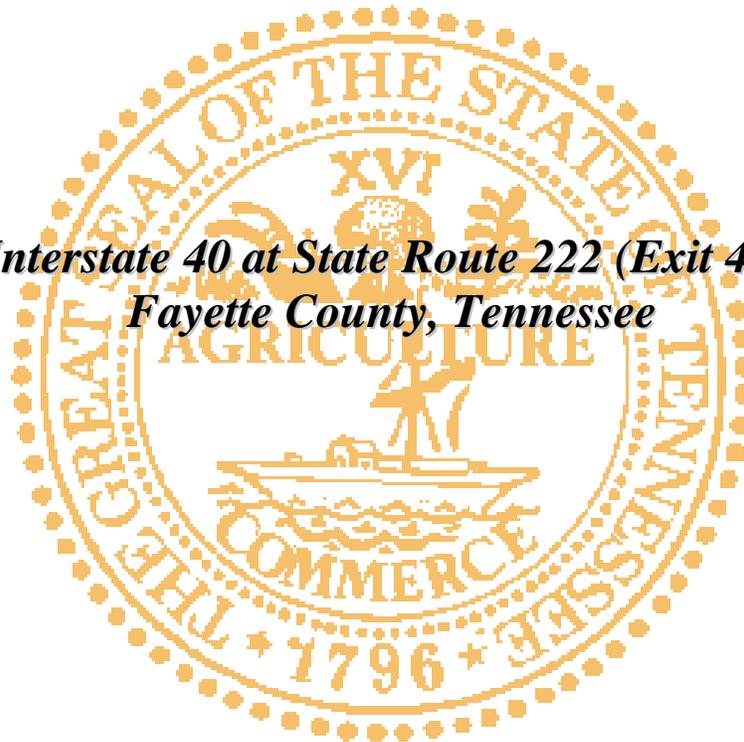


INTERCHANGE MODIFICATION STUDY

***Interstate 40 at State Route 222 (Exit 42)
Fayette County, Tennessee***



***PREPARED BY
TRANSYSTEMS***

FOR

***THE TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION***

November 2011

TABLE OF CONTENTS

Executive Summary	iv
1.0 Introduction	1
1.1 Study Scope	1
1.2 Project Need	1
1.3 Description of Project Area	2
1.4 Relationship to Other Highway Improvement Plans and Programs	6
2.0 Preliminary Planning Data	9
2.1 Land Use	9
2.2 Environmental Concerns	12
2.3 Traffic Served	12
2.4 Discussion of Interchange Concepts	15
3.0 Engineering Investigation	20
3.1 Traffic Operations	20
3.2 Crash Analysis	27
3.3 S.R. 222 Bridge Inspection Report	28
3.4 Wastewater Treatment Facility	29
3.5 Interchange Concept Evaluation Comparison	29
3.6 Access Analysis (FHWA Eight Policy Points)	33
FHWA Prompt-List for Reviewing Interstate Access Requests (Concepts 1 and 5)	---
4.0 Summary and Conclusions	38
4.1 TDOT Design Concurrence Letter and Local Agency Letters of Support	38
Tables	
1.1 - U.S. Census Population Trends	6
2.1 - Historical Traffic Volumes Growth Rate Summary	13
2.2 - Estimated Development Build-Out Trips	14
2.3 - Description of Interchange Concepts	15
3.1 - Level of Service (LOS) Description	20
3.2 - Traffic Volumes (Two-Way) and Truck Percentages	21
3.3 – 3.8 - Capacity Analysis Results	22-27
3.9 - I-40/S.R. 222 Crash Data Summary	28

Figures

1.1	-	Location Map	3
1.2	-	Existing Interchange Overview	4
1.3	-	Northbound on S.R. 222	5
1.4	-	Southbound on S.R. 222	5
1.5	-	Concept Relationship	8
2.1	-	Abandoned Gas Station and UST's	9
2.2	-	Pilot Travel Center	10
2.3	-	Deerfield Inn	10
2.4	-	Exxon Gas Station/Convenience Store	11
2.5	-	Bethlehem Hebron Chapel Church	11
2.6	-	TDOT Traffic Count Stations	12
2.7	-	Combination Interchange Option (with Shared Frontage Road)	19
2.8	-	Combination Interchange Option (with Separate Frontage Roads)	19
3.1	-	Concept 1	31
3.2	-	Concept 5	32

Appendix

A	Traffic Data
B	Concept Figures
C	Cost Estimate Worksheets
D	Highway Capacity Analysis Output Files

1.0 INTRODUCTION

1.1 Study Scope

The scope of this study is to provide a detailed evaluation of potential modifications and/or configurations to better accommodate existing and future traffic for the study interchange of I-40 at S.R. 222 (Exit 42). This study addresses the issues required to obtain Federal Highway Administration (FHWA) approval for an interchange modification, consistent with the Tennessee Department of Transportation's (TDOT) roadway design standards. This report considers existing and future traffic conditions in the project study area to assess the potential traffic impacts on the interstate and connecting roadway system over a twenty (20) year planning horizon.

1.2 Project Need

The request for upgrading the study interchange was initiated by the Tennessee Department of Economic and Community Development (ECD) on behalf of the Tennessee Valley Authority (TVA). In March 2007, the University of Memphis conducted an economic research study on land adjacent to the interchange area referred to as the Memphis-Jackson I-40 Advantage Megasite. The report, *The Potential Economic Impact of an Automobile Assembly Plant: I-40 Advantage Auto Park*, discusses the economic impacts and characteristics of the Megasite totaling approximately 2,000 jobs and evaluates the potential for this location to bring jobs, income, and tax revenue to the citizens of West Tennessee.

TVA's Megasite Program offers sites suitable for large-scale manufacturing that are certified as ready for development. To be certified, a large land parcel must meet the criteria of being ready for sale, accessible to utilities, and physically developable. The proposed improvements for the study interchange are essential to the development of the Megasite located on the north side of I-40 within the study area as shown in **Figure 1.1**.

The adjacent interchanges as described in **Section 1.3** are too far away to adequately serve the Megasite. The local road system is adequate for the current land uses in the vicinity of the study interchange. However, if the Megasite is developed, the local road system and existing interchange will not provide the necessary capacity and the desired access to function adequately. As detailed in **Section 3.1**, the capacity of the study interchange will be at LOS F if the Megasite is developed without modifications to the interchange.

The existing two (2) lane S.R. 222 bridge is constructed over I-40 on a fifty-two (52) degree skew angle. The latest bridge inspection report was conducted on December 14, 2010. During this inspection, the overall condition of the study bridge was determined to be rated fair with a sufficiency rating of 63.2. TDOT Structures Division has determined that the existing bridge consists of four (4) spans and is not a candidate for retrofit and needs to be replaced for the following reasons:

- Any new bridge would be a two (2) span structure for the safety of motorists travelling on I-40.
- A two (2) span structure would accommodate any future widening of I-40 without additional bridge modifications.
- The cost of widening the existing structure to accommodate the required travel lanes plus full shoulders would be greater than the cost of replacing the entire structure.

The ECD has agreed to provide 100% of the funding for the preparation of the Preliminary Engineering documents for the S.R. 222 construction improvements. Even though there are no confirmed developments for the Megasite, the ECD envisions that all of the paperwork including construction design documents be completed and are shovel-ready projects when a tenant for the Megasite is identified so that the roadway improvements can be in place in conjunction with the opening of the Megasite.

1.3 Description of Project Area

The I-40 at S.R. 222 (Exit 42) study interchange, a traditional diamond interchange, is located in Fayette County near Mile Marker 42. Within the interchange study area, I-40 is a four (4) lane divided, limited access interstate facility and S.R. 222 is a two (2) lane arterial facility that bridges over I-40. S.R. 222, also known as Stanton-Somerville Road, provides direct interstate access to Stanton to the north side and Somerville to the south. Somerville is the County Seat for Fayette County.

The nearest interchange to the east along I-40 is located at Exit 47 (Dancyville Road) and the nearest interchange to the west is located at Exit 35 (S.R. 59). These adjacent I-40 interchanges are approximately five (5) miles to the east and seven (7) miles to the west, respectively.

Figure 1.1 depicts the study location and the surrounding area with the proximity of the adjacent interchanges highlighted and the approximate location of the Megasite. **Figure 1.2** shows the study interchange area on an aerial photograph. **Figure 1.3** and **Figure 1.4** depict the northbound and southbound views along S.R. 222, respectively.

Figure 1.1 – Location Map

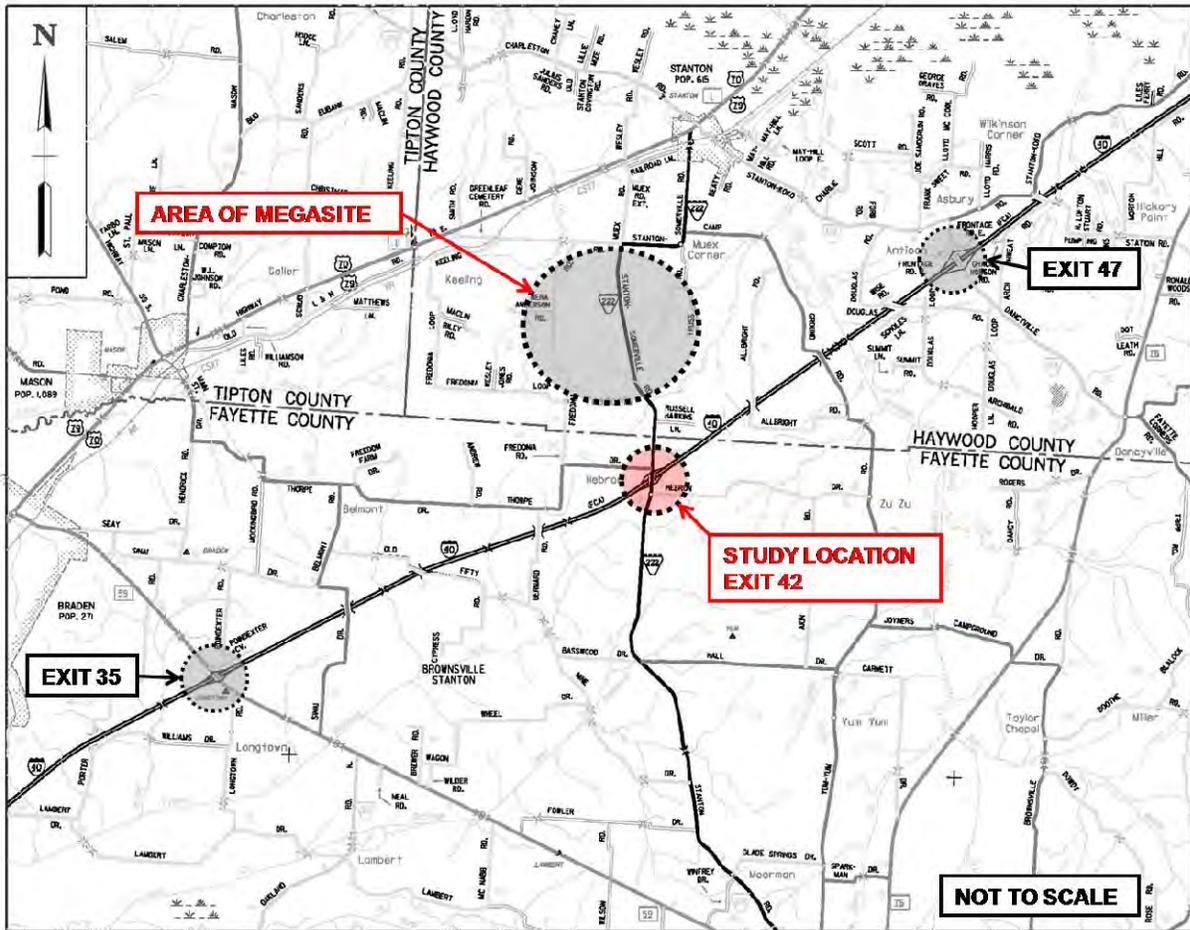


Figure 1.2 – Existing Interchange Overview



Figure 1.3 – Northbound on S.R. 222



Figure 1.4 – Southbound on S.R. 222



Population and Growth

Table 1.1 presents population trends for the area. From the year 1990 to 2009, the population in Fayette County increased by 52% while Haywood County decreased by 3%, respectively. For comparison, the statewide pace increased during the same period by 29%. The difference in growth between Fayette and Haywood Counties is mainly due to the influence of the Memphis suburban growth on the western area of Fayette County, which is approximately twenty (20) miles west of the study interchange. The Megasite development area is entirely in Haywood County and closer to the study interchange (located just south of the county line in Fayette County) than the primary population centers in Fayette County.

Table 1.1 – U.S. Census Population Trends

Year	Fayette County	Haywood County	Tennessee
1990	25,509	19,437	4.9 mil
2000	28,806	19,797	5.7 mil
2009 (Est.)	38,785	18,881	6.3 mil

1.4 Relationship to Other Highway Improvement Plans and Programs

In 2009, Tennessee Governor Phil Bredesen requested the State’s General Assembly to include approximately \$27 million in next fiscal-year’s budget for the construction of roads, bridges, water and sewer lines, and other infrastructure items related to the potential Megasite. The proposed modifications to the I-40 at S.R. 222 (Exit 42) interchange will provide significant transportation significant infrastructure improvements for the Megasite. The request was approved. Currently, the ECD has authorized funding for the preparation of the Preliminary Engineering documents for the S.R. 222 construction improvements in conjunction with this study.

This Interchange Modification Study (IMS) is being prepared in conjunction with other studies, planned projects, and consideration for future needs within the study area. The following summarizes these considerations and efforts:

I-40/I-81 Corridor Feasibility Study

In 2007, Parsons Brinckerhoff prepared an I-40/I-81 Corridor Feasibility Study for TDOT. Based on the findings of the study, the I-40 corridor will merit at least one (1) additional lane in each direction in the future.

S.R. 222 Relocation & System Improvements Feasibility Study

A draft study was prepared in 2009 to evaluate the feasibility of improving S.R. 222 to better meet the needs of the area necessitated if the Megasite is developed. The S.R. 222 study limits extended 5.81 miles from the I-40 interchange in Fayette County to the intersection of S.R. 1 (U.S. 70/U.S. 79) in Haywood County. The feasibility study established the immediate and long-term needs of the study area and assessed various options for meeting these needs in the future. One need is to relocate the alignment of S.R. 222 to allow for the full development of the Megasite area.

The ECD has agreed to provide 100% of the funding for the preparation of the Preliminary Engineering documents for the S.R. 222 construction improvements. Even though there are no confirmed developments for the Megasite, the ECD envisions that all of the paperwork including

construction design documents be completed and are shovel-ready projects when a tenant for the Megasite is identified so that the roadway improvements can be in place in conjunction with the opening of the Megasite.

Potential I-40 Interchange Justification Study (IJS)

There is a potential need for a new interchange to the east if the Megasite is developed and demand exceeds the capacity at an improved Exit 42 interchange. A new interchange is solely dependent upon the potential development of the Megasite and the ability to accommodate capacity at the existing Exit 42 interchange. Preliminary analysis was conducted to investigate the viability of providing a new interchange on I-40 between the existing interchanges at Exit 42 (S.R. 222) in Fayette County and Exit 47 (Dancyville Road) in Haywood County. The analysis conceptualized the proposed interchange configuration is a trumpet layout with a bridge over I-40 connecting to a new State Industrial Access (SIA) roadway on the north side of I-40. Auxiliary lanes along I-40 are included in conjunction with the addition of a new interchange.

Potential State Industrial Access (SIA) Road to Connect the Potential I-40 Interchange

Similar to the new interchange, the State Industrial Access (SIA) road is directly dependent upon the potential new interchange and the development of the Megasite. The SIA provides an alternative connection from the Megasite to the potential new interchange on I-40.

Figure 1.5 (Concept Relationship) presents a depiction of how these future (potential and feasibility study) projects relate to the improvements at the I-40/S.R. 222 interchange.

LEGEND	
	PROPOSED S.R. 222 INTERCHANGE MODIFICATIONS
	POTENTIAL S.R. 222 ALIGNMENT ROUTE
	POTENTIAL I-40 TRUMPET INTERCHANGE, INCLUDING I-40 AUXILIARY LANES AND S.I.A. ROUTE FOR MEGASITE DEVELOPMENT

POTENTIAL S.R. 222 ALIGNMENT ROUTE CONTINUES TO S.R. 1 (U.S. 70/U.S. 79) (CONSIDERATION FOR S.R. 222 RELOCATION AT REQUEST OF MEGASITE DEVELOPMENT)

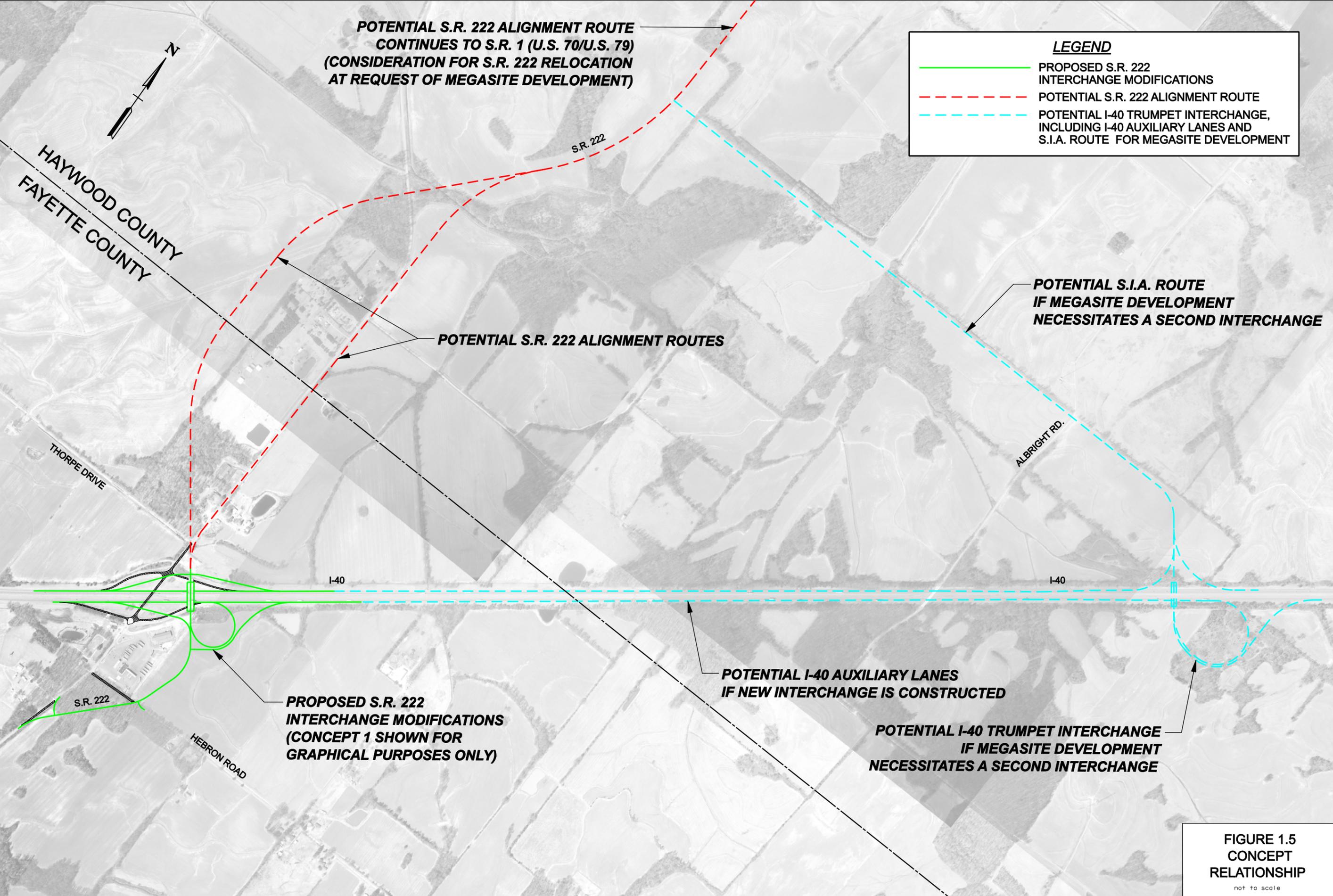
POTENTIAL S.R. 222 ALIGNMENT ROUTES

POTENTIAL S.I.A. ROUTE IF MEGASITE DEVELOPMENT NECESSITATES A SECOND INTERCHANGE

POTENTIAL I-40 AUXILIARY LANES IF NEW INTERCHANGE IS CONSTRUCTED

POTENTIAL I-40 TRUMPET INTERCHANGE IF MEGASITE DEVELOPMENT NECESSITATES A SECOND INTERCHANGE

PROPOSED S.R. 222 INTERCHANGE MODIFICATIONS (CONCEPT 1 SHOWN FOR GRAPHICAL PURPOSES ONLY)



**HAYWOOD COUNTY
FAYETTE COUNTY**

THORPE DRIVE

S.R. 222

HEBRON ROAD

S.R. 222

I-40

I-40

ALBRIGHT RD.

**FIGURE 1.5
CONCEPT
RELATIONSHIP**
not to scale

2.0 PRELIMINARY PLANNING DATA

2.1 Land Use

The land in the vicinity of the study interchange is a mixture of various commercial, residential, agricultural, and institutional land uses. Specific areas adjacent to this interchange are discussed below.

Northeast Quadrant

In the study interchange's northeast quadrant, there is an abandoned service station shown in **Figure 2.1**. Underground storage tanks (UST's) exist on this abandoned site.

Figure 2.1 – Abandoned Service Station and UST's



Northwest Quadrant

In the study interchange's northwest quadrant, the land use is primarily agricultural with some residential. No commercial development exists in this quadrant.

Southeast Quadrant

In the study interchange's southeast quadrant, there is a truck stop (Pilot Travel Center) and a hotel (Deerfield Inn) shown in **Figure 2.2** and **Figure 2.3**, respectively. The Pilot Travel Center consists of many uses (truck stop/gas station/convenience store). As a result, the truck percentage within the vehicle classification composition on S.R. 222 between I-40 and the Pilot Travel Center is almost half (48%). In addition, there is a waste water treatment facility located adjacent to I-40 that is owned by the Pilot Travel Center and also used by the Deerfield Inn.

Figure 2.2 – Pilot Travel Center



Figure 2.3 – Deerfield Inn



Southwest Quadrant

In the study interchange's southwest quadrant, there is a gas station/convenience store (Exxon) and a church (Bethlehem Hebron Chapel) shown in **Figure 2.4** and **Figure 2.5**, respectively. A cemetery is adjacent to the church.

Figure 2.4 – Exxon Gas Station/Convenience Store



Figure 2.5 – Bethlehem Hebron Chapel Church



Northern Area

The northern area along S.R. 222 contains agricultural and residential land uses along with some commercial land uses, a service station (Earl's Garage) and a motel (America's Best Value Inn).

Southern Area

The southern area along S.R. 222 is primarily undeveloped with some agricultural and residential land uses.

2.2 Environmental Concerns

There are UST's in three (3) of the four (4) quadrants of the study interchange. Other concerns include potential impacts to the waste water treatment facility in the southeast quadrant. Two (2) concepts discussed later in this report include widening S.R. 222 adjacent to the church/cemetery site in the southwest quadrant of the interchange.

As this project progresses in the National Environmental Policy Act (NEPA) planning process, it will be necessary to conduct other studies to determine detailed environmental and historical impacts. TDOT will perform all necessary studies including ecological and historical studies.

2.3 Traffic Served

The traffic volumes used in this study were approved by TDOT on April 14, 2011. A copy of the TDOT approval letter is contained in **Appendix A**. The following is a summary of the background information utilized in the development of these traffic volumes.

Traffic Volume Data Collection

24-hour traffic counts were obtained from TDOT within the study area. In addition, TDOT provided I-40 ramp counts for each of the twelve (12) entrance/exit ramps within the study area. Turning movement counts (TMC) were also collected at ramp terminal intersections. Truck percentages were provided by TDOT with the exception of the Megasite that was estimated to be 10%. The traffic volume data collected for this study is contained in **Appendix A**.

Historical Growth Rate Analyses

Historical traffic volumes were obtained from nine (9) traffic count stations within the project study area. Three (3) traffic count stations were located on I-40 and two (2) traffic count stations each were located at the three (3) study interchanges (Exit 35, Exit 42, and Exit 47). All of these traffic count stations are maintained by TDOT. A summary of the historical traffic volumes growth rates at these nine traffic count stations is shown in **Figure 2.6** and **Table 2.1**.

Figure 2.6 – TDOT Traffic Count Stations

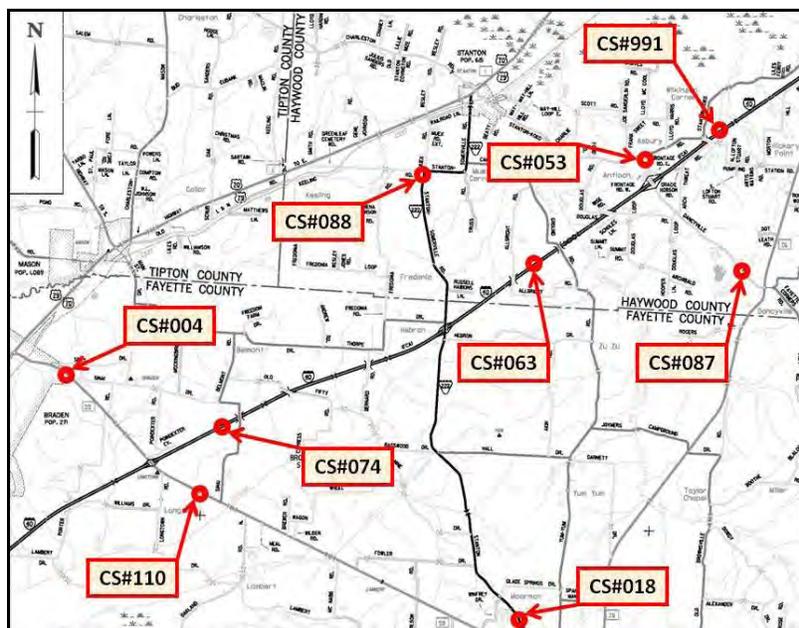


Table 2.1 – Historical Traffic Volumes Growth Rate Summary

Year	Annual Average Daily Traffic (AADT)								
	I-40 Mainline			SR 59 Mainline (Exit 35)		S.R. 222 Mainline (Exit 42)		Dancyville Road Mainline (Exit 47)	
	CS#074	CS#063	CS#991	CS#004	CS#110	CS#088	CS#018	CS#053	CS#087
2010	26,834	26,502	35,613	2738	2695	581	689	459	890
2009	26,568	25,896	34,730	2350	2864	576	743	463	924
2008	26,798	26,580	33,339	2573	2593	573	662	426	886
2007	35,626	37,392	36,856	2779	2804	599	748	463	912
2006	34,253	33,295	36,960	3170	3137	593	692	450	956
2005	36,566	33,382	35,983	2805	2725	644	749	404	972
2004	30,448	31,721	33,168	2494	3070	626	720	396	964
2003	33,943	31,501	31,462	2482	2960	601	686	355	899
2002	30,670	33,972	31,213	2229	4372	536	702	426	956
2001	36,234	34,958	32,109	2209	3137	518	909	433	937
2000	34,030	31,810	31,730	2875		545	632	420	853
10-Year Average Growth Rate	-0.85%	-0.92%	2.37%	2.17%	1.80%	0.69%	1.07%	2.56%	0.13%
2-Year Average Growth Rate	-0.15%	0.07%	2.71%	2.86%	1.75%	0.67%	1.80%	3.20%	0.22%

As shown in **Table 2.1**, the traffic volumes on the I-40 mainline experienced an overall 20%± reduction between 2007 and 2008. Since 2008, the I-40 traffic volumes have increased at a slow to moderate growth rate. As a result, the historical traffic volumes were analyzed for both a ten (10) year period (2000-2010) and for a two (2) year period (2008-2010). The overall average growth rate for both analyses was calculated using simple linear regression procedures. Relying on engineering judgment and being conservative, it was decided to only use CS#991 for the I-40 mainline growth rate calculations since negligible growth had occurred at the other two (2) traffic count stations and both of these traffic count stations had experienced a greater reduction in traffic since 2008 when compared against CS#991. The final growth rate for each mainline was determined by combining the 2-year (2008-2010) and the 10-year (2000-2010) growth rates, giving two-thirds weight to the 2-year growth rate and one-third weight to the 10-year growth rate. In addition, the final growth rate for each of the side roads (i.e. S.R. 59, S.R. 222, and Dancyville Road) was adjusted to 2.00% if the growth rate was calculated below 2.00%.

The following are the final calculated growth rates for each mainline utilized in this study:

- I-40: 2.60%
- SR 59 (Exit 35): 2.19%
- S.R. 222 (Exit 42): 2.00%
- Dancyville Road (Exit 47): 2.00%

Horizon Years and Time Periods Analyzed

The horizon years were determined to be 2014 and 2034. For both horizon years, the time periods analyzed were AM and PM Design Hour Volumes (DHV) and Annual Average Daily Traffic (AADT).

Traffic Volume Projections

Traffic volumes were projected using the previously described growth rates within the project study area for the horizon years 2014 and 2034 and for each time period AM and PM DHV and AADT. A truck stop, Pilot Travel Center, is located on S.R. 222 (Exit 42) in the southeast quadrant of the I-40/S.R. 222 interchange. This place of business attracts heavy truck volumes not indicative of the other sections along S.R. 222. In order to reduce the interchange traffic volumes down to the S.R. 222 traffic volumes southeast of the Pilot Travel Center, the S.R. 222 intersection with the Pilot Travel Center has been included in the traffic volume projections.

Megasite and Other Assumed Developments

In addition to the traffic volume projections developed for horizon years 2014 and 2034, trips were generated for the megasite and other assumed developments. The number of trips was estimated using the Institute of Transportation Engineer’s (ITE) 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 other assumed development around the I-40/S.R. 222 interchange which included four (4) fast food restaurants and two (2) convenience markets with gas pumps. Overall, a total of 17,708 trips were estimated for the Megasite development build-out. **Table 2.2** summarizes the trips generated for each land use.

Table 2.2 – Estimated Development Build-Out 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)
	Total Estimated Trips	6,680	5,074	5,954
AM Peak Hour	Average Rate	0.47/Employee (86% In - 14% Out)	45.58/KSF (50% In - 50% Out)	53.11/KSF (51% In - 49% Out)
	Total Estimated Trips	940	274	638
PM Peak Hour	Average Rate	0.46/Employee (20% In - 80% Out)	60.61/KSF (50% In - 50% Out)	34.64/KSF (52% In - 48% Out)
	Total Estimated Trips	920	364	416

The trip distribution percentages are contained in **Appendix A** along with the development trip assignments for time period analyzed. To be conservative and a worst-case scenario, internal capture and pass-by reductions were not included in the above trip totals in the trip assignments.

Traffic Volume Diagrams

Traffic volume diagrams were prepared for I-40 between Exit 35 and Exit 47 and approved by TDOT on April 14, 2011. These traffic volume diagrams include the AM DHV, the PM DHV and the AADT for the horizon years 2014 and 2034. The traffic volumes include the calculated traffic volume projections and the total generated trips from full build-out of the Megasite and other assumed developments. The traffic volume diagrams are contained in **Appendix A**.

2.4 Discussion of Interchange Concepts

During the course of this study, a total of six (6) build interchange concepts were developed for evaluation. In addition, a no-build alternative was evaluated to determine the transportation impacts if no construction improvements are made to the study interchange. The following is a summary of the study concepts considered and evaluated include:

Table 2.3 – Description of Interchange Concepts

Concept No.	Description
Concept 1	Partial Traditional Diamond Interchange located to the east of the existing interchange.
Concept 2	Traditional Diamond Interchange located to the east of the existing interchange.
Concept 3	Diverging Diamond Interchange located to the east of the existing interchange.
Concept 4	Traditional Diamond Interchange located at the existing interchange.
Concept 5	Combined Traditional/Tight Diamond Interchange located at the existing interchange.
Concept 6	Traditional Diamond Interchange located to the west of the existing interchange.
-	No-Build Alternative

Cost estimates were prepared for the construction of all six (6) concepts. These cost estimates include the costs to construct a new S.R. 222 bridge over I-40 and the required modifications to S.R. 222 such as providing connections back to S.R. 222 on both the north and south sides of I-40. Concept figures and cost estimates including the breakdown details for the six (6) concepts are contained in **Appendix B** and **Appendix C**, respectively. All concept figures provide full interchange access for all traffic movements and show connections to public roads. The following is a description of these six (6) interchange concepts and the No-Build Alternative:

Concept 1 – Partial Traditional Diamond Interchange East of the Existing Interchange

This concept consists of constructing a new S.R. 222 bridge, perpendicular to I-40, approximately 500 feet east of the existing S.R. 222 bridge structure. A five (5) lane section for S.R. 222 is proposed with this concept that consists of two (2) travel lanes in each direction and a center left turn lane in each direction. An I-40 eastbound loop ramp is located in the southeast quadrant of the interchange for traffic heading north on S.R. 222 and an I-40 eastbound right turn ramp is located in the southwest quadrant of the interchange for traffic heading south on S.R. 222. The S.R. 222 improvements extend approximately 1,100 feet north from the northern ramp terminal intersection and 2,500 feet south from the southern ramp terminal intersection.

The loop ramp provides for improved access to the north side of the interchange for vehicular movements from the west. This is a critical movement for goods and supplies if the Megasite ntial Megasite development. This loop provides separation from other off-ramp movements and eliminates the need for signalization at this ramp terminal. Because of the loop ramp, the I-40 eastbound exit traffic movement will utilize a split along the exit ramp for the north/south direction. The will require an overhead sign truss and two (2) large guide signs that are not included in any of the other concepts.

On the north side of I-40, a field drive would be connected to Thorpe Drive since it is located within the proposed controlled access limits. On the south side of I-40, a separate roadway connection is provided from the existing S.R. 222 roadway to the relocated S.R. 222 roadway for access to the Pilot Travel Center and other nearby destinations. The existing wastewater treatment facility would be relocated with this concept or an alternative system provided. The estimated cost for Concept 1 is \$13.1 million.

Concept 2 – Traditional Diamond Interchange East of the Existing Interchange

This concept is similar to Concept 1 with the exception of eliminating the I-40 eastbound loop ramp located in the southeast quadrant of the interchange. As a result, this I-40 eastbound traffic movement must turn left via a signalized intersection in order to head north on S.R. 222. Similar to Concept 1, the existing wastewater treatment facility would need to be relocated or an alternative system provided. The estimated cost for Concept 2 is \$12.2 million.

Concept 3 – Diverging Diamond Interchange East of the Existing Interchange

This diverging diamond concept consists of constructing a new S.R. 222 bridge perpendicular to I-40 approximately 500 feet east of the existing S.R. 222 bridge structure. A four (4) lane section for S.R. 222 is proposed with this concept that consists of two (2) travel lanes in each direction separated by barrier. The left turn and right turn movements from both eastbound and westbound ramps consist of two (2) lanes each. The design of the Thorpe Drive intersection is similar to a divided highway intersection because S.R. 222 is divided through this location.

The design speed on S.R. 222 within the vicinity of the I-40 bridge area is reduced to twenty-five (25) miles per hour (mph). This speed restriction could be increased to thirty (30) mph by increasing the right-of-way impacts.

The S.R. 222 improvements extend approximately 1,200 feet north from the northern ramp terminal intersection and 2,500 feet south from the southern ramp terminal intersection. On the north side of I-40, a field drive would be connected to Thorpe Drive since it is located within the proposed controlled access limits. On the south side of I-40, a separate roadway connection is provided from the existing S.R. 222 roadway to the relocated S.R. 222 roadway for access to the Pilot Travel Center and other nearby destinations.

Similar to Concepts 1 and 2, the existing wastewater treatment facility would be relocated with this concept or an alternative system provided. The total estimated cost for Concept 3 is \$13.4 million.

Concept 4 – Traditional Diamond Interchange

This concept consists of rebuilding the S.R. 222 bridge at the same location on the same skew angle. Similar to Concept 1, a five (5) lane section for S.R. 222 is proposed with this concept that consists of two (2) travel lanes in each direction and a center left turn lane in each direction. The west side of S.R. 222 remains on the existing location due to the church and cemetery located on the south side of I-40 and all of the widening is along the east side of S.R. 222. Therefore, a separate roadway connection is provided from the existing S.R. 222 roadway for access to the Pilot Travel Center and other destinations on the south side of I-40. The existing businesses along the east side of S.R. 222 and their access to S.R. 222 would be greatly impacted and limited due to the construction of the separate roadway connection. These additional access challenges will require more direct negotiations with the Pilot Station and Deerfield Inn properties.

This concept also includes the widening S.R. 222 adjacent to the church/cemetery site in the southwest quadrant of the interchange. This concept does not eliminate the existing access connections along the west side of S.R. 222 (south side of I-40) currently within the controlled access limits. The S.R. 222 improvements extend approximately 700 feet north from the northern ramp terminal intersection and 1,800 feet south from the southern ramp terminal intersection. On the north side of I-40, a field drive would be connected to Thorpe Drive since it is located within the proposed controlled access limits. Since the proposed bridge is located at the same location of the existing bridge and being constructed under traffic, the estimated costs for the bridge structure include a 25% contingency. The total estimated cost for Concept 4 is \$13.8 million.

Concept 5 – Combined Traditional/Tight Diamond Interchange

This concept is similar to Concept 4 with two (2) exceptions: 1) the I-40 eastbound interchange ramp terminal intersection is relocated approximately 150 feet closer towards I-40, and 2) the separate roadway connection providing access to the Pilot Travel Center and other destinations on the south side of I-40 is eliminated. Overall, the I-40 westbound interchange ramp terminal intersection functions as a Traditional Diamond Interchange and the I-40 eastbound interchange ramp terminal intersection functions as a Tight Diamond Interchange. As with Concept 4, the west side of S.R. 222 remains on the existing location due to the church and cemetery located on the south side of I-40 and all of the widening is along the east side of S.R. 222. Similar to Concept 4, the S.R. 222 widening will create additional access challenges and will require more direct negotiations with the Pilot Station and Deerfield Inn properties.

In order to eliminate all access driveways within the controlled access limits, the first (or closest) driveway from I-40 to the Exxon gas station/convenience store is closed and the Deerfield Inn driveway is relocated approximately fifty (50) feet southward. The Exxon gas

station/convenience store has a third driveway that has been temporarily closed with bollards. The removal of these bollards would provide for a second driveway replacing the closed driveway.

This concept also includes widening S.R. 222 adjacent to the church/cemetery site in the southwest quadrant of the interchange. A lane add/drop situation occurs at the Hebron Road intersection, thus creating the four-lane typical section northward on S.R. 222. These S.R. 222 improvements reduce the construction impacts on S.R. 222 south of I-40 to approximately 1,400 feet south from the southern ramp terminal intersection. On the north side of I-40, a field drive would be constructed to Thorpe Drive since it is located within the proposed controlled access limits. Similar to Concept 4, the estimated costs for the bridge structure include a 25% contingency since the proposed bridge is located at the same location of the existing bridge and being constructed under traffic. The total estimated cost for Concept 5 is \$13.2 million.

Concept 6 – Traditional Diamond Interchange West of the Existing Interchange

This concept consists of constructing a new S.R. 222 bridge perpendicular to I-40, but approximately 1,500 feet west of the existing S.R. 222 bridge structure. The proposed S.R. 222 bridge over I-40 was relocated approximately 1,500 feet west of S.R. 222 in order to avoid the existing cemetery and keep the residential impacts to a minimum. Similar to most of the previous concepts, a five (5) lane section for S.R. 222 is proposed with this concept that consists of two (2) travel lanes in each direction and a center left turn lane in each direction.

The horizontal and vertical alignment geometry would be of concern as a result of the number of turns along the proposed route. The S.R. 222 improvements extend approximately 2,300 feet north from the northern ramp terminal intersection and 2,000 feet south from the southern ramp terminal intersection. On the south side of I-40, a separate roadway connection is provided from the existing S.R. 222 roadway to the relocated S.R. 222 roadway for access to the Pilot Travel Center and other nearby destinations. The total estimated cost for Concept 6 is \$11.9 million.

No-Build Alternative

No construction improvements are made to the study interchange. The no-build alternative is being considered as an option if the Megasite is not developed. However, if the Megasite is developed, then the interchange will require the upgrade improvements previously described in Concepts 1-6.

Other Options Considered during the Planning Process

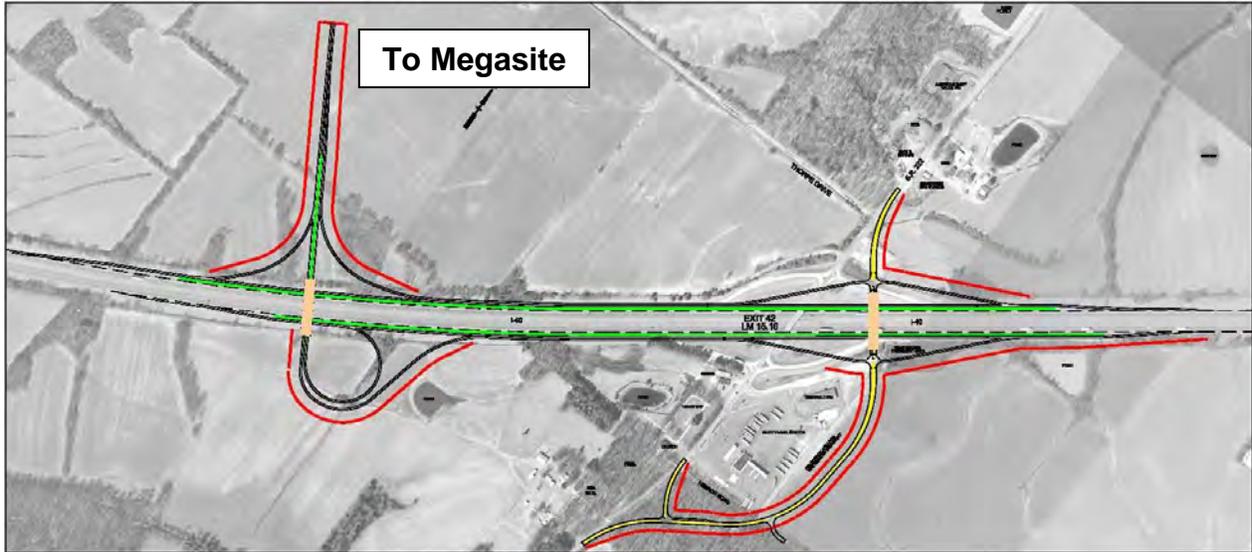
Two other options were considered during the planning process that focused on improving the existing S.R. 222 bridge and also providing direct access to the Megasite area. The following are brief descriptions of two (2) of these options:

Combination Interchange Option (with Shared Frontage Road between Interchanges):

This option, shown in **Figure 2.7**, consists of constructing a new trumpet interchange approximately two-thirds ($\frac{2}{3}$) mile west of the existing S.R. 222 interchange in conjunction with Concept 1. With this option, an assumption was made to assign 50% of the development traffic to the new trumpet interchange. As a result of the reduced traffic volume on S.R. 222, a three (3) lane section for S.R. 222 is shown with this option. A separate roadway connection is provided from the existing S.R. 222 roadway to the relocated S.R. 222 roadway for access to the Pilot Travel Center and other destinations on the south side of I-40. This option also consists of constructing auxiliary lanes (barrier separated) to link ramp movements between the new trumpet interchange and the ramps for the new S.R. 222 diamond interchange. The frontage

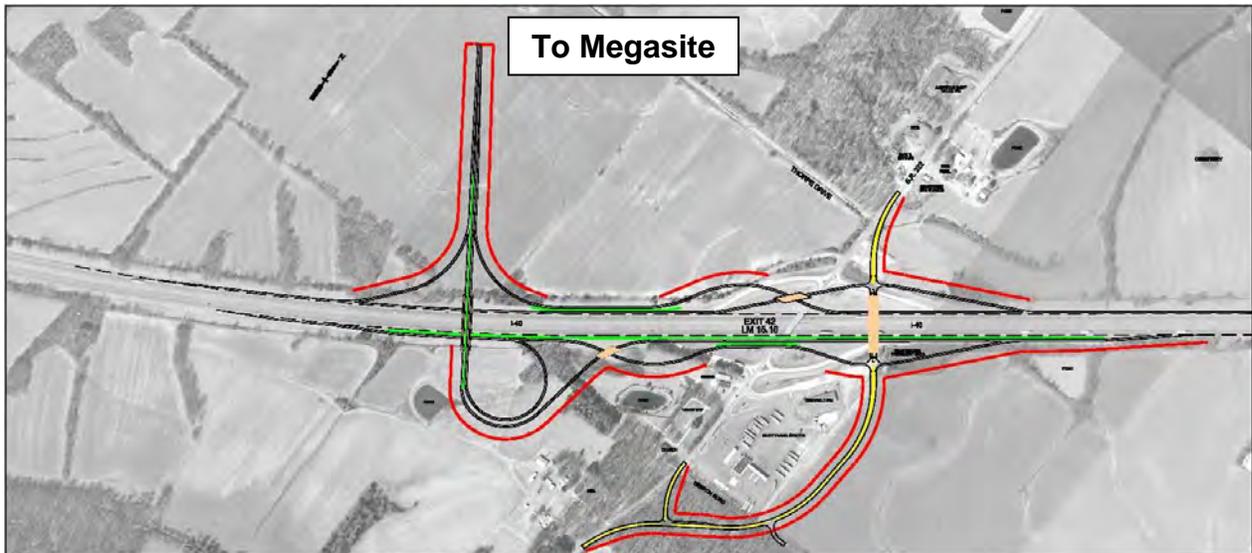
road weave distance between interchanges is 1500 feet (EB) and 2200 feet (WB). Because of the concern regarding the development of the Megasite, plus the extent of construction impacts and the weaving area impacts between interchanges, this option was eliminated from consideration.

Figure 2.7 – Combination Interchange Option (with Shared Frontage Road)



Combination Interchange Option (with Separate Frontage Roads between Interchanges):
This option, shown in **Figure 2.8**, is similar to the other option with the exception that the new trumpet interchange is located approximately one-half (½) mile west of the existing S.R. 222 interchange and the on/off ramp movements from each interchange are grade separated at the location where the two (2) ramps intersect. This option was eliminated from considerations for the same reasons previously listed in the other option.

Figure 2.8 – Combination Interchange Option (with Separate Frontage Roads)



3.0 ENGINEERING INVESTIGATION

3.1 Traffic Operations

Analysis was made to determine the potential impacts of proposed concept modifications to the existing interchange and the effect these changes may have on the Interstate system.

The capacity of a facility is defined in the Highway Capacity Manual (HCM) as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions. Any change in these conditions will result in a change in the capacity of a facility.

The analysis of highway capacity is a set of procedures used to estimate the traffic-carrying ability of facilities over a range of defined operational conditions known as level-of-service (LOS). LOS is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A LOS definition generally describes these operational conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. **Table 3.1** presents general descriptions for each LOS.

Table 3.1 – Level-of-Service (LOS) Description

LOS	Level-of-Service (LOS) Description
A	Free Flow operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The general level of physical and psychological comfort provided the driver is high.
B	Reasonably 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 high.
C	Flow with speeds at or near free flow. 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 because of additional vigilance required for safe operation.
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is noticeably limited. The driver experiences reduced physical and psychological comfort levels.
E	At the lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little or no 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 or no room to maneuver. The driver experiences poor levels of physical and psychological comfort.

Source: Highway Capacity Manual (2000), Transportation Research Board

The Highway Capacity Software (HCS) was used to obtain the capacity analysis LOS results presented in this study for different facility types: Basic Freeway Segments, Freeway Ramp Merges, Freeway Ramp Diverges, Multi-Lane Highways, Two-Lane Highways, Signalized Intersections, and Unsignalized Intersections. The HCS printouts for all of the capacity analyses can be found in **Appendix C** of this report.

Traffic Volumes

The project study area Annual Average Daily Traffic (AADT) Volumes and the Design Hour Volumes (DHV) for the horizon years 2014 and 2034 are shown in **Table 3.2**.

Table 3.2 – Traffic Volumes (Two-Way) and Truck Percentages

Type	Location	Segment	Traffic Volumes		Truck Pct.
			2014	2034	
AADT	I-40	West of Exit 35	44,420	62,340	35%
		Exit 35 to Exit 42	43,610	60,510	35%
		Exit 42 to Exit 47	38,820	55,560	35%
		East of Exit 47	36,850	53,510	35%
	S.R. 59 (Exit 35)	North of I-40	4290	5780	3%
		South of I-40	4440	5990	3%
	S.R. 222 (Exit 42)	North of I-40	14,490	15,960	10%
		I-40 to PTC ¹	13,220	16,250	48%
		South of PTC ¹	4940	6450	3%
	Dancyville Road (Exit 47)	North of I-40	1700	2040	2%
South of I-40		2530	3230	2%	
DHV AM Peak Period	I-40	West of Exit 35	4256	5992	
		Exit 35 to Exit 42	4125	5706	
		Exit 42 to Exit 47	3629	5194	
		East of Exit 47	3396	4937	
	S.R. 59 (Exit 35)	North of I-40	404	555	
		South of I-40	417	575	
	S.R. 222 (Exit 42)	North of I-40	1485	1503	
		I-40 to PTC ¹	673	791	
		South of PTC ¹	462	544	
	Dancyville Road (Exit 47)	North of I-40	199	250	
South of I-40		206	263		
DHV PM Peak Period	I-40	West of Exit 35	4353	6133	
		Exit 35 to Exit 42	4275	5935	
		Exit 42 to Exit 47	3845	5503	
		East of Exit 47	3652	5298	
	S.R. 59 (Exit 35)	North of I-40	384	531	
		South of I-40	398	549	
	S.R. 222 (Exit 42)	North of I-40	1327	1343	
		I-40 to PTC ¹	667	815	
		South of PTC ¹	400	500	
	Dancyville Road (Exit 47)	North of I-40	169	210	
South of I-40		212	273		

1. PTC is Pilot Travel Center.

I-40 Mainline Capacity Analyses

The project study area I-40 mainline capacity analysis results for the horizon years 2014 and 2034 are shown in **Table 3.3**.

**Table 3.3 – I-40 Mainline Capacity Analysis Results
(Existing Conditions)**

Location	Direction	Peak Period	2014	2034
West of Exit 35 (S.R. 59)	EB	AM	C	D
		PM	C	D
	WB	AM	C	D
		PM	C	D
Exit 35 (S.R. 59) to Exit 42 (S.R. 222)	EB	AM	C	D
		PM	C	D
	WB	AM	B	C
		PM	C	D
Exit 42 (S.R. 222) to Exit 47 (Dancyville Rd.)	EB	AM	B	C
		PM	C	D
	WB	AM	B	C
		PM	C	D
East of Exit 47 (Dancyville Rd.)	EB	AM	B	C
		PM	B	C
	WB	AM	B	C
		PM	B	C

I-40 Merge and Diverge Ramp Capacity Analyses

The I-40 merge/diverge ramp capacity analysis results are shown in **Table 3.4**.

**Table 3.4 – I-40 Merge and Diverge Ramps Capacity Analysis Results
(Existing Conditions)**

Location	Direction	Peak Period	2014	2034
MERGE RAMPS				
I-40 at Exit 35 (S.R. 59)	EB Entrance Ramp	AM	C	D
		PM	C	D
	WB Entrance Ramp	AM	C	D
		PM	C	E
I-40 at Exit 42 (S.R. 222)	EB Entrance Ramp	AM	C	D
		PM	C	D
	WB Entrance Ramp	AM	C	D
		PM	D	E
I-40 at Exit 47 (Dancyville Rd.)	EB Entrance Ramp	AM	B	C
		PM	C	D
	WB Entrance Ramp	AM	C	D
		PM	C	D
DIVERGE RAMPS				
I-40 at Exit 35 (S.R. 59)	EB Exit Ramp	AM	C	D
		PM	B	C
	WB Exit Ramp	AM	B	C
		PM	C	D
I-40 at Exit 42 (S.R. 222)	EB Exit Ramp	AM	B	C
		PM	B	C
	WB Exit Ramp	AM	B	C
		PM	B	C
I-40 at Exit 47 (Dancyville Rd.)	EB Exit Ramp	AM	B	C
		PM	B	C
	WB Exit Ramp	AM	B	C
		PM	B	C

I-40 Interchange Crossroads Mainline Capacity Analyses

The project study area I-40 interchange crossroads mainline capacity analysis results for the horizon years 2014 and 2034 are shown in **Table 3.5**.

**Table 3.5 – I-40 Interchange Crossroads Mainline Capacity Analysis Results
(Existing Conditions)**

Crossroad	Location	Direction	Peak Period	2014	2034
S.R. 59 (Exit 35) [Note: Two-Lane Analyses]	North of I-40	Two-Way	AM	C	C
			PM	B	C
	South of I-40	Two-Way	AM	C	C
			PM	C	C
S.R. 222 (Exit 42) [Note: Two-Lane Analyses]	North of I-40	Two-Way	AM	D	D
			PM	D	D
	I-40 to PTC ¹	Two-Way	AM	C	C
			PM	C	C
	South of PTC ¹	Two-Way	AM	C	C
			PM	B	C
S.R. 222 (Exit 42) [Note: Multilane Analyses]	North of I-40	NB	AM	B	B
			PM	A	A
		SB	AM	A	A
			PM	A	A
	I-40 to PTC ¹	NB	AM	A	A
			PM	A	A
		SB	AM	A	A
			PM	A	A
	South of PTC ¹	NB	AM	A	A
			PM	A	A
		SB	AM	A	A
			PM	A	A
Dancyville Road (Exit 47) [Note: Two-Lane Analyses]	North of I-40	Two-Way	AM	B	B
			PM	A	B
	South of I-40	Two-Way	AM	B	B
			PM	B	B

1. PTC is Pilot Travel Center.

2. The multilane capacity analysis results are shown by direction (NB/SB).

Ramp Terminal Intersections

The project study area ramp terminal intersection capacity analysis results were conducted for the horizon years 2014 and 2034. The SR 59 (Exit 35) and the Dancyville Road (Exit 47) intersection capacity analysis results are shown in **Table 3.6**.

**Table 3.6 – S.R. 59 (Exit 35) and the Dancyville Road (Exit 47)
Ramp Terminal Intersections Capacity Analysis Results
(Existing Conditions)**

Location	Approach	Peak Period	S.R. 59 (Exit 35) ¹		Dancyville Road (Exit 47) ¹		
			2014	2034	2014	2034	
I-40 EB Ramps ²	Overall	AM	N/A	N/A	N/A	N/A	
		PM					
	NB	AM	A	A	A	A	
		PM	A	A	A	A	
	SB	AM	A	A	A	A	
		PM	A	A	A	A	
	EB	AM	B	C	A	B	
		PM	B	C	A	B	
	I-40 WB Ramps ³	Overall	AM	N/A	N/A	N/A	N/A
			PM				
NB		AM	A	A	A	A	
		PM	A	A	A	A	
SB		AM	A	A	A	A	
		PM	A	A	A	A	
WB		AM	B	C	B	B	
		PM	B	C	B	B	

1. Unsignalized capacity analysis results.

The S.R. 222 (Exit 42) capacity analysis results for each concept are shown in **Table 3.7**. The proposed lanes for each concept are depicted graphically in **Appendix B**.

Table 3.7 – S.R. 222 (Exit 42) Ramp Terminal Intersections Capacity Analysis Results (Existing and Proposed Conditions)

Location	Approach and Movement		Peak Period	Interchange Types ¹							No-Build Alternative (Existing Conditions)	
				Proposed Conditions								
				Traditional Diamond				Diverging Diamond				
				Concept 1 (Mod. for EB Loop Ramp)		Concepts 2, 4, 5, 6		Concept 3				
				2014	2034	2014	2034	2014	2034	2014		
I-40/S.R. 222 EB Off/On-Ramp	Overall		AM			(B)	(B)	(B)	(B)	N/A	N/A	
			PM	N/A	N/A	(B)	(B)	(B)	(B)			
	Traffic Movement	NB Thru	AM	A	A	(B)	(B)	(B)	(B)	A	A	
			PM	A	A	(B)	(B)	(B)	(B)	A	A	
		SB ²	AM	A	A	(A)	(A)	(B)	(B)	A	A	
			PM	A	A	(A)	(A)	(B)	(B)	A	A	
		EB Left Turn	AM	N/A ⁴	N/A ⁴	(B)	(B)	(B)	(B)	F	F	
			PM			(B)	(B)	(B)	(B)	F	F	
		EB Right Turn	AM	B	B	(B)	(B)	(B)	(B)	--- ⁵	--- ⁵	
			PM	A	B	(B)	(C)	(B)	(B)			
I-40/S.R. 222 WB Off/On-Ramp	Overall		AM	(B)	(B)	(B)	(B)	(B)	(B)	N/A	N/A	
			PM	(B)	(B)	(B)	(B)	(B)	(B)			
	Traffic Movement	NB ³	AM	(A)	(A)	(A)	(A)	(B)	(C)	A	A	
			PM	(A)	(A)	(A)	(A)	(B)	(B)	B	B	
		SB Thru	AM	(B)	(B)	(B)	(B)	(B)	(B)	A	A	
			PM	(B)	(B)	(B)	(B)	(B)	(B)	A	A	
		WB Left Turn	AM	(B)	(B)	(B)	(B)	(B)	(B)	F	F	
			PM	(C)	(C)	(C)	(C)	(B)	(B)	F	F	
		WB Right Turn	AM	(C)	(C)	(C)	(C)	(B)	(B)	--- ⁵	--- ⁵	
			PM	(C)	(C)	(C)	(C)	(B)	(B)			

1. The signalized capacity analysis results are shown in parentheses.
2. The capacity analysis results shown represent the SB Left Turn Movement for the Traditional Diamond Interchange/No-Build concepts and the SB Thru Movement for the Diverging Diamond Interchange concept.
3. The capacity analysis results shown represent the NB Left Turn Movement for the Traditional Diamond Interchange/No-Build concepts and the NB Thru Movement for the Diverging Diamond Interchange concept.
4. The EB Left Turn Movement is free-flow utilizing a one-lane loop ramp to S.R. 222 NB.
5. The EB Right Turn Movement is included in the EB Left Turn Movement (Shared Lane) for the No-Build concept.

As shown in **Table 3.7**, all of the concepts provide LOS C or better capacity results for all traffic movements with the exception of the No-Build Alternative which produced LOS F capacity results.

S.R. 222/Pilot Travel Center Intersection

The project study area intersection capacity analysis results for the S.R. 222/Pilot Travel Center intersection was conducted for the horizon years 2014 and 2034. These intersection capacity analysis results are shown in **Table 3.8**.

**Table 3.8 – S.R. 222/Pilot Travel Center Intersection Capacity Analysis Results
(Proposed Conditions)**

Location	Approach	Peak Period	2014 ¹	2034 ¹
S.R. 222 at Pilot Travel Center	Overall	AM	N/A	N/A
		PM		
	NB	AM	A	A
		PM	A	A
	SB	AM	A	A
		PM	A	A
	WB	AM	B	B
		PM	B	B

1. Unsignalized capacity analysis results.
2. Existing geometry for the intersection: 1 NB Thru/Right Turn Shared Lane, 1 SB Left Turn/Thru Shared Lane, and 1 WB Left Turn/Right Turn Shared Lane.

3.2 Crash Analysis

The crash data used in this analysis was provided by TDOT and included reports from 2005 to 2007. A total of twenty-one (21) crashes were reported within the vicinity of the study interchange during this three (3) year period. Of these twenty-one (21) reported crashes, eight (8) occurred along I-40 and thirteen (13) occurred along S.R. 222. A summary of the I-40/S.R. 222 crash data is presented in **Table 3.9**.

As expected, the predominant types were right angle crashes (7) and rear end crashes (5). The overall severity damage totals included five (5) injury crashes with no incapacitating injury or fatal crashes.

Table 3.9 – I-40/S.R. 222 Crash Data Summary

Description	I-40			S.R. 222			Total	Pct. of Total
	2005	2006	2007	2005	2006	2007		
Rear End	1			2		2	5	23.8%
Right Angle		1		1	1	4	7	33.3%
Overturn			1				1	4.8%
Struck Bridge Rail/Guardrail		2	1	1			4	19.0%
Struck Other Object (Fixed)		1					1	4.8%
Struck Animal in Road			1	1			2	9.5%
Run off the Road				1			1	4.8%
INVOLVEMENT								
All Vehicles	2	5	3	9	2	12	33	
ROAD SURFACE								
Dry (No Adverse Conditions)	1	2	2	5	1	4	15	71.5%
Wet (Rain)			1	1		2	4	19.0%
Snow / Ice		2					2	9.5%
SEVERITY DAMAGE								
Property Damage Only		4	2	5	1	4	16	76.2%
Injury Crashes (No Fatalities)	1		1	1		2	5	23.8%
Incap. Injury Crashes (No Fatalities)							0	-
Fatality Crashes							0	-
Number of Injuries (All Crashes)	2		1	1		2	6	
Number of Fatalities (All Crashes)							0	
CRASH SUMMARY								
Total Crashes	1	4	3	6	1	6	21	100%
Percentage of Total	4.8%	19.0%	14.3%	28.6%	4.8%	28.6%		

3.3 S.R. 222 Bridge Inspection Report

The latest bridge inspection report was conducted on December 14, 2010. During this inspection, the overall condition of the study bridge was determined to be “Fair” and having a sufficiency rating of 63.2. Repairs to correct previously identified deficiencies to the bridge structure and the bridge rails were made in 2008.

3.4 Wastewater Treatment Facility

An existing wastewater treatment facility is located in the southeast quadrant of the I-40 at S.R. 222 interchange adjacent to the Deerfield Inn. This facility is owned by the Pilot Travel Center and serves both the Pilot Travel Center and the Deerfield Inn. This treatment facility consists of a series of septic tanks with sand filters, discharging to a pond adjacent to the right of way for I-40.

Concepts 1, 2, and 3 will require the relocation of this wastewater treatment facility. An area adjacent to the present location is available and noted on each of these three (3) concept figures contained in **Appendix B**. A representative of the Tennessee Department of Environment and Conservation (TDEC) stated that due to heavy vegetation around the pond and since there is no history of noted problems at this location, the facility is apparently functioning very efficiently and could be relocated with no anticipated problems. If a wastewater treatment system cannot be provided, a worst-case scenario of approximately \$7.0 million has been estimated by TDOT for the acquisition of two businesses (Pilot Travel Center and Deerfield Inn). However, this worst-case scenario should not be an issue and should be resolved in design especially with all of the various technologies available.

3.5 Interchange Concept Evaluation Summary

During the course of the study, the six (6) interchange concepts along with the No-Build Alternative, described in **Section 2.4**, were discussed with TDOT, FHWA, and the ECD. The design criteria considered included, but was not limited to, sight distance at ramp terminals, sufficient storage on the ramps, vertical clearance, pedestrian access through the interchange, length of acceleration/deceleration lanes, length of tapers, spacing between ramps, lane continuity, lane balance, and uniformity in interchange design and operational patterns. Through these discussions, two (2) concepts were determined to be viable while the four (4) others were removed from further consideration for a variety of reasons. A summary of these concepts are included in the following paragraphs.

Viable Concepts

Concepts 1 and 5, shown in **Figures 3.1 and 3.2** respectively, were determined viable for this study.

Concept 1 satisfies the travel demands of the interchange especially since the major traffic movement within the interchange (I-40 eastbound to S.R. 222 northbound) would be free-flow via a single lane loop ramp, as compared to Concept 2 that requires the signalization of this traffic movement. The total estimated cost for Concept 1 is \$13.1 million.

Concept 5 satisfies the 300 feet of controlled access limits for this interchange and does not include a separate frontage road paralleling S.R. 222, as compared to Concept 4. On the south side of the interchange, direct access to businesses south of I-40 is maintained in Concept 5, but two (2) existing driveways are affected along S.R. 222. These driveways include the closure of the first (or closest) driveway from I-40 to the Exxon gas station/convenience store along the west side of S.R. 222 and the relocation of the Deerfield Inn driveway approximately fifty (50) feet southward along the east side of S.R. 222. Even though this concept includes the widening of S.R. 222 adjacent to the church/cemetery site in the southwest quadrant of the interchange, all of the widening impacts are on the east side of S.R. 222 resulting in no construction impacts to the church/cemetery site. The total estimated cost for Concept 5 is \$13.2 million.

The No-Build Alternative was determined viable if the Megasite is not developed. If the Megasite is developed, then the No-Build Alternative is a non-viable concept because the capacity of the existing interchange will not be satisfied (LOS F conditions) in the future 2034 design year.

Between the viable construction concepts, TDOT and ECD both prefer Concept 1 since the I-40 eastbound to S.R. 222 northbound traffic movement would be free-flow via a single lane loop ramp and removed from signalization as required with Concept 5. This traffic movement is the highest turning movement within the interchange totaling 586 vehicles during the 2034 morning peak period.

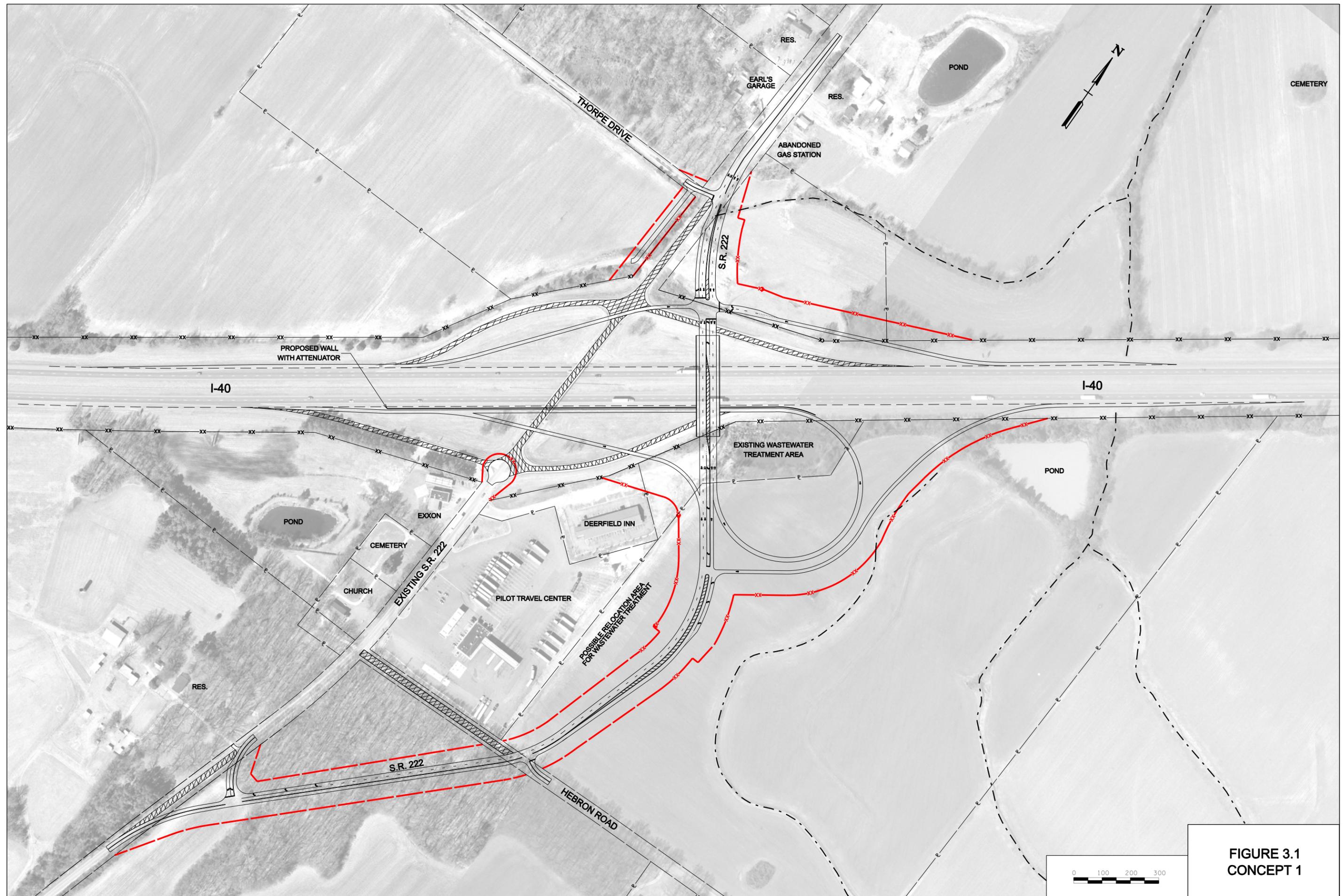
Non-Viable Concepts

Concept 2 (Traditional Diamond Interchange East of the Existing Interchange) was determined not viable and eliminated because the I-40 eastbound to S.R. 222 northbound traffic movement within the interchange must travel through a signalized intersection at the ramp terminal instead of the single lane free-flow loop ramp provided in Concept 1. This is the highest traffic movement within the study interchange and since it will be controlled through signalization in this concept, it would contain vehicular delays for this movement that would not be present in Concept 1. Safety considerations of this traffic driving through a signalized intersection vs. free-flow were also considered during the elimination process. As a result, this concept was removed from further consideration.

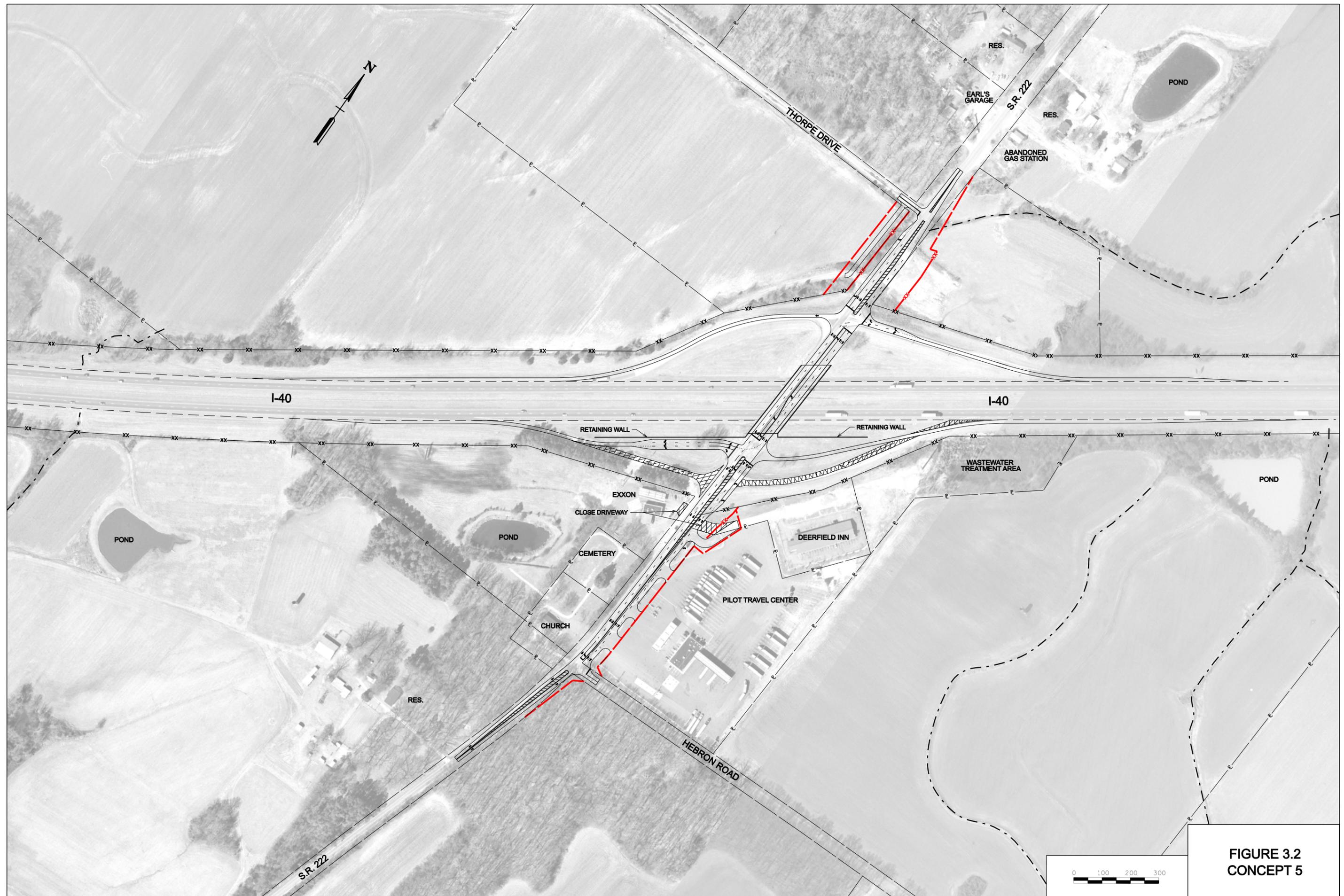
Concept 3 (Diverging Diamond Interchange East of the Existing Interchange) was determined not viable because the traffic patterns do not provide a good fit for a diverging diamond footprint, especially with both of the S.R. 222 left turn traffic volumes being less than 226 vehicles during the 2034 morning and afternoon peak periods. The major traffic movement is the I-40 eastbound to S.R. 222 northbound which would require signalization similar to Concept 2. The motorists speed would require being reduced through their navigation within the interchange. As a result, this concept was removed from further consideration.

Concept 4 (Traditional Diamond Interchange) was determined not viable because the 300 feet of controlled access limits for this interchange could not be achieved. On the south side of the interchange, direct access to businesses south of I-40 is maintained in Concept 4, but the 300 feet of controlled access limits for this interchange cannot be achieved along the west side of S.R. 222 south of the interchange. In order to meet the 300 feet of controlled access limits along the east side of S.R. 222 south of the interchange, a frontage road was developed that parallels S.R. 222 and intersects S.R. 222 about 400 feet south of Hebron Road. This frontage road requires the acquisition of right-of-way along the Pilot Travel Center property adjacent to S.R. 222 which includes business impacts such as parking and truck maneuverability within the site. This interchange concept is the same as Concept 5 with the exception that in Concept 5, the 300 feet of controlled access limits can be achieved with the relocation of the eastbound ramps closer to I-40 in conjunction with the closure/relocation of two (2) existing driveways. As a result, this concept was removed from further consideration.

Concept 6 (Traditional Diamond Interchange West of the Existing Interchange) was determined not viable. The main reason is that the horizontal and vertical alignment geometry would be of concern as a result of the number of turns required along the proposed route. As a result, this concept was removed from further consideration.



**FIGURE 3.1
CONCEPT 1**



**FIGURE 3.2
CONCEPT 5**

3.6 Access Analysis (FHWA Eight Policy Points)

This study is undertaken in accordance with the Federal Highway Administration's (FHWA) eight policy points as outlined in the document entitled "*Interstate System Access Informational Guide*". These eight policy points address the appropriate issues and provide the information necessary to allow the FHWA to make an informed decision considering the potential consequences of a change in access. The eight (8) policy points are listed below in *bulleted italics*, followed by the response as analyzed for this location.

1. *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

The request for upgrading the study interchange was initiated by the Tennessee Department of Economic and Community Development (ECD) on behalf of the Tennessee Valley Authority (TVA). The proposed improvements for the study interchange are essential to the development of the Megasite located on the north side of I-40 within the study area. The expected increases in both population and development activity related to the Megasite will reduce the traffic operating conditions to LOS F with the current interchange configuration (i.e. No-Build Alternative). It is crucial for this development of regional significance that a modified and improved interchange access be considered to preserve efficient traffic operations in the region. The current adjacent interchanges are too far way (approximately five (5) and seven (7) miles to the adjacent interchanges) to accommodate development traffic and the local routes by themselves will not accommodate the travel patterns, nor be the preferred routes, for the employment base, suppliers, and distributors.

During the latest bridge inspection, the overall condition of the study bridge was determined to be rated as fair with a sufficiency rating of 63.2. TDOT Structures Division has determined that the existing bridge consists of four (4) spans and is not a candidate for retrofit and needs to be replaced for the following reasons:

- Any new bridge would be a two (2) span structure for the safety of motorists travelling on I-40.
- A two (2) span structure would accommodate any future widening of I-40 without additional bridge modifications.
- The cost of widening the existing structure to accommodate the required travel lanes plus full shoulders would be greater than the cost of replacing the entire structure.

The ECD has agreed to provide 100% of the funding for the preparation of the Preliminary Engineering documents for the S.R. 222 construction improvements. Even though there are no confirmed developments for the Megasite, the ECD envisions that all of the paperwork including construction design documents be completed and are shovel-ready projects when a tenant for the Megasite is identified so that the roadway improvements can be in place in conjunction with the opening of the Megasite.

If the Megasite is developed, the Megasite will serve a regional need with primary access from I-40 via the Exit 42 interchange. All proposed improvements currently identified in the State/Regional Long Range Transportation Plan (LRTP) have been included in this study. In

conjunction with the development of the Megasite, additional improvements to S.R. 222 will be recommended to the north of the interchange study limits.

2. *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

This study area covered a sufficient area to allow for the evaluation of different types of interchange configurations such as a traditional diamond, a modified traditional diamond containing a loop ramp in one quadrant, a combined traditional/tight diamond, and a diverging diamond. In addition, this study included the evaluation of different intersection configurations such as stop control, signal control, and free right turns. The No-Build Alternative was also included in the analyses.

The location of the study interchange for the two (2) viable concepts is the best location as it is at or in extremely close proximity to the existing interchange location. The proposed improvements do not include pedestrian and bicycle accommodations at this time since such facilities are not currently provided along the existing S.R. 222 roadway system nor typical in this rural area.

Safety issues related to the existing interchange cannot be addressed through Transportation Systems Management (TSM) strategies. There is no mass transit service in the area of the interchange. HOV facilities are not available or planned along the I-40 mainline study area. The widening of I-40 to six (6) lanes may be constructed by the 2034 planning horizon. Even with the addition of I-40 mainline lanes, the functionality of the existing study interchange will be deficient without the proposed improvements.

3. *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).*

The 2014 and 2034 design traffic volumes analyzed in this study were approved by TDOT and a copy of the approval letter is contained in **Appendix A**. The capacity analyses conducted in this study utilized Highway Capacity Manual procedures and included the following facility types: Basic Freeway Segments, Freeway Ramp Merges, Freeway Ramp Diverges, Multi-Lane Highways, Two-Lane Highways, Signalized Intersections, and Unsignalized Intersections. The capacity analyses included the Pilot Travel Center intersection with S.R.222 because of the high percentage of trucks (48%) utilizing this facility. Results of the capacity analyses presented in **Section 3.1** indicate that no significant traffic operational issues are expected with construction improvements of the viable concepts (Concepts 1 and 5). The No-Build Alternative indicates that if no improvements are made to the study interchange, then LOS F traffic conditions will be expected if the Megasite is developed. All of the proposed improvements for each concept satisfactorily accommodate the 2014 and 2034 design traffic volumes. The results from the capacity analyses are summarized in **Tables 3.3 to 3.8**.

For the two (2) viable concepts, the proposed access point is either relocated approximately 500 feet eastward on I-40 (Concept 1) or at the same location (Concept 5). The adjacent I-40 interchanges, Exit 35 (S.R. 59) and Exit 47 (Dancyville Road), are approximately seven (7) miles to the west and five (5) miles to the east along I-40.

In addition, a proposed interchange discussed in **Section 1.4** is located between the study interchange and Exit 47 (Dancyville Road) approximately 1.1 miles east of the study interchange. As a result of this distance, the existing adjacent interchanges, as they relate to this proposed interchange, are outside the influence of traffic weaving conditions along I-40.

The proposed interchange access provides connections to S.R. 222 and other public roads in the vicinity of the interchange such as Hebron Road and Thorpe Drive and will not require upgrading of those facilities. The proximity of both Hebron Road and Thorpe Drive do not contribute to any safety and operational problems associated with the study interchange. On both the north and south sides of the study interchange, the 300 feet of controlled access limits are satisfied for the two (2) viable concepts (Concepts 1 and 5).

The State Strategic Highway Safety Plan was used as a benchmark on safety for this study. However, as mentioned in Policy Point 2, the proposed improvements do not include pedestrian and bicycle accommodations because such facilities are not currently provided in the existing roadway system. In addition, a conceptual signing plan for Concepts 1 and 5 are contained in **Appendix B**. The conceptual signing plan for Concept 1 shows that the I-40 eastbound will require the use of A and B exits to distinguish between S.R. 222 northbound and southbound traffic movements.

- 4. The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The existing study interchange currently serves, and the proposed improvements will provide for all traffic movements for full interchange access. The proposed improvements secure sufficient ROW by utilizing either available existing ROW or through the acquisition of proposed ROW. Concepts 1 and 5 require the approximate ROW acquisition of 25.5 acres and 2.2 acres, respectively.

As mentioned in Policy Point 3, the proposed interchange access provides connections to S.R. 222 and other public roads in the vicinity of the interchange such as Hebron Road and Thorpe Drive and meets and/or exceeds current design standards for the Interstate System. No design exceptions are anticipated with either Concept 1 or Concept 5. All traffic movements have been analyzed during the 2014 and 2034 design years for each concept and have been summarized in **Table 3.7**.

- 5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

This study includes coordination with other projects as discussed in **Section 1.4** and the proposed improvements are consistent and conform with applicable local, regional, and statewide land use and transportation plans. The study interchange is in the current 2012-14 TIP (TDOT Proposed Comprehensive Multimodal Program) funded for ROW in FY 2013.

The location of the study interchange is not within a Transportation Management Area (TMA) and is not within a non-attainment area for air quality. As mentioned in Policy Point 3, the proposed access point for the two (2) viable concepts is either relocated approximately 500 feet eastward on I-40 (Concept 1) or at the same location (Concept 5).

- 6. In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

This study does not preclude or affect future access points along I-40 and the proposed improvements satisfy the future needs for the study interchange. However, if the Megasite is developed and the travel demand of the Megasite exceeds the capacity of these proposed interchange improvements, the potential construction of the new interchange near Mile Marker 45, shown in **Figure 1.5**, could be considered in the future.

- 7. When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).*

This study was coordinated with the adjacent Megasite area because of its close proximity to the study interchange. **Table 2.2** summarizes the trips generated for the Megasite which were considered conservative and a worst-case scenario. The improvements recommended in this study interchange are integral to adequately accommodating projected traffic volumes and operations if the Megasite is developed.

As mentioned in Policy Point 3, the proposed improvements in this study are compatible and provide adequate tie-in connections to the existing street network. As discussed in **Section 1.4**, this study has been coordinated with the S.R. 222 Relocation & System Improvements Feasibility Study to ensure that the immediate and long-term needs of the study area will be met. In addition, if the potential interchange near Mile Marker 45 is constructed, a State Industrial Access (SIA) road to the Megasite will be necessary to access S.R. 222 on the north side of the study interchange as shown in **Figure 1.5**. The location of the SIA road will have no direct impacts to the operations of the study interchange because of their proposed distance apart from each other.

There are no pre-condition contingencies related to the adjacent projects that are required for this study. In addition, this study does not require financial or infrastructure commitments from other agencies, organizations, or private entities.

8. *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

This study was developed in coordination with TDOT and documents the expected impacts and benefits from modifying the existing I-40 interchange at Exit 42 (S.R. 222). If the Megasite is developed and with the proposed modifications contained in this IMS report, the overall traffic operations at the study interchange can be adequately accommodated through the 20-year horizon year (2034).

As mentioned in Policy Point 5, this study is consistent with the current 2012-14 STIP (TDOT Proposed Comprehensive Multimodal Program) funded for ROW in FY 2013. The known environmental issues are provided in **Section 2.2**. When this study receives a finding of Operational and Engineering Acceptability, it will then be necessary to begin conducting additional environmental studies as outlined in the NEPA planning process.

The FHWA Prompt-List for Reviewing Interstate Access Requests for Concepts 1 and 5 are provided on the following pages.

Concept 1 Review

Prompt List for Review of Interstate System Access Change Requests		
Adequately Addressed?		FHWA Interstate Access Policy Points
Yes	No	
X		Policy Point 1: The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).
X		Policy Point 2: The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).
X		Policy Point 3: An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).
X		Policy Point 4: The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).
X		Policy Point 5: The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.
X		Policy Point 6: In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).
X		Policy Point 7: When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).
X		Policy Point 8: The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Concept 1 Review

Policy Point 1: “The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request clearly describe the need and purpose of the proposal and identify project goals and objectives that are specific and measurable?	<i>Sect. 1.2 and 3.6 (PP1)</i>
X			Is the proposal in the best interest of the public, or does it merely serve a narrow interest?	<i>Sect. 1.2 (P1) and 3.6 (PP1)</i>
X			Is the proposal serving a regional transportation need, or is it merely compensating for deficiencies in the local network of arterials and collectors?	<i>Sect. 1.2 (P1) and 3.6 (PP1)</i>
		X	In lieu of granting new access, is there any reasonable alternative consisting of improvements to the existing roadway(s) or adjacent access points that could serve the need and purpose?	<i>This request is for modification of an existing interchange.</i>
X			Has the evaluation of existing interchanges and the local road network taken into account all proposed improvements currently identified in the State and/or Regional Long Range Plan?	<i>Sect. 3.6 (PP5-P1)</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange?	<i>Sect. 1.4 (SR 222 Study), 2.4, and 3.6 (PP1-P3); Fig. 3.1 and 3.2; App. B</i>
Policy Point 2: “The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Was FHWA actively involved in preliminary studies and decisions? If not, then more detailed information may be required in support of proposed action.	<i>FHWA attended a design concept meeting at TDOT on 8/23/2010. Sect. 3.5 (P1)</i>
X			Did the study area cover sufficient area to allow for an evaluation of all reasonable alternatives?	<i>Sect. 1.3 (P3), 2.4 (Traffic Volume Diagrams), and 3.6 (PP2); Fig. 1.1</i>
X			Was a No-Build Alternative evaluated?	<i>Sect. 2.4 (P1)(No-Build Alternative), 3.1 (Ramp Terminal Intersections), 3.5 (Viable Concepts), 3.6 (PP2-P1)(PP3-P1), and 4.0 (P1&P2); Tables 2.3 and 3.7</i>
X			Considering the context of the proposal, is this the best location for the proposed new interchange?	<i>Sect. 3.5 (P1) and 3.6 (PP2-P2)</i>
X			Were different interchange configurations (Tight diamond, SPDI, Parclo) considered?	<i>AASHTO Greenbook Chapter 10 Sect. 2.4 (Concepts) and 3.6 (PP2-P1); Table 2.3</i>
X			Were pedestrians and bicyclists considered in the alternative evaluation?	<i>Sect. 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			Was there an evaluation of different intersection configurations (stop control, signal, roundabout, free right turns, etc?)	<i>Sect. 3.1 (P4) and 3.6 (PP2-P1); Tables 3.7 and 3.8</i>
X			Have Transportation Systems Management (i.e. HOV, ITS, Ramp Metering, Transit etc.) options been evaluated as an alternative to a new or modification to an existing interchange?	<i>This request is for modification of an existing interchange. Sect. 3.6 (PP2-P3)</i>

Concept 1 Review

X			Did the report discuss how TSM alternatives were evaluated and eliminated from consideration?	<i>Sect. 3.6 (PP2-P3)</i>
	X		Does the proposal consider any future planned TSM strategies and is the design consistent with the ability to implement the future TSM strategies?	<i>The design is consistent with future TSM strategies, but none were considered in the study.</i>
<p>Policy Point 3: “An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).”</p>				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the report demonstrate that a proper traffic operational analysis was conducted? The analysis should include the applicable basic freeway segments, freeway weaving segments, freeway ramp segments, ramp junctions and crossroad intersections related to the proposed access point and at least the two adjacent interchanges.	<i>Sect. 3.1(P4) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			Does the report include a safety analysis of the mainline, ramps and intersections of the proposed access point and the nearest adjacent interchange (provided they are near enough that it is reasonable to assume there may be impacts)?	<i>Sect. 3.1 (P4), 3.5 (P1), and 3.6 (PP3-P1&P2); Tables 3.3-3.8</i>
X			Has the design traffic volume been validated?	<i>Sect. 2.3 (P1) and 3.6 (PP3-P1)</i>
X			Does the report include verification that the data used in the traffic analysis is consistent with the traffic and air quality models MPOs use to develop their current Transportation Plan (20-year) and Transportation Improvement Program (TIP)?	<i>Sect. 2.3 (P1); App. A</i>
X			Does the report include a design period of 20 years commencing at the time of project approval (PS&E approval)?	<i>Sect. 2.3 (Horizon Years and Time Periods Analyzed)</i>
X			Does the report include quantitative analyses and results to identify operational differences between alternatives that are heavily congested?	<i>Sect. 3.1 (Ramp Terminal Intersections) and 3.6 (PP2-P1); Table 3.7</i>
X			Has a conceptual signing plan been provided?	<i>Viable Concepts 1&5; Sect. 3.6 (PP3-P4); App. B</i>
X			Is guidance signing (i.e., way-finding or trail blazing signs) clear and simple?	MUTCD Chapter 2E: Guide Signs – Freeways and Expressways <i>Sect. 3.6 (PP3-P4)</i>
	X		Do the results of the operational analysis result in a significant adverse impact to existing or future conditions?	<i>Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange? If so, have impacts to the local network been disclosed and fully evaluated?"	<i>SR 222 would be upgraded as part of the Megasite development.</i> <i>Sect. 2.4 (P2) and 3.6 (PP1-P3)</i>

Concept 1 Review

X			Are the cross roads or adjacent surface level roads and intersections affected by the proposed access point analyzed to the extent (length) where impacts caused or affecting the new proposed access point are disclosed to the appropriate managing jurisdiction?	<i>Sect. 3.6 (PP3-P3) and 4.1 (Local Agency Letters)</i>
X			Are pedestrian and/or bicycle facilities included (as appropriate) and do these facilities provide for reasonable accommodation?	<i>Sect. 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			Does the proposed access secure sufficient Limits of Access adjacent to the Interchange ramps?	AASHTO's "A Policy on Design Standards Interstate System, 2005" Pg. 2; NCHRP Synthesis 332 <i>Sect. 2.4 (P2), 3.5 (P4), and 3.6 (PP4-P2)</i>
X			Does the proximity of the nearest crossroad intersections to the ramps contribute to safety or operational problems? Can they be mitigated??	<i>Sect. 2.4 (Concepts), 3.1, and 3.6 (PP3-P3)</i>
		X	In addition to HCS, what analysis tools were employed and were they appropriate?	<i>HCS only.</i>
X			Has the proposal distinguished between nominal safety (i.e. adherence to design policies and standards) and substantive safety (actual and expected safety performance)?	<i>Safety was considered throughout the study in the development of the concepts. Fig. 3.1 and 3.2; App. B</i>
X			Will any individual elements within the recommended alternative be degraded operationally as a result of this action? If yes, are reasons provided to accept them?	<i>Acceptable LOS were obtained from the capacity analysis results. Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			In evaluating whether the proposal has a "significant adverse impact" on safety, has the State Strategic Highway Safety Plan been used as a benchmark?	<i>Safety was considered throughout the study in the development of the concepts. Sect. 3.6 (PP3-P4); Fig. 3.1 and 3.2; App. B</i>
X			Are the proposed interchange design configurations able to satisfactorily accommodate the design year traffic volumes?	<i>Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			If the project is to be built in stages, has the traffic operational and safety analyses considered the interim stages of the proposal?	<i>Project is being built in one stage.</i>
Policy Point 4: "The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d))."				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the proposed access connect to a public road?	<i>Sect. 2.4 (P2), 3.5 (P1), 3.6 (PP3-P3), and 3.6 (PP4-P2); Fig. 3.1 and 3.2; App. B</i>
X			Are all traffic movements for full interchange access provided?	<i>Sect. 2.4 (P2), 3.5, and 3.6 (PP4-P1); Fig. 3.1 and 3.2; App. B</i>
		X	If not, is the proposed access for special purposes such as transit vehicles, HOVs, and/or a park and ride lot?	<i>Providing for a full interchange.</i>
		X	If a partial interchange is proposed, is there sufficient justification for providing only a partial interchange?	AASHTO Greenbook 2004 Pg. 821-823 <i>Providing for a full interchange.</i>
		X	If a partial interchange is proposed; was a full interchange evaluated as an alternative and is there sufficient justification to eliminate or discard it?	<i>Providing for a full interchange.</i>

Concept 1 Review

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
		X	Is sufficient ROW available (or being acquired) to provide a full interchange at a future date (staged construction)?	<i>Providing for a full interchange.</i>
		X	Are you comfortable with how the missing movements will be accommodated on the surface streets and adjacent interchanges?	<i>Providing for a full interchange.</i>
X			Does FHWA support the selection of design controls/criteria and desired operational goals?	<i>Sect. 2.4 (Concepts), 3.1 (Capacity Analysis Results), 3.5 (P1), and 3.6 (PP4-P2); Tables 3.3-3.8</i>
X			Does the proposed access meet or exceed current design standards for the Interstate System?	AASHTO’s Greenbook and A Policy on Design Standards Interstate System, 2005 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
		X	If not, have anticipated design exceptions been identified and reviewed (at least conceptually)?	<i>Concept meets current design standards</i>
		X	If expected design exceptions could have significant operational impacts on the Interstate and/or Crossroad system, are mitigation measures described?	<i>Concept meets current design standards</i>
X			Will the length of access control along the crossroad provide for acceptable operations and safety? (100-300' is a minimum. Additional access control is strongly encouraged when needed for safety and operational enhancement)	AASHTO "A Policy on Design Standards Interstate System" 2005 <i>Sect. 2.4 (P2), 3.5 (P4), and 3.6 (PP4-P2)</i>
X			Does FHWA support selection of opening and design years?	<i>Sect. 2.3 (Horizon Year and Time Periods Analyzed)</i>
X			Has each movement of the proposal been "tested" for ease of operation?	AASHTO Greenbook 2004 Pg. 863 <i>Sect. 2.4 (Concepts), 3.1 (Capacity Analysis Results), 3.6 (PP3-P1), and 3.6 (PP4-P2); Table 3.7</i>
Have all design criteria (including but not limited to the following) been adequately addressed?				
X			a. Sight distance at ramp terminals (Don't overlook signal heads obscured by structures.)	AASHTO Greenbook 2004 Pg. 841 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			b. Sufficient storage on ramp to prevent queues from spilling on to the Interstate (based on current and/or future projected traffic demand)	<i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			c. Vertical clearance	AASHTO "A Policy on Design Standards Interstate System" 2005 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			d. Pedestrian access through the interchange	AASHTO Greenbook 2004 Pg. 864 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			e. Length of acceleration/deceleration lanes	AASHTO Greenbook 2004 Pg. 823, 847 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>

Concept 1 Review

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			f. Length of tapers	AASHTO Greenbook 2004 Pg. 849 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			g. Spacing between ramps	Greenbook pg 843 & Ex. 10-68 and operational analysis <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			h. Lane continuity	AASHTO Greenbook 2004 Pg. 810 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			i. Lane balance	AASHTO Greenbook 2004 Pg. 810 AASHTO Greenbook 2004 Pg. 807 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			j. Uniformity in interchange design and operational patterns (i.e. right-side ramps, exit design consistent w/adjacent interchanges)	<i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
Policy Point 5: “The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the IJR discuss or include (as appropriate) other project(s), studies or planned actions that may have an effect on the report analysis results?	<i>Sect. 1.4 (4 Projects Listed) and 3.6 (PP5-P1)</i>
X			Does the project conform to the local planning, MPO or other related plans?	<i>Sect. 3.6 (PP5-P1)</i>
		X	Does the report include an endorsement of land use plans by the appropriate government entity before it is utilized for traffic generation purposes?	<i>Existing land use is rural agriculture</i>
X			Is the access request located within a Transportation Management Areas? (TMAs are metropolitan areas of 200,000 or more in population)	http://hepgis.fhwa.dot.gov/hepgis_v2/Urbanboundaries/Map.aspx <i>Sect. 3.6 (PP5-P2)</i>
X			Is the access request located within a non-attainment area for air quality? (requests for access in a non-attainment or maintenance areas for air quality must be a part of a conforming transportation plan)	<i>Sect. 3.6 (PP5-P2)</i>
X			Is the project included in the TIP/STIP and LRTP?	<i>Sect. 3.6 (PP5-P1)</i>
X			Is the access point covered as a part of an Interstate corridor study or plan? (<i>especially important for areas where the potential exists for construction of future adjacent interchanges</i>)	<i>Sect. 3.6 (PP5-P2)</i>
Policy Point 6: “In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		

Concept 1 Review

Y	N	N/A		
X			Is it possible that new interchange(s) not addressed in the IJR could be added within an area of influence to the proposed access point? (If so, could the proposal preclude or otherwise be affected by any future access points?)	<i>Sect. 3.6 (PP6-P1&P2)</i>
		X	Does the IJR report include the traffic volumes generated by any future additional interchanges within a vicinity of influence that are proposed?	<i>No planned future interchanges.</i>
X			Does the IJR report fail to include any other proposed interstate access points within a vicinity of influence that are being proposed or are in the current long range construction program?	<i>Sect. 1.4 (1 Potential Project Listed) and 3.6 (PP6-P1&P2)</i>
Policy Point 7: “When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request adequately demonstrate that an appropriate effort of coordination has been made with appropriate proposed developments?	<i>Sect. 2.3 (Megasite and Other Assumed Developments) and 3.6 (PP7-P1); Table 2.2</i>
X			Are the proposed improvements compatible with the existing street network or are other improvements needed?	<i>Sect. 2.4 (Concepts), 3.1, and 3.6 (PP3-P3); Fig. 3.1 and 3.2; App. B</i>
X			Are there any pre-condition contingencies required in regards to the timing of other improvements?	<i>Sect. 3.6 (PP7-P3)</i>
X			Have all commitments to improve the local transportation network been included in a TIP/STIP/LRTP prior to the Interstate access approval (final approval of NEPA document)?	<i>Sect. 1.4 (P1) and 3.6 (PP7-P2)</i>
		X	If pre-condition contingencies are required, are pertinent parties in agreement with these contingencies and is this documented?	<i>No pre-conditions are required.</i>
		X	If the proposed improvements are founded on the need for providing access to new development, are appropriate commitments in place to ensure that the development will likely occur as planned?	<i>No commitments are required.</i>
		X	If project is privately funded, are appropriate measures in place to ensure improvements will be completed if the developer is unable to meet financial obligations?	<i>Project is not privately funded.</i>
X			If the purpose and need to accommodate new development/traffic demands aren't fully known, is a worst case scenario used for future traffic?	<i>Sect. 2.3 and 3.6 (PP7-P1); Table 2.2</i>
X			Does the project require financial or infrastructure commitments from other agencies, organizations, or private entities?	<i>Sect. 3.6 (PP7-P3)</i>
Policy Point 8: “The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Are there any known social or environmental issues that could affect the proposal?	<i>Sect. 2.2 (P1&P2) and 3.6 (PP8-P2)</i>
X			Is the project consistent with the current TIP/STIP and LRTP and/or proposed amendments to the plan?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>
X			Although NEPA is a separate action, is an environmental overview for the proposed improvements included?	<i>Sect. 2.2 (P2) and 3.6 (PP8-P2)</i>

Concept 1 Review

X			Is it appropriate to emphasize to the project stakeholders that the access approval will be handled as a two-step process? (i.e. Step 1: Engineering and Operational Acceptability and Step 2: Environmental Approvals)	<i>Sect. 3.6 (PP8-P2)</i>
X			Are all funding commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>
X			Are all commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>

Reference Location Legend: P# = Paragraph Number; PP# = Policy Point Number

Concept 5 Review

Prompt List for Review of Interstate System Access Change Requests		
Adequately Addressed?		FHWA Interstate Access Policy Points
Yes	No	
X		Policy Point 1: The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).
X		Policy Point 2: The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).
X		Policy Point 3: An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).
X		Policy Point 4: The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).
X		Policy Point 5: The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.
X		Policy Point 6: In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).
X		Policy Point 7: When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).
X		Policy Point 8: The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Concept 5 Review

Policy Point 1: “The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request clearly describe the need and purpose of the proposal and identify project goals and objectives that are specific and measurable?	<i>Sect. 1.2 and 3.6 (PP1)</i>
X			Is the proposal in the best interest of the public, or does it merely serve a narrow interest?	<i>Sect. 1.2 (P1) and 3.6 (PP1)</i>
X			Is the proposal serving a regional transportation need, or is it merely compensating for deficiencies in the local network of arterials and collectors?	<i>Sect. 1.2 (P1) and 3.6 (PP1)</i>
		X	In lieu of granting new access, is there any reasonable alternative consisting of improvements to the existing roadway(s) or adjacent access points that could serve the need and purpose?	<i>This request is for modification of an existing interchange.</i>
X			Has the evaluation of existing interchanges and the local road network taken into account all proposed improvements currently identified in the State and/or Regional Long Range Plan?	<i>Sect. 3.6 (PP5-P1)</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange?	<i>Sect. 1.4 (SR 222 Study), 2.4, and 3.6 (PP1-P3); Fig. 3.1 and 3.2; App. B</i>
Policy Point 2: “The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Was FHWA actively involved in preliminary studies and decisions? If not, then more detailed information may be required in support of proposed action.	<i>FHWA attended a design concept meeting at TDOT on 8/23/2010. Sect. 3.5 (P1)</i>
X			Did the study area cover sufficient area to allow for an evaluation of all reasonable alternatives?	<i>Sect. 1.3 (P3), 2.4 (Traffic Volume Diagrams), and 3.6 (PP2); Fig. 1.1</i>
X			Was a No-Build Alternative evaluated?	<i>Sect. 2.4 (P1)(No-Build Alternative), 3.1 (Ramp Terminal Intersections), 3.5 (Viable Concepts), 3.6 (PP2-P1)(PP3-P1), and 4.0 (P1&P2); Tables 2.3 and 3.7</i>
X			Considering the context of the proposal, is this the best location for the proposed new interchange?	<i>Sect. 3.5 (P1) and 3.6 (PP2-P2)</i>
X			Were different interchange configurations (Tight diamond, SPDI, Parclo) considered?	<i>AASHTO Greenbook Chapter 10 Sect. 2.4 (Concepts) and 3.6 (PP2-P1); Table 2.3</i>
X			Were pedestrians and bicyclists considered in the alternative evaluation?	<i>Sect. 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			Was there an evaluation of different intersection configurations (stop control, signal, roundabout, free right turns, etc?)	<i>Sect. 3.1 (P4) and 3.6 (PP2-P1); Tables 3.7 and 3.8</i>
X			Have Transportation Systems Management (i.e. HOV, ITS, Ramp Metering, Transit etc.) options been evaluated as an alternative to a new or modification to an existing interchange?	<i>This request is for modification of an existing interchange. Sect. 3.6 (PP2-P3)</i>

Concept 5 Review

X			Did the report discuss how TSM alternatives were evaluated and eliminated from consideration?	<i>Sect. 3.6 (PP2-P3)</i>
	X		Does the proposal consider any future planned TSM strategies and is the design consistent with the ability to implement the future TSM strategies?	<i>The design is consistent with future TSM strategies, but none were considered in the study.</i>
<p>Policy Point 3: “An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).”</p>				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the report demonstrate that a proper traffic operational analysis was conducted? The analysis should include the applicable basic freeway segments, freeway weaving segments, freeway ramp segments, ramp junctions and crossroad intersections related to the proposed access point and at least the two adjacent interchanges.	<i>Sect. 3.1(P4) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			Does the report include a safety analysis of the mainline, ramps and intersections of the proposed access point and the nearest adjacent interchange (provided they are near enough that it is reasonable to assume there may be impacts)?	<i>Sect. 3.1 (P4), 3.5 (P1), and 3.6 (PP3-P1&P2); Tables 3.3-3.8</i>
X			Has the design traffic volume been validated?	<i>Sect. 2.3 (P1) and 3.6 (PP3-P1)</i>
X			Does the report include verification that the data used in the traffic analysis is consistent with the traffic and air quality models MPOs use to develop their current Transportation Plan (20-year) and Transportation Improvement Program (TIP)?	<i>Sect. 2.3 (P1); App. A</i>
X			Does the report include a design period of 20 years commencing at the time of project approval (PS&E approval)?	<i>Sect. 2.3 (Horizon Years and Time Periods Analyzed)</i>
X			Does the report include quantitative analyses and results to identify operational differences between alternatives that are heavily congested?	<i>Sect. 3.1 (Ramp Terminal Intersections) and 3.6 (PP2-P1); Table 3.7</i>
X			Has a conceptual signing plan been provided?	<i>Viable Concepts 1&5; Sect. 3.6 (PP3-P4); App. B</i>
X			Is guidance signing (i.e., way-finding or trail blazing signs) clear and simple?	MUTCD Chapter 2E: Guide Signs – Freeways and Expressways <i>Sect. 3.6 (PP3-P4)</i>
	X		Do the results of the operational analysis result in a significant adverse impact to existing or future conditions?	<i>Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange? If so, have impacts to the local network been disclosed and fully evaluated?"	<i>SR 222 would be upgraded as part of the Megasite development.</i> <i>Sect. 2.4 (P2) and 3.6 (PP1-P3)</i>

Concept 5 Review

X			Are the cross roads or adjacent surface level roads and intersections affected by the proposed access point analyzed to the extent (length) where impacts caused or affecting the new proposed access point are disclosed to the appropriate managing jurisdiction?	<i>Sect. 3.6 (PP3-P3) and 4.1 (Local Agency Letters)</i>
X			Are pedestrian and/or bicycle facilities included (as appropriate) and do these facilities provide for reasonable accommodation?	<i>Sect. 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			Does the proposed access secure sufficient Limits of Access adjacent to the Interchange ramps?	AASHTO's "A Policy on Design Standards Interstate System, 2005" Pg. 2; NCHRP Synthesis 332 <i>Sect. 2.4 (P2), 3.5 (P4), and 3.6 (PP4-P2)</i>
X			Does the proximity of the nearest crossroad intersections to the ramps contribute to safety or operational problems? Can they be mitigated??	<i>Sect. 2.4 (Concepts), 3.1, and 3.6 (PP3-P3)</i>
		X	In addition to HCS, what analysis tools were employed and were they appropriate?	<i>HCS only.</i>
X			Has the proposal distinguished between nominal safety (i.e. adherence to design policies and standards) and substantive safety (actual and expected safety performance)?	<i>Safety was considered throughout the study in the development of the concepts. Fig. 3.1 and 3.2; App. B</i>
X			Will any individual elements within the recommended alternative be degraded operationally as a result of this action? If yes, are reasons provided to accept them?	<i>Acceptable LOS were obtained from the capacity analysis results. Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			In evaluating whether the proposal has a "significant adverse impact" on safety, has the State Strategic Highway Safety Plan been used as a benchmark?	<i>Safety was considered throughout the study in the development of the concepts. Sect. 3.6 (PP3-P4); Fig. 3.1 and 3.2; App. B</i>
X			Are the proposed interchange design configurations able to satisfactorily accommodate the design year traffic volumes?	<i>Sect. 3.1 (Capacity Analysis Results) and 3.6 (PP3-P1); Tables 3.3-3.8</i>
X			If the project is to be built in stages, has the traffic operational and safety analyses considered the interim stages of the proposal?	<i>Project is being built in one stage.</i>
Policy Point 4: "The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d))."				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the proposed access connect to a public road?	<i>Sect. 2.4 (P2), 3.5 (P1), 3.6 (PP3-P3), and 3.6 (PP4-P2); Fig. 3.1 and 3.2; App. B</i>
X			Are all traffic movements for full interchange access provided?	<i>Sect. 2.4 (P2), 3.5, and 3.6 (PP4-P1); Fig. 3.1 and 3.2; App. B</i>
		X	If not, is the proposed access for special purposes such as transit vehicles, HOVs, and/or a park and ride lot?	<i>Providing for a full interchange.</i>
		X	If a partial interchange is proposed, is there sufficient justification for providing only a partial interchange?	AASHTO Greenbook 2004 Pg. 821-823 <i>Providing for a full interchange.</i>
		X	If a partial interchange is proposed; was a full interchange evaluated as an alternative and is there sufficient justification to eliminate or discard it?	<i>Providing for a full interchange.</i>

Concept 5 Review

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
		X	Is sufficient ROW available (or being acquired) to provide a full interchange at a future date (staged construction)?	<i>Providing for a full interchange.</i>
		X	Are you comfortable with how the missing movements will be accommodated on the surface streets and adjacent interchanges?	<i>Providing for a full interchange.</i>
X			Does FHWA support the selection of design controls/criteria and desired operational goals?	<i>Sect. 2.4 (Concepts), 3.1 (Capacity Analysis Results), 3.5 (P1), and 3.6 (PP4-P2); Tables 3.3-3.8</i>
X			Does the proposed access meet or exceed current design standards for the Interstate System?	AASHTO’s Greenbook and A Policy on Design Standards Interstate System, 2005 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
		X	If not, have anticipated design exceptions been identified and reviewed (at least conceptually)?	<i>Concept meets current design standards</i>
		X	If expected design exceptions could have significant operational impacts on the Interstate and/or Crossroad system, are mitigation measures described?	<i>Concept meets current design standards</i>
X			Will the length of access control along the crossroad provide for acceptable operations and safety? (100-300' is a minimum. Additional access control is strongly encouraged when needed for safety and operational enhancement)	AASHTO "A Policy on Design Standards Interstate System" 2005 <i>Sect. 2.4 (P2), 3.5 (P4), and 3.6 (PP4-P2)</i>
X			Does FHWA support selection of opening and design years?	<i>Sect. 2.3 (Horizon Year and Time Periods Analyzed)</i>
X			Has each movement of the proposal been "tested" for ease of operation?	AASHTO Greenbook 2004 Pg. 863 <i>Sect. 2.4 (Concepts), 3.1 (Capacity Analysis Results), 3.6 (PP3-P1), and 3.6 (PP4-P2); Table 3.7</i>
Have all design criteria (including but not limited to the following) been adequately addressed?				
X			a. Sight distance at ramp terminals (Don't overlook signal heads obscured by structures.)	AASHTO Greenbook 2004 Pg. 841 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			b. Sufficient storage on ramp to prevent queues from spilling on to the Interstate (based on current and/or future projected traffic demand)	<i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			c. Vertical clearance	AASHTO "A Policy on Design Standards Interstate System" 2005 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			d. Pedestrian access through the interchange	AASHTO Greenbook 2004 Pg. 864 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP2-P2) and 3.6 (PP3-P4)</i>
X			e. Length of acceleration/deceleration lanes	AASHTO Greenbook 2004 Pg. 823, 847 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>

Concept 5 Review

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			f. Length of tapers	AASHTO Greenbook 2004 Pg. 849 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			g. Spacing between ramps	Greenbook pg 843 & Ex. 10-68 and operational analysis <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			h. Lane continuity	AASHTO Greenbook 2004 Pg. 810 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			i. Lane balance	AASHTO Greenbook 2004 Pg. 810 AASHTO Greenbook 2004 Pg. 807 <i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
X			j. Uniformity in interchange design and operational patterns (i.e. right-side ramps, exit design consistent w/adjacent interchanges)	<i>Sect. 2.4 (Concepts), 3.5 (P1), and 3.6 (PP4-P2)</i>
Policy Point 5: “The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the IJR discuss or include (as appropriate) other project(s), studies or planned actions that may have an effect on the report analysis results?	<i>Sect. 1.4 (4 Projects Listed) and 3.6 (PP5-P1)</i>
X			Does the project conform to the local planning, MPO or other related plans?	<i>Sect. 3.6 (PP5-P1)</i>
		X	Does the report include an endorsement of land use plans by the appropriate government entity before it is utilized for traffic generation purposes?	<i>Existing land use is rural agriculture</i>
X			Is the access request located within a Transportation Management Areas? (TMAs are metropolitan areas of 200,000 or more in population)	http://hepgis.fhwa.dot.gov/hepgis_v2/Urbanboundaries/M ap.aspx <i>Sect. 3.6 (PP5-P2)</i>
X			Is the access request located within a non-attainment area for air quality? (requests for access in a non-attainment or maintenance areas for air quality must be a part of a conforming transportation plan)	<i>Sect. 3.6 (PP5-P2)</i>
X			Is the project included in the TIP/STIP and LRTP?	<i>Sect. 3.6 (PP5-P1)</i>
X			Is the access point covered as a part of an Interstate corridor study or plan? (<i>especially important for areas where the potential exists for construction of future adjacent interchanges</i>)	<i>Sect. 3.6 (PP5-P2)</i>
Policy Point 6: “In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		

Concept 5 Review

Y	N	N/A		
X			Is it possible that new interchange(s) not addressed in the IJR could be added within an area of influence to the proposed access point? (If so, could the proposal preclude or otherwise be affected by any future access points?)	<i>Sect. 3.6 (PP6-P1&P2)</i>
		X	Does the IJR report include the traffic volumes generated by any future additional interchanges within a vicinity of influence that are proposed?	<i>No planned future interchanges.</i>
X			Does the IJR report fail to include any other proposed interstate access points within a vicinity of influence that are being proposed or are in the current long range construction program?	<i>Sect. 1.4 (1 Potential Project Listed) and 3.6 (PP6-P1&P2)</i>
Policy Point 7: “When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request adequately demonstrate that an appropriate effort of coordination has been made with appropriate proposed developments?	<i>Sect. 2.3 (Megasite and Other Assumed Developments) and 3.6 (PP7-P1); Table 2.2</i>
X			Are the proposed improvements compatible with the existing street network or are other improvements needed?	<i>Sect. 2.4 (Concepts), 3.1, and 3.6 (PP3-P3); Fig. 3.1 and 3.2; App. B</i>
X			Are there any pre-condition contingencies required in regards to the timing of other improvements?	<i>Sect. 3.6 (PP7-P3)</i>
X			Have all commitments to improve the local transportation network been included in a TIP/STIP/LRTP prior to the Interstate access approval (final approval of NEPA document)?	<i>Sect. 1.4 (P1) and 3.6 (PP7-P2)</i>
		X	If pre-condition contingencies are required, are pertinent parties in agreement with these contingencies and is this documented?	<i>No pre-conditions are required.</i>
		X	If the proposed improvements are founded on the need for providing access to new development, are appropriate commitments in place to ensure that the development will likely occur as planned?	<i>No commitments are required.</i>
		X	If project is privately funded, are appropriate measures in place to ensure improvements will be completed if the developer is unable to meet financial obligations?	<i>Project is not privately funded.</i>
X			If the purpose and need to accommodate new development/traffic demands aren't fully known, is a worst case scenario used for future traffic?	<i>Sect. 2.3 and 3.6 (PP7-P1); Table 2.2</i>
X			Does the project require financial or infrastructure commitments from other agencies, organizations, or private entities?	<i>Sect. 3.6 (PP7-P3)</i>
Policy Point 8: “The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Are there any known social or environmental issues that could affect the proposal?	<i>Sect. 2.2 (P1&P2) and 3.6 (PP8-P2)</i>
X			Is the project consistent with the current TIP/STIP and LRTP and/or proposed amendments to the plan?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>
X			Although NEPA is a separate action, is an environmental overview for the proposed improvements included?	<i>Sect. 2.2 (P2) and 3.6 (PP8-P2)</i>

Concept 5 Review

X			Is it appropriate to emphasize to the project stakeholders that the access approval will be handled as a two-step process? (i.e. Step 1: Engineering and Operational Acceptability and Step 2: Environmental Approvals)	<i>Sect. 3.6 (PP8-P2)</i>
X			Are all funding commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>
X			Are all commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Sect. 3.6 (PP5-P1)(PP8-P2)</i>

Reference Location Legend: P# = Paragraph Number; PP# = Policy Point Number

4.0 SUMMARY AND CONCLUSIONS

As discussed in **Section 3.5**, this study determined that the following options are considered viable for this interchange location:

- Concept 1 - Partial Traditional Diamond located east of the existing interchange.
- Concept 5 - Combined Traditional/Tight Diamond located at the existing interchange.
- No-Build Alternative.

The No-Build Alternative was determined viable option if the Megasite is not developed. However, if the Megasite is developed, then the No-Build Alternative is a non-viable concept because the capacity of the existing interchange will not be satisfied (LOS F conditions) in the future 2034 design year.

Between the viable construction concepts, TDOT and ECD both prefer Concept 1 since the I-40 eastbound to S.R. 222 northbound traffic movement would be free-flow via a single lane loop ramp and removed from signalization as required with Concept 5. This traffic movement is the highest turning movement within the interchange totaling 586 vehicles during the 2034 morning peak period. The construction cost for both of these concepts are similar with Concept 1 (\$13.1 million) being slightly less than Concept 5 (\$13.2 million).

At this time, a tenant for the Megasite has not been identified. However, if a tenant is identified and the Megasite is developed, these proposed modifications will be needed to meet the passenger and freight transportation needs and to support the future logical pattern of development within the study area. Without the construction of one of these two (2) viable concepts, the existing level of service (LOS) at the I-40/S.R. 222 interchange will be LOS F which includes the development of the Megasite. The service life of the viable concepts along with the development of the Megasite will exceed the 2034 planning horizon.

4.1 TDOT Design Concurrence Letter and Local Agency Letters of Support

The TDOT Design concurrence letter and three (3) letters of local agency support are included on subsequent pages.



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243-0340

MEMORANDUM

TO: Steve Allen, Director, Project Planning Division
FROM: *CAS* Carolyn Stonecipher, Director, Design Division
DATE: September 9, 2010
SUBJECT: Interchange Modification Study
Interstate 40 at State Route 222 (exit 42)
Fayette County

The subject Interchange Modification Study has been reviewed by my office and we concur with the conceptual plan as shown.

Please advise if this office can be of further assistance.

CAS:rd

HAYWOOD COUNTY

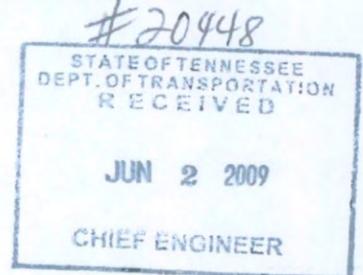
TELEPHONE (731) 772-1432



OFFICE OF
COUNTY MAYOR

COURTHOUSE

1 NORTH WASHINGTON • BROWNSVILLE, TN 38012



May 19, 2009

Paul Degges, P.E.
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building
505 Deaderick Street, Suite 700
Nashville, TN 37243-0349

Dear Mr. Degges:

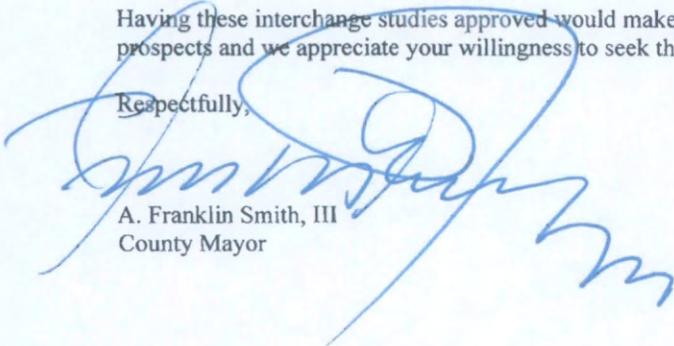
The purpose of this letter is to support efforts by the Tennessee Department of Transportation to get operational approvals for proposed interchange studies along Interstate 40 in Haywood and Fayette Counties. We appreciate the opportunity to express our preferences on your conceptual drawings of the interchanges and commend your staff for their hard work.

As you know, the interchange at Exit 42 is currently insufficient to serve the I-40 Advantage Auto Park in Haywood County, assuming that a large project decides to locate on this TVA-certified megasite. Improvements to the existing interchange at SR 222, as shown on Concept 1, will add that capability and we respectfully ask you to submit an Interchange Modification Study to the Federal Highway Administration (FHWA).

Furthermore, a new I-40 interchange will be necessary if the megasite develops as expected. Another interchange at about mile marker 44, as shown on Concept 4, would provide additional interstate highway access to an assembly plant and adjoining supplier park. Again, we ask you to submit an Interchange Justification Study to FHWA in conjunction with the aforementioned Modification Study of Exit 42.

Having these interchange studies approved would make the megasite even more attractive to industrial prospects and we appreciate your willingness to seek the operational approvals mentioned above.

Respectfully,


A. Franklin Smith, III
County Mayor

20446



Town of Stanton

8 MAIN STREET
P.O. BOX 97
STANTON, TENNESSEE 38069
731-548-2565

May 19, 2009

Paul Degges, P.E.
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building
505 Deaderick Street, Suite 700
Nashville, TN 37243-0349

Dear Mr. Degges:

The purpose of this letter is to support efforts by the Tennessee Department of Transportation to get operational approvals for proposed interchange studies along Interstate 40 in Haywood and Fayette Counties. We appreciate the opportunity to express our preferences on your conceptual drawings of the interchanges and commend your staff for their hard work.

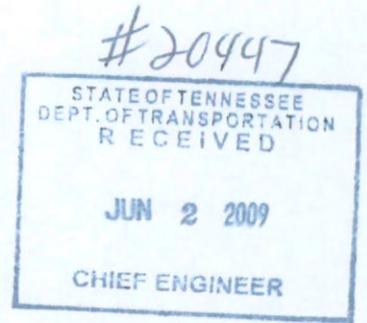
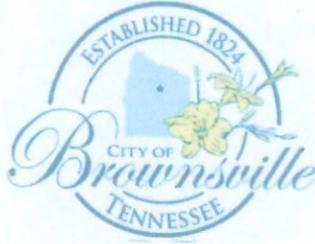
As you know, the interchange at Exit 42 is currently insufficient to serve the I-40 Advantage Auto Park in Haywood County, assuming that a large project decides to locate on this TVA-certified megasite. Improvements to the existing interchange at SR 222, as shown on Concept 1, will add that capability and we respectfully ask you to submit an Interchange Modification Study to the Federal Highway Administration (FHWA).

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Having these interchange studies approved would make the megasite even more attractive to industrial prospects and we appreciate your willingness to seek the operational approvals mentioned above.

Respectfully,

Allan Sterbinsky
Mayor of Stanton



111 North Washington
P.O. Box 375
Brownsville, TN 38012
(731)772-1212

May 26, 2009

Paul Degges, P.E.
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building
505 Deaderick Street, Suite 700
Nashville, TN 37243-0349

Dear Mr. Degges:

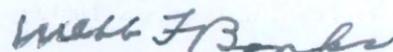
The purpose of this letter is to support efforts by the Tennessee Department of Transportation to get operational approvals for proposed interchange studies along Interstate 40 in Haywood and Fayette Counties. We appreciate the opportunity to express our preferences on your conceptual drawings of the interchanges and commend your staff for their hard work.

As you know, the interchange at Exit 42 is currently insufficient to serve the I-40 Advantage Auto Park in Haywood County, assuming that a large project decides to locate on the TVA-certified mega site. Improvements to the existing interchange at SR 222, as shown on Concept 1, will add that capability and we respectfully ask you to submit an Interchange Modification Study to the Federal Highway Administration (FHWA).

Furthermore, a new I-40 interchange will be necessary if the mega site develops as expected. Another interchange at about mile marker 44, as shown on Concept 4, would provide additional interstate highway access to an assembly plant and adjoining supplier park. Again, we ask you to submit an Interchange Justification Study to FHWA in conjunction with the aforementioned Modification Study of Exit 42.

Having these interchange studies approved would make the mega site even more attractive to industrial prospects and we appreciate your willingness to seek the operational approvals mentioned above.

Respectfully,


Webb F. Banks, Mayor