

D.O.T. 66

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE P. I. No. 132100-, Habersham County **OFFICE** Preconstruction
STP-2640(10)
US 441/SR 105 Widening and Reconstruction **DATE** April 5, 2007
FROM *Cybil Kumb*
Genetha Rice-Singleton, Assistant Director of Preconstruction
TO *GRS* SEE DISTRIBUTION

SUBJECT APPROVED REVISED PROJECT CONCEPT REPORT

Attached for your files is the approval for subject project.

GRS/cj

Attachment

DISTRIBUTION:

Brian Summers
Harvey Keeper
Ken Thompson
Jamie Simpson
Michael Henry
Keith Golden
Angela Alexander (file copy)
Babs Abubakar
Russell McMurry
BOARD MEMBER

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2640(10), Habersham County **OFFICE** District 1
P.I. No. 132100
Widening and Reconstruction of U.S. 441/S.R. 105 **DATE** March 5, 2007

FROM Robert W. Mahoney, District Preconstruction Engineer
TO Genetha Rice-Singleton, Assistant Director of Preconstruction
SUBJECT Revised Project Concept Report

Attached is the original copy of the Revised Concept Report for your further handling for approval in accordance with the Plan Development Process (PDP).

The concept has been revised to change the design configuration of the interchange at SR 365 and U.S. 441/SR 105. The ramp locations and horizontal/vertical alignments of the south bound ramps are revised based on the final traffic study to provide a modified diamond interchange instead of conventional diamond interchange. Also the five-lane and one-way pair roadway sections for SR 105 from Walnut Street to Lee Street have been revised to minimize environmental and right of way impacts by utilizing a five lane roadway with a 12 foot wide center turn lane. (Requires Typical Section change.)

The revised concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Program (RTP) and/or the State Transportation Improvement Program (STIP).

3/23/07
Date


State Transportation Planning Administrator

RM:RM:NK:jjg
Attachments

cc: Brian Summers, Project Review Engineer
Harvey Keeper, State Environmental/Location Engineer
Keith Golden, State Traffic Safety and Design Engineer
Angela Alexander, State Transportation Planning Administrator
Jamie Simpson, State Transportation Financial Management Administrator
Paul Liles, State Bridge Design Engineer

REVISED PROJECT CONCEPT REPORT

STP-2640(10), Habersham County P.I. 132100

Need and Purpose: The purpose of this project is to improve the safety and operational capacity along State Route 105/U.S. Highway 441 Business Route (referenced hereafter as SR 105) from Cannon Bridge Road (SR 385) and ending near Camp Creek Parkway (CR 391). To the west of SR 365, towards Demorest, SR 105 currently provides four, 12-foot lanes, with a central turn-lane and curb and gutter. To the east of SR 365, towards downtown Cornelia, SR 105 currently offers two, 12-foot lanes with graded outside shoulders of variable widths. The Annual Average Daily Traffic (AADT) along this section of SR 105, from the Cannon Bridge Road intersection to downtown Cornelia at Main Street, ranged from 11,895 to 19,948 in 1999. The base year (2005) traffic along this 2.41 mile section of SR 105 varies from 15,430 to 28,270 vehicles per day (VPD). By 2025, future traffic volumes along the same section of roadway are expected to vary from 27,900 to 50,900 VPD. The accident rate along this section of roadway exceeded the statewide averages for similar roadway facilities in the years 1995 through 1997. Many of the accidents were rear-end and angle intersection type accidents, which may attribute to limited passing opportunities and left turn lane storage lengths along this route. The existing level of service (LOS) along the existing facility between Cannon Bridge Road and Main Street varies from “B” to “E.”

Widening SR 105 would improve safety along this route and improve the LOS to “C” or better.

Project location: The proposed project is located along SR 105 beginning at the Cannon Bridge Road intersection approximately one mile west of the exiting interchange at SR 365, near the city of Cornelia, in Habersham County (*See Project Location Map*). The project would widen and reconstruct SR 105 southeast from Cannon Bridge Road crossing over SR 365 (Cornelia Bypass) at the existing interchange and continuing to the intersection of SR 105 (identified as North Main Street) with Pine Street located on the northern edge of downtown Cornelia. The total project length of 2.41 miles would include the reconstruction of the existing southbound ramps in the SR

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105/SR 365 interchange, as well as improve the intersections of North Main Street with Wayside and Cleveland Streets, and Wayside Street with Clarkesville and Lee Streets.

Description of Existing Roadway: The existing typical section of SR 105 is as follows: To the west of SR 365, towards Demorest, SR 105 currently provides four, 12-foot wide travel lanes, two in each direction separated with a center turn-lane and curb and gutter along the outside edges of pavement. To the east of SR 365, towards downtown Cornelia, SR 105 currently provides two 12-foot wide travel lanes with variable width graded outside shoulders.

There are existing signalized intersections at the following:

- SR 105/US 441 at SR 105 (Cannon Bridge Road), US 441 and Habersham Hill Court
- SR 105/US 441 at Carpenters Cove Land and J Warren Road
- SR 105/US 441 at SR 365/US 441/US 23 northbound ramps
- SR 105 at Camp Creek Parkway
- SR 105 at North Main Street and Cleveland Road

Traffic signals are warranted at the intersection of SR 105/US 441 Business with the VFW Post Road and the proposed development entrance that aligns with VFW Post Road.

Description of the approved concept: The approved concept proposes to widen US441/SR 105 to a six lane divided roadway with a 20' wide raised concrete median from Cannon Bridge Road to SR 365 with curb and gutter along the outside edges of pavement. The interchange at SR 365 will be reconstructed to reconfigure the interchange from a partial cloverleaf interchange with loop ramps in the northeast and the southeast quadrants to a diamond type interchange. From SR 365 to just north of Camp Creek Road, a five lane roadway will be constructed with a 14' flush median with outside curb and gutter. A one-way pair will be constructed from Walnut Street to Lee Street with southbound traffic utilizing existing SR 105/Clarkesville Street and northbound traffic routed on new alignment constructed along part of the abandoned railroad. Included in this project is a 10' wide two-way multi-use path offset 12' from the travel lanes paralleling the northbound lanes of existing SR 105 from Furniture Drive to Walnut Street and along the northbound side of the one-way pair from Camp Creek Road to Lee Street. Traffic will be maintained during construction.

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PDP Classification: Major X Minor _____

Federal Oversight: Full Oversight (), Exempt (X), State Funded (), or Other ()

Functional Classification: Minor Arterial

U. S. Route Number(s): 441

State Route Number(s): 105

Traffic (AADT) as shown in the approved concept:

	<u>Current Year 2005:</u>	<u>Design Year 2025:</u>
1. Cannon Bridge Road to SR 365	28,270 AADT	50,900 AADT
2. SR 365 to Camp Creek Road	15,430 AADT	27,900 AADT
3. Camp Creek Road to Lee Street	17,730 AADT	31,940 AADT

Proposed features to be revised:

1. The configuration of the interchange at SR 365 and U.S. 441/SR 105. (Ramp locations and horizontal/vertical alignments of the south bound ramps.
2. The five-lane and one-way pair roadway sections for SR 105 from Walnut Street to Lee Street. (Typical Section change.)

Describe the revised feature(s) to be approved:

The proposed roadway typical sections and interchange design would be revised as follows:

From Cannon Bridge Road south and east to SR 365, the proposed project would widen SR 105 to a six-lane divided roadway with a 20-foot raised median, and curb and gutter with sidewalks. (No change from the original approved concept.)

The interchange at SR 365 would be re-designed using a partial diamond-type interchange,

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replacing the existing partial cloverleaf design. Diamond entrance and exit ramps to SB SR 365 would be constructed on the southbound side of SR 365 replacing the existing southbound exit loop ramp and relocating the southbound entrance ramp to form a new ramp intersection with SR 105. The existing SR 365 northbound entrance loop ramp from SR 105 and the existing northbound SR 365 diamond exit ramp to SR 105 in the southeast quadrant of the interchange would remain unchanged. Moving the southbound ramps away from the J. Warren/Mize Road intersection improves storage capacity between signals and improves the weaving conditions at the southbound on-ramp. Leaving the northbound ramps in their existing condition provides greater intersection efficiency, reduced construction time, cost and does not impact existing properties. The reconfiguration and proposed design of the interchange, with regards to modifying the southbound ramps and retaining the existing northbound ramps meets the justifications and criteria required to satisfy the federal guidelines for approval of an interchange modification report (IMR). The new proposed design provides acceptable levels of service (LOS) for the mainline, crossroad and ramps and provides for adequate distances between other existing interchanges along the S.R. 365 corridor.

From the east side of the SR 365 interchange to just west of the intersection with Camp Creek Road, a five-lane roadway would be constructed, with a 12-foot wide flush median two-way left turn lane and outside curb and gutter as opposed to the 14 foot flush turn lane approved in the original. This section of the SR 105 roadway would be widened on the north side along the existing alignment and would encroach on the abandoned bed of the former Tallulah Falls Railway. Also through the above mentioned section of SR 105 the proposed project would include the development and installation of a 10-foot wide, two-way, multi-use path, which would be offset 12-feet and parallel in and along the shoulder area of the northbound travel lanes. Beginning at the path's northern terminus at SR 105's intersection with Furniture Drive south to Walnut Street, this path would parallel the existing alignment of SR 105. From Walnut Street south to Lee Street, the multi-use path would diverge from the current alignment of SR 105. From Camp Creek Road to Lee Street, the path would roughly follow the current alignment of existing Stonecypher Street, using part of its right-of-way.

Also approved as a part of the original concept, SR 105 beginning just west of Camp Creek Road

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and extending to Lee Street would transition to a one-way pair roadway section using Stonecypher Street's alignment as the westbound lanes and the exiting SR 105 roadway alignment as the eastbound lanes. Due to the need to acquire additional Right of Way and the result of significant historical impacts through this one-way pair section, it is proposed to provide a five-lane roadway with a 12 foot flush median turn lane to reduce and or eliminate environmental impacts and property damage. As proposed the five-lane section will reduce access issues and provide a protective storage area for left turning traffic into the local businesses in the downtown area of Cornelia along this section of SR 105.

Updated Traffic Data (AADT):

Current Year 2012: 33,100 AADT Design Year 2032: 49,200 AADT

Programmed/Schedule:

P. E. FY '06 R/W: FY '08 Construction: LR

Revised cost estimates:

1. Construction cost including inflation and E&C,
2. Right-of-Way, and
3. Utilities

Is the project located in a Non-attainment area? _____ Yes _____ **X** _____ No

Recommendation: Recommend that the proposed revision to the concept be approved for implementation.

Attachments:

1. Sketch Map,
2. Cost Estimate,
3. Conforming plan's network schematics showing thru lanes, (Note: This attachment is required for non-attainment areas only.), and
4. Other supporting documents.

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- **Exempt projects**

Concur: 
Director of Preconstruction

Approve: 
Chief Engineer

January 29, 2007

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**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2640(10) Habersham Co.
P.I. No. 132100

OFFICE Atlanta

DATE November 30, 2006

FROM Robert Mahoney, P.E., District 1 Preconstruction Engineer

TO Brian Summers, P.E., Project Review Engineer

SUBJECT **REVISION TO PROGRAMMED COST**

A REVISION IS REQUIRED FOR THIS PROJECT

PROGRAMMED COSTS:

- Construction Cost \$13,515,000
- Right-of-Way Cost \$ 5,000,000
- Reimbursable Utility Cost \$ 68,000

NEW COST ESTIMATES:

- Construction Cost* \$16,087,000
- Right-of-Way Cost \$ 5,000,000
- Reimbursable Utility Cost \$ 68,000

*Costs contain 10% E&C, and no inflation or escalation.

Reasons why the costs changed:

The unit cost of items changed in detest program.

RM:NK:jjg

cc:

Jamie Simpson, Financial Management Administrator
File

January 29, 2007

State of Georgia
Department of Transportation

PB

Final Report

***US 441 BUS / SR 105 Improvements
from Cannon Bridge Road to SR 365
Habersham County, Georgia***

Traffic Analysis Study

January 18, 2006

Submitted By

*Parsons Brinckerhoff Quade & Douglas, Inc.
3340 Peachtree Road, NE
Suite 2400, Tower Place
Atlanta, Georgia 30326-1087*



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1. INTRODUCTION

This report describes the traffic engineering and design efforts to address traffic issues along the corridor of SR 105 / US 441 Business from Cannon Bridge Rd to the interchange of SR 105 / US 441 Business at SR 365 in Habersham County, Georgia. The objective of the analysis is to identify needed roadway and intersection improvements to accommodate future demand volumes. To fulfill this purpose, both the existing roadway geometry (No-Build) and three build alternatives were analyzed in the future year 2032. The build alternatives include:

- Improving the existing US 441 BUS/SR 365 partial cloverleaf interchange to a full diamond interchange.
- Modifying the existing interchange to include a new ramp to provide direct southbound SR 365 to westbound US 441 BUS movement. The loop ramp would remain, and both ramps would provide right-turn only ramps at their intersections with US 441 BUS.
- Creating a partial diamond interchange, with diamond ramps on southbound SR 356 and while leaving the northbound ramps as existing;

The traffic analysis was performed using a combination of Synchro 6 and CORSIM 5.1^{1,2}. The network was developed in CORSIM and signal timings were optimized in Synchro, which were then exported and inserted into the CORSIM model.

2. TRAFFIC VOLUMES

The design year (2032) forecasted AM and PM peak hour traffic volumes were provided by the Office of Environment and Location from the Georgia Department of Transportation, and are included in the Appendix. Traffic data also included a truck percent of four percent east of the interchange. The analysis utilized four percent for the entire corridor.

3. NO BUILD ALTERNATIVE ANALYSIS

The existing roadway geometry schematic is provided in **Figure 1**. Using the 2032 traffic volumes and existing geometric lane configurations, the 2032 No-Build LOS was evaluated for both the AM and PM peak hours. Future signal timings were optimized at each location. The resulting CORSIM average level of service (LOS) for the overall intersection as well as each approach are presented in **Table 1**. Note that specific approaches and/or lane groups may operate better or worse than the average intersection LOS.

¹ Synchro is a traffic analysis and simulation software package that is widely used by traffic engineering professionals to evaluate intersection operations and traffic signal coordination.

² CORSIM is a microscopic traffic simulation model (developed and supported by FHWA) that provides detailed traffic network analysis including impacts from traffic signals, intersection queues and delays, parking, bus routes and pedestrian crossings.

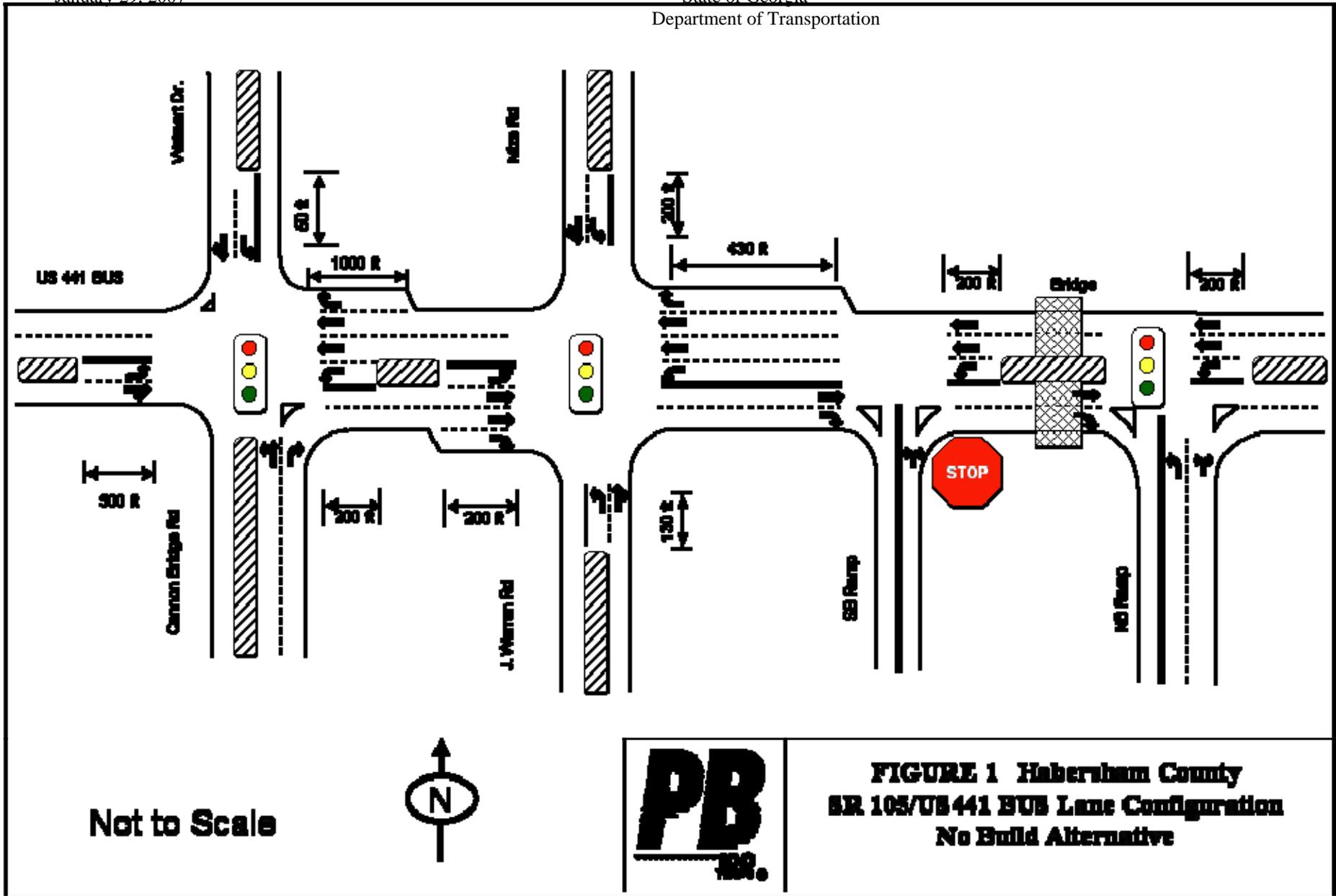


Figure 1. No Build Geometric Layout Schematic

Table 1. 2032 No Build AM & PM LOS

Intersections & Approach	2032	
	AM Peak	PM Peak
	LOS	LOS
US441 Business @ Cannon Bridge Rd/ Walmart Dr	D	E
EB – US 441 Business East	C	E
WB – SR 105/US 441 Business West	D	E
SB – Walmart Dr.	F	F
NB – Cannon Bridge Rd/SR 105 North	B	B
US 441 Business / SR 105 @ J.Warren Rd / Mize Rd	E	F
EB - SR 105/US 441 Business East	F	F
WB - SR 105/US 441 Business West	C	F
SB - Mize Road South	D	F
NB – J. Warren Rd North	C	C
US 441 Business / SR 105 @ SB Ramps (unsignalized)	F	F
EB - SR 105/US 441 Business East	A	A
WB - SR 105/US 441 Business West	E ¹	F ²
NB – SR 365 SB Loop Off Ramp ³	F	F
US 441 Business / SR 105 @ NB Ramps	C	D
EB - SR 105/US 441 Business East	B	C
WB - SR 105/US 441 Business West	A	C
NB – SR 365 NB Off Ramp	D	F

¹ Substantial left turn queuing
² A result of downstream spillback
³ Off-ramp queuing blocks freeway mainline

Based on the No-Build analysis, it is evident that the two most critical deficiencies are (1) the left turn movement from southbound SR 365 loop ramp to westbound US 441 BUS, and (2) the intersection of US 441 Business / SR 105 at J. Warren Road / Mize Road. Specific findings of the 2032 No-Build analysis include:

- The signalized intersection of US 441 Business at Cannon Bridge Road / Walmart Drive is expected to operate at LOS E in the 2032 PM peak periods under the No Build scenario as shown in **Table 1**. With the exception of northbound approach, all other approaches would fail by 2032. Upon examining the movement delays, it is evident that one eastbound through lane will not provide enough capacity for US 441 Business eastbound; substantial left turn queuing occurs on US 441 Business / SR105 westbound; and the left turn vehicles exiting from Walmart would block the through and right turn traffic on that single-lane driveway.
- The signalized intersection of US 441 Business / SR 105 at J. Warren Road / Mize Road is projected to operate at LOS E and LOS F in the 2032 AM and PM peak periods, respectively. During the PM peak, the southbound approach is over capacity, and the eastbound left turns experience significant

queuing. The westbound queues extend over the bridge through the interchange to the intersection of US 441 Business / SR 105 at the northbound Ramps.

- As a result of the queuing at US 441 Business / SR 105 at J. Warren Road / Mize Road, the westbound approach at the adjacent unsignalized intersection of US 441 Business / SR 105 at the southbound Ramps would operate at LOS F during PM peak hour. The westbound spillback impacts the southbound loop off ramp left turn traffic with queuing extending to the SR 365 southbound mainline.

4. BUILD ALTERNATIVE ANALYSIS

The build alternatives include (1) a diamond interchange, (2) a modified southbound ramp interchange and (3) a southbound partial diamond interchange. Each of these alternatives includes similar roadway and intersection improvements to US 441 Business / SR 105 from Cannon Bridge Road / Walmart Drive to the SR 365 NB off ramps. Through this section, US 441 Business / SR 105 will be improved to a six-lane roadway with turn bays at specific locations. Intersection improvements at the two signalized intersections west of the interchange (1) US 441 Business / SR 105 with Cannon Bridge Road / Walmart Drive and (2) US 441 Business / SR 105 at J. Warren Rd / Mize Road, are consistent between the three build alternatives. Improvements at these Intersections include:

US 441 Business / SR 105 with Cannon Bridge Road / Walmart Drive

- EB additional through lane along SR 105
- WB second left turn lane on SR 105 (drop additional through lane)
- NB separate left turn bay on Cannon Bridge Road
- Extended SB left turn bay length on Walmart Drive

US 441 Business / SR 105 at J. Warren Rd / Mize Road

- EB additional through lane (to make a shared through/right) and second left turn bay along SR 105
- WB additional through lane and second left turn bay on SR 105
- NB separate right turn bay on J. Warren Road
- SB second left turn bay and right turn bay on Mize Road

4.1 Diamond Interchange Alternative

The lane layout for the diamond interchange alternative is shown in **Figure 2**. In this alternative, both the northbound and southbound ramps are signalized, and should be coordinated with the adjacent intersections. The average intersection and approach LOS for the AM and PM peak hours for this alternative in the design year 2032 are shown in **Table 2**.

Table 2. 2032 Full Diamond Interchange Alternative AM & PM LOS

Intersections & Approach	2032	
	AM Peak	PM Peak
	LOS	LOS
US 441 Business @ Cannon Bridge Rd / Walmart Dr	B	C
EB – US 441 Business East	C	C
WB – SR 105/US 441 Business West	C	C
SB – Walmart Dr.	C	C
NB – Cannon Bridge Rd/SR 105 North	A	A
US 441 Business / SR 105 @ J. Warren Rd / Mize Rd	C	C
EB - SR 105/US 441 Business East	D	D
WB - SR 105/US 441 Business West	B	C
SB - Mize Road South	C	C
NB – J. Warren Rd North	C	C
US 441 Business / SR 105 @ SB Ramps	A	A
EB - SR 105/US 441 Business East	A	A
WB - SR 105/US 441 Business West	A	A
SB – SR 365 SB Off ramp	B	C
US 441 Business / SR 105 @ NB Ramps	C	C
EB - SR 105/US 441 Business East ¹	B	C
WB - SR 105/US 441 Business West	C	C
NB – SR 365 NB Off Ramp	D	D

¹ Simulation shows significant queuing for the left turn movement on this approach

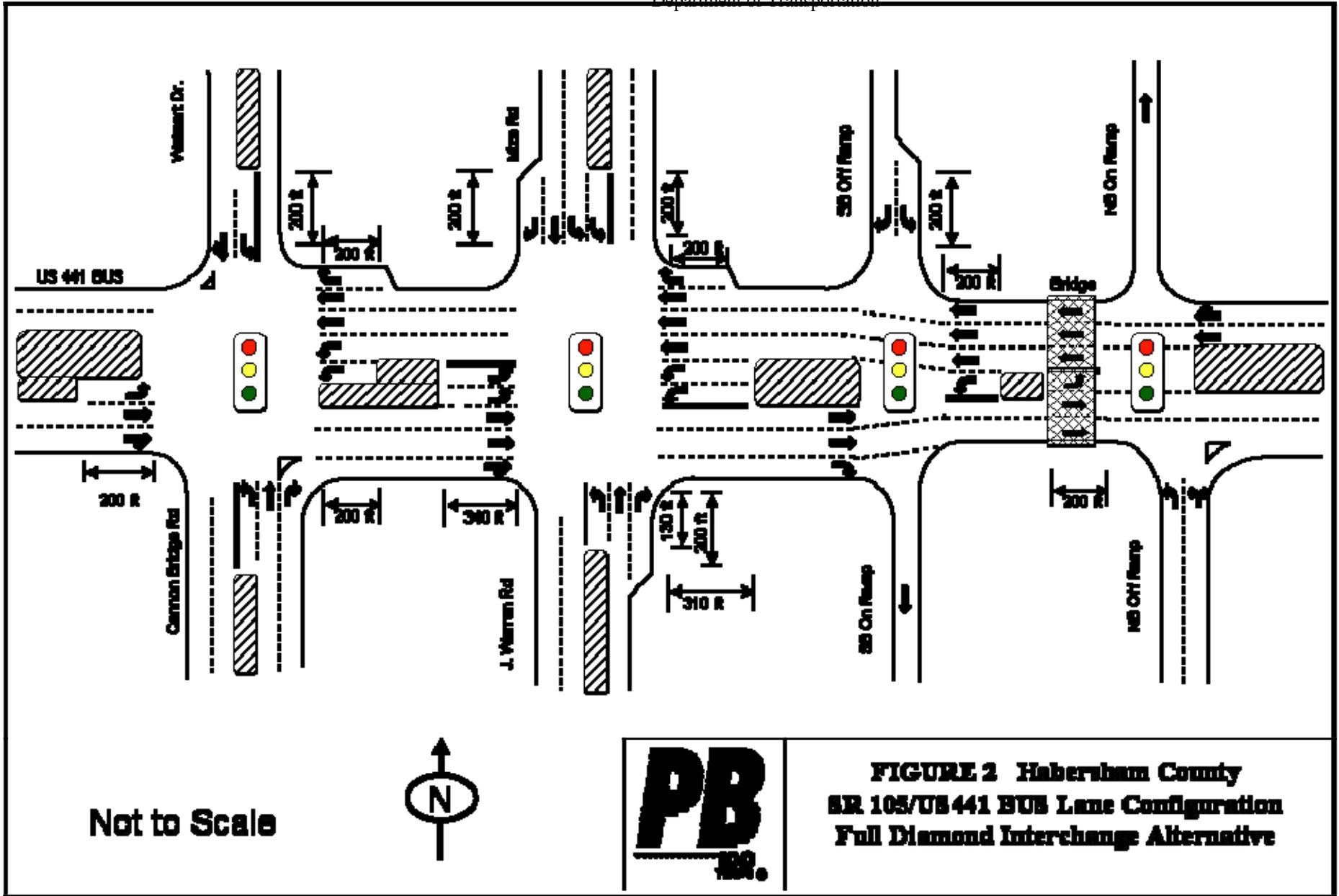


Figure 2. Full Diamond Interchange Geometric Layout Schematic

4.2 Modified Southbound Ramp Interchange Alternative

The geometric layout for the Modified Southbound Ramp Interchange alternative is shown in **Figure 3**. The right turns for the new southbound ramp are stop controlled at the intersection with US 441 Business. The average intersection and approach LOS for the AM and PM peak hours for this alternative in the design year 2032 are shown in **Table 3**.

Upon review of the simulation model results, a slight geometric modification was also analyzed for this alternative. The addition of a right turn bay on eastbound US 441 Business at the southbound on-ramp was analyzed to mitigate potential lane changing difficulties between the closely-spaced signals. Analysis results showed the LOS was unchanged by this modification

Table 3. 2032 Modified Southbound Ramp Alternative AM & PM LOS

Intersections & Approach	2032	
	AM Peak	PM Peak
	LOS	LOS
US 441 Business @ Cannon Bridge Rd / Walmart Dr	B	C
EB – US 441 Business East	B	C
WB – SR 105/US 441 Business West	C	C
SB – Walmart Dr.	C	C
NB – Cannon Bridge Rd/SR 105 North	A	A
US 441 Business / SR 105 @ J. Warren Rd / Mize Rd	C	C
EB - SR 105/US 441 Business East	C	C
WB - SR 105/US 441 Business West	C	C
SB - Mize Road South	C	C
NB – J. Warren Rd North	C	B
US 441 Business / SR 105 @ Old SB Off Ramp (Unsignalized)	A	A
EB - SR 105/US 441 Business East	A	A
WB - SR 105/US 441 Business West	A	A
NB – SR 365 SB Off ramp	A	A
US 441 Business / SR 105 @ New SB Off Ramp (Unsignalized)	A	A
EB - SR 105/US 441 Business East ¹	A	A
WB - SR 105/US 441 Business West	A	A
SB – SR 365 SB Off ramp	C	D
US 441 Business / SR 105 @ NB Ramps	B	B
EB - SR 105/US 441 Business East	B	B
WB - SR 105/US 441 Business West	A	A
NB – SR 365 NB Off Ramp	C	C

¹ LOS remains the same with or without right turn bay eastbound

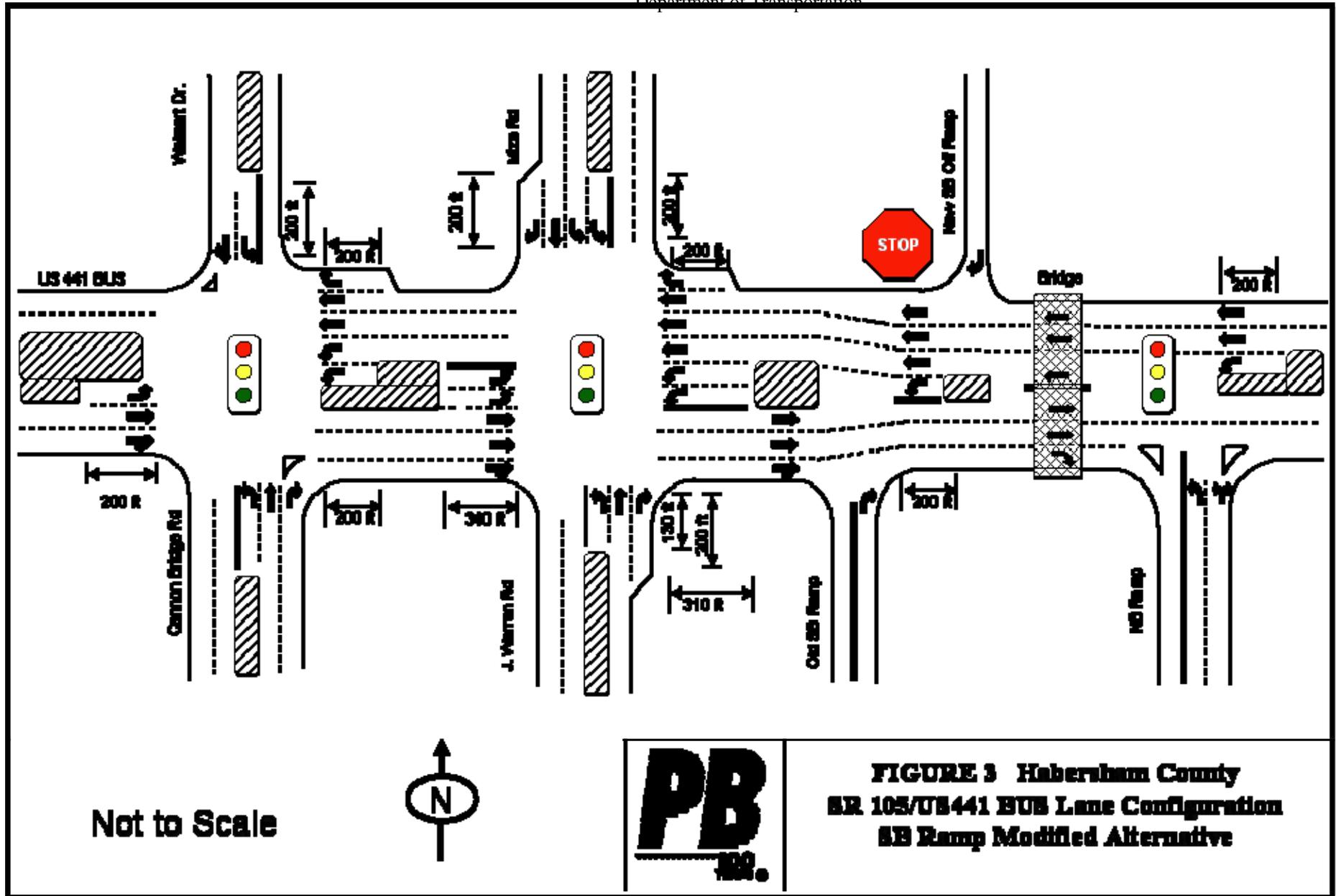


Figure 3. Modified Southbound Ramp Interchange Geometric Layout Schematic

4.3 Southbound Partial Diamond Interchange Alternative

The lane layout for the southbound partial diamond interchange alternative is shown in **Figure 4**. This alternative also requires both the northbound and southbound ramps be signalized, and coordinated with the adjacent intersections. The average intersection and approach LOS for the AM and PM peak hours for this alternative in the design year 2032 are shown in **Table 4**.

Table 4. 2032 Southbound Partial Diamond Alternative AM & PM LOS

Intersections & Approach	2032	
	AM Peak	PM Peak
	LOS	LOS
US 441 Business @ Cannon Bridge Rd / Walmart Dr	B	C
EB – US 441 Business East	C	C
WB – SR 105/US 441 Business West	C	C
SB – Walmart Dr.	C	D
NB – Cannon Bridge Rd/SR 105 North	A	A
US 441 Business / SR 105 @ J. Warren Rd / Mize Rd	C	C
EB - SR 105/US 441 Business East	C	C
WB - SR 105/US 441 Business West	C	C
SB - Mize Road South	C	C
NB – J. Warren Rd North	C	C
US 441 Business / SR 105 @ SB Ramps	A	A
EB - SR 105/US 441 Business East	A	A
WB - SR 105/US 441 Business West	A	A
SB – SR 365 SB Off ramp	B	B
US 441 Business / SR 105 @ NB Ramps	B	B
EB - SR 105/US 441 Business East	B	A
WB - SR 105/US 441 Business West	A	B
NB – SR 365 NB Off Ramp	C	C

5. ALTERNATIVE EVALUATION

The level of service results show that the geometric modifications to the intersections of US 441 Business / SR 105 at Cannon Bridge Rd / Walmart Drive and at J. Warren Road / Mize Road show significant operational improvements as compared to the No Build scenario. With these improvements, all approaches at these two intersections will operate at LOS C or better in 2032. As an exception the intersection at the northbound SR 365 off-ramp approach to US 441 Business, is expected to operate at LOS D utilizing the Full Diamond Interchange alternative in the AM and PM peak hour. However this same intersection will operate at a LOS C for the Modified and the Southbound Partial Diamond alternatives.

With the interchange ramp modifications and geometric improvements to the intersections of US 441 Business / SR 105 at Cannon Bridge Rd / Walmart Drive and at J. Warren Road / Mize Road in place, all the interchange types provide acceptable ramp intersection levels of service. However, there are slight variations between each alternative, as described below:

Full Diamond Interchange

In the Full Diamond Interchange alternative, the relocation of the southbound off ramp allows the current heavy left turn volume that uses the existing WB SR105 loop ramp, would now come directly up the ramp and turn right. The current right turn volumes using the same existing loop ramp now become left turn volumes and will require a new traffic signal at the ramp intersection. The existing northbound loop ramp in the diamond Interchange alternative will be replaced with a diamond ramp which will introduce a new left turn movement (and signal phase) to serve eastbound SR 105 traffic turning onto northbound SR 365. Some signal efficiency is compromised to serve the additional movement, but adequate levels of service can still be achieved.

The proposed northbound on ramp taper to the mainline of SR 365 may also impact the existing Iron Ore Road intersection at SR 365.

Modified Southbound Ramp Interchange

The Modified Southbound Ramp alternative for the interchange allows for only right turn movements at the two southbound ramp terminals, this design provides for efficient traffic operations and allows for an un-signalized intersection at the ramp terminals.

Due to significant queuing for the eastbound right turn on US 441 BUS / SR 105 at the southbound on ramp, a separate right turn bay was analyzed for this movement. Upon viewing the simulation of both alternatives and examining several measures of effectiveness (max queues, percent stops in each lane, and delay time to each movement), the separate right turn bay provides minimal improvement to the flow of the through vehicles. However, the right turn vehicles still experienced queuing in the right turn bay itself. The most critical reason for this stacking issue is largely attributed to the short spacing between the intersection of US 441 Business / SR 105 and the southbound on ramp. This condition may be improved by introducing a wider on-ramp turn radius so that vehicles do not have to slow as much to make the right turn.

At the northbound ramp terminal location on the east side of the interchange on SR 105, the existing ramp layout services the volume demand adequately.

Southbound Partial Diamond Interchange

The Southbound Partial Diamond Interchange alternative alleviates the stacking issues that were identified in the second alternative (Modified Southbound Ramp Interchange). The southbound diamond ramp relocation provides an additional 200 feet spacing between the intersection of J. Warren Road / Mize Road and the proposed southbound on ramp. This allows the eastbound SR 105 right-turn traffic more time and distance to merge into the right turn lane. The additional distance between signals at the same intersections also helps to improve progression through the corridor.

At the northbound entrance (loop ramp) and exit ramp intersection, the ramp geometry and location is maintained. The existing design does not introduce signal timing issues which affects LOS such that will occur with delays to the eastbound left-turn traffic and also the existing northbound ramp taper will not impact the Iron Ore Road intersection to the north of the interchange.

6. CONCLUSION

Based on this traffic analysis study conducted, it is our recommendation that the Southbound Partial Diamond interchange be the selected alternative. Moving the southbound ramps away from the J. Warren/Mize Road intersection improves storage capacity between signals and improves the weaving conditions at the southbound on-ramp. Leaving the northbound ramps in their existing condition provides greater intersection efficiency, reduced project costs and does not impact existing properties.

It is also recommended that a coordinated signal system be installed to interconnect the signals along US 441 Business between the northbound ramps and Cannon Bridge Road. Without coordination, much of the efficiency gained by roadway and intersection improvements would be lost in potential queuing and congestion.

Additional guide signs are also recommended to alert drivers to the non-standard intersection configuration, as well as overhead lane signs over the dual left turn lanes on Mize Road to inform drivers to be in the outside lane for movements to the SR 365 southbound ramp.

PROJECT MAP - Project No.: STP-2640(10), Habersham County



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