adequate capacity to handle increased volume;
- **Providing better access to the megasite and other potential developments** to stimulate the local, regional, and state economies;
- **Relocating the route** in order to provide a safer, more efficient route while maximizing the economic potential of the megasite; and
- **Meeting present and future demand for mobility** in the area.

4.0 OPTIONS FOR IMPROVEMENT

This section identifies and evaluates the various options for improvement. The options considered for the study area include:

- a **no-build option** that assumes no improvements are made within the study area; and
- a **relocation option** that provides a new corridor for alternative alignments within the study area in order to meet the needs of the region.

These options are detailed below and discussed throughout the remainder of this study. Additionally, this section contains information on the proposed SIA road adjacent to the study area.

4.1 Option 1 (No-Build)

This option assumes no modifications or improvements are made over the length of the planning horizon to the roadway (though maintenance activities such as resurfacing, signing, and isolated safety projects may occur). This option provides no capacity, efficiency, or safety improvements and can be considered a benchmark for comparison of all other improvement options.

4.2 Option 2 (Relocation and Improvements)

This option considers the completion of an improved, relocated facility along alternative corridors east and west of the existing alignment. The alternatives utilize varying amounts of the existing alignment, deviating when necessary to provide safer, more efficient traffic flow while also consolidating the properties that compose the megasite.

Portions of the existing State Route 222 unaffected by the completion of Option 2 and outside the megasite boundary would remain in place to provide access to residences and some local roads. Maintenance for these sections would revert to local jurisdictions.

Figure 4.1 presents an overall view of Option 2, detailing the segment limits. Conceptual plans for Option 2 are attached at the end of this study.

4.2.1 Location

For the purposes of analysis, the study area as improved by Option 2 is divided into three segments. **Segment 1** lies between Interstate 40 and the intersection of State Route 222 with the proposed SIA road. There are two alternative alignments within this segment which prioritize differently the goals and objectives of an improved route:

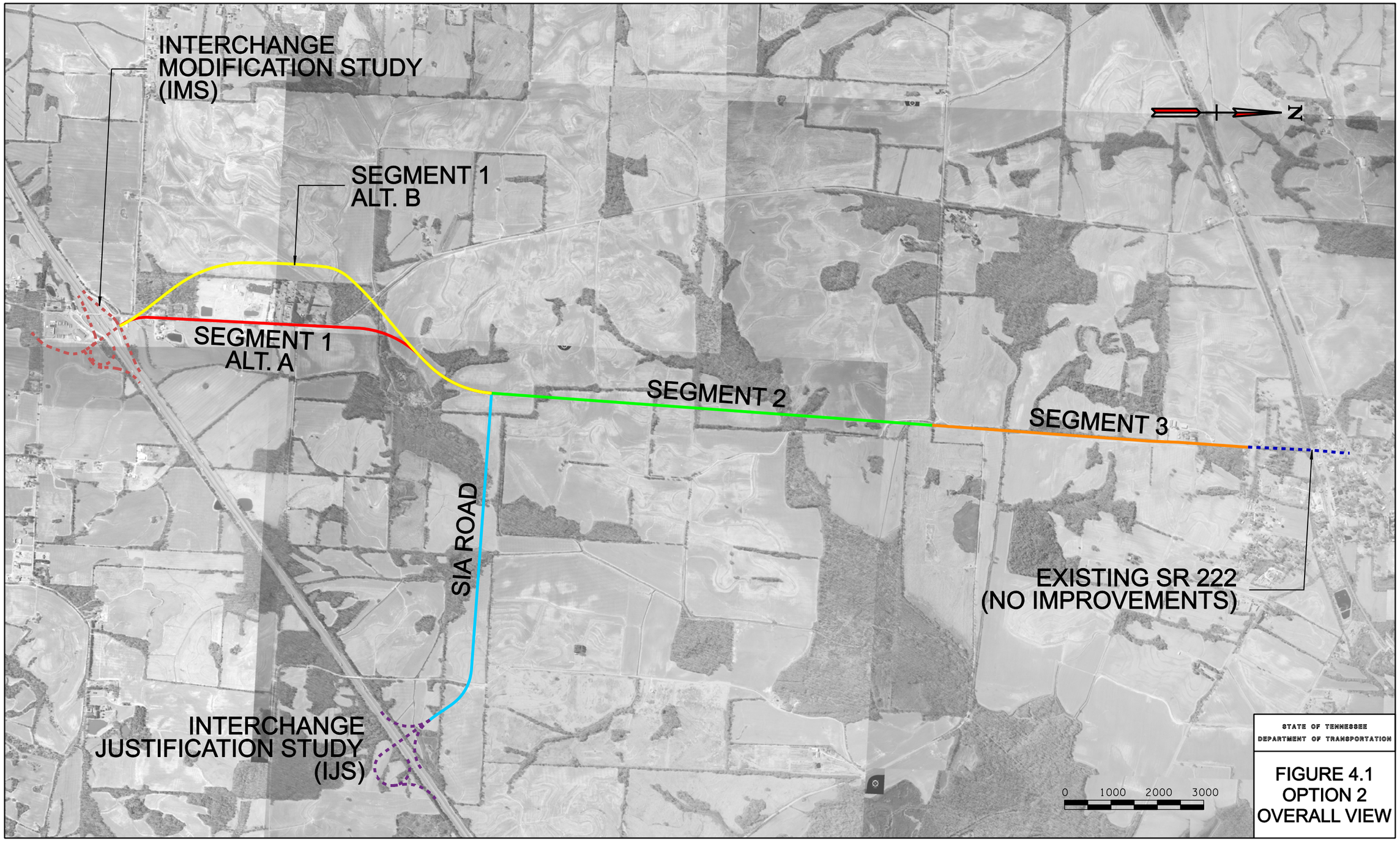


FIGURE 4.1
OPTION 2
OVERALL VIEW

- **Alternative A** follows the existing alignment of State Route 222 north of Interstate 40 before diverging from the route north of Russel Hawkins Lane. From there, it runs east of the existing route before intersecting the proposed SIA road. This alternative is intended to use as much of the existing alignment as practical, minimizing ROW acquisition and construction costs at the expense of impacting residential properties along the route.
- **Alternative B** departs from the existing route at the Interstate 40 interchange, running west of and roughly parallel to the existing alignment before crossing it north of Russel Hawkins Lane. From there, it travels northeast before turning to intersect the proposed SIA road at the same location as Alternative A. This alignment provides more space for curves, cross-section transitions, and intersections. However, it requires more ROW acquisition and severely impacts commercial and residential properties near the Interstate 40 interchange.

Segment 2 lies between the intersection of State Route 222 and the proposed SIA road and Meux Corner. The alignment within this segment runs east of and roughly parallel to the existing route before rejoining it at the intersection of State Route 222 and Truss Road at Meux Corner. The alignment of **Segment 3** follows the existing route from Meux Corner to the Stanton city limit.

Option 2 bypasses the intersection of the existing State Route 222, Keeling Road, and Muex Road, increasing the safety and efficiency of the route. Additionally, they relocate the roadway to the boundary of the megasite, increasing the usability of the property.

4.2.2 Cross-Section

Capacity analysis for the design years indicate that a two-lane cross-section is sufficient to accommodate forecasted volumes, both with and without the additional traffic generated by the megasite and ancillary developments. However, multi-lane cross-sections are instrumental to development and economic growth and provide for more efficient traffic flow.

Option 2 utilizes three different cross-sections. Both Alternatives A and B within Segment 1 feature a five-lane cross-section, with four 12-foot travel lanes and a 12-foot center turning lane. **Figure 4.2** presents a typical cross-section for this segment of the option. The typical cross-section for Segment 2 is a three-lane segment with two 12-foot travel lanes and a 12-foot center turning lane, while the typical cross-section for Segment 3 consists of two 12-foot travel lanes. Typical cross-sections for Segments 2 and 3 can be found in **Figure 4.3** and **Figure 4.4**, respectively.

The typical cross-sections for Option 2 can also be found within the conceptual plans attached at the end of this study.

The proposed cross-sections for Option 2 do not have provisions for dedicated bicycle lanes or sidewalks. However, paved shoulders in conjunction with 12-foot travel lanes are adequate for bicycle use. Sidewalks are considered unnecessary for Option 2 due to low building density and lack of pedestrian destinations along the improved route.

Figure 4.2 — Option 2 Segment 1A/1B Typical Cross-Section

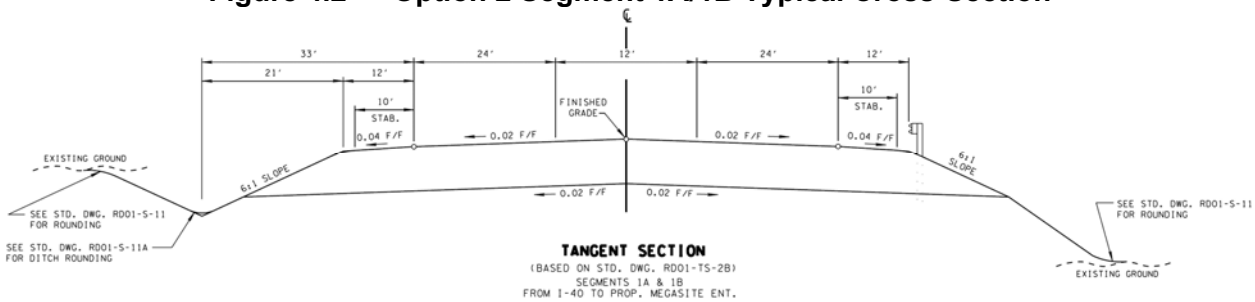


Figure 4.3 — Option 2 Segment 2 Typical Cross-Section

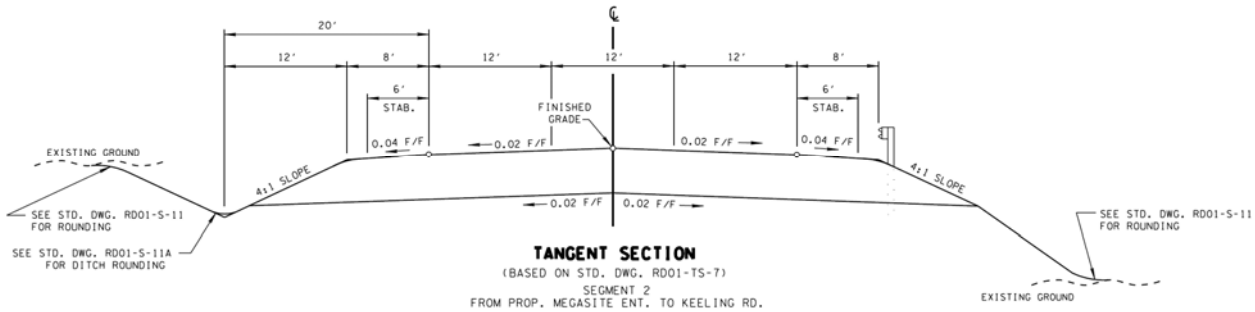
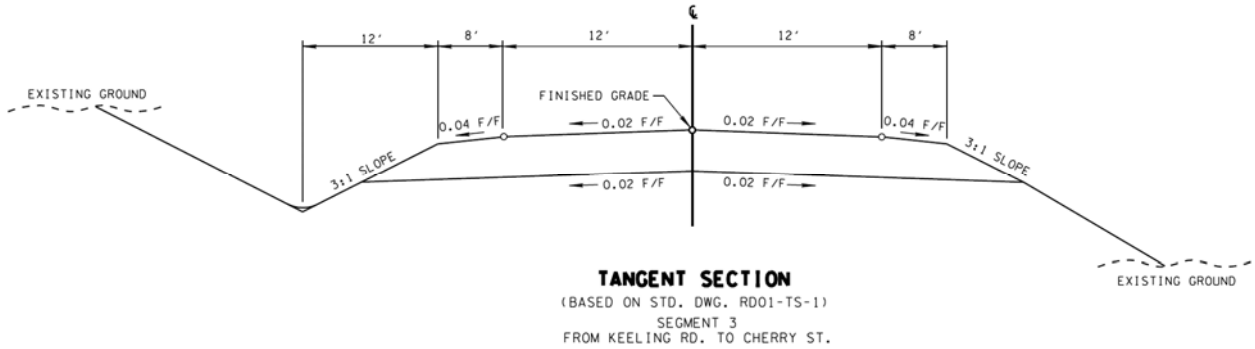


Figure 4.4 — Option 2 Segment 3 Typical Cross-Section



4.2.3 Trip Generation

In order to account for the increased volume that proposed development within the study area may cause, additional trip volumes were added to the current and projected volumes. Using the Institute of Traffic Engineers (ITE) *Trip Generation Manual* (7th edition), the number of trips and corresponding volumes were estimated for typical development. For the purposes of trip generation, the development on the megasite was treated as an Industrial Park (ITE Code 130) with 2,000 full-time employees. Additionally, development of five fast food restaurants (ITE

Code 853) and two convenience markets (ITE Code 934) around the interchange of Interstate 40 and State Route 222 (Exit 42) was assumed.

Overall, 19,196 trips were estimated for development in the study area. To create a conservative estimate, internal capture and pass-by reductions were not included in the trip assignments and totals.

Table 4.1 summarizes the number of trips generated for each land use. The trip distribution percentages for the systems and development trip assignments are attached in **Appendix B**.

Table 4.1 — Estimated Trips Due to Development

Land Use Description	Industrial Park	Convenience Markets with Gas Pumps	Fast Food Restaurant with Drive Thru
ITE Code	130	853	934
Development Size	2,000 Employees	3,000 Gross SF	3,000 Gross SF
No. of Developments	1	2	4
Daily Average Rate of Trips	3.34 per Employee (50% In - 50% Out)	845.60 per KSF (50% In - 50% Out)	496.12 per KSF (50% In - 50% Out)
Daily Estimated Trips	6,680	5,074	5,954

4.2.4 Level of Service (LOS) Analyses

A “Level of Service” (LOS) index was used to gauge the operational performance at each intersection/roadway segment. The LOS is a qualitative measure that describes traffic conditions related to speed and travel time, freedom to maneuver, traffic interruptions, etc. There are six levels ranging from “A” to “F” with “F” being the worst. Each level represents a range of operating conditions. **Table 4.2** shows the traffic flow conditions and approximate driver comfort level at each level of service.

Table 4.2 — Level of Service (LOS) Description

LOS	Traffic Flow Conditions
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver with the traffic stream. The general level of physical and psychological comfort provided to the driver is high.
B	Reasonable free flow operations. The ability to maneuver within the traffic stream is only slightly restricted and the general level of physical and psychological comfort provided to the driver is still high.
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension.
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.
E	At lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceeds the capacity or ability of the highway to accommodate that number of vehicles. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.

Capacity analyses were performed using the McTrans *Highway Capacity Software* (HCS+), version 5.3. Mainline LOS were calculated using design-level, two-lane analysis and volumes projected from the data given in **Section 2.4** for 2014 and 2034. **Table 4.3** and **Table 4.4** present the LOS data for segments of State Route 222 and side roads, respectively. The analysis reports are attached in **Appendix B**.

Table 4.3 — Mainline LOS Analysis for SR 222 (Existing Conditions)

SR 222 Segment	Level of Service (LOS)			
	Without Dev.		With Dev.	
	2014	2034	2014	2034
I-40 to Thorpe Dr. / Russel Hawkins Ln.	A	A	B	C
Thorpe Dr. / Russel Hawkins Ln. to Megasite Entrance	A	A	B	C
Megasite Entrance to Proposed SIA Road	A	A	A	B
Proposed SIA Road to Keeling Rd. / Muex Rd.	A	A	A	B
Keeling Rd. / Muex Rd. to Camp Ground Rd.	A	A	A	B
Camp Ground Rd. to Cherry St.	A	A	A	B
Cherry St. to S. Main St.	A	A	A	B
S. Main St. to US 70/79 (SR 1)	A	A	A	B

Table 4.4 — Mainline LOS Analysis for Side Roads

Side Road	Level of Service (LOS)			
	Without Dev.		With Dev.	
	2014	2034	2014	2034
Russel Hawkins Ln. (East of State Route 222)	A	A	A	A
Thorpe Dr. (West of State Route 222)	A	B	A	B
Megasite Entrance (West of State Route 222)	—	—	B	B
Proposed SIA Road (East of State Route 222)	—	—	B	B
Proposed SIA Road (West of State Route 222)	—	—	C	C
Keeling Rd. (West of State Route 222)	A	A	A	A
Muex Rd. (West of State Route 222)	A	A	A	A
Camp Ground Rd. (East of State Route 222)	A	A	A	A
Cherry St. (East of State Route 222)	A	A	A	A
S. Main St. (East of State Route 222)	A	A	A	A
US 70/79 (SR 1) (East of State Route 222)	A	C	B	C
US 70/79 (SR 1) (West of State Route 222)	A	C	B	C

The differences between Alternatives A and B should not affect traffic demand between segments; consequently, LOS analyses for the two alignments are combined for the purposes of this report. **Table 4.5** displays the LOS calculations for State Route 222 improved using Option 2.

Table 4.5 — Mainline LOS Analysis for SR 222 (Option 2)

SR 222 Segment	Level of Service (LOS)			
	Without Dev.		With Dev.	
	2014	2034	2014	2034
I-40 to Thorpe Dr. / Russel Hawkins Ln.	A	A	A	A
Thorpe Dr. / Russel Hawkins Ln. to Megasite Entrance	A	A	A	A
Megasite Entrance to Proposed SIA Road	A	A	A	A
Proposed SIA Road to Keeling Rd.	A	A	A	B
Keeling Rd. to Camp Ground Rd.	A	A	A	B
Camp Ground Rd. to Cherry St.	A	A	A	B

4.2.5 Cost Estimates

Table 4.6 presents a summary of cost estimates for both alternatives of Option 2. Detailed cost estimates can be found in the summary tables attached at the end of this study. Estimate calculations and backup data are attached in **Appendix C.**

Table 4.6 — Option 2 Cost Estimate Summary

Segment	ROW	Utility	Const.	Inflation	Total
Seg. 1 (Alt. A)	$380,000	$32,000	$5,222,000	$3,440,000	$9,080,000
Seg. 1 (Alt. B)	$420,000	$32,000	$5,999,000	$3,939,000	$10,390,000
Segment 2	$274,000	$20,000	$4,312,000	$2,813,000	$7,420,000
Segment 3	$76,000	$15,000	$1,625,000	$1,048,000	$2,770,000
Option 2 (Alt. A)	**$730,000**	**$67,000**	**$11,159,000**	**$7,301,000**	**$19,270,000**
Option 2 (Alt. B)	**$770,000**	**$67,000**	**$1,936,000**	**$7,800,000**	**$20,580,000**

4.3 Proposed SIA Road

In addition to the proposed improvements to State Route 222 within the study area, a State Industrial Access (SIA) road is proposed on a site adjacent to the study area. This road is intended to further alleviate traffic volume due to megasite development on State Route 222.

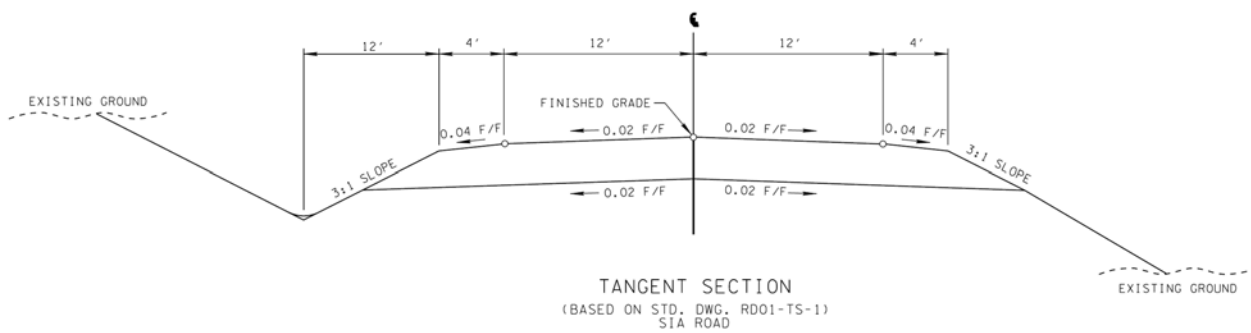
4.3.1 Location

The proposed alignment of the SIA road begins at the proposed Interstate 40 interchange (detailed in a separate study). From there, it travels west to intersect State Route 222 as proposed under Option 2, slightly south of the megasite boundary. West of this intersection, the road continues as a privately-owned entrance to the megasite.

4.3.2 Cross-Section

The proposed cross-section for the SIA road is a two-lane, rural highway with twelve-foot travel lanes and four-foot stone shoulders, as prescribed by TDOT procedure for SIA applications. **Figure 4.5** presents a typical cross-section for the SIA road.

Figure 4.5 — SIA Road Typical Cross-Section



4.3.3 Level of Service (LOS) Analysis

Megasite traffic for the proposed SIA road was calculated using the methods outlined in **Section 4.2.3**. LOS are given in **Table 4.4**.

4.3.4 Cost Estimate

Table 4.7 presents a summary of cost estimates for the proposed SIA road. Estimate calculations and backup data are attached in **Appendix C.**

Table 4.7 — Prop. SIA Road Cost Estimate Summary

Segment	ROW	Utility	Const.	Inflation	Total
SIA Road	$191,000	$10,000	$2,591,000	$1,705,000	$4,500,000

5.0 ASSESSMENT OF CORRIDOR OPTIONS

5.1 TDOT Seven Guiding Principles

The Tennessee Department of Transportation (TDOT) has developed a set of seven guiding principles by which all transportation projects are to be evaluated. The principles address concerns for system management, mobility, economic growth, safety, community, environmental stewardship, and financial responsibility. This section outlines the seven guiding principles and includes discussion of each as it pertains to the options evaluated in this report.

5.1.1 Preserve and Manage the Existing Transportation System

> *Plan, implement, maintain, and manage an integrated transportation system for the movement of people and products, with emphasis on quality, safety, efficiency, and the environment.*

Many aspects of the existing State Route 222 are less than ideal. The roadway is narrow and without shoulders, with few opportunities to maneuver around slower traffic. Deficiencies in the existing alignment lead to an overall reduction in safety, operations, and LOS. These faults in the route would only worsen should economic development occur as planned in the area.

Addressing the operational needs of the corridor, in addition to improving the capacity and overall safety, would improve the transportation system in the region by providing the infrastructure to adequately address the movement of people and goods. This improved route, connecting local population centers, developments, and Interstate 40, will provide a more efficient and safer route for users.

5.1.2 Move a Growing, Diverse, and Active Population

> *Reduce congestion, optimize service and operation efficiency, develop inter-modal connections, and support transportation technology advances.*

The improvement options discussed in this report will reduce congestion, optimize service and operational efficiency, and benefit mobility in Fayette and Haywood Counties. An improved State Route 222 will benefit freight movements and passenger cars, particularly with development present along the route.

This corridor is important to the economic development of the region. An improvement to the full route provides the infrastructure necessary to allow for optimum growth in the area.

The rural characteristic of the corridor and area does not lend itself easily to pedestrian and bicycle movements along the existing route. However, the proposed options provide additional safety concessions for alternative modes of transportation, such as wide shoulders and increased sight distance.

5.1.3 Support the State's Economy

Target transportation investment to support business, employment growth, and enhance the economy of Tennessee.

The State Route 222 corridor is economically significant because of its location of the megasite and other areas for development. However, the existing roadway is not fit for the increased volume and truck traffic that corresponds with such growth. Improvements along the corridor will serve as a catalyst for development in the area, not only on the megasite, but also in nearby areas. This growth will benefit both the region and the state and bring jobs, income, and tax revenue to the area.

5.1.4 Maximize Safety and Security

Provide a transportation system that offers a high degree of mobility in a reliable and safe fashion.

From 2005 to 2007, 22 crashes occurred on the segment of State Route 222 from Interstate 40 to Keeling Road / Muex Road, of which 7 were injury crashes. (See **Table 2.1** for a summary of crash data.) Approximately 40.9% of the crashes stemmed from vehicles leaving the roadway, which may be attributed to poor sight distance, insufficient lane width, or the lack of shoulders.

Option 2 will improve safety along their respective corridors by increasing lane width, adding shoulders, and providing more sight distance. These options bypass the four-way stop-controlled intersection of the existing State Route 222, Keeling Road, and Muex Road, and also remove the curve at Meux Corner, providing additional security to vehicles traversing the route. Additionally, Alternative B may also increase safety at the interchange of Interstate 40 and State Route 222 by providing a straighter approach to the intersections and increasing sight distance.

5.1.5 Build Partnerships for Livable Communities

Establish strategies for the goal of creating and maintaining livable communities.

TDOT's Long Range Transportation Plan promotes and encourages projects that have public and community support. Improvements to the State Route 222 corridor are identified as necessary for the potential development of the megasite and nearby areas, which in turn will provide the area with jobs, income, and tax revenue. As this project advances, the public involvement process will continue as mandated by the provisions of the National Environmental Policy Act (NEPA).

5.1.6 Promote Stewardship of the Environment

Ensure a compatible interface of the transportation system with environmental, social, and energy goals.

Further environmental studies will be required if state and/or federal funds are planned for the proposed project. If federal funds are involved, a document consistent with NEPA will be required. If state funds are involved, and no federal monies are used, a Tennessee Environmental Evaluation Report (TEER) will be required.

5.1.7 Emphasize Financial Responsibility

Follow a comprehensive transportation planning process, promote coordination among public and private operators of transportation systems, and support efforts to provide stable funding for the public component of the transportation system.

Many of the costs associated with the improvement options are offset by the savings associated with reduced travel time delays, the savings associated with potential reductions in crashes, and the economic opportunities generated by an improved corridor. The investment in upgrading State Route 222 is warranted by the significant development plans along its route. Additionally, the relocation option fully utilizes available space on the megasite.

5.2 Summary of Guiding Principles

A summary of the improvement options as discussed in this report in relationship to the seven guiding principles adopted by TDOT can be found in **Table 5.1**. The options are described as "good", "fair", or "poor" in relation to each individual principle, as defined below:

- **Good:** The option is compatible with and promotes the vision of the guiding principle.
- **Fair:** The option is acceptable but not an ideal fit with the guiding principle.
- **Poor:** The option is not compatible with the guiding principle.

Table 5.1 — Improvement Options in Relation to Guiding Principles

Principle	Option 1	Option 2 Alt. A	Option 2 Alt. B
Preserve and Manage the Existing Transportation System	Fair	Good	Good
Move a Growing, Diverse, and Active Population	Poor	Good	Good
Support the State's Economy	Poor	Good	Good
Maximize Safety and Security	Poor	Good	Good
Build Partnerships for Livable Communities	Poor	Good	Good
Promote Stewardship of the Environment	Good	Fair	Fair
Emphasize Financial Responsibility	Good	Good	Fair

6.0 SUMMARY

Improvements to the existing State Route 222 corridor are necessitated by the potential development of the Memphis-Jackson I-40 Advantage Megasite and the surrounding area. This route, currently serving as a rural collector between Interstate 40 and Stanton, Tennessee, suffers from several inadequacies in safety and efficiency that hamper development in the area and transit throughout the region. In addition to the correction of safety issues and improvement of traffic flow, State Route 222 also needs satisfactory access to the megasite and better system connectivity to provide for future mobility demands in the area.

The following options are proposed in order to address the aforementioned issues within the study area while adhering to the purpose of the improvements:

- **Option 1**, detailed in **Section 4.1**, specifies no improvements to the roadway over the planning horizon. The existing capacity is adequate for projected volumes through this period; however, this option overlooks deficiencies in safety and efficiency and deters development on the megasite and elsewhere in the area.
- **Option 2**, specified in **Section 4.2**, considers relocation of the roadway to alternative corridors east and west of the existing route. This option creates a safe, high-capacity, efficient roadway that could serve as a catalyst for development in the region.

CHECKLIST OF DETERMINANTS FOR LOCATION STUDY

(Relocation Construction)

If preliminary field reviews indicate the presence of any of the following facilities or ESE categories, place an "X" in the blank opposite the item. Where more than one alternate is to be considered, place its letter designation in the blank.

1.	Agricultural land usage	X
2.	Airport (existing or proposed)	
3.	Commercial area or shopping center	
4.	Floodplains	
5.	Forested land	X
6.	Historical, archaeological, cultural, or natural landmark or cemeteries	X
7.	Industrial park or factory	
8.	Institutional usages	X
	a. School or other educational institution	X
	b. Church or other religious institution	X
	c. Hospital or other medical facility	
	d. Public building (e.g., fire station)	
	e. Defense installation	
9.	Recreational usages	
	a. Park, recreational area, or State Natural Area	
	b. Wildlife refuge or wildlife management area (WMA)	
10.	Residential establishment	X
11.	Urban area, town, city, or community	X
	a. Title 6, low-income or minority community	X
12.	Waterway, lake, pond, river, stream, spring, or wetland	X
	a. Permits required:	X
	i. Coast Guard	
	ii. Section 404	
	iii. Section 10	
	iv. TVA Section 26a review	
	v. NPDES	
	vi. Aquatic Resource Alteration Permit	
	vii. Class V injection wells	
13.	Location coordinated with local officials	
14.	Railroad crossings	X
15.	Hazardous material site	X
	a. Underground storage tanks (UST)	X
16.	Other	

DATA TABLE (OPTION 2 AND SIA)

Item	Seg. 1A	Seg. 1B	Segment 2	Segment 3	SIA Road
Functional Class	Rural	Rural	Rural	Rural	Rural
System Class					
Length - Miles	1.765	1.958	1.528	1.234	1.409
Cross Section - Feet	60	60	36	24	24
Base Year ADT (2014)	4,580	4,580	1,840	1,660	3,160
Design Year ADT (2034)	6,580	6,580	3,620	3,440	3,740
Design Year DHV (2034) (10%)	658	658	362	344	374
Percent Trucks (DHV)	10%	10%	4%	4%	10%
Estimated ROW Cost	$380,000	$420,000	$274,000	$76,000	$191,000
Estimated Utility Cost	$32,000	$32,000	$20,000	$15,000	$10,000
Estimated Const. Cost	$5,222,000	$5,999,000	$4,312,000	$1,625,000	$2,591,000
Estimated Inflation	$3,440,000	$3,939,000	$2,813,000	$1,048,000	$1,705,000
Total Estimated Cost	$9,080,000	$10,390,000	$7,420,000	$2,770,000	$4,500,000
Estimated Per Mile Cost	$5,144,476	$5,306,435	$4,856,021	$2,244,733	$3,193,754

Tennessee Department of Transportation
Design Criteria for Location and Design Phase

Route:	State Route 222	**Alternate:**	Option 2, Segment 1A
Section:		**Region:**	4
County:	Fayette & Haywood	**Project:**	

Location

From:	Interstate 40
To:	Proposed SIA Road

Parameter	**Criteria**
2014 AADT	4,640
2034 AADT	6,580
Percent Trucks (DHV)	10%
Functional Classification:	Rural Major Collector
Minimum Design Speed	60 MPH
Access Control	None
Maximum Curve	4° 45’
Maximum Grade	5%
Minimum Stopping Sight Distance	525–650 ft.
Surface Width	5 @ 12 ft.
Number of Lanes	5
Usable Shoulder Width	8 ft.
Median Width	N/A
Minimum R.O.W.	200 ft.
Signalization	None

Tennessee Department of Transportation
Design Criteria for Location and Design Phase

Route:	State Route 222	**Alternate:**	Option 2, Segment 1B
Section:		**Region:**	4
County:	Fayette & Haywood	**Project:**	

Location

From:	Interstate 40
To:	Proposed SIA Road

Parameter	**Criteria**
2014 AADT	4,640
2034 AADT	6,580
Percent Trucks (DHV)	10%
Functional Classification:	Rural Major Collector
Minimum Design Speed	60 MPH
Access Control	None
Maximum Curve	4° 45’
Maximum Grade	5%
Minimum Stopping Sight Distance	525–650 ft.
Surface Width	5 @ 12 ft.
Number of Lanes	5
Usable Shoulder Width	8 ft.
Median Width	0 ft.
Minimum R.O.W.	200 ft.
Signalization	None

Tennessee Department of Transportation
Design Criteria for Location and Design Phase

Route:	State Route 222	**Alternate:**	Option 2, Segment 2
Section:		**Region:**	4
County:	Fayette & Haywood	**Project:**	

Location

From:	Proposed SIA Road
To:	Keeling Road

Parameter	**Criteria**
2014 AADT	1,700
2034 AADT	3,700
Percent Trucks (DHV)	10%
Functional Classification:	Rural Major Collector
Minimum Design Speed	60 MPH
Access Control	None
Maximum Curve	4° 45’
Maximum Grade	5%
Minimum Stopping Sight Distance	525–650 ft.
Surface Width	3 @ 12 ft.
Number of Lanes	3
Usable Shoulder Width	8 ft.
Median Width	0 ft.
Minimum R.O.W.	140 ft.
Signalization	None

Tennessee Department of Transportation
Design Criteria for Location and Design Phase

Route:	State Route 222	**Alternate:**	Option 2, Segment 3
Section:		**Region:**	4
County:	Fayette & Haywood	**Project:**	

Location

From:	Keeling Road
To:	Cherry Street

Parameter	**Criteria**
2014 AADT	1,660
2034 AADT	3,440
Percent Trucks (DHV)	4%
Functional Classification:	Rural Major Collector
Minimum Design Speed	60 MPH
Access Control	None
Maximum Curve	4° 45’
Maximum Grade	5%
Minimum Stopping Sight Distance	525–650 ft.
Surface Width	2 @ 12 ft.
Number of Lanes	2
Usable Shoulder Width	8 ft.
Median Width	0 ft.
Minimum R.O.W.	80 ft.
Signalization	None

STATE ROUTE 222
FAYETTE AND HAYWOOD
COUNTIES

COST ESTIMATE SUMMARY

OPTION 2
SEGMENT 1A

Segment 1A **SR 222 from Interstate 40 to Prop. SIA Road**

ITEM	COST				
Clear & Grubbing:	$109,963	=	$110,000	$	110,000
Earthwork:	$606,296	=	$606,000	$	716,000
Pavement Removal:	$0	=	$0	$	716,000
Drainage:	$20,215	=	$20,000	$	736,000
Structures:	$0	=	$0	$	736,000
Railroad:	$0	=	$0	$	736,000
Paving:	$2,434,849	=	$2,435,000	$	3,171,000
Retaining Walls:	$0	=	$0	$	3,171,000
Maintenance of Traffic:	$50,000	=	$50,000	$	3,221,000
Topsoil:	$111,533	=	$112,000	$	3,333,000
Seeding:	$33,460	=	$33,000	$	3,366,000
Sodding:	$25,000	=	$25,000	$	3,391,000
Signing:	$20,000	=	$20,000	$	3,411,000
Signalization:	$0	=	$0	$	3,411,000
Fencing:	$0	=	$0	$	3,411,000
Guardrail:	$80,000	=	$80,000	$	3,491,000
Rip-Rap:	$5,000	=	$5,000	$	3,496,000
Other Construction (15%):	$523,698	=	$524,000	$	4,020,000
Erosion Control (3.5%):	$122,196	=	$122,000	$	4,142,000
Sub-Total:	$4,142,211	=	$4,142,000	$	4,142,000
10% Eng. & Cont.:	$414,221	=	$414,000	$	4,556,000
Sub-Total:	$4,556,432	=	$4,556,000	$	4,556,000
			Mobilization =	$	210,000
			10% Preliminary. Engineering =	$	456,000
			Construction Total =	$	5,222,000
			ROW Total =	$	380,000
			Utility Total =	$	32,000
			INFLATION (10% Per Year for 5 Years) =	$	3,440,000
			LOCATION SUBTOTAL =	**$**	**9,080,000**
			RANGE LOW =	**$**	**7,800,000**
			RANGE HIGH =	**$**	**10,500,000**

STATE ROUTE 222
FAYETTE AND HAYWOOD COUNTIES

COST ESTIMATE SUMMARY

OPTION 2
SEGMENT 1B

Segment 1B **SR 222 from Interstate 40 to Prop. SIA Road**

ITEM	COST				
Clear & Grubbing:	$170,891	=	$171,000	$	171,000
Earthwork:	$698,148	=	$698,000	$	869,000
Pavement Removal:	$0	=	$0	$	869,000
Drainage:	$17,799	=	$18,000	$	887,000
Structures:	$0	=	$0	$	887,000
Railroad:	$0	=	$0	$	887,000
Paving:	$2,807,736	=	$2,808,000	$	3,695,000
Retaining Walls:	$0	=	$0	$	3,695,000
Maintenance of Traffic:	$25,000	=	$25,000	$	3,720,000
Topsoil:	$128,867	=	$129,000	$	3,849,000
Seeding:	$38,660	=	$39,000	$	3,888,000
Sodding:	$25,000	=	$25,000	$	3,913,000
Signing:	$20,000	=	$20,000	$	3,933,000
Signalization:	$0	=	$0	$	3,933,000
Fencing:	$0	=	$0	$	3,933,000
Guardrail:	$80,000	=	$80,000	$	4,013,000
Rip-Rap:	$5,000	=	$5,000	$	4,018,000
Other Construction (15%):	$601,815	=	$602,000	$	4,620,000
Erosion Control (3.5%):	$140,424	=	$140,000	$	4,760,000
Sub-Total:	$4,759,339	=	$4,760,000	$	4,760,000
10% Eng. & Cont.:	$475,934	=	$476,000	$	5,236,000
Sub-Total:	$5,235,273	=	$5,235,000	$	5,236,000
			Mobilization =	$	239,000
			10% Preliminary. Engineering =	$	524,000
			Construction Total =	$	5,999,000
			ROW Total =	$	420,000
			Utility Total =	$	32,000
			INFLATION (10% Per Year for 5 Years) =	$	3,939,000
			LOCATION SUBTOTAL =	**$**	**10,390,000**
			RANGE LOW =	**$**	**8,900,000**
			RANGE HIGH =	**$**	**12,000,000**

STATE ROUTE 222
FAYETTE AND HAYWOOD COUNTIES

COST ESTIMATE SUMMARY

OPTION 2
SEGMENT 2

Segment 2 **SR 222 from Prop. SIA Road to Keeling Rd.**

ITEM	COST				
Clear & Grubbing:	$124,311	=	$124,000	$	124,000
Earthwork:	$580,556	=	$581,000	$	705,000
Pavement Removal:	$5,000	=	$5,000	$	710,000
Drainage:	$9,450	=	$9,000	$	719,000
Structures:	$0	=	$0	$	719,000
Railroad:	$0	=	$0	$	719,000
Paving:	$1,848,603	=	$1,849,000	$	2,568,000
Retaining Walls:	$0	=	$0	$	2,568,000
Maintenance of Traffic:	$15,000	=	$15,000	$	2,583,000
Topsoil:	$133,000	=	$133,000	$	2,716,000
Seeding:	$39,900	=	$40,000	$	2,756,000
Sodding:	$25,000	=	$25,000	$	2,781,000
Signing:	$20,000	=	$20,000	$	2,801,000
Signalization:	$0	=	$0	$	2,801,000
Fencing:	$0	=	$0	$	2,801,000
Guardrail:	$80,000	=	$80,000	$	2,881,000
Rip-Rap:	$5,000	=	$5,000	$	2,886,000
Other Construction (15%):	$432,123	=	$432,000	$	3,318,000
Erosion Control (3.5%):	$100,829	=	$101,000	$	3,419,000
Sub-Total:	$3,418,771	=	$3,419,000	$	3,419,000
10% Eng. & Cont.:	$341,877	=	$342,000	$	3,761,000
Sub-Total:	$3,760,648	=	$3,761,000	$	3,761,000
			Mobilization =	$	174,000
			10% Preliminary. Engineering =	$	377,000
			Construction Total =	$	4,312,000
			ROW Total =	$	274,000
			Utility Total =	$	20,000
			INFLATION (10% Per Year for 5 Years) =	$	2,813,000
			LOCATION SUBTOTAL =	**$**	**7,420,000**
			RANGE LOW =	**$**	**6,400,000**
			RANGE HIGH =	**$**	**8,600,000**

STATE ROUTE 222
FAYETTE AND HAYWOOD
COUNTIES

COST ESTIMATE SUMMARY

OPTION 2
SEGMENT 3

Segment 3 **SR 222 from Keeling Rd. to Cherry St.**

ITEM	COST				
Clear & Grubbing:	$18,733	=	$19,000	$	19,000
Earthwork:	$151,111	=	$151,000	$	170,000
Pavement Removal:	$0	=	$0	$	170,000
Drainage:	$23,748	=	$24,000	$	194,000
Structures:	$0	=	$0	$	194,000
Railroad:	$0	=	$0	$	194,000
Paving:	$636,708	=	$637,000	$	831,000
Retaining Walls:	$0	=	$0	$	831,000
Maintenance of Traffic:	$50,000	=	$50,000	$	881,000
Topsoil:	$56,667	=	$57,000	$	938,000
Seeding:	$17,000	=	$17,000	$	955,000
Sodding:	$25,000	=	$25,000	$	980,000
Signing:	$20,000	=	$20,000	$	1,000,000
Signalization:	$0	=	$0	$	1,000,000
Fencing:	$0	=	$0	$	1,000,000
Guardrail:	$80,000	=	$80,000	$	1,080,000
Rip-Rap:	$5,000	=	$5,000	$	1,085,000
Other Construction (15%):	$161,845	=	$162,000	$	1,247,000
Erosion Control (3.5%):	$37,764	=	$38,000	$	1,285,000
Sub-Total:	$1,283,576	=	$1,285,000	$	1,285,000
10% Eng. & Cont.:	$128,358	=	$129,000	$	1,414,000
Sub-Total:	$1,411,933	=	$1,412,000	$	1,414,000
			Mobilization =	$	69,000
			10% Preliminary. Engineering =	$	142,000
			Construction Total =	$	1,625,000
			ROW Total =	$	76,000
			Utility Total =	$	15,000
			INFLATION (10% Per Year for 5 Years) =	$	1,048,000
			LOCATION SUBTOTAL =	**$**	**2,770,000**
			RANGE LOW =	**$**	**2,400,000**
			RANGE HIGH =	**$**	**3,200,000**

SIA ROAD
HAYWOOD COUNTY

COST ESTIMATE SUMMARY

SIA Road **From Interstate 40 to Prop. State Route 222**

ITEM	COST				
Clear & Grubbing:	$59,504	=	$60,000	$	60,000
Earthwork:	$368,889	=	$369,000	$	429,000
Pavement Removal:	$6,667	=	$7,000	$	436,000
Drainage:	$9,450	=	$9,000	$	445,000
Structures:	$0	=	$0	$	445,000
Railroad:	$0	=	$0	$	445,000
Paving:	$1,127,188	=	$1,127,000	$	1,572,000
Retaining Walls:	$0	=	$0	$	1,572,000
Maintenance of Traffic:	$15,000	=	$15,000	$	1,587,000
Topsoil:	$43,500	=	$44,000	$	1,631,000
Seeding:	$13,050	=	$13,000	$	1,644,000
Sodding:	$25,000	=	$25,000	$	1,669,000
Signing:	$20,000	=	$20,000	$	1,689,000
Signalization:	$0	=	$0	$	1,689,000
Fencing:	$0	=	$0	$	1,689,000
Guardrail:	$40,000	=	$40,000	$	1,729,000
Rip-Rap:	$5,000	=	$5,000	$	1,734,000
Other Construction (15%):	$259,237	=	$259,000	$	1,993,000
Erosion Control (3.5%):	$60,489	=	$60,000	$	2,053,000
Sub-Total:	$2,052,973	=	$2,053,000	$	2,053,000
10% Eng. & Cont.:	$205,297	=	$205,000	$	2,258,000
Sub-Total:	$2,258,271	=	$2,258,000	$	2,258,000
			Mobilization =	$	107,000
			10% Preliminary. Engineering =	$	226,000
			Construction Total =	$	2,591,000
			ROW Total =	$	191,000
			Utility Total =	$	10,000
			INFLATION (10% Per Year for 5 Years) =	$	1,705,000
			LOCATION SUBTOTAL =	**$**	**4,500,000**
			RANGE LOW =	**$**	**3,900,000**
			RANGE HIGH =	**$**	**5,200,000**

STATE ROUTE 222 CONCEPTUAL PLANS

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TENN.	YEAR	SHEET NO.
	2009	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		

Index of Sheets

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-2A	TYPICAL SECTIONS
3-12	LAYOUT SHEETS

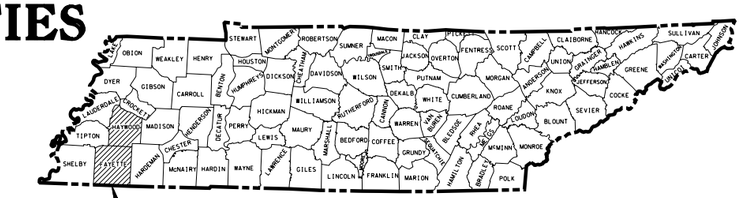
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

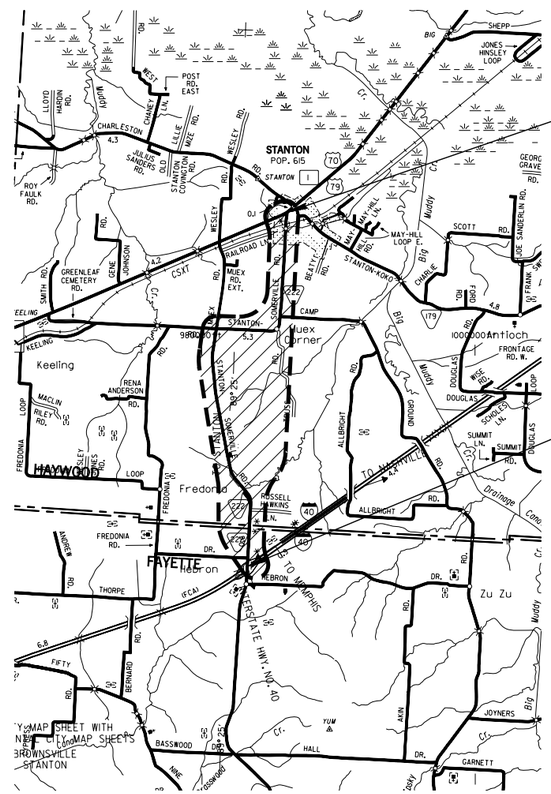
FAYETTE & HAYWOOD COUNTIES

STATE ROUTE 222 FROM INTERSTATE 40
TO U.S. 70 (SR 1)

CONCEPTUAL PLANS

STATE HIGHWAY NO. 222 F.A.H.S. NO.





END STUDY AREA

BEGIN STUDY AREA

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SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED MARCH 1, 2006 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 OR
TDOT DESIGN MANAGER 1 _____
TDOT ROAD SP. SV. 2 _____
DESIGNED BY _____
DESIGNER LONG ENGINEERING, INC. CHECKED BY _____

P.E. NO. _____

PIN NO. _____

APPROVED: _____
CHIEF ENGINEER

DATE: _____

APPROVED: _____
COMMISSIONER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

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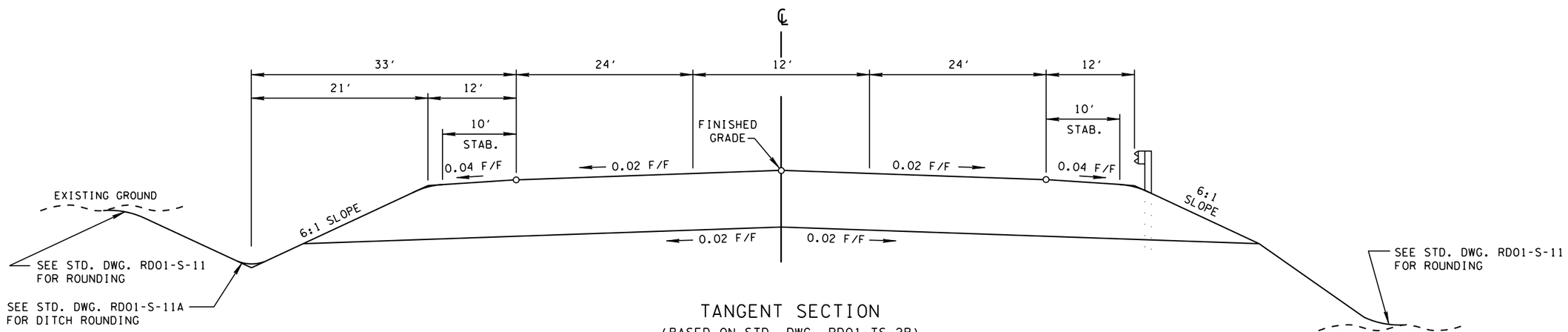
TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-2B)
SEGMENTS 1A & 1B
FROM I-40 TO PROP. MEGASITE ENT.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

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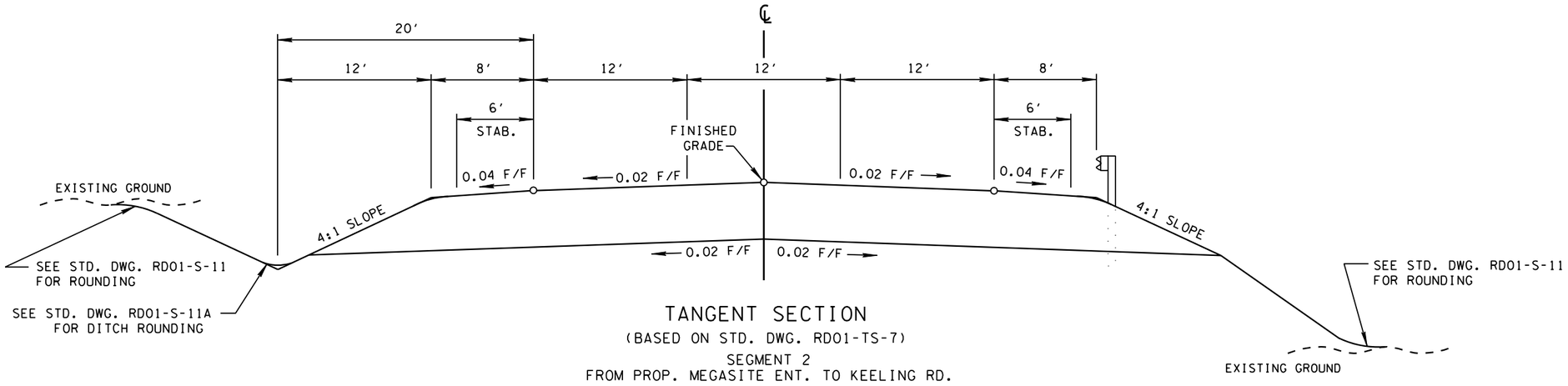
	2009		2A

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.



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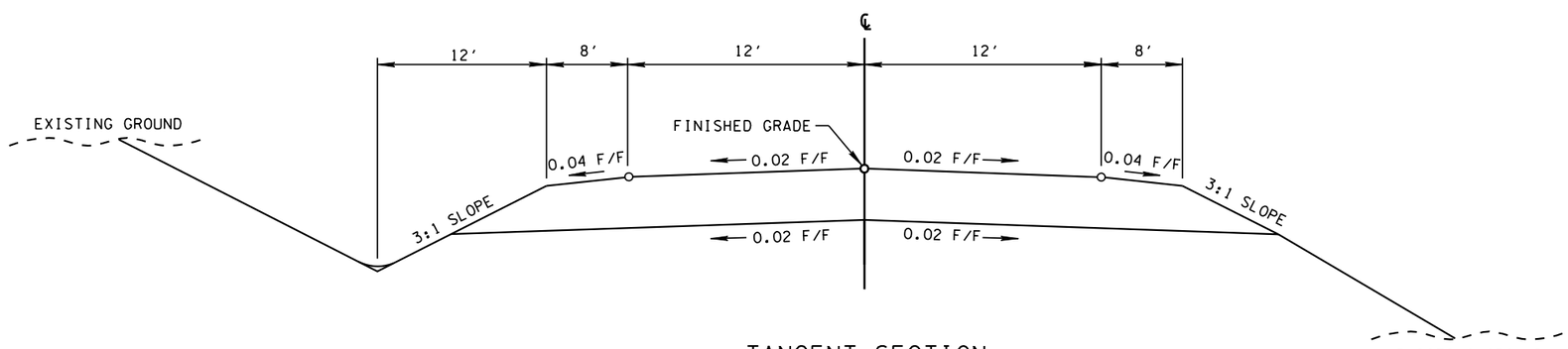
SEGMENT 2
FROM PROP. MEGASITE ENT. TO KEELING RD.



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-1)
SEGMENT 3
FROM KEELING RD. TO CHERRY ST.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2009		3A

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222 CONCEPT ALT. A

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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DESIGN DIVISION
FILE NO.

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222 CONCEPT ALT. B

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

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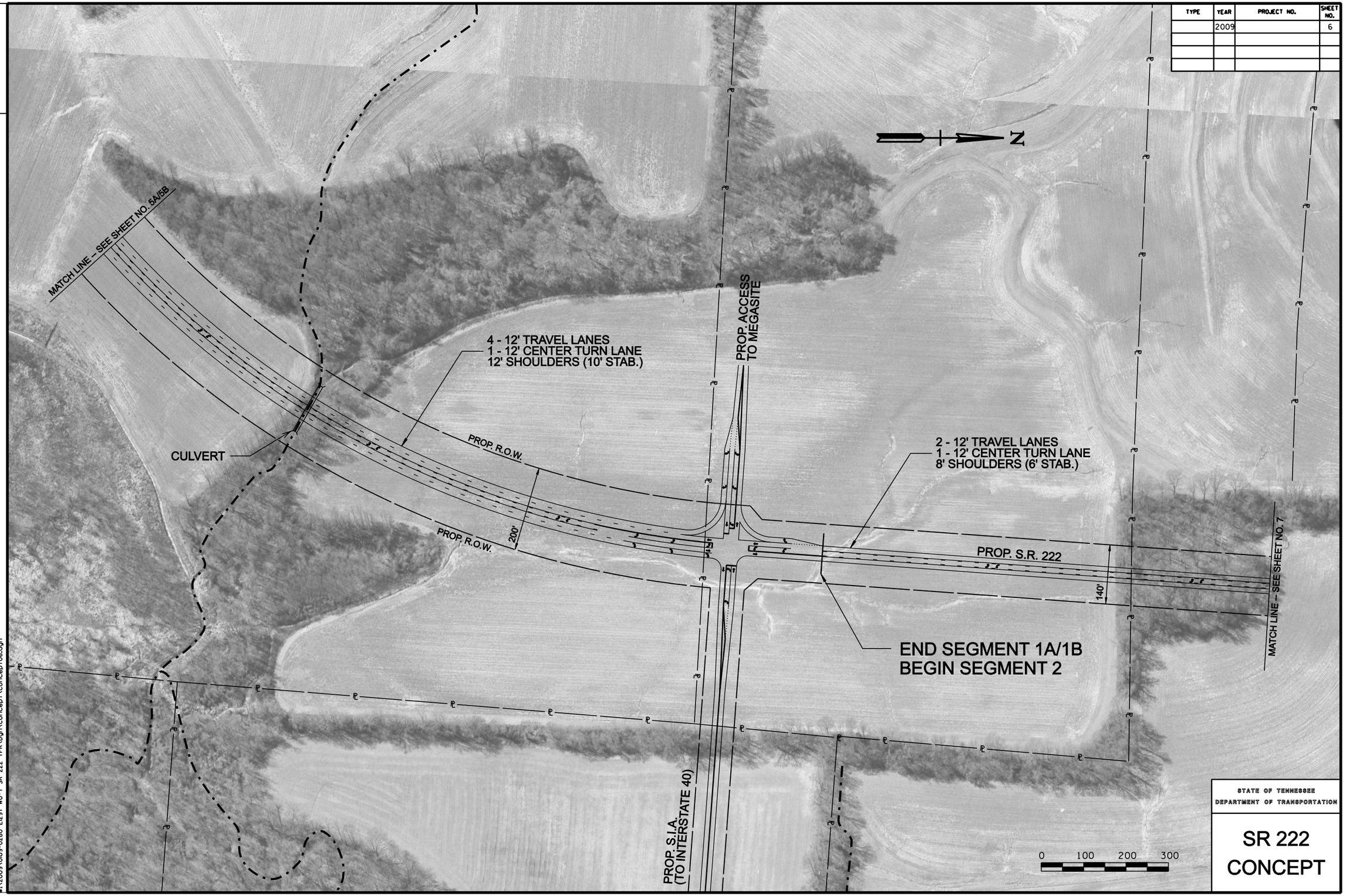

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222
CONCEPT

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222 CONCEPT

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TENNESSEE D.O.T.	
DESIGN DIVISION	
FILE NO.	

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222 CONCEPT

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DESIGN DIVISION
FILE NO.

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222
CONCEPT

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DESIGN DIVISION
FILE NO.

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222
CONCEPT

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 222 CONCEPT

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SIA ROAD CONCEPTUAL PLANS

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TENN.	YEAR	SHEET NO.
	2009	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		

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SHEET NO.	DESCRIPTION
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2	TYPICAL SECTIONS
3-6	LAYOUT SHEETS

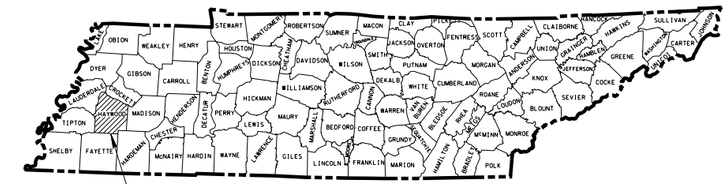
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

HAYWOOD COUNTY

SIA ROAD
FROM INTERSTATE 40 TO PROP. STATE ROUTE 222

CONCEPTUAL PLANS

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



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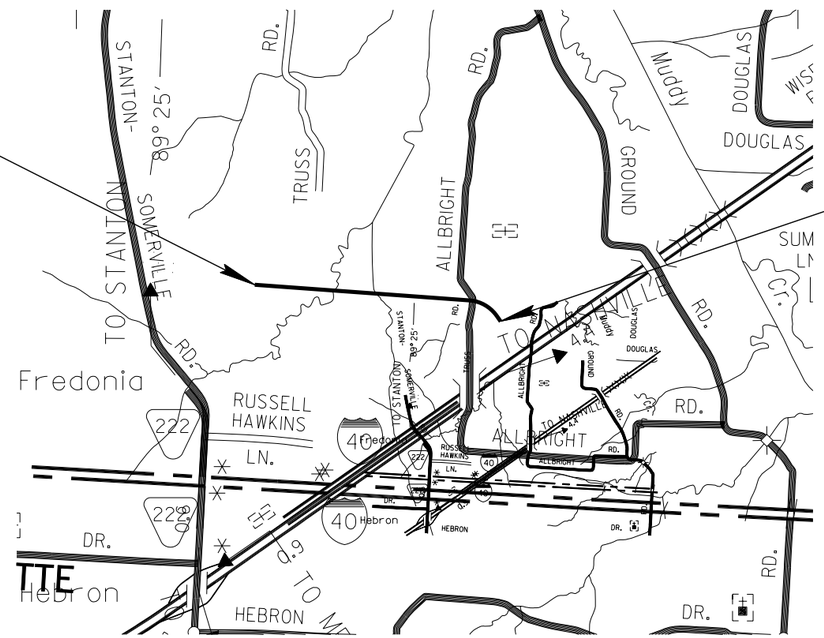

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TDOT C.E. MANAGER 1 OR
TDOT DESIGN MANAGER 1 _____
TDOT ROAD SP. SV. 2 _____
DESIGNED BY _____
DESIGNER LONG ENGINEERING, INC. CHECKED BY _____

P.E. NO. _____

PIN NO. _____

APPROVED: _____ CHIEF ENGINEER

DATE: _____

APPROVED: _____ COMMISSIONER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____ DIVISION ADMINISTRATOR _____ DATE

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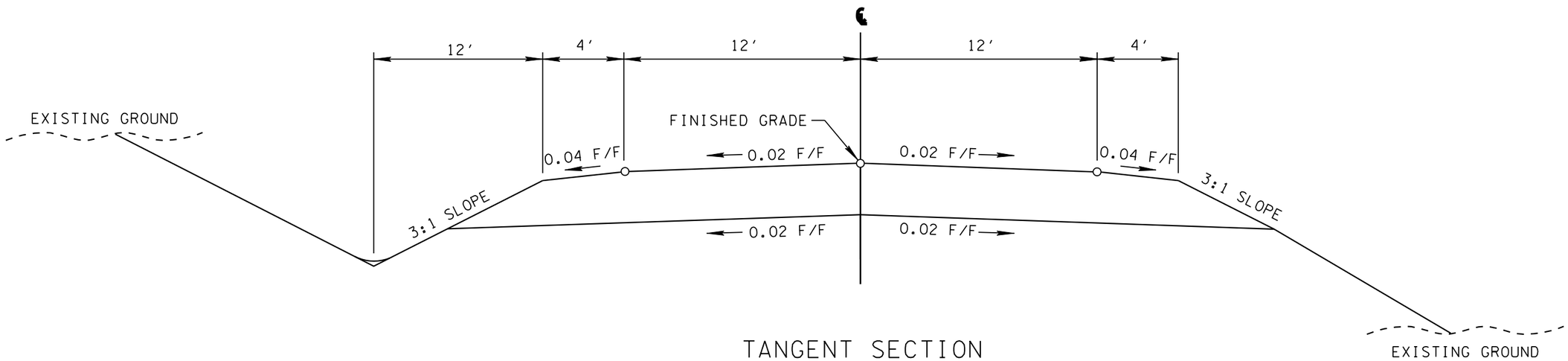
TYPE	YEAR	PROJECT NO.	SHEET NO.
	2009		2

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-1)
SIA ROAD
FROM I-40 TO PROP. SR 222

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
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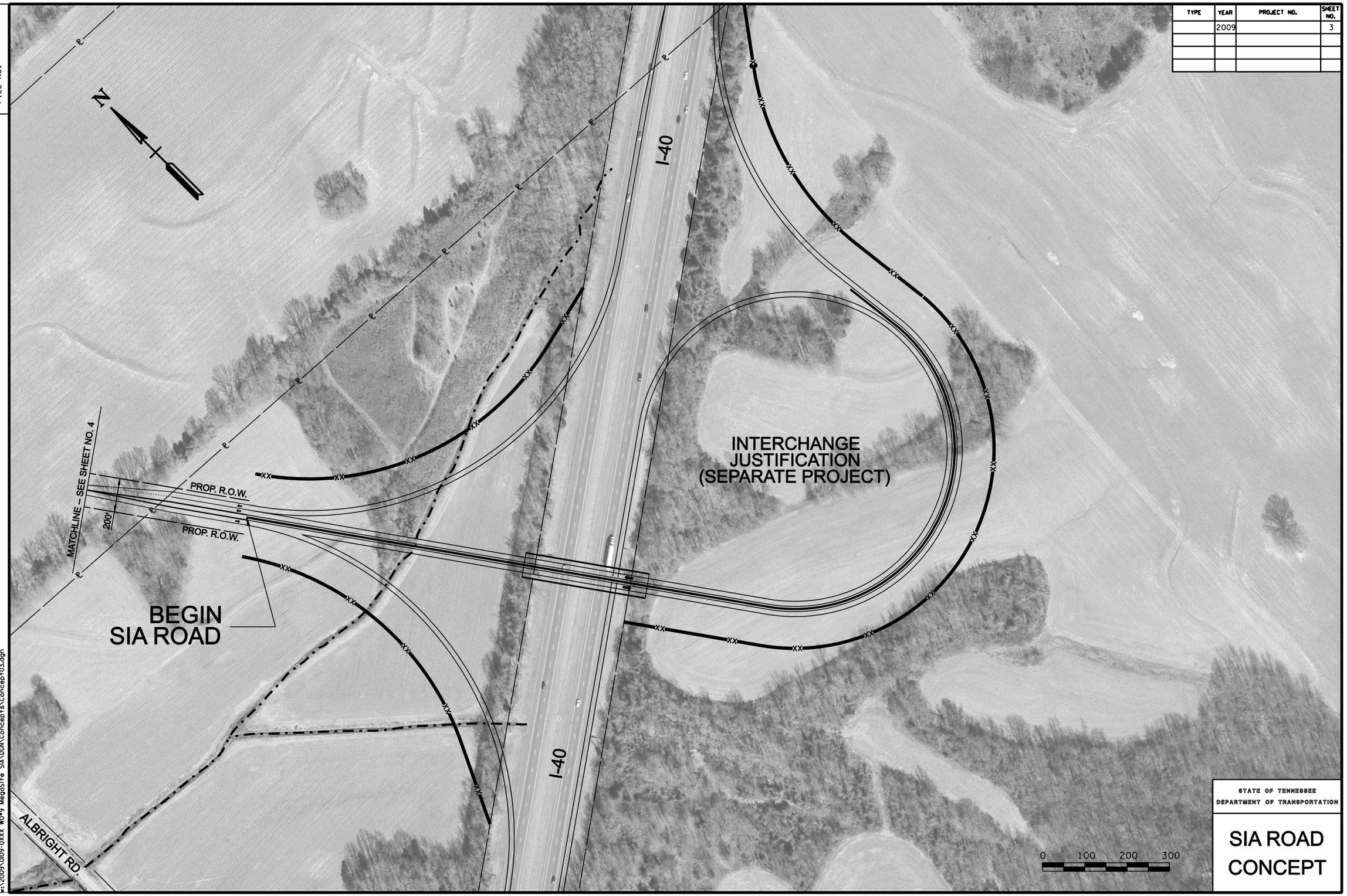

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIA ROAD CONCEPT

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2009		4

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIA ROAD CONCEPT

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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2009		5

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIA ROAD CONCEPT

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TYPE	YEAR	PROJECT NO.	SHEET NO.
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TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIA ROAD CONCEPT

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APPENDIX A

SSOE Megasite Conceptual Plans

1. PHASE I AND II AUTOMOTIVE MANUFACTURING PLANTS
2. SUPPLIER BUILDINGS
3. TRAINING CENTER
4. TEST TRACK
5. WELCOME CENTER
6. FIRE DEPARTMENT
7. SEGMENT 1 INTERSTATE INTERCHANGE
8. SEGMENT 2 INTERSTATE INTERCHANGE
9. WATER TOWER AND WATER TREATMENT PLANT
10. SANITARY LIFT STATION
11. CONCEPTUAL POWER LINE (SUBJECT TO NEPA PROCESS)
12. FORESTED BUFFER
13. PROPOSED BERM LOCATIONS
14. SITE EXCLUDED
15. STORMWATER POND
16. 12 MILES TO TEXAS NATURAL GAS PIPELINE

LEGEND:

- OVERHEAD ELECTRICAL LINE
- SANITARY SEWER MAIN
- WATER MAIN
- STANTON CITY LIMITS
- PROPERTY LINES
- APPROXIMATE COUNTY LINE
- BOUNDARY FOR MEGASITE (AUTO PLANT CONSTRUCTION)

FAYETTE COUNTY

- ZONED B-2
- ZONED B-3

IF NOT SHADED OR OUTLINED THE PROPERTY IS R-1

HAYWOOD COUNTY

- ZONED C
- ZONED R-1

IF NOT SHADED OR OUTLINED THE PROPERTY IS FAR

SSOE, INC.
ARCHITECTS • ENGINEERS
www.ssoe.com

CONSULTANTS

THE SEAL ON THIS DOCUMENT WAS AUTHORIZED BY:

SEAL ID:
DATE:

MEMPHIS JACKSON MEGASITE
HAYWOOD COUNTY, TN

TVA
103 MARSHALL RD.
BRANDON, MS
39047

CLIENT PROJECT NO: 000-000-000

NO.	DATE	SUBJECT
REVISION OR ISSUE		

PROJECT NO: 009-00269-00
PROJECT MANAGER:
DESIGNED:
CHECKED:

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DRAWING TITLE
OVERALL SITE INFORMATION PLAN

DRAWING NO:
C.000

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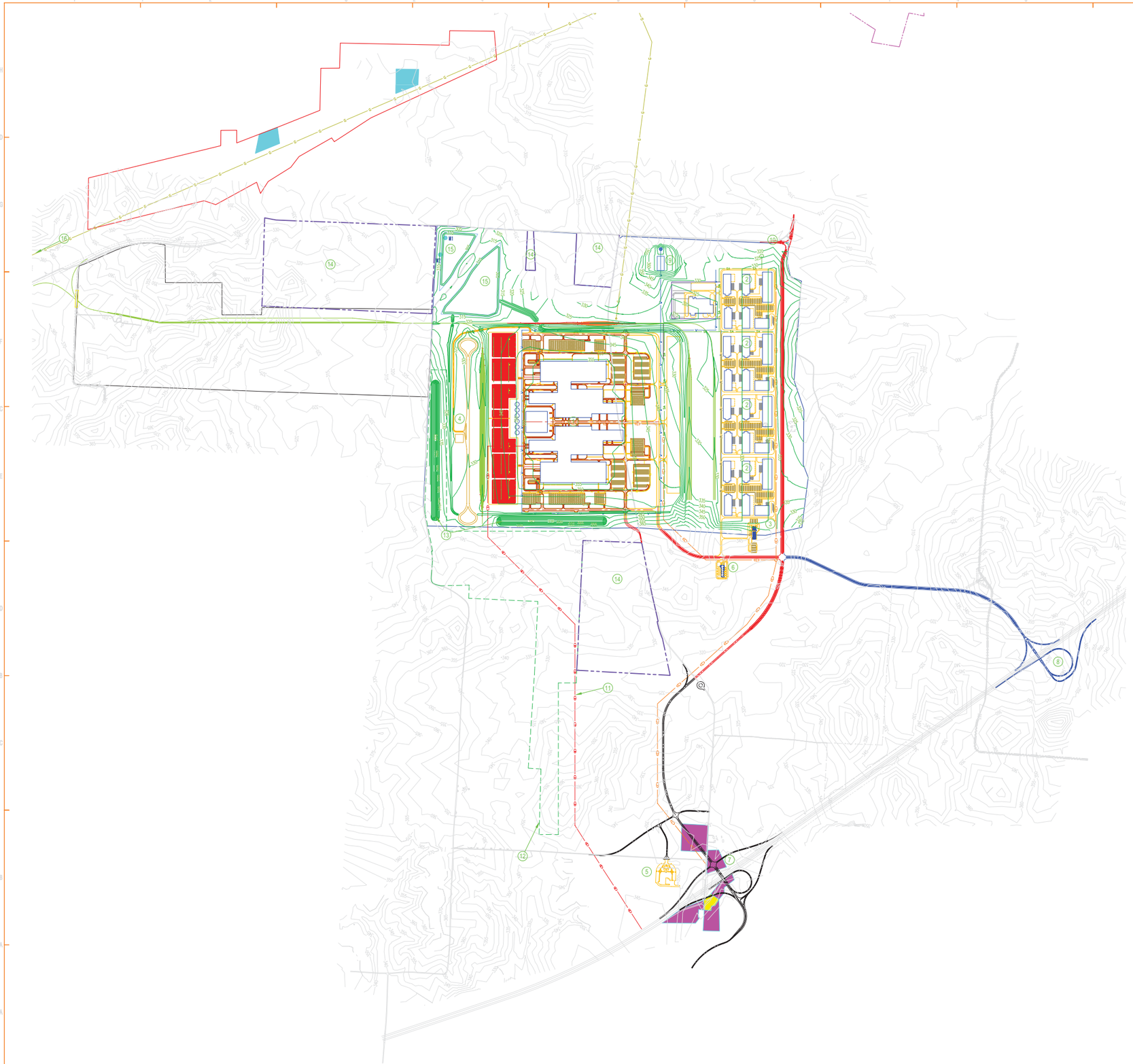
DATE: April 01, 2009 - 12:08am USER: 41433



1. PHASE I AND II AUTOMOTIVE MANUFACTURING PLANTS
2. SUPPLIER BUILDINGS
3. TRAINING CENTER
4. TEST TRACK
5. WELCOME CENTER
6. FIRE DEPARTMENT
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13. PROPOSED BERM LOCATIONS
14. SITE EXCLUDED
15. STORMWATER POND
16. 12 MILES TO TEXAS NATURAL GAS PIPELINE

LEGEND:

- OVERHEAD ELECTRICAL LINE
- SANITARY SEWER MAIN
- WATER MAIN
- STANTON CITY LIMITS
- PROPERTY LINES
- APPROXIMATE COUNTY LINE
- BOUNDARY FOR MEGASITE (AUTO PLANT CONSTRUCTION)

FAYETTE COUNTY

- ZONED B-2
- ZONED B-3

IF NOT SHADED OR OUTLINED THE PROPERTY IS R-1

HAYWOOD COUNTY

- ZONED C
- ZONED R-1

IF NOT SHADED OR OUTLINED THE PROPERTY IS FAR

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HAYWOOD COUNTY, TN

TVA
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39047

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NO.	DATE	SUBJECT

REVISION OR ISSUE

PROJECT NO: 009-00269-00
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DESIGNED:
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DRAWING TITLE
OVERALL GRADING PLAN

DRAWING NO:
C.001

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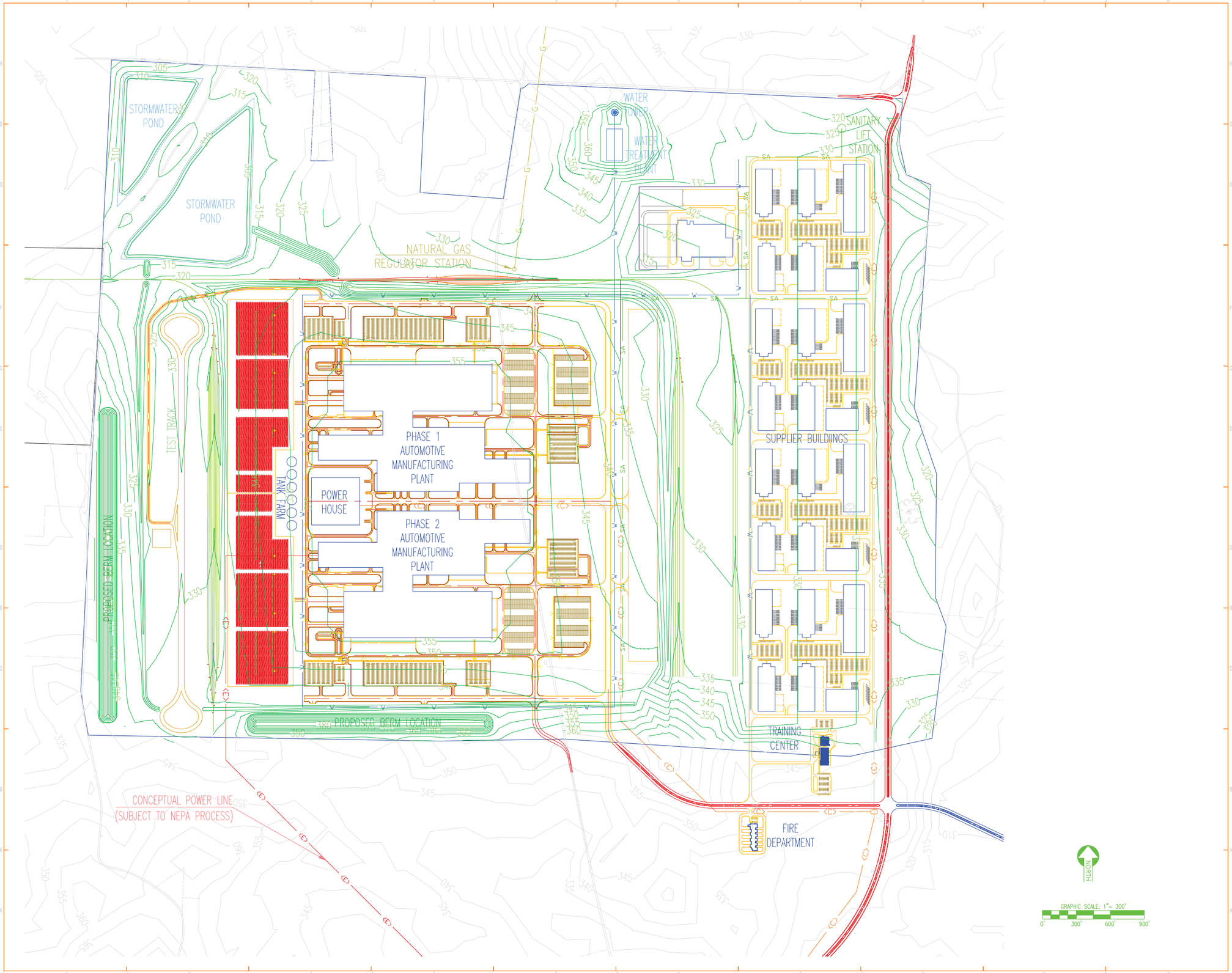

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DATE: XX/XX/XX

MEMPHIS JACKSON MEGASITE
HAYWOOD COUNTY, TN

TVA
103 MARSHALL RD.
BRANDON, MS
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NO.	DATE	SUBJECT
REVISION OR ISSUE		

PROJECT NO: 009-00269-00
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DRAWING TITLE
ENLARGED MANUFACTURING SITE PLAN

DRAWING NO:
C.002

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DATE: Apr 01, 2009 - 12:11am USER: 4430

APPENDIX B

Traffic Analysis Calculations and Data

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING OFFICE
SUITE 1000, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0344

June 25, 2009

Mr. Steve Bryan
Long Engineering Inc.
5550 Franklin Road
Suite 202
Nashville Tn. 37220

Subject: Traffic Figures for the I-40 TVA Megasite
Fayette-Haywood Counties

Dear Steve:

We have reviewed the traffic schematics you submitted on June 11, 2009 for the subject project. These figures have our approval for your use in the study.

Further coordination should be directed to Mr. Bill Hart's office. If I can be of further assistance, please advice.

Sincerely,

Tony Armstrong
Transportation Manager 1

Cc: Mr. Bill Hart

June 11, 2009

Mr. Tony Armstrong
Project Planning Division
Suite 1000, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: TVA Certified Memphis-Jackson I-40 Advantage Megasite
S.R. 222 TPR and State Industrial Access (SIA) Report
Fayette and Haywood Counties, Tennessee
Project No. 99108-7018-04
PIN: 112898.00 and 112899.00
Traffic Volume Projections

This memorandum was prepared by Long Engineering, Inc. (LEI) to document the development of the traffic volume projections for the above referenced projects in Fayette and Haywood Counties, Tennessee. The limits of the S.R. 222 Transportation Planning Report (TPR) extend from I-40 to U.S. 70 in Stanton, Tennessee and the limits of the State Industrial Access (SIA) Report extends from I-40 to S.R. 222 adjacent to the megasite location. These forecasts are based on the information provided by the Tennessee Valley Authority (TVA) and the Tennessee Department of Economic and Community Development (ECD) with regards to development layout and the potential S.R. 222 relocation. A drawing of this layout and potential S.R. 222 relocation is attached to this memorandum.

For purposes of these reports, two systems are depicted. The baseline system is characterized as S.R. 222 maintaining its existing location. The proposed system is characterized as S.R. 222 being relocated to the east aligning with the existing S.R. 222 in Stanton. Two traffic condition scenarios were prepared for each system, one without development build-out and one with development build-out. Both baseline and proposed systems assume the construction of the new interchange and the SIA road.

Traffic volumes were previously projected for the companion I-40/S.R. 222 Interchange Modification Study (IMS) and the I-40 Megasite Interchange Justification Study (IJS). The traffic volume projections for the S.R. 222 TPR and the SIA Report contained the same horizon years (2014 and 2034) and the same growth rates. In addition to the previously collected traffic data, information from six other TDOT count stations (#007, #054, #056, #057, #059, and #088) were also utilized to develop background traffic along the S.R. 222 corridor.

The same development build-out and the trip distribution percentages provided in the IMS and IJS reports was also utilized in these traffic projections. Drawings of trip distribution percentages for the existing and proposed systems are attached to this memorandum along with the development link trip assignments for each system. To be conservative, internal capture and pass-by reductions were not included in the above trip totals in the trip assignments. The number of trips was estimated using ITE's Trip Generation Manual, 7th Edition. The development build-out was assumed to be 2,000 full-time employees for the Industrial Park Land Use Type. In addition, the trips were increased to account for assumed development around the interchanges which included five fast food restaurants and two convenience markets

with gas pumps. Overall, a total of 19,196 trips were estimated for the development build-out. The following table is a summary of the daily trips generated for each land use.

Estimated Development Build-Out Daily Trips

Land Use Description		Industrial Park	Convenience Markets with Gas Pumps	Fast Food Restaurant with Drive Thru
ITE Code		130	853	934
Development Size (Each)		2000 Employees	3,000 Gross SF	3,000 Gross SF
Number of Developments		1	2	4
Daily	Average Rate	3.34/Employee (50% In - 50% Out)	845.60/KSF (50% In - 50% Out)	496.12/KSF (50% In - 50% Out)
	Estimated Trips	6,680	5,074	5,954

The traffic volumes shown in the attachments are link volumes between intersections. These traffic volumes were developed based on the following four traffic condition scenarios which consisted of the baseline and proposed systems with and without the development build-out.

- S.R. 222 Existing Alignment without Development (Baseline System)
- S.R. 222 Existing Alignment with Development (Baseline System)
- S.R. 222 New Alignment without Development (Proposed System)
- S.R. 222 New Alignment with Development (Proposed System)

To expedite the forecasting findings for both horizon years, the first item was to prepare the baseline and proposed systems without development trips. The second item was to prepare the baseline and proposed systems development trips. To obtain the baseline and proposed systems with development trips, the first two items were added together. Drawings of the traffic volumes projections for all four traffic condition scenarios are attached to this memorandum.

After your review, if you have any questions, please contact me via email or at 615-221-1131. If acceptable, please provide a letter of approval to use these traffic volumes in the S.R. 222 TPR and the SIA Report.

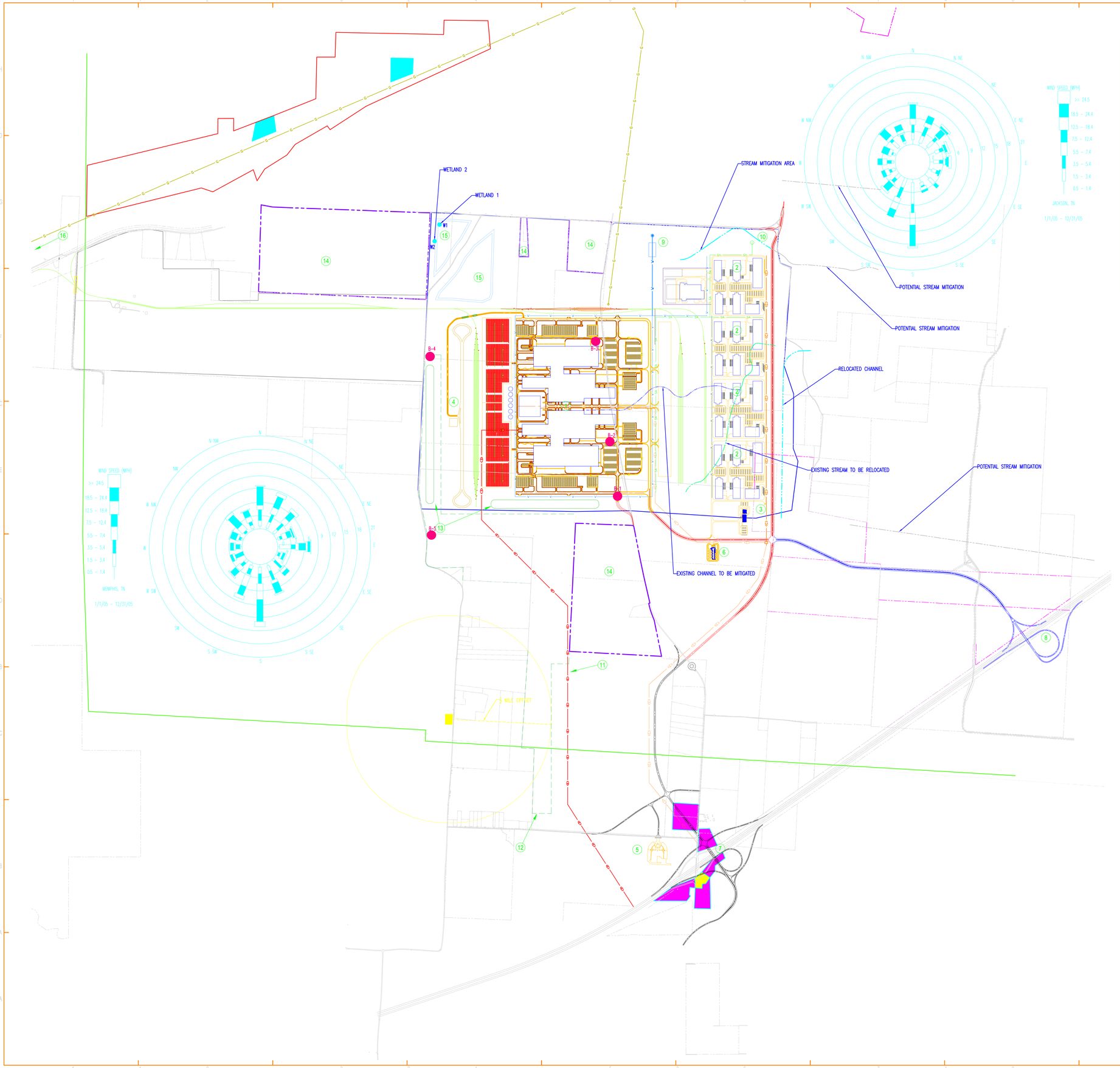
Sincerely,

LONG ENGINEERING, INC

Stephen K. Bryan

Stephen K. Bryan, P.E., PTOE
Project Engineer
sbryan@longeng.com

Attachments: SSOE Exhibit
Traffic Diagrams



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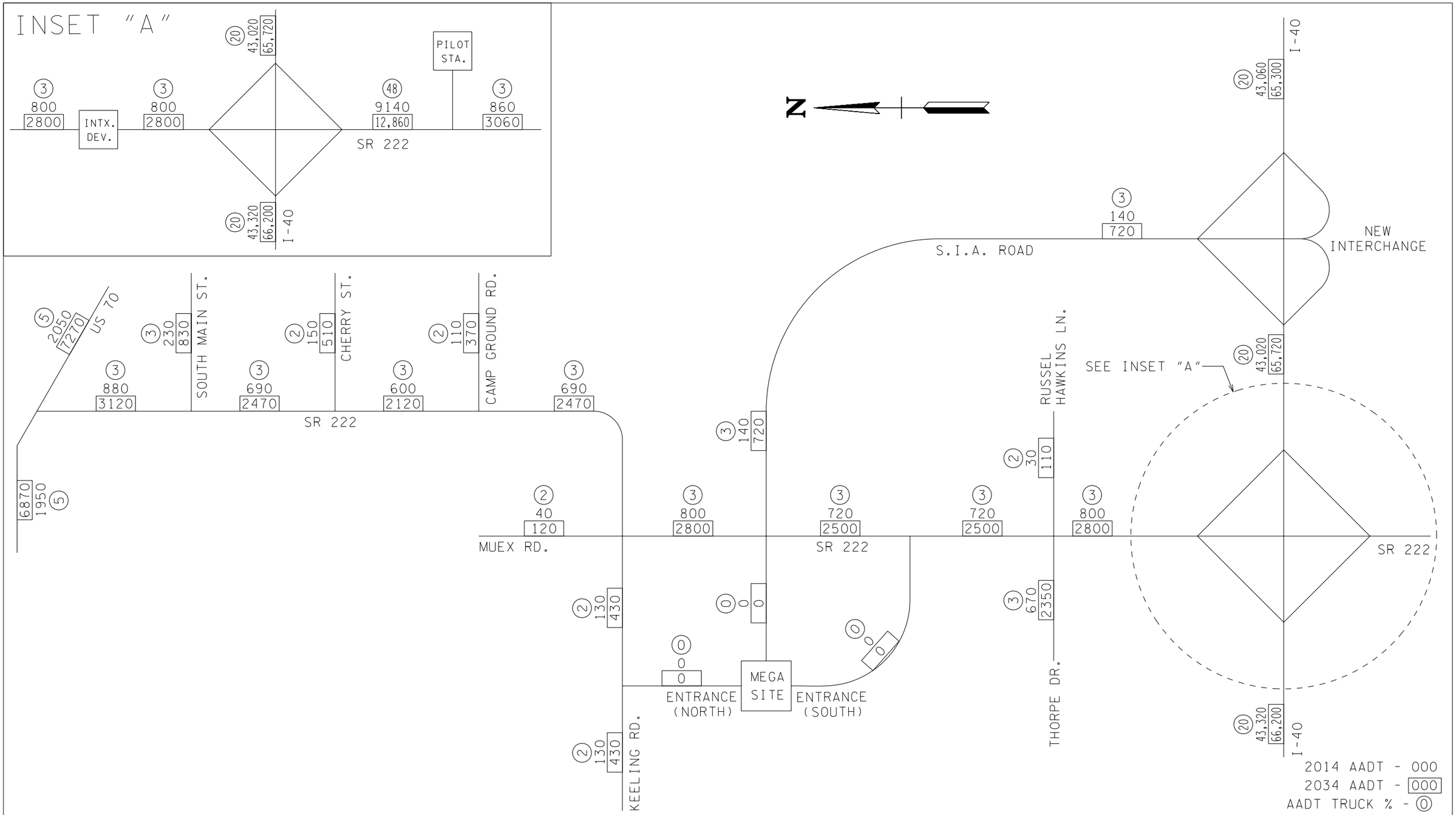
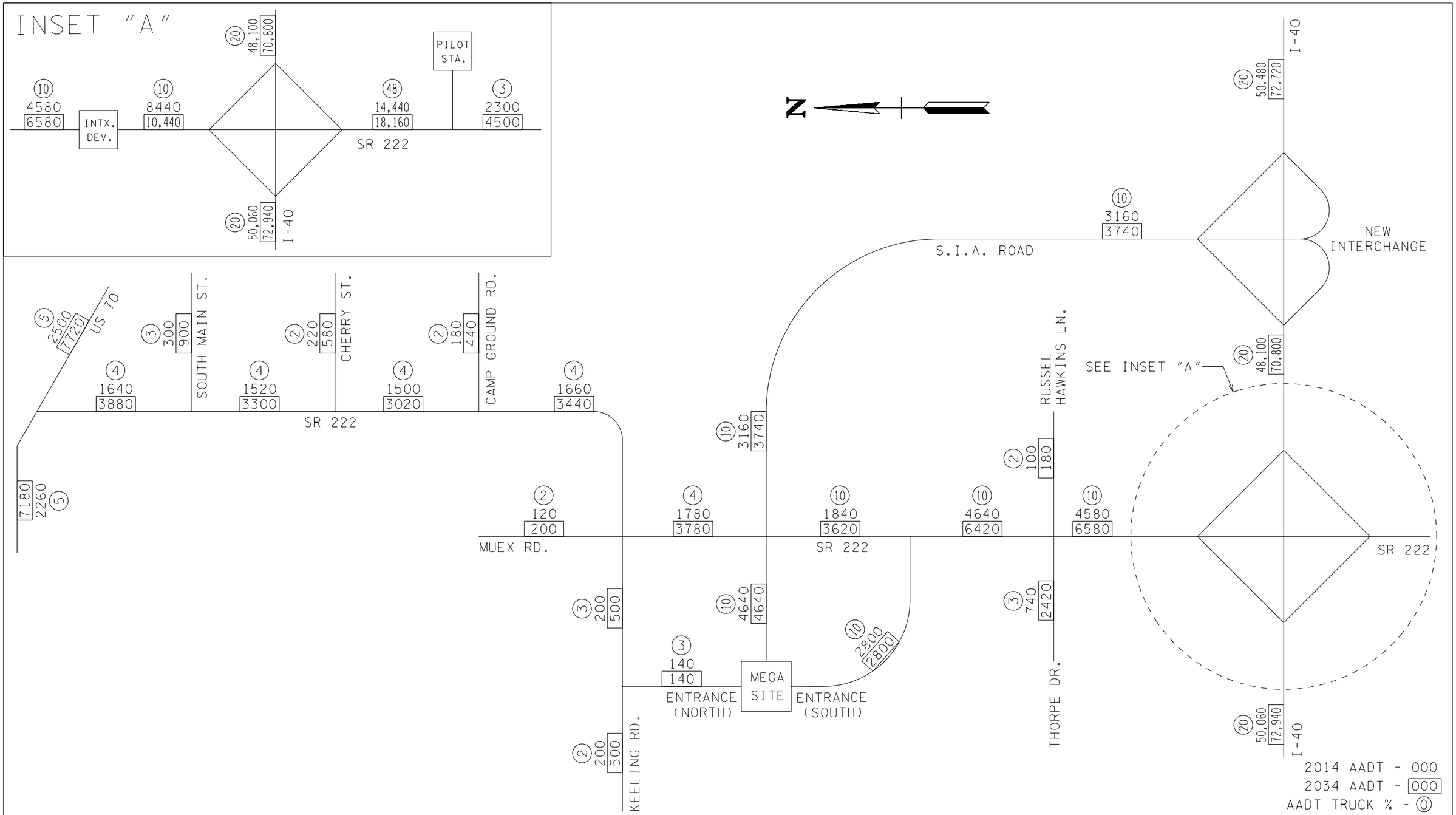


TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

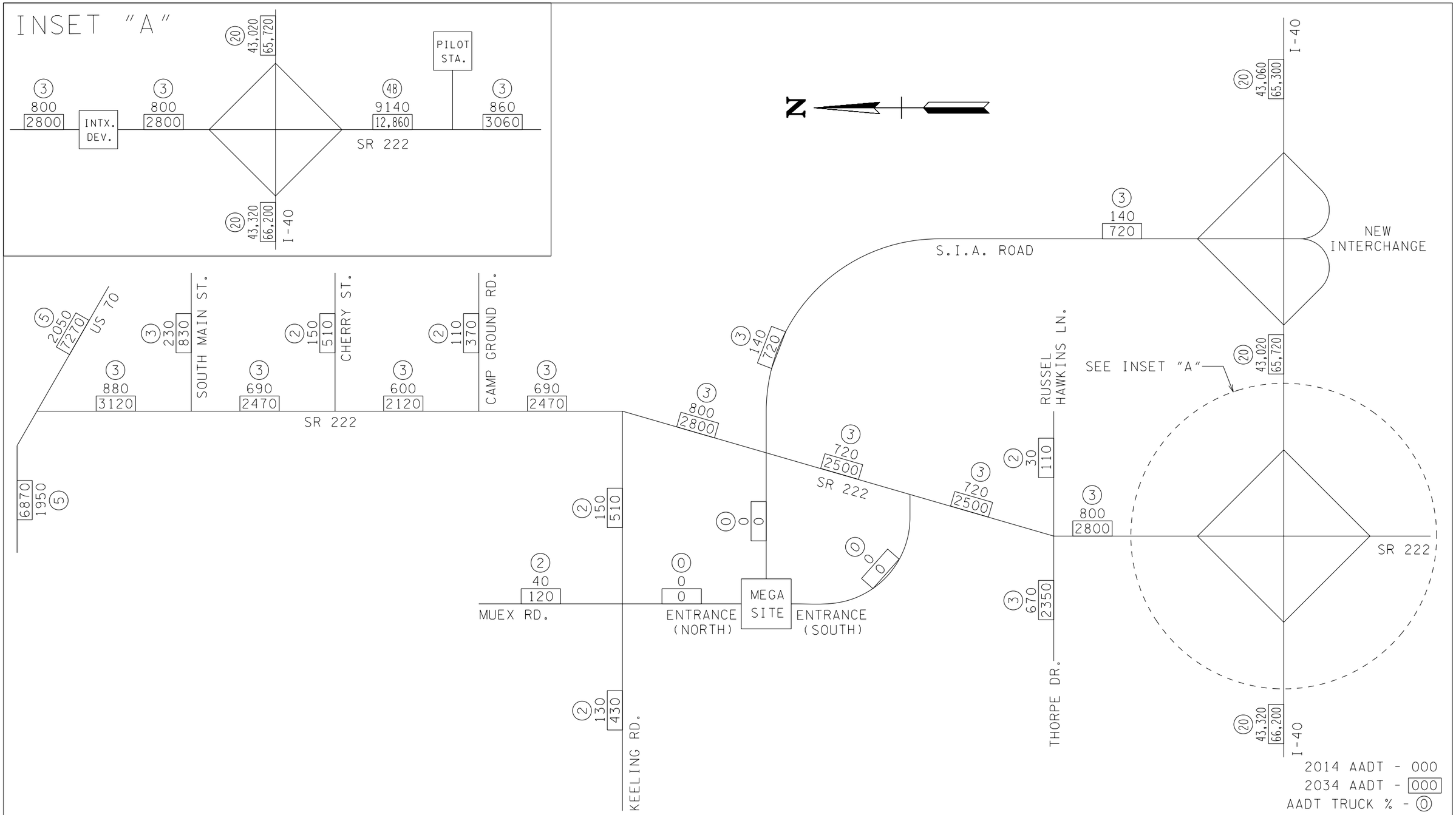
BASELINE SYSTEM
TWO-WAY AADT VOLUMES
WITHOUT DEVELOPMENT



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

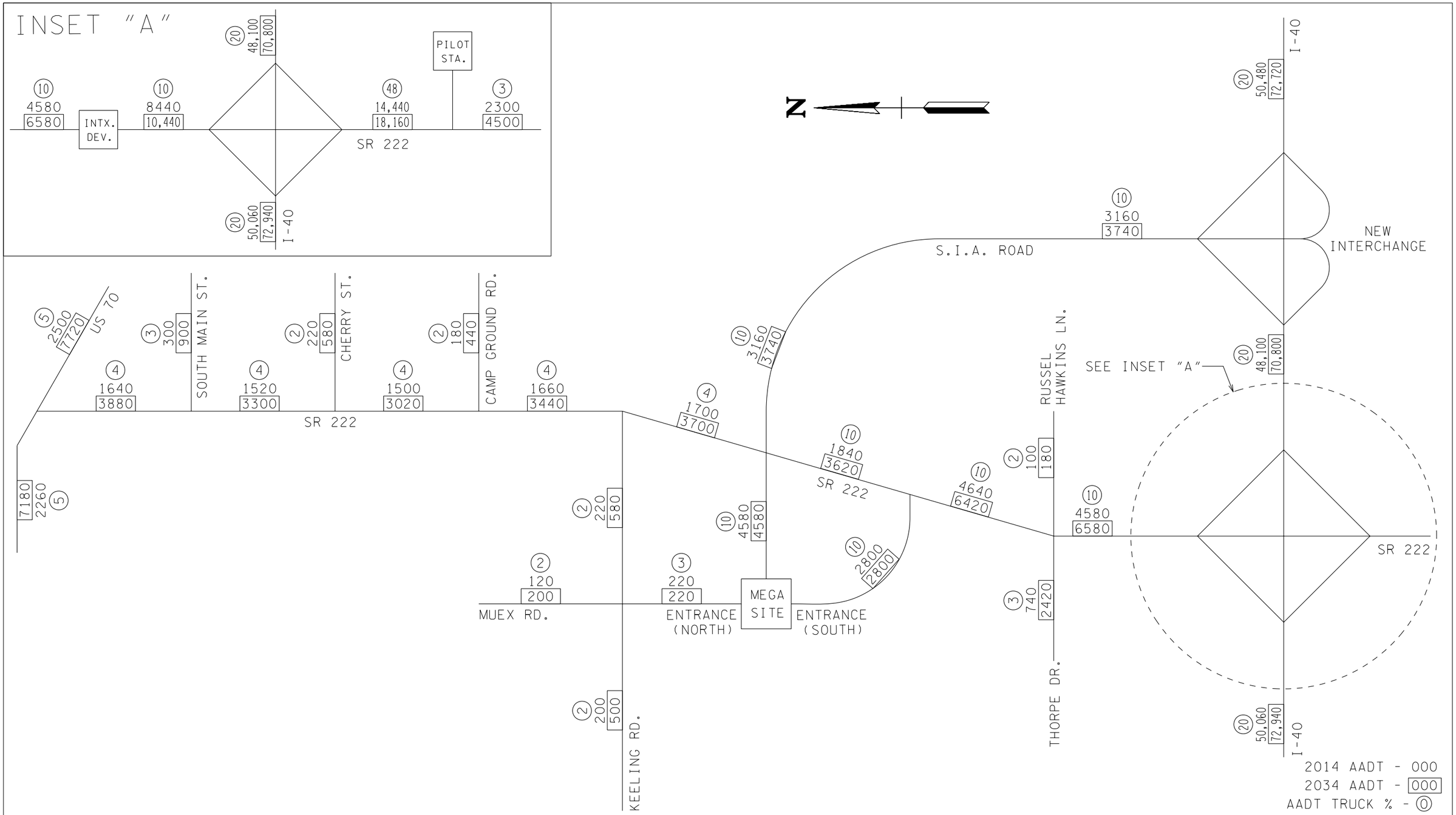
BASELINE SYSTEM
TWO-WAY AADT VOLUMES
WITH DEVELOPMENT



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

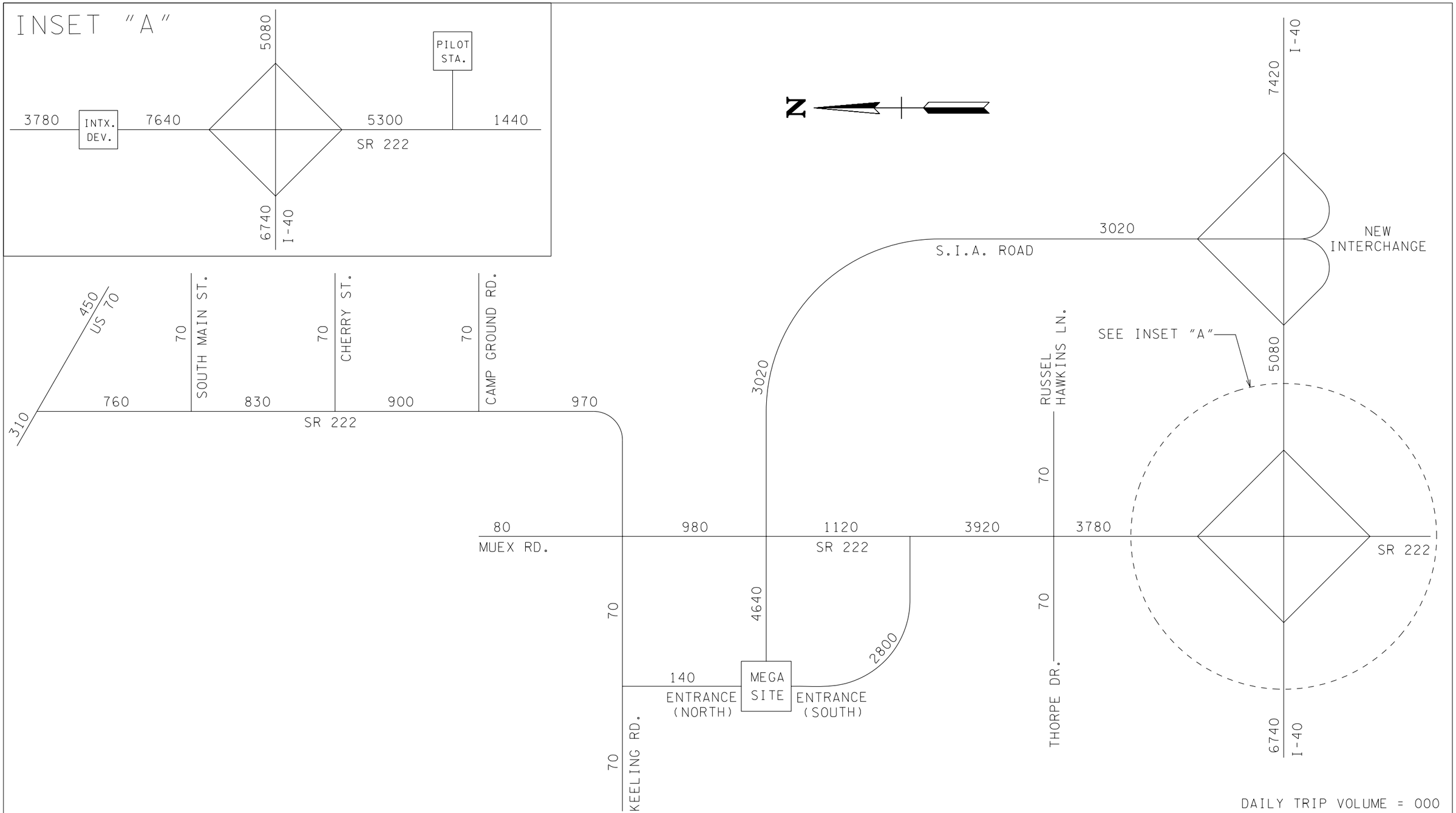
PROPOSED SYSTEM
TWO-WAY AADT VOLUMES
WITHOUT DEVELOPMENT



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

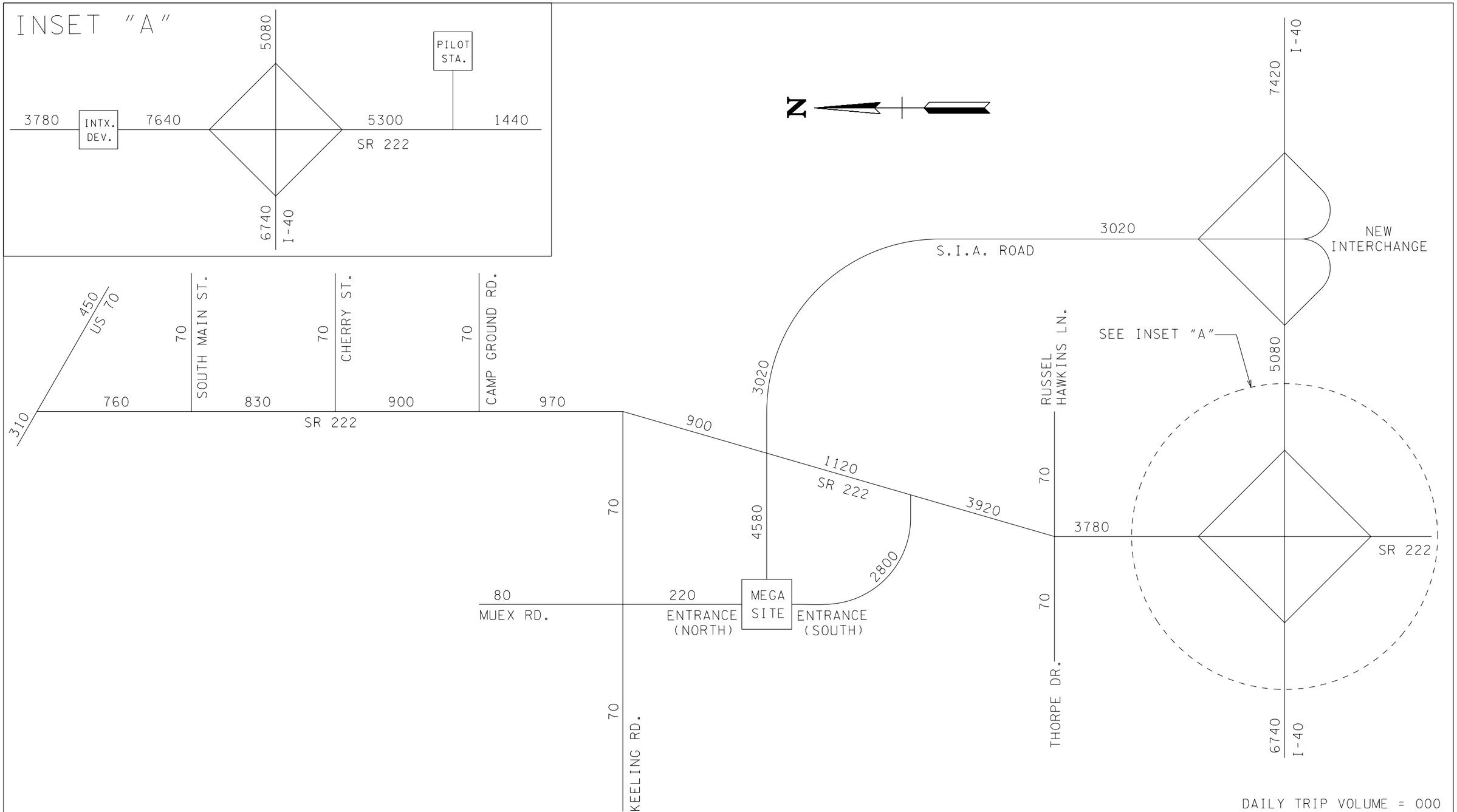
PROPOSED SYSTEM
TWO-WAY AADT VOLUMES
WITH DEVELOPMENT



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

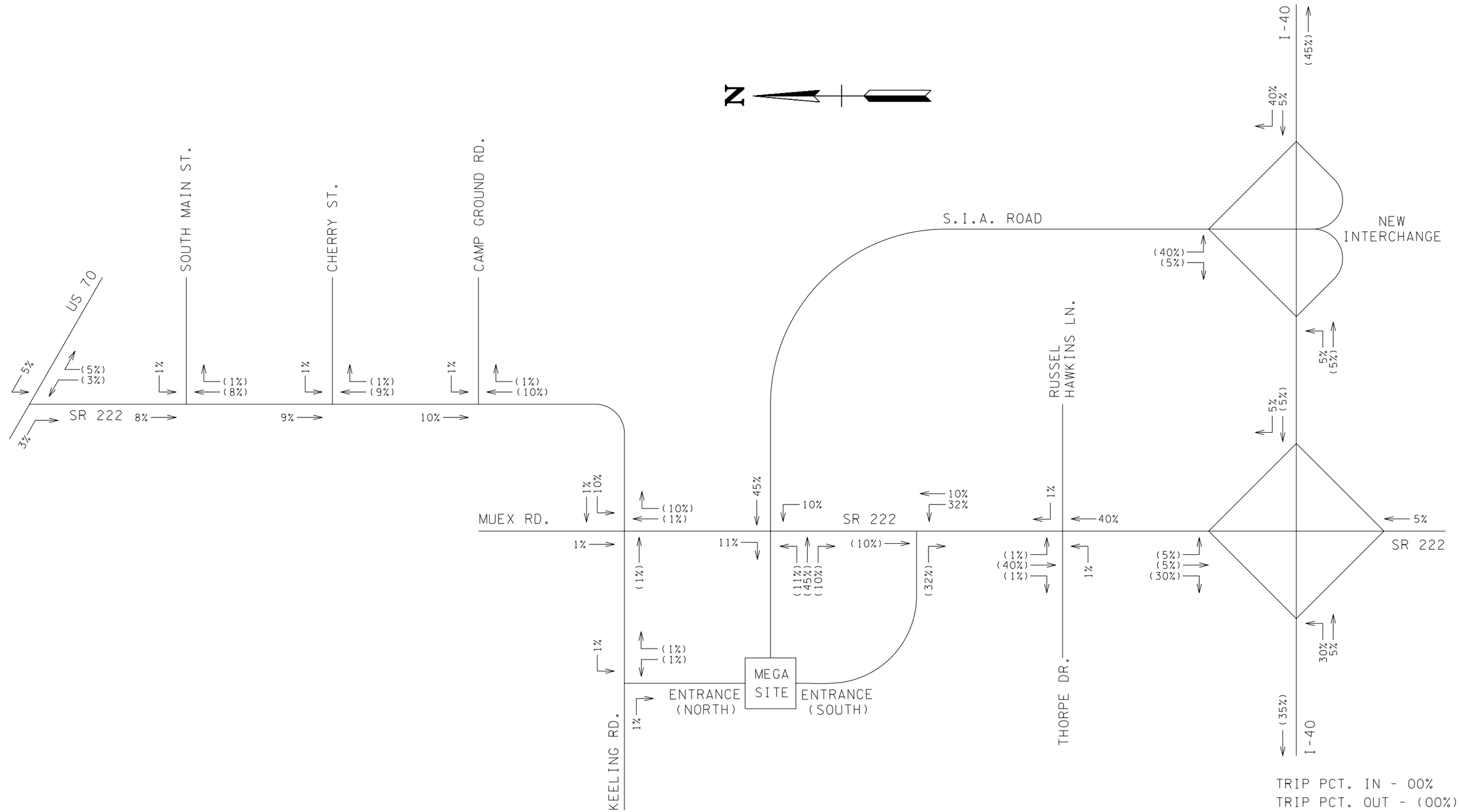
BASELINE SYSTEM
TOTAL DAILY LINK TRIPS
DEVELOPMENT ONLY



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

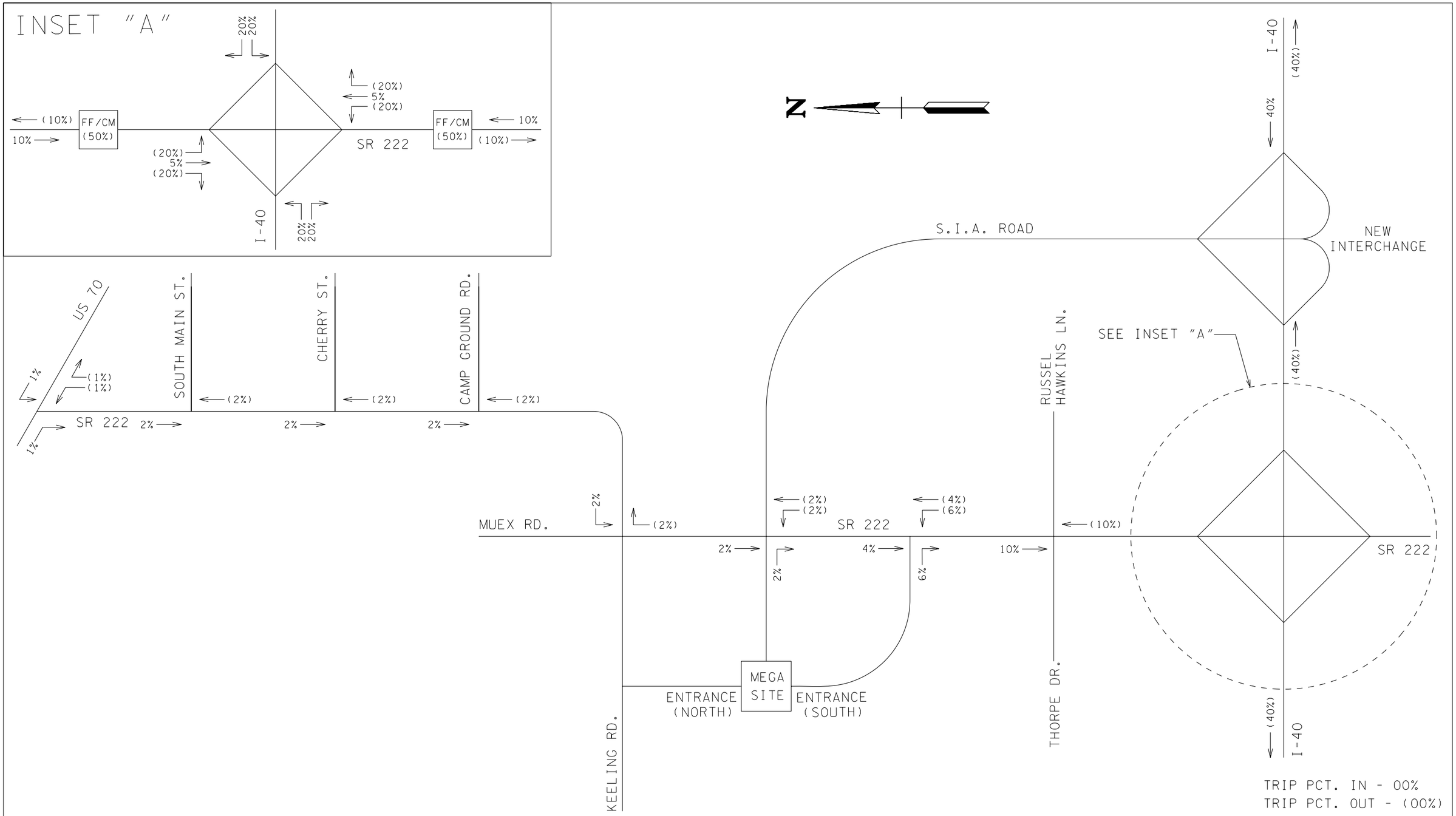
PROPOSED SYSTEM
TOTAL DAILY LINK TRIPS
DEVELOPMENT ONLY



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

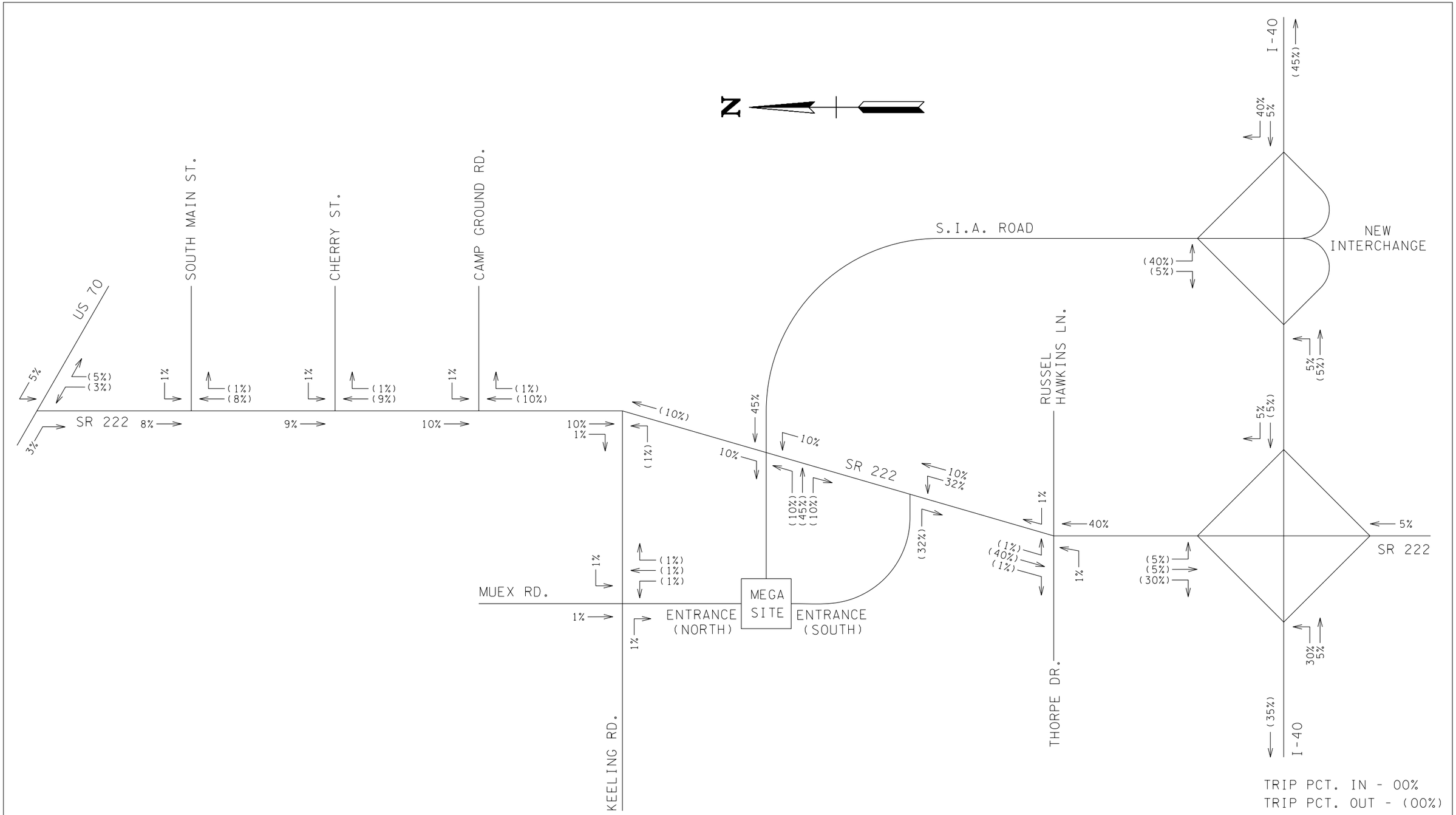
BASELINE SYSTEM
TRIP DISTRIBUTION
MEGASITE ONLY



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

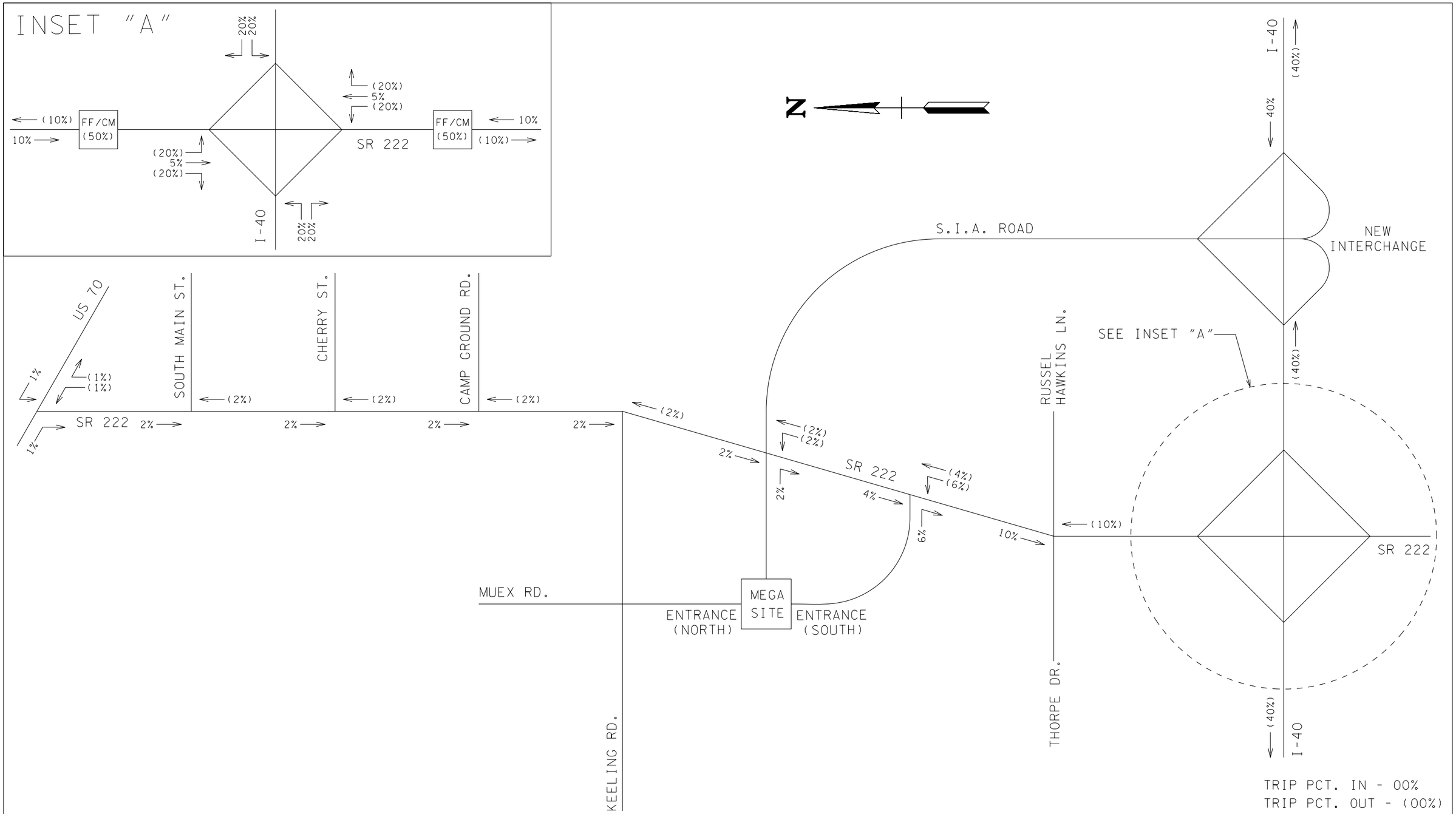
BASELINE SYSTEM
TRIP DISTRIBUTION
FAST FOOD/CONVENIENCE MARKETS



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

PROPOSED SYSTEM
TRIP DISTRIBUTION
MEGASITE ONLY



TDOT

FAYETTE AND HAYWOOD COUNTIES
I-40, S.R. 222, AND S.I.A. ROAD

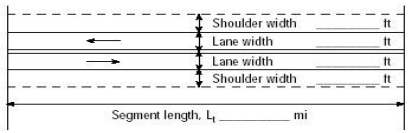
PROPOSED SYSTEM
TRIP DISTRIBUTION
FAST FOOD/CONVENIENCE MARKETS

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Interstate 40 / Thorpe Dr.*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*80* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*93*
v_p * highest directional split proportion[2] (pc/h)	*56*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*91*
v_p * highest directional split proportion[2] (pc/h)	*55*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*9.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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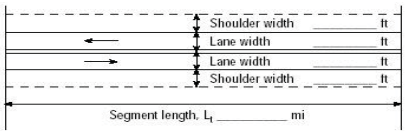
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Interstate 40 / Thorpe Dr.*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*280* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*325*
v_p * highest directional split proportion[2] (pc/h)	*195*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*319*
v_p * highest directional split proportion[2] (pc/h)	*191*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*24.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*0.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*25.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.10*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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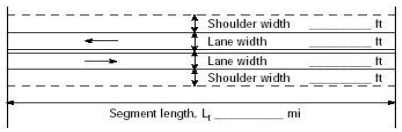
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Thorpe Dr. / Megasite Entrance*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette & Haywood Counties, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*72* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*84*
v_p * highest directional split proportion[2] (pc/h)	*50*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*82*
v_p * highest directional split proportion[2] (pc/h)	*49*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.0*
Adj. for directional distribution and no-passing zone, f_{dnp}(%)(Exh. 20-12)	*2.2*
Percent time-spent-following, PTSF(%)=BPTSF+f_{dnp}	*9.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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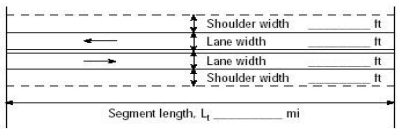
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Thorpe Dr. / Megasite Entrance*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette & Haywood Counties, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*250* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*290*
v_p * highest directional split proportion[2] (pc/h)	*174*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*285*
v_p * highest directional split proportion[2] (pc/h)	*171*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*22.2*
Adj. for directional distribution and no-passing zone, f_{dnp}(%)(Exh. 20-12)	*1.1*
Percent time-spent-following, PTSF(%)=BPTSF+f_{dnp}	*23.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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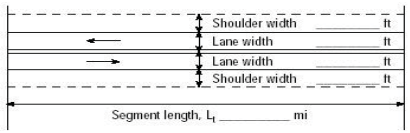
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Megasite Entrance / SIA Road*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*72* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*84*
v_p * highest directional split proportion[2] (pc/h)	*50*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.3*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*82*
v_p * highest directional split proportion[2] (pc/h)	*49*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*9.2*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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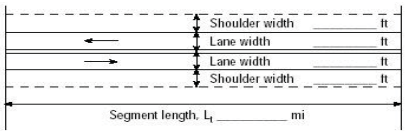
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Megasite Entrance / SIA Road*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*250* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*290*
v_p * highest directional split proportion[2] (pc/h)	*174*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.7*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*285*
v_p * highest directional split proportion[2] (pc/h)	*171*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*22.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*1.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*23.3*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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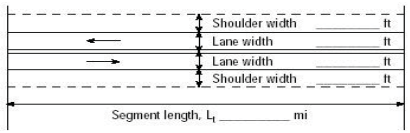
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*SIA Road / Keeling Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*80* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*93*
v_p * highest directional split proportion[2] (pc/h)	*56*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*91*
v_p * highest directional split proportion[2] (pc/h)	*55*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*9.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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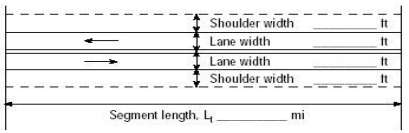
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*SIA Road / Keeling Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*280* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*325*
v_p * highest directional split proportion[2] (pc/h)	*195*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*319*
v_p * highest directional split proportion[2] (pc/h)	*191*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*24.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*0.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*25.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.10*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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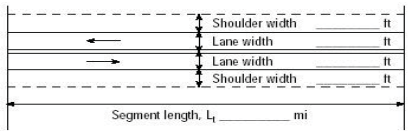
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Keeling Rd. / Camp Ground Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*69* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*80*
v_p * highest directional split proportion[2] (pc/h)	*48*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.4*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*79*
v_p * highest directional split proportion[2] (pc/h)	*47*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*6.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.3*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*9.0*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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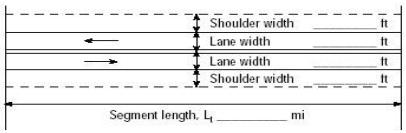
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Keeling Rd. / Camp Ground Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*247* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*287*
v_p * highest directional split proportion[2] (pc/h)	*172*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.8*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*282*
v_p * highest directional split proportion[2] (pc/h)	*169*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*22.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*1.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*23.1*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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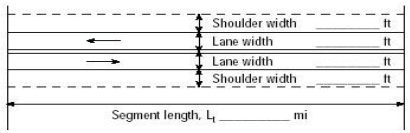
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Camp Ground Rd. / Cherry St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*60* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*70*
v_p * highest directional split proportion[2] (pc/h)	*42*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.5*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*68*
v_p * highest directional split proportion[2] (pc/h)	*41*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*5.8*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.3*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*8.1*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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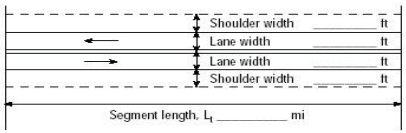
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Camp Ground Rd. / Cherry St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*212* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*246*
v_p * highest directional split proportion[2] (pc/h)	*148*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.1*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*242*
v_p * highest directional split proportion[2] (pc/h)	*145*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*19.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*1.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*20.5*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.08*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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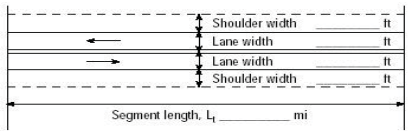
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Cherry St. / S. Main St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*69* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*80*
v_p * highest directional split proportion[2] (pc/h)	*48*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*79*
v_p * highest directional split proportion[2] (pc/h)	*47*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*6.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.3*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*9.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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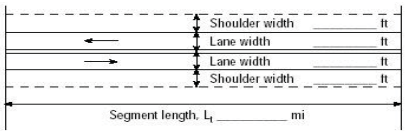
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Cherry St. / S. Main St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*247* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*287*
v_p * highest directional split proportion[2] (pc/h)	*172*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.8*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*282*
v_p * highest directional split proportion[2] (pc/h)	*169*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*22.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*1.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*23.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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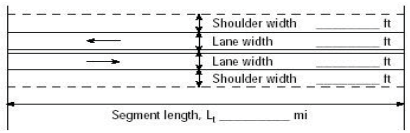
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*S. Main St. / US 70*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*88* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*102*
v_p * highest directional split proportion[2] (pc/h)	*61*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*100*
v_p * highest directional split proportion[2] (pc/h)	*60*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*8.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*2.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*10.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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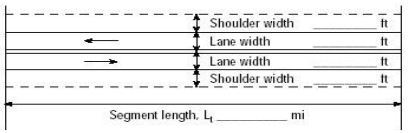
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*S. Main St. / US 70*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*312* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*0*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*362*
v_p * highest directional split proportion[2] (pc/h)	*217*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*356*
v_p * highest directional split proportion[2] (pc/h)	*214*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*26.9*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*0.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.11*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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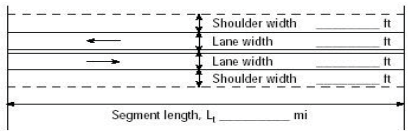
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Russel Hawkins Ln.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*3* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*3*
v_p * highest directional split proportion[2] (pc/h)	*2*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*3*
v_p * highest directional split proportion[2] (pc/h)	*2*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*0.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*25.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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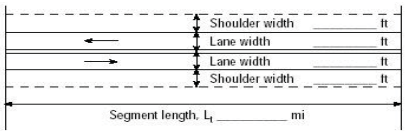
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Russel Hawkins Ln.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*11* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*13*
v_p * highest directional split proportion[2] (pc/h)	*8*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*13*
v_p * highest directional split proportion[2] (pc/h)	*8*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.1*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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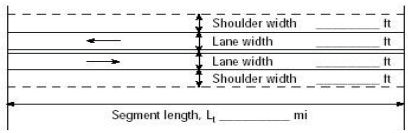
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Thorpe Dr.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*67* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*78*
v_p * highest directional split proportion[2] (pc/h)	*47*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*34.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*76*
v_p * highest directional split proportion[2] (pc/h)	*46*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*6.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.6*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*31.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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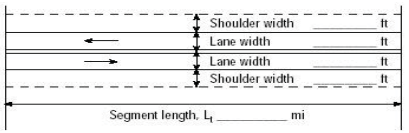
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Thorpe Dr.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*235* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*273*
v_p * highest directional split proportion[2] (pc/h)	*164*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*30.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*268*
v_p * highest directional split proportion[2] (pc/h)	*161*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*21.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*23.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*44.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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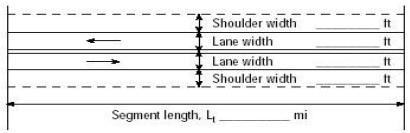
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*14* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*14* %
% Recreational vehicles, P_R	*4%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.911*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*17*
v_p * highest directional split proportion[2] (pc/h)	*10*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*16*
v_p * highest directional split proportion[2] (pc/h)	*10*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*21.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*22.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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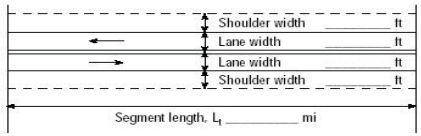
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*72* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*14* %
% Recreational vehicles, P_R	*4%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.911*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*90*
v_p * highest directional split proportion[2] (pc/h)	*54*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*83*
v_p * highest directional split proportion[2] (pc/h)	*50*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*20.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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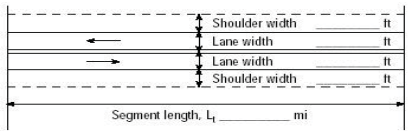
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Keeling Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*13* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*15*
v_p * highest directional split proportion[2] (pc/h)	*9*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*15*
v_p * highest directional split proportion[2] (pc/h)	*9*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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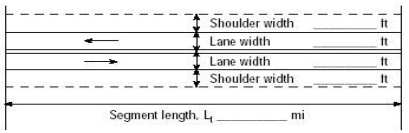
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Keeling Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*43* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*50*
v_p * highest directional split proportion[2] (pc/h)	*30*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*49*
v_p * highest directional split proportion[2] (pc/h)	*29*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*4.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*29.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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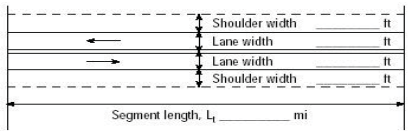
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Muex Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*4* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*5*
v_p * highest directional split proportion[2] (pc/h)	*3*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*5*
v_p * highest directional split proportion[2] (pc/h)	*3*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*0.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*25.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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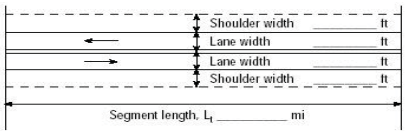
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Muex Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*12* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*14*
v_p * highest directional split proportion[2] (pc/h)	*8*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*14*
v_p * highest directional split proportion[2] (pc/h)	*8*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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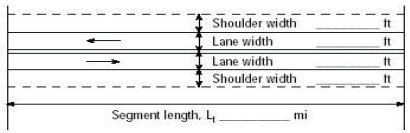
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Camp Ground Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*11* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*13*
v_p * highest directional split proportion[2] (pc/h)	*8*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*13*
v_p * highest directional split proportion[2] (pc/h)	*8*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.1*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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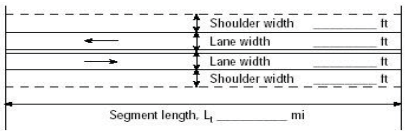
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Camp Ground Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*37* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*43*
v_p * highest directional split proportion[2] (pc/h)	*26*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*42*
v_p * highest directional split proportion[2] (pc/h)	*25*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*3.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*28.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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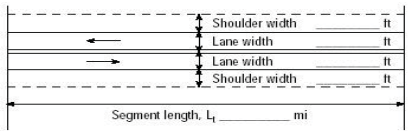
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Cherry St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*15* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*17*
v_p * highest directional split proportion[2] (pc/h)	*10*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*17*
v_p * highest directional split proportion[2] (pc/h)	*10*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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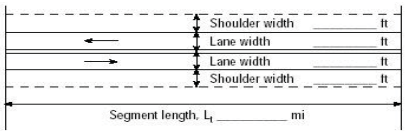
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Cherry St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*51* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*59*
v_p * highest directional split proportion[2] (pc/h)	*35*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*58*
v_p * highest directional split proportion[2] (pc/h)	*35*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*5.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*29.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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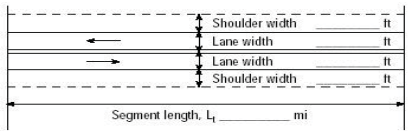
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*S. Main St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*23* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*27*
v_p * highest directional split proportion[2] (pc/h)	*16*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.9*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*26*
v_p * highest directional split proportion[2] (pc/h)	*16*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*2.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.3*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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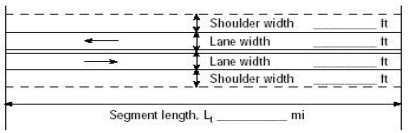
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*S. Main St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*83* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed	
Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*96*
v_p * highest directional split proportion[2] (pc/h)	*58*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.7*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*34.2*

Percent Time-Spent-Following	
Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*95*
v_p * highest directional split proportion[2] (pc/h)	*57*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*8.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.5*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*32.5*

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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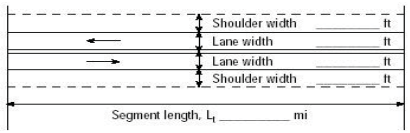
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*205* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.966*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*241*
v_p * highest directional split proportion[2] (pc/h)	*145*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*49.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*234*
v_p * highest directional split proportion[2] (pc/h)	*140*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*18.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.6*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*38.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.08*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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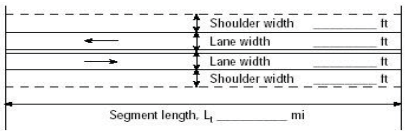
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*727* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*834*
v_p * highest directional split proportion[2] (pc/h)	*500*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*830*
v_p * highest directional split proportion[2] (pc/h)	*498*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*51.8*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*11.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*63.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.26*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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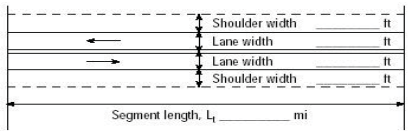
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*195* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.966*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*229*
v_p * highest directional split proportion[2] (pc/h)	*137*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*49.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*223*
v_p * highest directional split proportion[2] (pc/h)	*134*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*17.8*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*37.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.07*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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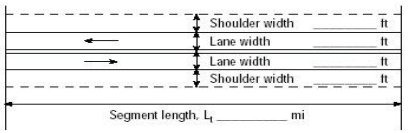
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option Without Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*687* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*788*
v_p * highest directional split proportion[2] (pc/h)	*473*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*785*
v_p * highest directional split proportion[2] (pc/h)	*471*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*49.8*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*12.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*61.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.25*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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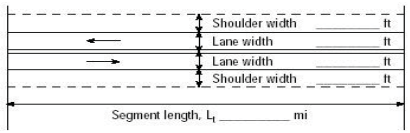
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Interstate 40 / Thorpe Dr.*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*458* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*557*
v_p * highest directional split proportion[2] (pc/h)	*334*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*40.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*526*
v_p * highest directional split proportion[2] (pc/h)	*316*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*17.6*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*54.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.17*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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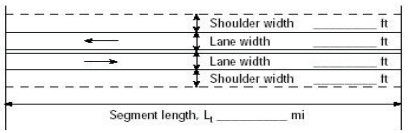
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Interstate 40 / Thorpe Dr.*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*658* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.980*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*763*
v_p * highest directional split proportion[2] (pc/h)	*458*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*39.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*755*
v_p * highest directional split proportion[2] (pc/h)	*453*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*48.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*12.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*61.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.24*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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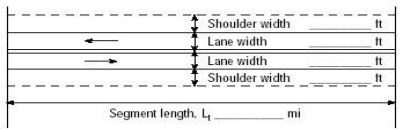
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Thorpe Dr. / Megasite Entrance*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette & Haywood Counties, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	*464* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*564*
v_p * highest directional split proportion[2] (pc/h)	*338*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed		
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0*	*mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3*	*mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0*	*mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7*	*mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*40.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*533*
v_p * highest directional split proportion[2] (pc/h)	*320*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*17.5*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*54.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.18*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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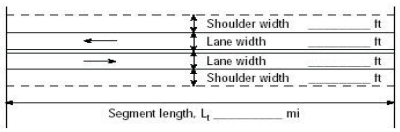
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Thorpe Dr. / Megasite Entrance*
Date Performed	*06/05/2009*	Jurisdiction	*Fayette & Haywood Counties, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	*642* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.980*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*744*
v_p * highest directional split proportion[2] (pc/h)	*446*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed		
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0*	*mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3*	*mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0*	*mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7*	*mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*39.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*737*
v_p * highest directional split proportion[2] (pc/h)	*442*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*47.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*13.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*61.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.23*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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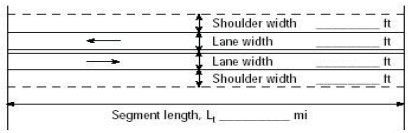
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Megasite Entrance / SIA Road*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*184* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*224*
v_p * highest directional split proportion[2] (pc/h)	*134*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*43.9*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*211*
v_p * highest directional split proportion[2] (pc/h)	*127*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*16.9*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*36.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.07*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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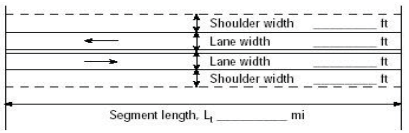
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Megasite Entrance / SIA Road*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*362* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*440*
v_p * highest directional split proportion[2] (pc/h)	*264*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*41.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*415*
v_p * highest directional split proportion[2] (pc/h)	*249*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*30.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.3*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*48.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.14*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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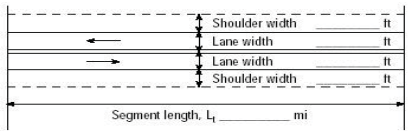
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*SIA Road / Keeling Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*178* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*208*
v_p * highest directional split proportion[2] (pc/h)	*125*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*203*
v_p * highest directional split proportion[2] (pc/h)	*122*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*16.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*36.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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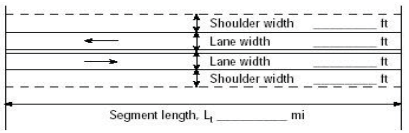
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*SIA Road / Keeling Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*378* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*442*
v_p * highest directional split proportion[2] (pc/h)	*265*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*41.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*431*
v_p * highest directional split proportion[2] (pc/h)	*259*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*31.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*49.8*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.14*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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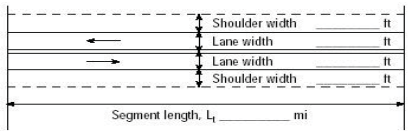
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Keeling Rd. / Camp Ground Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*166* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*194*
v_p * highest directional split proportion[2] (pc/h)	*116*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*189*
v_p * highest directional split proportion[2] (pc/h)	*113*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*15.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*35.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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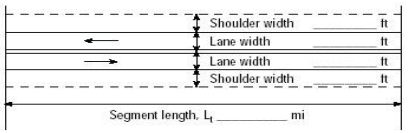
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Keeling Rd. / Camp Ground Rd.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*344* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*402*
v_p * highest directional split proportion[2] (pc/h)	*241*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*41.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*392*
v_p * highest directional split proportion[2] (pc/h)	*235*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*29.1*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.5*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*47.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.13*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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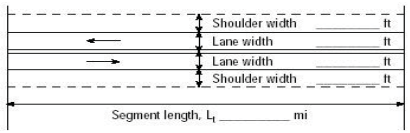
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Camp Ground Rd. / Cherry St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*150* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*175*
v_p * highest directional split proportion[2] (pc/h)	*105*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.7*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*171*
v_p * highest directional split proportion[2] (pc/h)	*103*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*14.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*20.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*34.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.05*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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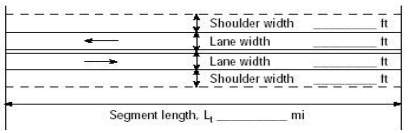
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Camp Ground Rd. / Cherry St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*302* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*353*
v_p * highest directional split proportion[2] (pc/h)	*212*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*47.7 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*42.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*345*
v_p * highest directional split proportion[2] (pc/h)	*207*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*26.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*45.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.11*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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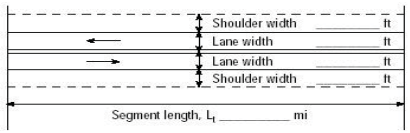
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Cherry St. / S. Main St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*152* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*25*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*178*
v_p * highest directional split proportion[2] (pc/h)	*107*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*6.3 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*33.5 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*29.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*173*
v_p * highest directional split proportion[2] (pc/h)	*104*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*14.1*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*23.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*38.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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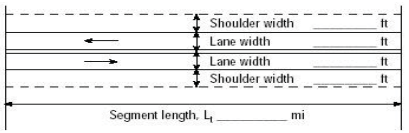
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*Cherry St. / S. Main St.*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*330* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*25*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*386*
v_p * highest directional split proportion[2] (pc/h)	*232*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*6.3 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*33.5 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*26.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*377*
v_p * highest directional split proportion[2] (pc/h)	*226*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*28.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*22.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*50.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.12*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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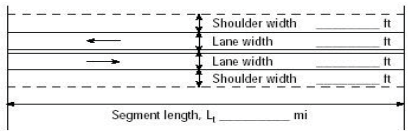
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*S. Main St. / US 70*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*164* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*25*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*192*
v_p * highest directional split proportion[2] (pc/h)	*115*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*6.3 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*33.5 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*28.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*187*
v_p * highest directional split proportion[2] (pc/h)	*112*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*15.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*23.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*39.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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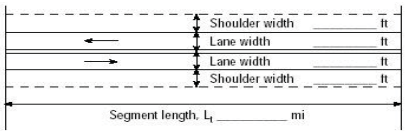
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*State Route 222*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*S. Main St. / US 70*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, TN*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*388* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*4 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*25*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.973*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*453*
v_p * highest directional split proportion[2] (pc/h)	*272*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*5.3 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*6.3 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*33.5 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*25.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.996*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*443*
v_p * highest directional split proportion[2] (pc/h)	*266*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*32.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*21.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*54.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.14*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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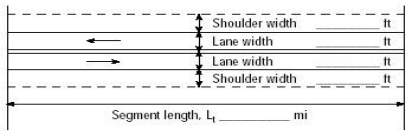
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Thorpe Dr.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*74* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*86*
v_p * highest directional split proportion[2] (pc/h)	*52*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*34.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*84*
v_p * highest directional split proportion[2] (pc/h)	*50*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*7.1*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.6*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*31.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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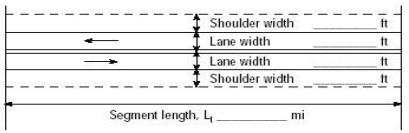
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Thorpe Dr.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*242* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*281*
v_p * highest directional split proportion[2] (pc/h)	*169*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*30.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*276*
v_p * highest directional split proportion[2] (pc/h)	*166*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*21.5*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*23.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*44.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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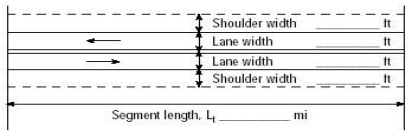
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Russel Hawkins Ln.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*10* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*12*
v_p * highest directional split proportion[2] (pc/h)	*7*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*11*
v_p * highest directional split proportion[2] (pc/h)	*7*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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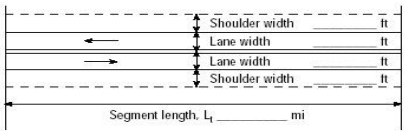
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Russel Hawkins Ln.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*18* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*21*
v_p * highest directional split proportion[2] (pc/h)	*13*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*20*
v_p * highest directional split proportion[2] (pc/h)	*12*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.8*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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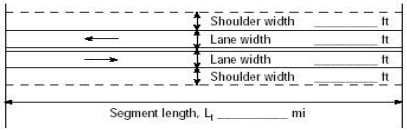
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Megasite Entrance*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*280* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*340*
v_p * highest directional split proportion[2] (pc/h)	*204*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*43.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*321*
v_p * highest directional split proportion[2] (pc/h)	*193*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*24.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*22.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*47.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.11*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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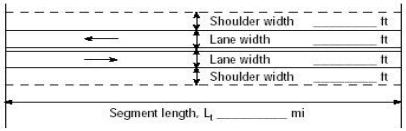
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Megasite Entrance*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*280* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*340*
v_p * highest directional split proportion[2] (pc/h)	*204*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*43.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*321*
v_p * highest directional split proportion[2] (pc/h)	*193*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*24.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*22.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*47.4*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.11*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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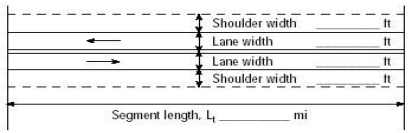
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*316* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*384*
v_p * highest directional split proportion[2] (pc/h)	*230*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*47.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*363*
v_p * highest directional split proportion[2] (pc/h)	*218*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*27.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*46.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.12*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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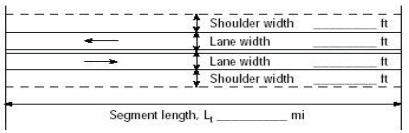
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*374* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*455*
v_p * highest directional split proportion[2] (pc/h)	*273*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*3.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*46.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*429*
v_p * highest directional split proportion[2] (pc/h)	*257*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*31.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*18.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*49.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.14*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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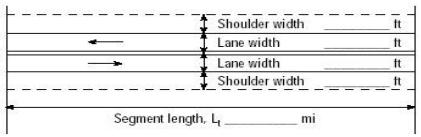
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*464* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*564*
v_p * highest directional split proportion[2] (pc/h)	*338*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*533*
v_p * highest directional split proportion[2] (pc/h)	*320*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*21.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*58.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.18*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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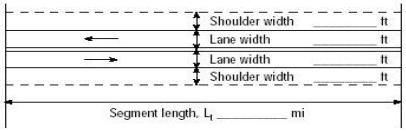
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*SIA Road*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*464* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*10* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.935*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*564*
v_p * highest directional split proportion[2] (pc/h)	*338*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*4.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*533*
v_p * highest directional split proportion[2] (pc/h)	*320*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*37.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*21.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*58.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.18*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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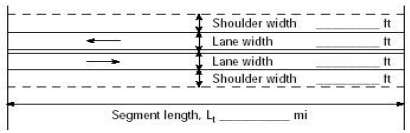
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Keeling Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*20* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*23*
v_p * highest directional split proportion[2] (pc/h)	*14*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*23*
v_p * highest directional split proportion[2] (pc/h)	*14*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*2.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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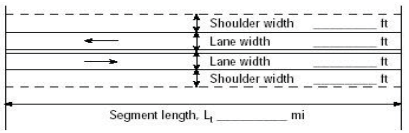
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Keeling Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*50* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*58*
v_p * highest directional split proportion[2] (pc/h)	*35*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*57*
v_p * highest directional split proportion[2] (pc/h)	*34*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*4.9*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*29.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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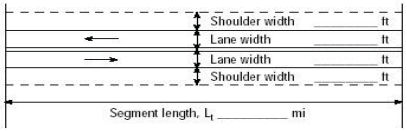
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Muex Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*12* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*14*
v_p * highest directional split proportion[2] (pc/h)	*8*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*14*
v_p * highest directional split proportion[2] (pc/h)	*8*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.00*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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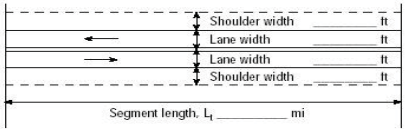
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Muex Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*20* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*23*
v_p * highest directional split proportion[2] (pc/h)	*14*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*23*
v_p * highest directional split proportion[2] (pc/h)	*14*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*2.0*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.0*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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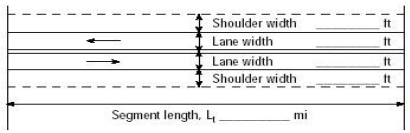
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Camp Ground Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*18* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*21*
v_p * highest directional split proportion[2] (pc/h)	*13*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*20*
v_p * highest directional split proportion[2] (pc/h)	*12*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*1.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*26.8*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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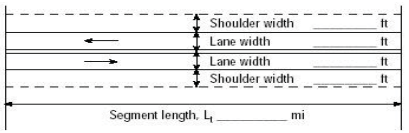
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Camp Ground Rd.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*44* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*51*
v_p * highest directional split proportion[2] (pc/h)	*31*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.9*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*50*
v_p * highest directional split proportion[2] (pc/h)	*30*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*4.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*29.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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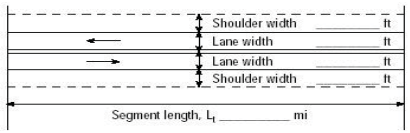
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Cherry St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*22* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*25*
v_p * highest directional split proportion[2] (pc/h)	*15*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*36.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*25*
v_p * highest directional split proportion[2] (pc/h)	*15*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*2.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*25.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.2*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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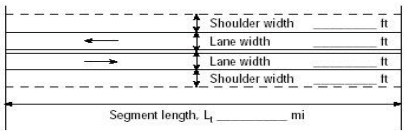
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*Cherry St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*58* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.986*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*67*
v_p * highest directional split proportion[2] (pc/h)	*40*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*34.9*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.998*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*66*
v_p * highest directional split proportion[2] (pc/h)	*40*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*5.6*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*30.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.02*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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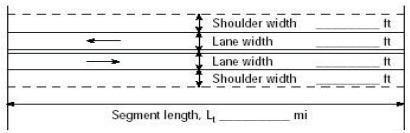
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*S. Main St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*30* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*35*
v_p * highest directional split proportion[2] (pc/h)	*21*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.6*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*35.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*34*
v_p * highest directional split proportion[2] (pc/h)	*20*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*2.9*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.01*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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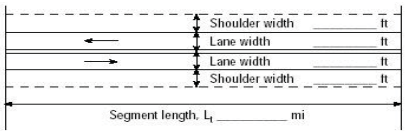
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*S. Main St.*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*90* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*100*
% Trucks and Buses , P_T	*3 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.979*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*104*
v_p * highest directional split proportion[2] (pc/h)	*62*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*45.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*6.4 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*36.6 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*1.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*34.0*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.997*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*103*
v_p * highest directional split proportion[2] (pc/h)	*62*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*8.7*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*24.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*33.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.03*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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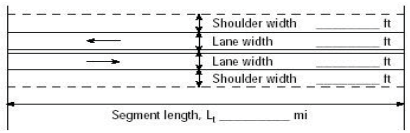
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*250* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.966*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*294*
v_p * highest directional split proportion[2] (pc/h)	*176*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*48.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*286*
v_p * highest directional split proportion[2] (pc/h)	*172*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*22.2*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*41.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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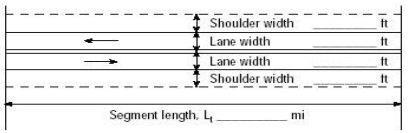
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*East of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*772* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*886*
v_p * highest directional split proportion[2] (pc/h)	*532*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.0*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.1*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*882*
v_p * highest directional split proportion[2] (pc/h)	*529*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*53.9*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*10.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*64.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.28*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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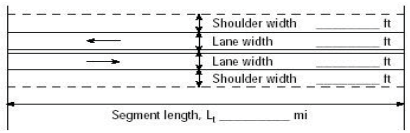
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2014*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*226* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.966*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*266*
v_p * highest directional split proportion[2] (pc/h)	*160*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*48.6*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*258*
v_p * highest directional split proportion[2] (pc/h)	*155*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*20.3*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*19.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*39.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*A*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.08*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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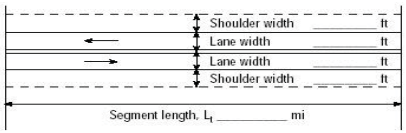
TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Luke Sullivan*	Highway	*U.S. Route 70*
Agency or Company	*TDOT / Long Engineering, Inc.*	From/To	*West of State Route 222*
Date Performed	*06/05/2009*	Jurisdiction	*Haywood County, Tennessee*
Analysis Time Period	*Daily*	Analysis Year	*2034*

Project Description: *No-Build Option With Development*

Input Data



☐ Class I highway ☑ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*718* veh/h
Directional split	*60 / 40*
Peak-hour factor, PHF	*0.88*
No-passing zone	*50*
% Trucks and Buses , P_T	*5 %*
% Recreational vehicles, P_R	*0%*
Access points/ *mi*	*8*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.2*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.990*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*824*
v_p * highest directional split proportion[2] (pc/h)	*494*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*2.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*53.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*2.1*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*44.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*0.995*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*820*
v_p * highest directional split proportion[2] (pc/h)	*492*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*51.4*
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	*11.5*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*62.8*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*C*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.26*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*0*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*0*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.0*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

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HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Luke Sullivan
Agency/Co: TDOT / Long Engineering, Inc.
Date: 06/05/2009
Analysis Period: Daily
Highway: State Route 222
From/To: Interstate 40 / Thorpe Dr.
Jurisdiction: Fayette County, Tennessee
Analysis Year: 2014
Project ID: New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	800	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 800 x 0.60 x 0.10 = 48

Volume for :			LOS
4-lane highway = 48	vph/2 lanes = 24	vphpl	A
6-lane highway = 48	vph/3 lanes = 16	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Luke Sullivan
Agency/Co: TDOT / Long Engineering, Inc.
Date: 06/05/2009
Analysis Period: Daily
Highway: State Route 222
From/To: Interstate 40 / Thorpe Dr.
Jurisdiction: Fayette County, Tennessee
Analysis Year: 2034
Project ID: New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2800	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2800 x 0.60 x 0.10 = 168

Volume for :			LOS
4-lane highway = 168	vph/2 lanes = 84	vphpl	A
6-lane highway = 168	vph/3 lanes = 56	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Thorpe Dr. / Megasite Entrance
Jurisdiction:	Fayette & Haywood Counties, TN
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	720	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 720 x 0.60 x 0.10 = 43

Volume for :			LOS
4-lane highway = 43	vph/2 lanes = 21	vphpl	A
6-lane highway = 43	vph/3 lanes = 14	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Thorpe Dr. / Megasite Entrance
Jurisdiction:	Fayette & Haywood Counties, TN
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2500	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2500 x 0.60 x 0.10 = 150

Volume for :			LOS
4-lane highway = 150	vph/2 lanes = 75	vphpl	A
6-lane highway = 150	vph/3 lanes = 50	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Megasite Entrance / SIA Road
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	720	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 720 x 0.60 x 0.10 = 43

Volume for :			LOS
4-lane highway = 43	vph/2 lanes = 21	vphpl	A
6-lane highway = 43	vph/3 lanes = 14	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Megasite Entrance / SIA Road
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2500	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2500 x 0.60 x 0.10 = 150

Volume for :			LOS
4-lane highway = 150	vph/2 lanes = 75	vphpl	A
6-lane highway = 150	vph/3 lanes = 50	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	SIA Road / Keeling Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	800	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 800 x 0.60 x 0.10 = 48

Volume for :			LOS
4-lane highway = 48	vph/2 lanes = 24	vphpl	A
6-lane highway = 48	vph/3 lanes = 16	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	SIA Road / Keeling Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2800	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2800 x 0.60 x 0.10 = 168

Volume for :			LOS
4-lane highway = 168	vph/2 lanes = 84	vphpl	A
6-lane highway = 168	vph/3 lanes = 56	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Keeling Rd. / Camp Ground Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	690	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 690 x 0.60 x 0.10 = 41

Volume for :			LOS
4-lane highway = 41	vph/2 lanes = 20	vphpl	A
6-lane highway = 41	vph/3 lanes = 13	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Keeling Rd. / Camp Ground Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2470	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2470 x 0.60 x 0.10 = 148

Volume for :			LOS
4-lane highway = 148	vph/2 lanes = 74	vphpl	A
6-lane highway = 148	vph/3 lanes = 49	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Camp Ground Rd. / Cherry St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	600	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 600 x 0.60 x 0.10 = 36

Volume for :			LOS
4-lane highway = 36	vph/2 lanes = 18	vphpl	A
6-lane highway = 36	vph/3 lanes = 12	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Camp Ground Rd. / Cherry St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2120	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2120 x 0.60 x 0.10 = 127

Volume for :			LOS
4-lane highway = 127	vph/2 lanes = 63	vphpl	A
6-lane highway = 127	vph/3 lanes = 42	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Cherry St. / S. Main St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	690	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 690 x 0.60 x 0.10 = 41

Volume for :			LOS
4-lane highway = 41	vph/2 lanes = 20	vphpl	A
6-lane highway = 41	vph/3 lanes = 13	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Cherry St. / S. Main St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	2470	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 2470 x 0.60 x 0.10 = 148

Volume for :			LOS
4-lane highway = 148	vph/2 lanes = 74	vphpl	A
6-lane highway = 148	vph/3 lanes = 49	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	S. Main St. / U.S. 70
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	880	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 880 x 0.60 x 0.10 = 53

Volume for :			LOS
4-lane highway = 53	vph/2 lanes = 26	vphpl	A
6-lane highway = 53	vph/3 lanes = 17	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	S. Main St. / U.S. 70
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option Without Development

INPUT DATA

Total AADT volume, AADT	3120	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	3	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3120 x 0.60 x 0.10 = 187

Volume for :			LOS
4-lane highway = 187	vph/2 lanes = 93	vphpl	A
6-lane highway = 187	vph/3 lanes = 62	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Interstate 40 / Thorpe Dr.
Jurisdiction:	Fayette County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	4580	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 4580 x 0.60 x 0.10 = 275

Volume for :			LOS
4-lane highway = 275	vph/2 lanes = 137	vphpl	A
6-lane highway = 275	vph/3 lanes = 91	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Interstate 40 / Thorpe Dr.
Jurisdiction:	Fayette County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	6580	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6580 x 0.60 x 0.10 = 395

Volume for :			LOS
4-lane highway = 395	vph/2 lanes = 197	vphpl	A
6-lane highway = 395	vph/3 lanes = 131	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Thorpe Dr. / Megasite Entrance
Jurisdiction:	Fayette & Haywood Counties, TN
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	4640	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 4640 x 0.60 x 0.10 = 278

Volume for :			LOS
4-lane highway = 278	vph/2 lanes = 139	vphpl	A
6-lane highway = 278	vph/3 lanes = 92	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Thorpe Dr. / Megasite Entrance
Jurisdiction:	Fayette & Haywood Counties, TN
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	6420	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6420 x 0.60 x 0.10 = 385

Volume for :			LOS
4-lane highway = 385	vph/2 lanes = 192	vphpl	A
6-lane highway = 385	vph/3 lanes = 128	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Megasite Entrance / SIA Road
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1840	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1840 x 0.60 x 0.10 = 110

Volume for :			LOS
4-lane highway = 110	vph/2 lanes = 55	vphpl	A
6-lane highway = 110	vph/3 lanes = 36	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Megasite Entrance / SIA Road
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3620	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	10	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3620 x 0.60 x 0.10 = 217

Volume for :			LOS
4-lane highway = 217	vph/2 lanes = 108	vphpl	A
6-lane highway = 217	vph/3 lanes = 72	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	SIA Road / Keeling Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1700	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1700 x 0.60 x 0.10 = 102

Volume for :			LOS
4-lane highway = 102	vph/2 lanes = 51	vphpl	A
6-lane highway = 102	vph/3 lanes = 34	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	SIA Road / Keeling Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3700	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3700 x 0.60 x 0.10 = 222

Volume for :			LOS
4-lane highway = 222	vph/2 lanes = 111	vphpl	A
6-lane highway = 222	vph/3 lanes = 74	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Keeling Rd. / Camp Ground Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1660	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1660 x 0.60 x 0.10 = 100

Volume for :			LOS
4-lane highway = 100	vph/2 lanes = 50	vphpl	A
6-lane highway = 100	vph/3 lanes = 33	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Keeling Rd. / Camp Ground Rd.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3440	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3440 x 0.60 x 0.10 = 206

Volume for :			LOS
4-lane highway = 206	vph/2 lanes = 103	vphpl	A
6-lane highway = 206	vph/3 lanes = 68	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Camp Ground Rd. / Cherry St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1500	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1500 x 0.60 x 0.10 = 90

Volume for :			LOS
4-lane highway = 90	vph/2 lanes = 45	vphpl	A
6-lane highway = 90	vph/3 lanes = 30	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	Camp Ground Rd. / Cherry St.
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3020	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3020 x 0.60 x 0.10 = 181

Volume for :			LOS
4-lane highway = 181	vph/2 lanes = 90	vphpl	A
6-lane highway = 181	vph/3 lanes = 60	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Luke Sullivan
Agency/Co: TDOT / Long Engineering, Inc.
Date: 06/05/2009
Analysis Period: Daily
Highway: State Route 222
From/To: Cherry St. / S. Main St.
Jurisdiction: Haywood County, Tennessee
Analysis Year: 2014
Project ID: New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1520	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1520 x 0.60 x 0.10 = 91

Volume for :			LOS
4-lane highway = 91	vph/2 lanes = 45	vphpl	A
6-lane highway = 91	vph/3 lanes = 30	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Luke Sullivan
Agency/Co: TDOT / Long Engineering, Inc.
Date: 06/05/2009
Analysis Period: Daily
Highway: State Route 222
From/To: Cherry St. / S. Main St.
Jurisdiction: Haywood County, Tennessee
Analysis Year: 2034
Project ID: New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3300	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3300 x 0.60 x 0.10 = 198

Volume for :			LOS
4-lane highway = 198	vph/2 lanes = 99	vphpl	A
6-lane highway = 198	vph/3 lanes = 66	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	S. Main St. / U.S. 70
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2014
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	1640	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 1640 x 0.60 x 0.10 = 98

Volume for :			LOS
4-lane highway = 98	vph/2 lanes = 49	vphpl	A
6-lane highway = 98	vph/3 lanes = 32	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Luke Sullivan
Agency/Co:	TDOT / Long Engineering, Inc.
Date:	06/05/2009
Analysis Period:	Daily
Highway:	State Route 222
From/To:	S. Main St. / U.S. 70
Jurisdiction:	Haywood County, Tennessee
Analysis Year:	2034
Project ID:	New Location Option with Development

INPUT DATA

Total AADT volume, AADT	3880	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	55.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3880 x 0.60 x 0.10 = 233

Volume for :			LOS
4-lane highway = 233	vph/2 lanes = 116	vphpl	A
6-lane highway = 233	vph/3 lanes = 77	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

APPENDIX C

Cost Estimate Calculations and Data

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Right of Way Cost

Length	Width	Acres	Cost ($/Acre)	Improvements (1.2 factor)	Land Cost	Total	
4215	140	13.547	$ 7,000.00	$ 8,400.00	$113,793		100' o/s existing
3700	200	16.988	$ 7,000.00	$ 8,400.00	$142,700		
450	80	0.826	$ 7,000.00	$ 8,400.00	$6,942		Side road to Megasite
Sub-Total		31.361			$ 263,435.26	$ 264,000	(Rounded)
Cost of Bldgs.						$ -	
Contengenices					=		
Total Land & Improvement Costs					=	$ 264,000	(Rounded)
Incidentals		14	$ 3,000	Per Tract for Incid	=	$ 42,000	
Replacement Housing		2	$ 12,000	Per Unit	=	$ 24,000	
Moving Expenses		2	$ 25,000	Per Unit	=	$ 50,000	
TOTAL ROW COSTS					=	$ 380,000	

201-07.05 Removal and Disposal of Brush and Trees (Clear. and Grub.)

Length (ft.)	Width (ft.)	Area (sq.ft.)	Acres	Cost ($/ac.)		Total	
4215	100	421,500	9.676	$4,000		$ 38,705	100' o/s existing
3700	200	740,000	16.988	$4,000		$ 67,952	
450	80	36,000	0.826	$4,000		$ 3,306	Side road to Megasite
8,365					**Total**	$ 109,963	

Maintenance of Traffic

Drums (Ea.)	Cost ($/drum)	Total

Signs (s.f.)	Cost ($/s.f.)

712-02.02 Interconnected Portable Barrier Rail

Lgth.(ft.)	Cost ($/ft.)

712-07.03 Temporary Barricades

Lgth.(ft.)	No.	Total Lgth.	Cost ($/ft)	Total Barricades

Total Maintenance of Traffic $ 50,000

Signing

Signs (s.f.)	Cost ($/s.f.)	Total
		$ 20,000

Utility Relocation Cost

	Lgth (mi.)	No. of Poles	Cost/Mi.	Lgth (ft.)	Cost ($/pole)	Cost ($/ft)	
Gas (2.5")				0		$20.00	$0
Water (4")				0		$25.00	$0
Poles		21			$1,500.00		$31,500
Water (6")				0		$45.00	$0
Water (8")				0		$60.00	$0
Water (6")				0		$45.00	$0

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Total	**$31,500**

203-01 Road and Drain. Exc. (Uncl.)

Length (ft.)	Width (ft.)	Avg. Exc. Depth	Factor	C.Y.	Cost/cy	Total
450	60	4	27	4000	$5.00	**$20,000**
7915	100	4	27	117259	$5.00	**$586,296**
					Total	**$606,296**

202-03.01 Pavement Removal

Area (sf)	/	sf/sy	*	Cost ($/sy)	Total
0	/	9	*	$3.75	**$0.00**

Drainage

	No. of basins		Cost ($/basin)				
Bedding Mat'l.		Length (ft)		cy/ft	Cost ($/cy)		
204-07		360		0.266	$30.00	**96**	3 pipes @ 120'
Pipe		Length (ft)		Cost ($/ft)			
607-05.02		360		$40.00		**14,400**	
Endwall Steel		lbs/wall		No. Endwalls	Cost ($/lb)		
611-07.02		172		6	$1.30	**1,342**	
Endwall Conc.		cy/wall		No. Endwalls	Cost ($/cy)		
611-07.01		1.52		6	$480.00	**4,378**	
Box Bridges/Culv.		0		$50,000		**0**	
Catchbasins	0		$2,500.00			**0**	
					Total	**20,215**	

Structure

Length (ft.)	Width (ft.)	s.f.	Cost/s.f.	Total
0	0	0	$150.00	**$0**

Paving

	Lgth (ft.)	Width (ft.)	Depth (ft.)	/	factor	Lb./Ton	Multiplier (NB, SB)	Cost ($/ft)	Total Tons	*	Cost ($/ton or cy)		Total
411-02.10 (Surf.)	4215	60	0.104	27	3816	2000	1		1859	*	$65.00	$	**120,812**
307-02.08 (B-M2)	4215	60	0.167	27	4068	2000	1		3182	*	$65.00	$	**206,807**
307-02.01 (Gr. 'A')	4215	60	0.292	27	4140	2000	1		5662	*	$65.00	$	**368,003**
303-01	4215	60	0.833	27	2.03		1		15839	*	$18.00	$	**285,101**
Outside Shld'r	8430	12	1.255	27	2.03		1		9545	*	$18.00	$	**171,814**
	8430	4.85	1.115	27	2.03		0		3427	*	$18.00	$	**61,695**
411-02.10 (Surf.)	3700	60	0.104	27	3816	2000	1		1632	*	$65.00	$	**106,051**
307-02.08 (B-M2)	3700	60	0.167	27	4068	2000	1		2793	*	$65.00	$	**181,539**
307-02.01 (Gr. 'A')	3700	60	0.292	27	4140	2000	1		4970	*	$65.00	$	**323,040**
303-01	3700	60	0.833	27	2.03		1		13904	*	$18.00	$	**250,267**
Outside Shld'r	7400	12	1.255	27	2.03		1		8379	*	$18.00	$	**150,821**
	7400	4.85	1.115	27	2.03		0		3009	*	$18.00	$	**54,157**

411-02.10 (Surf.)	450	24	0.104	27	3816	2000	1		79	*	$65.00	$	5,159
307-02.08 (B-M2)	450	24	0.167	27	4068	2000	1		136	*	$65.00	$	8,832
307-02.01 (Gr. 'A')	450	24	0.292	27	4140	2000	1		242	*	$65.00	$	15,715
303-01	450	24	0.833	27	2.03		1		676	*	$18.00	$	12,175
Outside Shld'r	900	8	1.255	27	2.03		1		679	*	$18.00	$	12,229
	900	6.85	1.115	27	2.03		0		517	*	$18.00	$	9,303
Milling	**Lgth. (ft.)**	**Width (ft.)**			**factor**	**Sq.Yd.**							
415-01.02	0	24		/	9	0.00			$ 3.00			$	-
411-01.07 ('E' Shldr.)	15830	10	0.125	27	3708	2000	1		1359	*	$65.00	$	88,318
411-01.07 ('E' Shldr.)	900	6	0.125	27	3708	2000	1		46	*	$65.00	$	3,013
Curb & Gutter	0							$29.00				$	-
											Total	$	2,434,849

Topsoil (203-07)

Based on 4:1 slope and 5' fill

Length (ft.)	Slope Lgth.(ft.)	Thk.(ft.)	cy factor	cy	Cost ($/cy)	No. of Sides	Median (ft.)		
16730	40	0.5	27	12392.6	$9.00	1		$	111,533
							0		
							Total	$	111,533

Seeding (801-01)

Length (ft.)	Slope Lgth.(ft.)	Sides	Median (ft.)	sf	sf/unit		factor	units	Cost ($/unit)		Total
16730	40	1		669200	1,000	*	1.25	837	$40.00	$	33,460

Signalization $ 33,460

$ -

Fencing

Length (ft.)		Cost ($/ft)		
0	(stock fence)	$5.00	$	-

Guardrail

(Length (ft)	*	Cost ($/ft)	+	(# Anch.)	*	Cost ($/Anch.)	Total
2000	*	$20.00	+	16	*	$2,500.00	
		$40,000	+			**$40,000**	$80,000

Total $ 80,000

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Right of Way Cost

Length	Width	Acres	Cost ($/Acre)	Improvements (1.2 factor)	Land Cost	Total	
350	80	0.643	$ 7,000.00	$ 8,400.00	$5,399		Prop. Access to Megasite
9065	200	41.621	$ 7,000.00	$ 8,400.00	$349,614		200' Mainline
250	80	0.459	$ 7,000.00	$ 8,400.00	$3,857		222 Connector
Sub-Total		42.723			$ 358,870.52	$ 359,000	(Rounded)
Cost of Bldgs.						$ -	
Contengenices					=		
Total Land & Improvement Costs					=	$ 359,000	(Rounded)
Incidentals		8	$ 3,000	Per Tract for Incid	=	$ 24,000	
Replacement Housing		1	$ 12,000	Per Unit	=	$ 12,000	
Moving Expenses		1	$ 25,000	Per Unit	=	$ 25,000	
TOTAL ROW COSTS					=	$ 420,000	

201-07.05 Removal and Disposal of Brush and Trees (Clear. and Grub.)

Length (ft.)	Width (ft.)	Area (sq.ft.)	Acres	Cost ($/ac.)		Total	
250	80	20,000	0.459	$4,000		$ 1,837	222 Connector
9065	200	1,813,000	41.621	$4,000		$ 166,483	Mainline
350	80	28,000	0.643	$4,000		$ 2,571	Prop. Access to Megasite
9,665					**Total**	$ 170,891	

Maintenance of Traffic

Drums (Ea.)	Cost ($/drum)	Total

Signs (s.f.)	Cost ($/s.f.)

712-02.02 Interconnected Portable Barrier Rail

Lgth.(ft.)	Cost ($/ft.)

712-07.03 Temporary Barricades

Lgth.(ft.)	No.	Total Lgth.	Cost ($/ft)	Total Barricades

Total Maintenance of Traffic $ 25,000

Signing

Signs (s.f.)	Cost ($/s.f.)	Total
		$ 20,000

Utility Relocation Cost

	Lgth (mi.)	No. of Poles	Cost/Mi.	Lgth (ft.)	Cost ($/pole)	Cost ($/ft)	
Gas (2.5")				0		$20.00	$0
Water (4")				0		$25.00	$0
Poles		21			$1,500.00		$31,500
Water (6")				0		$45.00	$0
Water (8")				0		$60.00	$0
Water (6")				0		$45.00	$0

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Total	**$31,500**

203-01 Road and Drain. Exc. (Uncl.)

Length (ft.)	Width (ft.)	Avg. Exc. Depth	Factor	C.Y.	Cost/cy	Total
600	60	4	27	5333	$5.00	**$26,667**
9065	100	4	27	134296	$5.00	**$671,481**
					Total	**$698,148**

202-03.01 Pavement Removal

Area (sf)	/	sf/sy	*	Cost ($/sy)	Total
0	/	9	*	$3.75	**$0.00**

Drainage

	No. of basins		Cost ($/basin)				
Bedding Mat'l.		Length (ft)		cy/ft		Cost ($/cy)		
204-07		300		0.266		$30.00	**80**	3 Pipes, 2 @ 120', and 1 @ 60'
Pipe		Length (ft)		Cost ($/ft)				
607-05.02		300		$40.00			**12,000**	
Endwall Steel		lbs/wall		No. Endwalls		Cost ($/lb)		
611-07.02		172		6		$1.30	**1,342**	
Endwall Conc.		cy/wall		No. Endwalls		Cost ($/cy)		
611-07.01		1.52		6		$480.00	**4,378**	
Box Bridges/Culv.		0			$50,000		**0**	
Catchbasins	0		$2,500.00				**0**	
						Total	**17,799**	

Structure

Length (ft.)	Width (ft.)	s.f.	Cost/s.f.	Total
0	0	0	$150.00	**$0**

Paving

	Lgth (ft.)	Width (ft.)	Depth (ft.)	/	factor	Lb./Ton	Multiplier (NB, SB)	Cost ($/ft)	Total Tons	*	Cost ($/ton or cy)		Total
411-02.10 (Surf.)	9065	60	0.104	27	3816	2000	1		3997	*	$65.00	$	**259,825**
307-02.08 (B-M2)	9065	60	0.167	27	4068	2000	1		6843	*	$65.00	$	**444,771**
307-02.01 (Gr. 'A')	9065	60	0.292	27	4140	2000	1		12176	*	$65.00	$	**791,447**
303-01	9065	60	0.833	27	2.03		1		34064	*	$18.00	$	**613,153**
Outside Shld'r	18130	12	1.255	27	2.03		1		20528	*	$18.00	$	**369,511**
	18130	4.85	1.115	27	2.03		0		7371	*	$18.00	$	**132,684**
411-02.10 (Surf.)	600	36	0.104	27	3816	2000	1		159	*	$65.00	$	**10,318**
307-02.08 (B-M2)	600	36	0.167	27	4068	2000	1		272	*	$65.00	$	**17,663**
307-02.01 (Gr. 'A')	600	36	0.292	27	4140	2000	1		484	*	$65.00	$	**31,431**
303-01	600	36	0.833	27	2.03		1		1353	*	$18.00	$	**24,350**
Outside Shld'r	500	6	1.255	27	2.03		1		283	*	$18.00	$	**5,095**
	500	4.85	1.115	27	2.03		0		203	*	$18.00	$	**3,659**

411-02.10 (Surf.)	0	24	0.104	27	3816	2000	1		0	*	$65.00	$	-
307-02.08 (B-M2)	0	24	0.167	27	4068	2000	1		0	*	$65.00	$	-
307-02.01 (Gr. 'A')	0	24	0.292	27	4140	2000	1		0	*	$65.00	$	-
303-01	0	24	0.833	27	2.03		1		0	*	$18.00	$	-
Outside Shld'r	0	12	1.255	27	2.03		1		0	*	$18.00	$	-
	0	4.85	1.115	27	2.03		0		0	*	$18.00	$	-
411-01.07 ('E' Shldr.)	18130	10	0.125	27	3708	2000	1		1556	*	$65.00	$	101,150
411-01.07 ('E' Shldr.)	1200	4	0.125	27	3708	2000	1		41	*	$65.00	$	2,678
Curb & Gutter	0							$29.00				$	-
											Total	$	2,807,736

Topsoil (203-07)

Based on 4:1 slope and 5' fill

Length (ft.)	Slope Lgth.(ft.)	Thk.(ft.)	cy factor	cy	Cost ($/cy)	No. of Sides	Median (ft.)		
18130	40	0.5	27	13429.6	$9.00	1		$	120,867
1200	40	0.5	27	888.9	$9.00	1		$	8,000

Seeding (801-01) **Total** $ 128,867

Length (ft.)	Slope Lgth.(ft.)	Sides	Median (ft.)	sf	sf/unit		factor	units	Cost ($/unit)		Total
18130	40	1		725200	1,000	*	1.25	907	$40.00	$	36,260
1200	40	1		48000	1,000	*	1.25	60	$40.00	$	2,400

Signalization $ 38,660

$ -

Fencing

Length (ft.)		Cost ($/ft)		
0	(stock fence)	$5.00	$	-

Guardrail

Length (ft)	*	Cost ($/ft)	+	(# Anch.)	*	Cost ($/Anch.)	Total
2000	*	$20.00	+	16	*	$2,500.00	
		$40,000	+			$40,000	$80,000

Total $ 80,000

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Right of Way Cost

Length	Width	Acres	Cost ($/Acre)	Improvements (1.2 factor)	Land Cost	Total	
0	100	0.000	$ 7,000.00	$ 8,400.00	$0		100' o/s existing
9500	140	30.533	$ 7,000.00	$ 8,400.00	$256,474		
475	50	0.545	$ 7,000.00	$ 8,400.00	$4,580		Side road to Megasite
Sub-Total		31.078			$ 261,053.72	$ 262,000	(Rounded)
Cost of Bldgs.						$ -	
Contengenices					=		
Total Land & Improvement Costs					=	$ 262,000	(Rounded)
Incidentals		4	$ 3,000	Per Tract for Incid	=	$ 12,000	
Replacement Housing		0	$ 12,000	Per Unit	=	$ -	
Moving Expenses		0	$ 25,000	Per Unit	=	$ -	
TOTAL ROW COSTS					=	$ 274,000	

201-07.05 Removal and Disposal of Brush and Trees (Clear. and Grub.)

Length (ft.)	Width (ft.)	Area (sq.ft.)	Acres	Cost ($/ac.)		Total	
0	100	0	0.000	$4,000		$ -	100' o/s existing
9500	140	1,330,000	30.533	$4,000		$ 122,130	
475	50	23,750	0.545	$4,000		$ 2,181	Side road to Megasite
9,975					**Total**	$ 124,311	

Maintenance of Traffic

Drums (Ea.)	Cost ($/drum)	Total

Signs (s.f.)	Cost ($/s.f.)

712-02.02 Interconnected Portable Barrier Rail

Lgth.(ft.)	Cost ($/ft.)

712-07.03 Temporary Barricades

Lgth.(ft.)	No.	Total Lgth.	Cost ($/ft)	Total Barricades

Total Maintenance of Traffic $ 15,000

Signing

Signs (s.f.)	Cost ($/s.f.)	Total
		$ 20,000

Utility Relocation Cost

	Lgth (mi.)	No. of Poles	Cost/Mi.	Lgth (ft.)	Cost ($/pole)	Cost ($/ft)	
Gas (2.5")				0		$20.00	$0
Water (4")				0		$25.00	$0
Poles		13			$1,500.00		$19,500
Water (6")				0		$45.00	$0
Water (8")				0		$60.00	$0
Water (6")				0		$45.00	$0
						Total	$19,500

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

203-01 Road and Drain. Exc. (Uncl.)

Length (ft.)	Width (ft.)	Avg. Exc. Depth	Factor	C.Y.	Cost/cy		Total
475	50	4	27	3519	$5.00		$17,593
9500	80	4	27	112593	$5.00		$562,963
						Total	$580,556

202-03.01 Pavement Removal

Area (sf)	/	sf/sy	*	Cost ($/sy)	Total
12000	/	9	*	$3.75	$5,000.00

Drainage

	No. of basins		Cost ($/basin)				
Bedding Mat'l.		Length (ft)		cy/ft	Cost ($/cy)		2 Pipes @ 70' ea.
204-07		140		0.266	$30.00	37	
Pipe		Length (ft)		Cost ($/ft)			
607-05.02		140		$40.00		5,600	
Endwall Steel		lbs/wall		No. Endwalls	Cost ($/lb)		
611-07.02		172		4	$1.30	894	
Endwall Conc.		cy/wall		No. Endwalls	Cost ($/cy)		
611-07.01		1.52		4	$480.00	2,918	
Box Bridges/Culv.		0			$50,000	0	
Catchbasins	0		$2,500.00			0	
					Total	9,450	

Structure

Length (ft.)	Width (ft.)	s.f.	Cost/s.f.	Total
0	0	0	$150.00	$0

Paving

	Lgth (ft.)	Width (ft.)	Depth (ft.)	/	factor	Lb./Ton	Multiplier (NB, SB)	Cost ($/ft)	Total Tons	*	Cost ($/ton or cy)		Total
411-02.10 (Surf.)	9500	36	0.104	27	3816	2000	1		2513	*	$65.00	$	163,376
307-02.08 (B-M2)	9500	36	0.167	27	4068	2000	1		4303	*	$65.00	$	279,668
307-02.01 (Gr. 'A')	9500	36	0.292	27	4140	2000	1		7656	*	$65.00	$	497,656
303-01	9500	36	0.833	27	2.03		1		21419	*	$18.00	$	385,546
Outside Shld'r	19000	8	1.255	27	2.03		1		14342	*	$18.00	$	258,162
	19000	4.85	1.115	27	2.03		0		7725	*	$18.00	$	139,051
411-02.10 (Surf.)	475	24	0.104	27	3816	2000	1		84	*	$65.00	$	5,446
307-02.08 (B-M2)	475	24	0.167	27	4068	2000	1		143	*	$65.00	$	9,322
307-02.01 (Gr. 'A')	475	24	0.292	27	4140	2000	1		255	*	$65.00	$	16,589
303-01	475	24	0.833	27	2.03		1		714	*	$18.00	$	12,852
Outside Shld'r	950	4	1.255	27	2.03		1		359	*	$18.00	$	6,454
	950	6.85	1.115	27	2.03		0		546	*	$18.00	$	9,820
411-02.10 (Surf.)	0	24	0.104	27	3816	2000	1		0	*	$65.00	$	-
307-02.08 (B-M2)	0	24	0.167	27	4068	2000	1		0	*	$65.00	$	-

307-02.01 (Gr. 'A')	0	24	0.292	27	4140	2000	1		0	*	$65.00	$	-
303-01	0	24	0.833	27	2.03		1		0	*	$18.00	$	-
Outside Shld'r	0	12	1.255	27	2.03		1		0	*	$18.00	$	-
	0	4.85	1.115	27	2.03		0		0	*	$18.00	$	-
411-01.07 ('E' Shldr.)	950	2	0.125	27	3708	2000	1		16	*	$65.00	$	1,060
411-01.07 ('E' Shldr.)	19000	6	0.125	27	3708	2000	1		979	*	$65.00	$	63,603
Curb & Gutter	0							$29.00				$	-
											Total	$	1,848,603

Topsoil (203-07)

Based on 4:1 slope and 5' fill

Length (ft.)	Slope Lgth.(ft.)	Thk.(ft.)	cy factor	cy	Cost ($/cy)	No. of Sides	Median (ft.)		
19000	40	0.5	27	14074.1	$9.00	1		$	126,667
950	40	0.5	27	703.7	$9.00	1		$	6,333
							Total	$	133,000

Seeding (801-01)

Length (ft.)	Slope Lgth.(ft.)	Sides	Median (ft.)	sf	sf/unit		factor	units	Cost ($/unit)		Total
19000	40	1		760000	1,000	*	1.25	950	$40.00	$	38,000
950	40	1		38000	1,000	*	1.25	48	$40.00	$	1,900

Signalization $ 39,900

$ -

Fencing

Length (ft.)		Cost ($/ft)		
0	(stock fence)	$5.00	$	-

Guardrail

(Length (ft)	*	Cost ($/ft)	+	(# Anch.)	*	Cost ($/Anch.)	Total
2000	*	$20.00	+	16	*	$2,500.00	
		$40,000	+			$40,000	$80,000

Total $ 80,000

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Right of Way Cost

Length	Width	Acres	Cost ($/Acre)	Improvements (1.2 factor)	Land Cost	Total	
6800	30	4.683	$ 7,000.00	$ 8,400.00	$39,339		100' o/s existing
0	140	0.000	$ 7,000.00	$ 8,400.00	$0		
0	100	0.000	$ 7,000.00	$ 8,400.00	$0		Side road to Megasite
Sub-Total		4.683			$ 39,338.84	$ 40,000	(Rounded)
Cost of Bldgs.						$ -	
Contengenices					=		
Total Land & Improvement Costs					=	$ 40,000	(Rounded)
Incidentals		12	$ 3,000	Per Tract for Incide	=	$ 36,000	
Replacement Housing		0	$ 12,000	Per Unit	=	$ -	
Moving Expenses		0	$ 25,000	Per Unit	=	$ -	
TOTAL ROW COSTS					=	$ 76,000	

201-07.05 Removal and Disposal of Brush and Trees (Clear. and Grub.)

Length (ft.)	Width (ft.)	Area (sq.ft.)	Acres	Cost ($/ac.)		Total	
6800	30	204,000	4.683	$4,000		$ 18,733	100' o/s existing
0	140	0	0.000	$4,000		$ -	
0	100	0	0.000	$4,000		$ -	Side road to Megasite
6,800					**Total**	$ 18,733	

Maintenance of Traffic

Drums (Ea.)	Cost ($/drum)	Total

Signs (s.f.)	Cost ($/s.f.)

712-02.02 Interconnected Portable Barrier Rail

Lgth.(ft.)	Cost ($/ft.)

712-07.03 Temporary Barricades

Lgth.(ft.)	No.	Total Lgth.	Cost ($/ft)	Total Barricades

Total Maintenance of Traffic $ 50,000

Signing

Signs (s.f.)	Cost ($/s.f.)	Total
		$ 20,000

Utility Relocation Cost

	Lgth (mi.)	No. of Poles	Cost/Mi.	Lgth (ft.)	Cost ($/pole)	Cost ($/ft)	
Gas (2.5")				0		$20.00	$0
Water (4")				0		$25.00	$0
Poles		10			$1,500.00		$15,000
Water (6")				0		$45.00	$0
Water (8")				0		$60.00	$0
Water (6")				0		$45.00	$0
						Total	$15,000

203-01 Road and Drain. Exc. (Uncl.)

Length (ft.)	Width (ft.)	Avg. Exc. Depth	Factor	C.Y.	Cost/cy	Total
0	60	4	27	0	$5.00	$0

6800	30	4	27	30222	$5.00		$151,111
						Total	$151,111

202-03.01 Pavement Removal

Area (sf)	/	sf/sy	*	Cost ($/sy)	Total
0	/	9	*	$3.75	$0.00

Drainage

	No. of basins		Cost ($/basin)			
Bedding Mat'l.		Length (ft)		cy/ft	Cost ($/cy)	
204-07		460		0.266	$30.00	122
Pipe		Length (ft)		Cost ($/ft)		
607-05.02		400		$40.00		16,000
Endwall Steel		lbs/wall		No. Endwalls	Cost ($/lb)	
611-07.02		172		8	$1.30	1,789
Endwall Conc.		cy/wall		No. Endwalls	Cost ($/cy)	
611-07.01		1.52		8	$480.00	5,837
Box Bridges/Culv.		0			$50,000	0
Catchbasins	0		$2,500.00			0
					Total	23,748

Structure

Length (ft.)	Width (ft.)	s.f.	Cost/s.f.	Total
0	0	0	$150.00	$0

Paving

	Lgth (ft.)	Width (ft.)	Depth (ft.)	/	factor	Lb./Ton	Multiplier (NB, SB)	Cost ($/ft)	Total Tons	*	Cost ($/ton or cy)	Total
411-02.10 (Surf.)	6800	24	0.104	27	3816	2000	1		1199	*	$65.00	$ 77,962
307-02.08 (B-M2)	6800	24	0.167	27	4068	2000	1		2053	*	$65.00	$ 133,456
307-02.01 (Gr. 'A')	0	24	0.292	27	4140	2000	1		0	*	$65.00	$ -
303-01	0	24	0.833	27	2.03		1		0	*	$18.00	$ -
Outside Shld'r	13600	8	1.255	27	2.03		1		10266	*	$18.00	$ 184,790
	13600	6.85	1.115	27	2.03		0		7810	*	$18.00	$ 140,575
411-02.10 (Surf.)	0	60	0.104	27	3816	2000	1		0	*	$65.00	$ -
307-02.08 (B-M2)	0	60	0.167	27	4068	2000	1		0	*	$65.00	$ -
307-02.01 (Gr. 'A')	0	60	0.292	27	4140	2000	1		0	*	$65.00	$ -
303-01	0	60	0.833	27	2.03		1		0	*	$18.00	$ -
Outside Shld'r	0	12	1.255	27	2.03		1		0	*	$18.00	$ -
	0	4.85	1.115	27	2.03		0		0	*	$18.00	$ -
411-02.10 (Surf.)	0	24	0.104	27	3816	2000	1		0	*	$65.00	$ -
307-02.08 (B-M2)	0	24	0.167	27	4068	2000	1		0	*	$65.00	$ -
307-02.01 (Gr. 'A')	0	24	0.292	27	4140	2000	1		0	*	$65.00	$ -
303-01	0	24	0.833	27	2.03		1		0	*	$18.00	$ -
Outside Shld'r	0	12	1.255	27	2.03		1		0	*	$18.00	$ -
	0	4.85	1.115	27	2.03		0		0	*	$18.00	$ -
411-01.07 ('E' Shldr.)	13600	6	0.125	27	3708	2000	1		700	*	$65.00	$ 45,526
411-01.07 ('E' Shldr.)	0	6	0.125	27	3708	2000	1		0	*	$65.00	$ -

Milling	**Lgth. (ft.)**	**Width (ft.)**			**factor**	**Sq.Yd.**

415-01.02	6800	24		/	9	18133.33				$ 3.00			$ 54,400
Curb & Gutter	0								$29.00				$ -
												Total	$ 636,708

Topsoil (203-07)

Based on 4:1 slope and 5' fill

Length (ft.)	Slope Lgth.(ft.)	Thk.(ft.)	cy factor	cy	Cost ($/cy)	No. of Sides	Median (ft.)					
13600	25	0.5	27	6296.3	$9.00	1	0					$ 56,667

Seeding (801-01) Total $ 56,667

Length (ft.)	Slope Lgth.(ft.)	Sides	Median (ft.)	sf	sf/unit		factor	units	Cost ($/unit)		Total
13600	25	1		340000	1,000	*	1.25	425	$40.00		$ 17,000

Signalization $ 17,000

$ -

Fencing

Length (ft.)		Cost ($/ft)		
0	(stock fence)	$5.00		$ -

Guardrail

	(Length (ft)	*	Cost ($/ft)	+	(# Anch.)	*	Cost ($/Anch.)		Total
	2000	*	$20.00	+	16	*	$2,500.00		
			$40,000	+			$40,000		$80,000
								Total	$ 80,000

SIA ROAD
HAYWOOD COUNTY

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Right of Way Cost

Length	Width	Acres	Cost ($/Acre)	Improvements (1.2 factor)	Land Cost	Total	
7500	80	13.774	$ 10,000.00	$ 12,000.00	$165,289		Acquisition for Prop. SIA Road
1200	40	1.102	$ 10,000.00	$ 12,000.00	$13,223		Acquisition for Albright Road
Sub-Total		14.876			$ 178,512.40	$ 179,000	(Rounded)
Cost of Bldgs.						$ -	
Contengenices					=		
Total Land & Improvement Costs					=	$ 179,000	(Rounded)
Incidentals		4	$ 3,000	Per Tract for Incid	=	$ 12,000	
Replacement Housing		0	$ 12,000	Per Unit	=	$ -	
Moving Expenses		0	$ 25,000	Per Unit	=	$ -	
TOTAL ROW COSTS					=	$ 191,000	

201-07.05 Removal and Disposal of Brush and Trees (Clear. and Grub.)

Length (ft.)	Width (ft.)	Area (sq.ft.)	Acres	Cost ($/ac.)		Total	
7500	80	600,000	13.774	$4,000		$ 55,096	C&G for Prop. SIA Road
1200	40	48,000	1.102	$4,000		$ 4,408	C&G for Albright Road
8,700					**Total**	$ 59,504	

Maintenance of Traffic

Drums (Ea.)	Cost ($/drum)	Total

Signs (s.f.)	Cost ($/s.f.)

712-02.02 Interconnected Portable Barrier Rail

Lgth.(ft.)	Cost ($/ft.)

712-07.03 Temporary Barricades

Lgth.(ft.)	No.	Total Lgth.	Cost ($/ft)	Total Barricades

Total Maintenance of Traffic $ 15,000

Signing

Signs (s.f.)	Cost ($/s.f.)	Total
		$ 20,000

Utility Relocation Cost

	Lgth (mi.)	No. of Poles	Cost/Mi.	Lgth (ft.)	Cost ($/pole)	Cost ($/ft)	
Gas (2.5")				0		$20.00	$0
Water (4")				0		$25.00	$0
Poles		0			$1,500.00		$0
Water (6")				0		$45.00	$0
Water (8")				0		$60.00	$0
Water (6")				0		$45.00	$0
							$10,000
						Total	$10,000

SIA ROAD
HAYWOOD COUNTY

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

203-01 Road and Drain. Exc. (Uncl.)

Length (ft.)	Width (ft.)	Avg. Exc. Depth	Factor	C.Y.	Cost/cy		Total
7500	60	4	27	66667	$5.00		**$333,333**
1200	40	4	27	7111	$5.00		**$35,556**
						Total	**$368,889**

202-03.01 Pavement Removal

Area (sf)	/	sf/sy	*	Cost ($/sy)	Total
16000	/	9	*	$3.75	**$6,666.67**

Drainage

	No. of basins		Cost ($/basin)				
Bedding Mat'l.		Length (ft)		cy/ft		Cost ($/cy)	2 Pipes @ 70' ea.
204-07		140		0.266		$30.00	**37**
Pipe		Length (ft)		Cost ($/ft)			
607-05.02		140		$40.00			**5,600**
Endwall Steel		lbs/wall		No. Endwalls		Cost ($/lb)	
611-07.02		172		4		$1.30	**894**
Endwall Conc.		cy/wall		No. Endwalls		Cost ($/cy)	
611-07.01		1.52		4		$480.00	**2,918**
Box Bridges/Culv.		0			$50,000		**0**
Catchbasins	0		$2,500.00				**0**
						Total	**9,450**

Structure

Length (ft.)	Width (ft.)	s.f.	Cost/s.f.	Total
0	0	0	$150.00	**$0**

Paving

	Lgth (ft.)	Width (ft.)	Depth (ft.)	/	factor	Lb./Ton	Multiplier (NB, SB)	Cost ($/ft)	Total Tons	*	Cost ($/ton or cy)	Total
411-02.10 (Surf.)	7500	24	0.104	27	3816	2000	1		1323	*	$65.00	**$ 85,987**
307-02.08 (B-M2)	7500	24	0.167	27	4068	2000	1		2265	*	$65.00	**$ 147,194**
307-02.01 (Gr. 'A')	7500	24	0.292	27	4140	2000	1		4030	*	$65.00	**$ 261,924**
303-01	7500	24	0.833	27	2.03		1		11273	*	$18.00	**$ 202,919**
Outside Shld'r	15000	4	1.255	27	2.03		1		5661	*	$18.00	**$ 101,906**
	15000	6.85	1.115	27	2.03		0		8614	*	$18.00	**$ 155,046**
411-02.10 (Surf.)	1200	24	0.104	27	3816	2000	1		212	*	$65.00	**$ 13,758**
307-02.08 (B-M2)	1200	24	0.167	27	4068	2000	1		362	*	$65.00	**$ 23,551**
307-02.01 (Gr. 'A')	1200	24	0.292	27	4140	2000	1		645	*	$65.00	**$ 41,908**
303-01	1200	24	0.833	27	2.03		1		1804	*	$18.00	**$ 32,467**
Outside Shld'r	2400	4	1.255	27	2.03		1		906	*	$18.00	**$ 16,305**
	2400	6.85	1.115	27	2.03		0		1378	*	$18.00	**$ 24,807**
411-01.07 ('E' Shldr.)	15000	2	0.125	27	3708	2000	1		258	*	$65.00	**$ 16,738**
411-01.07 ('E' Shldr.)	2400	2	0.125	27	3708	2000	1		41	*	$65.00	**$ 2,678**
Curb & Gutter	0							$29.00				**$ -**

SIA ROAD
HAYWOOD COUNTY

ESTIMATE BREAKDOWN AND QUANTITY SUMMARY

Total **$ 1,127,188**

Topsoil (203-07)

Based on 4:1 slope and 5' fill

Length (ft.)	Slope Lgth.(ft.)	Thk.(ft.)	cy factor	cy	Cost ($/cy)	No. of Sides	Median (ft.)	
7500	30	0.5	27	4166.7	$9.00	1		**$ 37,500**
1200	30	0.5	27	666.7	$9.00	1		**$ 6,000**

Seeding (801-01) **Total** **$ 43,500**

Length (ft.)	Slope Lgth.(ft.)	Sides	Median (ft.)	sf	sf/unit		factor	units	Cost ($/unit)	Total
7500	30	1		225000	1,000	*	1.25	281	$40.00	**$ 11,250**
1200	30	1		36000	1,000	*	1.25	45	$40.00	**$ 1,800**

Signalization **$ 13,050**

$ -

Fencing

Length (ft.)		Cost ($/ft)	
0	(stock fence)	$5.00	**$ -**

Guardrail

(Length (ft)	*	Cost ($/ft)	+	(# Anch.)	*	Cost ($/Anch.)	Total
1000	*	$20.00	+	8	*	$2,500.00	
		$20,000	+			**$20,000**	$40,000

Total **$ 40,000**