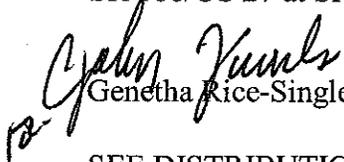


**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE P. I. No. 621990-, Carroll County **OFFICE** Preconstruction
NH00-0017-01(022)
Interchange Improvements
SR 166/US 27 at SR 166 in Carrollton **DATE** May 12, 2008

FROM  Genetha Rice-Singleton, Assistant Director of Preconstruction

TO SEE DISTRIBUTION

SUBJECT APPROVED PROJECT CONCEPT REPORT

Attached for your files is the approval for subject project.

Attachment

DISTRIBUTION:

Brian Summers
Glenn Bowman
Ken Thompson
Michael Henry
Keith Golden
Ben Buchan
Paul Liles
Kent Sager
Babs Abubakari
BOARD MEMBER

3

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENTAL CORRESPONDENCE

FILE: P.I. No. 621990-, Carroll County
NH00-0017-01(022)
Interchange Improvements-
SR 166/US 27 at SR 166 in Carrolton

OFFICE: Preconstruction

DATE: May 7, 2008


FROM: Genetha Rice-Singleton, Assistant Director of Preconstruction

TO: Gerald M. Ross, P.E., Chief Engineer

SUBJECT: PROJECT CONCEPT REPORT

This project is the interchange improvements at the SR 166 and US 27 interchange in the City of Carrolton. This project will provide for ramp reconstruction and the widening of the US 27 twin bridges over SR 166. The existing section of US 27 has minimal room for left turns. During heavy traffic hours this results in the 4-lane roadway becoming a 2-lane roadway due to the left turn traffic encroaching onto the inside travel lane of each bridge. ✓ The US 27 overpass consists of four, 12' lanes, two in each direction, single left turn lanes start at the end of the existing bridges. The median is a depressed 64' wide grassed median. Entrance ramps onto SR 166 are single lanes (16' wide) and exit ramps are dual lanes (24' wide) with separate left and right turn onto US 27. The interchange bridge provides access to the commercially developed urban area of South Carrolton. Highways 27 and 61 have been identified and zoned as future commercial corridors. Both bridges were constructed in 1977 and both have a sufficiency rating of 81. Projected traffic volumes for this section of US 27 are 38,050 VPD in the year 2015 and 51,160 VPD for the design year 2035. The projected volumes along SR 166 are 25,110 VPD for the year 2015 and 33,820 VPD in the design year 2035.

The proposed project will add dual left turn lanes to the inside of each of the twin structures. The improvements to the on-ramps and off-ramps eastbound and westbound will upgrade them to meet current design standards and to accommodate dual left turn movements. Traffic will be maintained via staging during construction.

Environmental concerns include requiring a Categorical Exclusion is anticipated; a Public Information Open House was held 4/24/2007; Time saving procedures is appropriate.

The estimated costs for this project are:

reduction

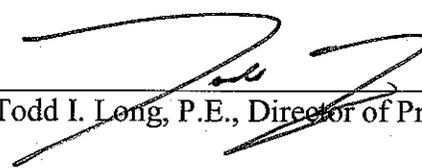
	<u>PROPOSED</u>	<u>APPROVED</u>	<u>FUNDING</u>	<u>PROG DATE</u>
Construction (includes E&C)	\$5,128,000	\$ 6,247,000	L050	LR
Right-of-way	--0--			
Utilities	\$310,000			

I recommend this project concept be approved.

GRS: JDQ

Attachment

CONCUR



Todd I. Long, P.E., Director of Preconstruction

APPROVED

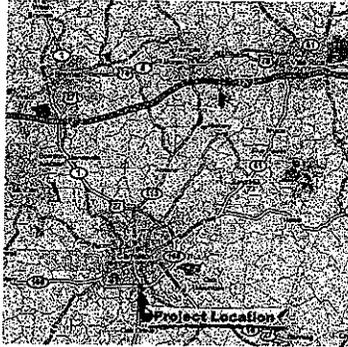


Gerald M. Ross, P.E., Chief Engineer

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
CONSULTANT DESIGN
PROJECT CONCEPT REPORT**

Project Number: NH-017-1(22)
County: Carroll
P. I. Number: 621990

Federal Route Number: US 27
State Route Number: SR 1, SR 166



SR 166 /US 27 Interchange Reconstruction

Recommendation for approval:

DATE 3-14-08

Steve Adewale
Project Manager

DATE 3-11-08

Stanley Hill
Fox Office Head/District Engineer

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

DATE _____

State Transportation Planning Administrator

DATE _____

State Transportation Financial Management Administrator

DATE 4/9/08

Sh. Sumner
State Environmental/Location Engineer

DATE _____

State Traffic Safety & Design Engineer

DATE _____

District Engineer

DATE _____

Project Review Engineer

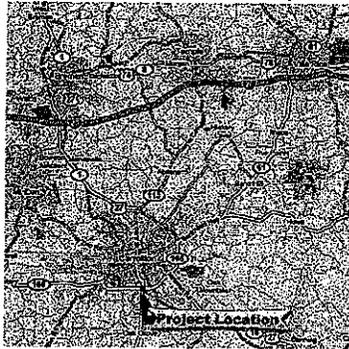
DATE _____

State Bridge and Structural Engineer

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
CONSULTANT DESIGN
PROJECT CONCEPT REPORT**

Project Number: NH-017-1(22)
County: Carroll
P. I. Number: 621990

Federal Route Number: US 27
State Route Number: SR 1, SR 166



SR 166 /US 27 Interchange Reconstruction

Recommendation for approval:

DATE 3-14-08

Steve Adewale
Project Manager

DATE 3-11-08

Stanley Hill
SOE Office Head/District Engineer

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

DATE _____

State Transportation Planning Administrator

DATE _____

State Transportation Financial Management Administrator

DATE _____

Paul Gold
State Environmental/Location Engineer

DATE 3-18-08

State Traffic Safety & Design Engineer

DATE _____

District Engineer

DATE _____

Project Review Engineer

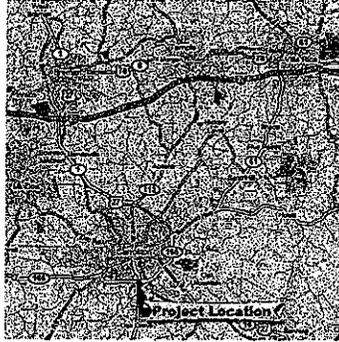
DATE _____

State Bridge and Structural Engineer

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
CONSULTANT DESIGN
PROJECT CONCEPT REPORT**

Project Number: NH-017-1(22)
County: Carroll
P. I. Number: 621990

Federal Route Number: US 27
State Route Number: SR 1, SR 166



SR 166 /US 27 Interchange Reconstruction

Recommendation for approval:

DATE 3-14-08

Steve Adewale
Project Manager

DATE 3-11-08

Stanley Hill
Fox Office Head/District Engineer

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

DATE 3/19/08

Angela J. Adams
State Transportation Planning Administrator

DATE _____

State Transportation Financial Management Administrator

DATE _____

State Environmental/Location Engineer

DATE _____

State Traffic Safety & Design Engineer

DATE _____

District Engineer

DATE _____

Project Review Engineer

DATE _____

State Bridge and Structural Engineer

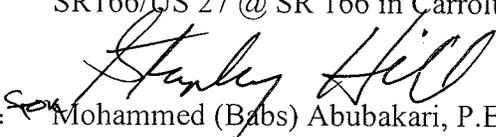
**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE: NH000-0017-01(022), Carroll County
P.I. No. 621990
SR166/JS 27 @ SR 166 in Carrolton

OFFICE: Consultant Design

DATE: March 11, 2008

FROM:  Mohammed (Babs) Abubakari, P.E., State Consultant Design & Program Delivery Engineer

TO: Genetha Rice-Singleton, Assistant Director of Preconstruction

SUBJECT: **Project Concept Report**

Attached is the original copy of the concept report for your further handling for approval in accordance with the Plan Development process (PDP).

If you have any questions concerning this matter, please contact Steve Adewale at (404) 463-0291.

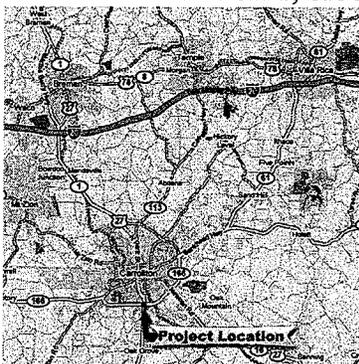
MBA:SH:ASA

cc: Brian Summers, P.E., Project Review Engineer
Glen Bowman, P.E., State Environmental/Location Engineer
Keith Golden, P.E., State Traffic Safety & Design Engineer
Angela Alexander, State Transportation Planning Administrator
Jamie Simpson, State Transportation Financial Management Administrator
Kent L. Sager, District One Engineer
Paul Liles, P.E., State Bridge and Structural Engineer

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
CONSULTANT DESIGN
PROJECT CONCEPT REPORT**

Project Number: NH-017-1(22)
County: Carroll
P. I. Number: 621990

Federal Route Number: US 27
State Route Number: SR 1, SR 166



SR 166 /US 27 Interchange Reconstruction

Recommendation for approval:

DATE 3-14-08

Steve Adewale
Project Manager

DATE 3-11-08

Stanley Hill
Sox Office Head/District Engineer

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

DATE _____

_____ State Transportation Planning Administrator

DATE _____

_____ State Transportation Financial Management Administrator

DATE _____

_____ State Environmental/Location Engineer

DATE _____

_____ State Traffic Safety & Design Engineer

DATE _____

_____ District Engineer

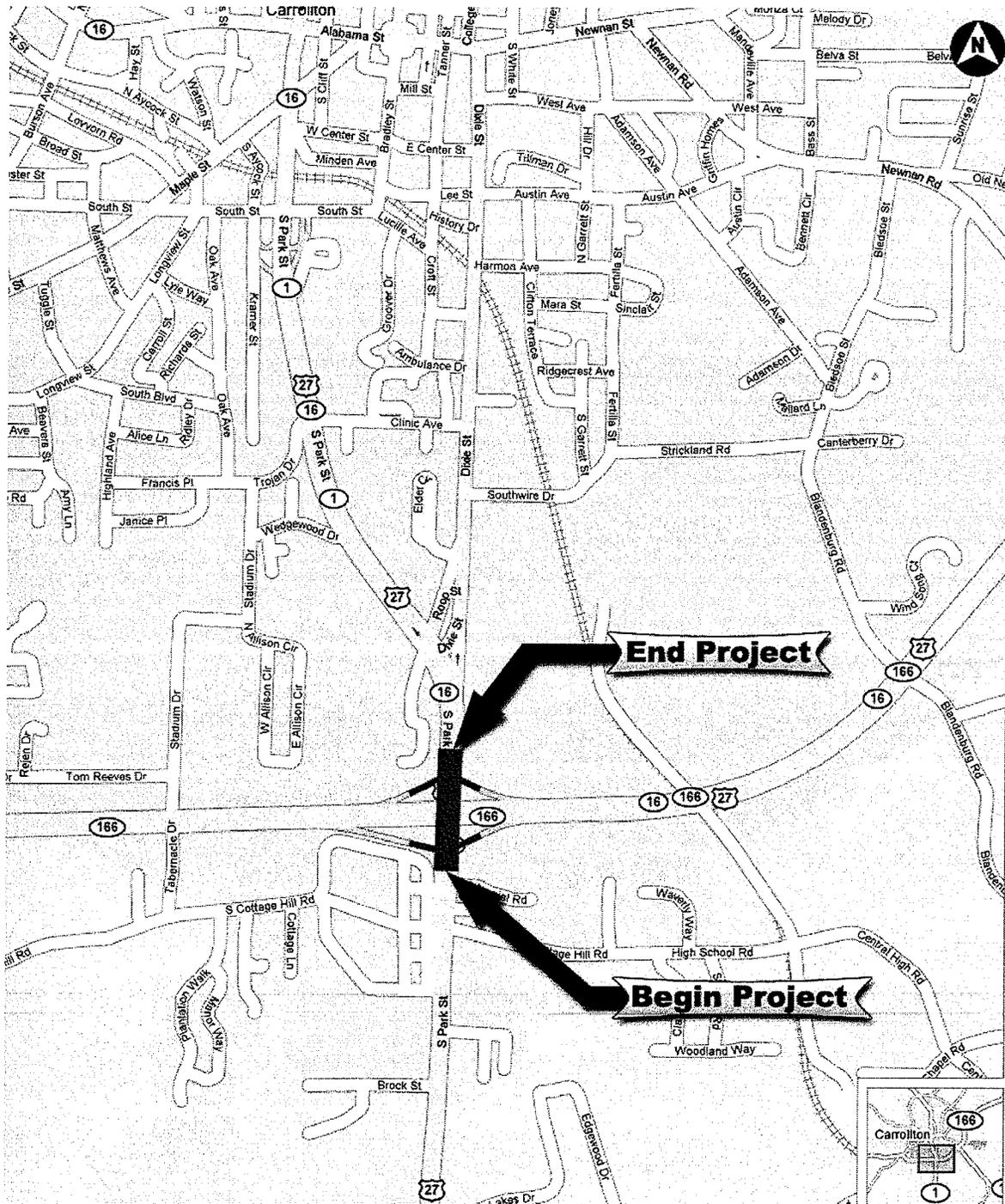
DATE _____

_____ Project Review Engineer

DATE _____

_____ State Bridge and Structural Engineer

Project Location Map:



Need and Purpose:

Project NH-017-1(22) would provide for ramp reconstruction and the widening of the US 27 twin bridges over SR 166 in Carrollton, GA. This existing section of US 27 has minimal room for left turns. During heavy traffic hours this results in the 4-lane roadway becoming a 2-lane roadway due to left turn lane traffic encroaching onto the inside travel lane of each bridge. It is proposed in this project to widen each of the twin bridges to allow for dual left turn lanes to accommodate heavy left turn movements. The widening of the bridges will allow for longer storage lengths for the left turn queue. Additionally, the interchange ramps would be reconstructed to match the additional left turn movements. This project will be constructed within the existing limits of the interchange.

Planning Background and Project History:

Project NH-017-1(22) would provide for the widening of the US 27 twin bridges over SR 166 and ramp reconstruction in Carrollton, GA for a length of 0.2 miles. Widening of the bridges will provide longer storage lengths as well as an additional turn lane in each direction; therefore, the bridge has independent utility.

The Carroll County Long Range Transportation Plan, published in 2004, documents that traffic counts increased 84% along US 27 / SR 1 from 1990 to 1992.

This project is listed in the current Transportation Improvement Program General Work Program. Carroll County is located outside of the Atlanta Metropolitan Area and is in a non-attainment area for air quality.

Existing Conditions:

US 27 is a four (4) lane facility. This corridor is located entirely within Carroll County. Existing average daily traffic counts along this project is 33,660 vehicles. The projected average daily traffic for Current Year 2015 indicates 38,050 vehicles will utilize US 27. The projected average daily traffic for Design Year 2035 indicates 51,160 vehicles will travel US 27.

SR 166 is classified as an urban principal arterial, which provides access to the US 27 interchange. The project is proposed to be constructed within existing right-of-way. The interchange bridge provides access to the commercially developed urban area of South Carrollton. Highways 27 and 61 have been identified and zoned as future commercial corridors. This area consists of retail shops, restaurants, and other commercial businesses. Both bridges were constructed in 1977 and both have a current sufficiency rating over 81.61. Because the bridges are rated over an 80.0 they do not qualify for Federal Aid funding. This project is programmed at the State level.

A Categorical Exclusion (CE) is expected to be obtained for this project.

Other Projects in the Area:

The twin bridges over SR 166 in Carrollton, Georgia have been determined to serve an independent utility. For discussion purposes, however, four other projects are programmed in this general area:

- *NHS-0000-00(312), PI 0000312 SR 1/US27 Widening from CR 526/Central Road north to Dixie Street – Project begins at mile post 10.07 to mile post 10.539 for a project length of 0.47 miles.*
- *STP-021-1(24), P.I.No. 631300, SR 166 Widening from CR 828 / 141 to 4-lane section in Carrollton - The proposed improvements would widen SR 166 from a 2-lane road to a 4-lane road with a depressed median from CR 828/Farmers High Road to the project termination point where the 4-lane section begins on the Carrollton bypass. Shoulders will be constructed to 6' inside and 10' outside with 2' and 6' paved, respectively.*
- *STP-021-1(25), P.I.No. 631310, SR 166 Bypass around City of Bowdon from east of Big Indian Creek on new location to CR 828 - This project is proposed to construct a southern bypass of the town of Bowdon and widen and reconstruct SR 166 from the eastern terminus of the bypass to County Road (CR) 828/Farmers High Road.*
- *STP-0804(1), P.I. No. 650620, SR 16 from Columbia Road to SR 1 Drainage Improvements – Improvements begin at mile post 11.42 to mile post 12.77 for a project length of 1.35 miles.*

Modal Relationships:

Land uses surrounding the interchange consist of industrial business parks and a Target store. There are no sidewalks in this area and sidewalks are not proposed for this bridge. Improving this bridge would bring it to current design standards and in doing so would improve the operation and safety of this roadway. There is also no scheduled transit service in this area, and no bus accommodation (pull-out bays or HOV lanes) is planned on either side of this bridge. Dual thru lanes and dual left turn lanes 12' in width in each direction will accommodate the mix of truck and car traffic projected in this area.

The Georgia Bicycle and Pedestrian Plan, originally adopted in 1997 and updated the summer of 2007, identifies a regional bicycle route planned on US 27/ SR 1 for 9.4 miles, turning right on SR 166 in Carrollton. A wide shoulder, a 4' wide striped bicycle lane, is provided to accommodate cyclists on the eastbound and westbound ramps and across the bridge into central Carrollton to accommodate bicycles in both directions connecting to SR 166 and across the bridge.

Existing Roadway Condition/Proposed Improvements:

SR 166 is a limited access state route that traverses in an east-west orientation within the study area. SR 166 is composed of a 4-lane divided cross section with a single lane at the eastbound and westbound off-ramps. The lane configuration at westbound SR 166 off-ramp at US 27 intersection is composed of a westbound shared left/through lane and a free flow right turn lane; the southbound US 27 approach has two through lanes and one right turn lane; the northbound US 27 approach has two through lanes and one left turn lane with approximately 140 feet of storage; the northbound US 27 approach has two through lanes and one right turn lane.

Condition of Bridges:

The project bridges over SR 166 in Carrollton are State-owned facilities and are currently rated in good condition. The programmed bridge widening is related to congestion and AADT, not because the structure is in poor condition.

Existing and Projected (Design Year) Traffic Conditions (Traffic AADT):

Roadway	Current Year (2015)	Design Year (2035)
US 27	38,050	51,160
SR 166	25,110	33,820

Accident Data:

Corridor crash history analysis has been conducted for the most current three years, 2003-2005, for the US 27 twin bridges over SR 166 in Carrollton, Georgia. The respective statewide rates for urban principal arterial facilities (GDOT, Office of Traffic Safety and Design) are included in the table.

Historical crash data at the US 27 / SR 166 interchange indicate 10 crashes in 2003, 17 crashes in 2004 and 6 crashes in 2005. The historical number of crashes is for the segment of US 27 between and including the SR 166 on-ramps. The statewide average crash rate per 100 million vehicle miles (MYM) for an urban principal arterial were 613 in 2003, 515 in 2004, and 573 in 2005. Comparing the statewide average to the Carroll County rates illustrates that US 27 has a below average crash rate for two of the three study years.

This crash data was used to calculate the standard corridor crash rate per one hundred million vehicle miles traveled as shown in the following table:

Crash Data:

SR 166 - US27 Interchange			
	Total Crashes	Crash Rate	State Avg.
2003	10	470	613
2004	17	865	515
2005	6	402	573

With the increase of traffic volumes expected for this corridor, accident rates and injury rates are anticipated to increase. As congestion increases, drivers tend to drive more carelessly in an effort to maintain speed. Reconstructing the US 27 twin bridge as a multilane bridge with dual left turn lanes should make the roadway safer for motorists by separating the turning traffic and also providing safe opportunities for other motorists to pass. The reconstruction improvements to the on-ramps and off-ramps eastbound and westbound will upgrade them to meet current design standards and match the new interchange layout. The additional lane to the on-ramp will require motorists to merge prior to joining the existing SR 166 mainline.

These improvements in conjunction with the on-ramp and off-ramp reconstruction and the other roadway improvement projects in the area should improve the overall congestion and operational safety within the project vicinity.

Level of Service Analysis:

The ARC travel demand model was used for AM, Midday and PM peak scenarios to project bridge capacity for the interchange intersection of SR 166 at US 27 without improvements for the years 2015 and 2035.

	<i>Existing No-Build Conditions</i>	<i>2015 Opening Year</i>	<i>2035 Design year</i>
<i>AM</i>	<i>LOS C</i>	<i>LOS C</i>	<i>LOS D</i>
<i>Midday</i>	<i>LOS B</i>	<i>LOS C</i>	<i>LOS D</i>
<i>PM</i>	<i>LOS C</i>	<i>LOS D</i>	<i>LOS F</i>

Logical Termini:

According to the definition of logical termini this project is considered an independent utility due to the usable and reasonable expenditure even if no additional transportation improvements in the area are made. Although four (4) other projects are scheduled in the vicinity of this project the improvements to the ramps and twin bridges alone improve the existing conditions of the interchange and the development in the immediate vicinity. The following will be constructed as part of this project:

- *Add two designated left hand turn lanes to US 27 both Southbound and Northbound. The tapers will begin approximately 50' before the bridge and will end approximately 200' beyond the bridge at the on/off-ramp interchange in both directions. This will impact approximately 550' of US 27 in both directions. Each bridge will be widened to the inside (median) to accommodate the additional 24' of turn lanes.*
- *Add an additional lane to the on-ramps, both SR 166 Eastbound and SR 166 Westbound, to accommodate the additional turn lanes from US 27. This will require approximately 8' of pavement widening to the existing ramps for approximately 350' and a 600' taper back to the existing on-ramp prior to joining with the existing SR 166 mainline.*
- *Add an additional lane to the off-ramps, both SR 166 Eastbound and SR 166 Westbound. This will require approximately 12' of pavement widening to the existing ramps for approximately 600' from the intersection of SR 166 and US 27.*

The ramp reconstruction and widening of the twin bridges would function as a major interchange collecting and distributing trips within the area. Construction of the additional lanes on the twin bridges and the reconstruction of the ramps would provide for a safer environment for vehicles to operate, facilitate the movement of freight and vehicular traffic more efficiently and improve the traffic safety and operations in the vicinity. The ramp reconstructions will assist motorist's ability to merge onto the existing SR 166.

Environmental Justice:

Due to existing development within the vicinity of the interchange and the improvements occurring within the foot print of the existing bridge, no environmental justice impacts are anticipated.

General Land Use in the Project Area:

The Carroll County Long Range Transportation Plan (2004) states that Highways 27 and 166 are zoned as future commercial corridors. The land in the immediate vicinity of the interchange is entirely developed, primarily commercial, with an industrial business park and a Target Store. The interchange serves traffic traveling north-south leading from one commercial developed area of the interchange to the other as well as providing access to the commercially developed urban area of South Carrollton. South Carrollton consists of retail shops, restaurants, and other commercial businesses.

Description of the Proposed Project:

This project consists of widening of the twin bridge structures at US 27 over SR 166. The proposed construction will add dual left turn lanes to the inside of each of the two twin structures. The existing single left turn lanes start at the bridge ends and have insufficient storage lengths. This causes left turn traffic to extend back into the through lanes. Adding a second left turn lane for each direction and extending their storage length onto the bridge will alleviate this problem. Interchange ramps will be reconstructed to accommodate dual left turn movements.

Is the project located in a Non-attainment area: Yes No.

Carroll County is one of twenty counties in the metro-Atlanta area that is currently designated as a Non-attainment area for air quality. The Atlanta Metropolitan Planning Organization (MPO) is an eighteen county area federally designated for regional transportation planning to meet air quality standards. The Atlanta MPO is responsible for programming projects and to implement the adopted Regional Transportation Plan (RTP). However, Carroll County is one of two Non-attainment counties not included in the Atlanta MPO and thus not included in the RTP. Thus, there is no conforming network plan for this project. Carroll County is included in the Chattahoochee-Flint Regional Development Center but no conforming network plan exists for this project in their plan either.

PDP Classification: Major X Minor

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

Functional Classification:

<i>US 27, SR 1</i>	<i>Urban Principal Arterial</i>
<i>SR 166</i>	<i>Urban Principal Arterial</i>

U.S. Route Number(s): <i>US 27</i>	State Route Number(s): <i>SR 1</i>
U.S. Route Number(s): <i>N/A</i>	State Route Number(s): <i>SR 166</i>

Traffic (AADT):

<u>Roadway</u>	<u>Current Year: (2015)</u>	<u>Design Year: (2035)</u>
<i>US 27</i>	<i>38,050</i>	<i>51,160</i>
<i>SR 166</i>	<i>25,110</i>	<i>33,820</i>

Existing Design Features:

- Typical Sections:

The US 27 overpass consists of four 12' lanes, two in each direction. Single left turn lanes start at the end of the existing bridges. The median is a depressed 64' wide grassed median. The shoulders are rural with a 4' paved inside shoulder and a 12' paved outside shoulder. The twin bridges each carry two 12' lanes with a 6' inside shoulder and 12' outside shoulder. The two bridges are 49' 7-in. apart. Entrance ramps onto SR 166 are single lane (16' wide) and exit ramps are dual lanes (24' wide) with a separate left and right turn onto US 27.

- Roadway

<u>Roadway</u>	<u>Posted Speed</u>	<u>Min. Radius</u>	<u>Max S.E.</u>	<u>Max. Grade</u>
<i>US 27</i>	<i>45 mph</i>		<i>N.C.</i>	<i>4.50%</i>
<i>SR 166</i>	<i>55 mph</i>		<i>N.C.</i>	<i>2.70%</i>
<i>EB Off-Ramp</i>			<i>2.60%</i>	<i>3.50%</i>
<i>EB On-Ramp</i>		<i>1650'</i>	<i>6.00%</i>	<i>3.00%</i>
<i>WB Off-Ramp</i>		<i>1200'</i>	<i>7.20%</i>	<i>2.50%</i>
<i>WB On-Ramp</i>		<i>1000'</i>	<i>7.80%</i>	<i>2.80%</i>

- Width of Rights-of-Way

US 27.....350'
SR 166Varies 350' to 900'

- Major Structures

<u>Bridge</u>	<u>Structure ID</u>	<u>Suff. Rating</u>	<u>Length</u>	<u>Width</u>	<u>Exist. Vert. Clearance</u>
US 27 NB	045-0001-0	81.83	291'	44.40'	16'-8"
US 27 SB	045-0002-0	81.61	291'	44.40'	18'-6"

- Major interchanges or intersections along the project:

US27 at SR 166

- Existing length of roadway segment and the beginning mile logs:

US 27 Begin Mile Point: 10.17

US 27 End Mile Point: 10.38

Total Length 0.21 miles

Proposed Design Features:

- Proposed typical sections: (see *attachment No. 2* for Typical Section drawings)
 - Four 12' lanes
 - Two 12' left turn lanes
 - 4' paved inside shoulder
 - 12' paved outside shoulder
 - 40' rural median (depressed)
- Proposed Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 4.5 % Maximum grade allowable 6.0 %
- Proposed Minimum radius (ramp) 1000' Minimum radius allowable 643'
- Right-of-way
 - Width: n/a ft
 - Easements: Temporary (), Permanent (X), Utility (), Other ().
 - Type of access control: Full (), Partial (), By Permit (X), Other ().
 - Number of parcels: 0
 - Number of displacements:
 - Business: 0
 - Residences: 0
 - Mobile homes: 0
- Structures:
 - Bridges:

<u>Bridge</u>	<u>Size</u>	<u>Description of work</u>
SR 166/ US 27	291' x 68'	Inside widening to add dual left turn lanes in each direction

- Retaining walls: none
- Major intersections and interchanges:
 - US 27 / SR 166
- Traffic control during construction:
 - Existing traffic will be maintained on the project during construction. The existing 12' shoulder on the bridges will be utilized and traffic will be shifted to the outside during initial construction.

- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
Horizontal Alignment:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Roadway Width:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shoulder Width:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vertical Grades:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cross Slopes:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Stopping Sight Distance:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Superelevation Rates:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Horizontal Clearance:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Speed Design:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vertical Clearance:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bridge Width:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bridge Structural Capacity:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Design Variances: *None*
- Environmental concerns: *None*
- Level of environmental analysis:
 - Are Time Savings Procedures appropriate? Yes (), No (X),
 - Categorical exclusion (X),
 - Environmental Assessment (EA)/Finding of No Significant Impact (FONSI) (), or
 - Environmental Impact Statement (EIS)/Record of Decision (ROD) ().
- Utility involvements:
 - Gas - *Atlanta Gas Light Company*
 - Water - *Carroll County Water Authority*
 - Sanitary Sewer - *City of Carrollton*
 - Telephone - *AT&T (Bellsouth)*
 - Electric - *Georgia Power*

VE Study Required: Yes (X) No ()

Project responsibilities:

- Design - *DMJM HARRIS / GDOT*
- Right-of-Way Acquisition - *DMJM HARRIS*
- Relocation of Utilities - *Utility Owners*
- Letting to contract - *GDOT*
- Supervision of construction - *GDOT*
- Providing material pits - *Contractor*
- Providing detours - *Contractor*

Coordination:

- Initial concept meeting – *March 9, 2007. Minutes attached.*
- Concept meeting – *October 26, 2007*
- PAR meetings – *N/A*
- FEMA, USCG, and/or TVA – *N/A*
- Public involvement –
 - *A Public Information Open House was held on April 24, 2007 at Jonesville Middle School in Bowdon, GA*
- Other projects in the area –
 - *STP-021-1(24), P.I.No. 631300, SR 166 Widening from CR 828 / 141 to 4-Lane section in Carrollton*
 - *STP-021-1(25), P.I.No. 631310, SR 166 Bypass around City of Bowdon from East of Big Indian Creek on new location to CR 828*
 - *STP-0804(1), P.I. No. 650620, SR 16 From Columbia Road to SR 1 Drainage Improvements*
 - *NHS-0000-00(312), P.I. No. 0000312 SR 1/US27 Widening from CR 526/Central Road North to Dixie Street – Project begins at mile post 10.07 to mile post 10.539 for a project length of 0.47 miles.*
- Other coordination to date
 - *July 30, 2007 S.U.E. Kickoff meeting*

Scheduling – Responsible Parties' Estimate:

- Time to complete the environmental process: 8 Months.
- Time to complete preliminary construction plans: 8 Months.
- Time to complete right-of-way plans: 0 Months.
- Time to complete the Section 404 Permit: 0 Months.
- Time to complete final construction plans: 6 Months.
- Time to complete the purchase of right-of-way: 0 Months.
- List other major items that will affect the project schedule: _____ Months.

Other Alternates Considered:

- **Increase left turn storage (Alternate A)** - *Extending the storage of the existing left turn lanes on US 27 by widening each bridge by one lane was considered. The traffic analysis showed that this alternative would perform at a Level of Service of F for the design year (2035) and thus not meet the need to effectively increase capacity at the interchange. As a result this alternative was eliminated.*
- **Add through lane capacity (Alternate B)** - *Extending the storage of the existing left turn lanes on US 27 as well as adding an additional through lane in each direction was considered. The alternative met the need of effectively increasing capacity at the interchange but was a more costly alternative than the preferred alternative. As a result this alternative was eliminated.*
- **No build** – *This alternative doesn't meet the operational and safety needs of this area.*

Project Concept Report, Page 12 of 13
Project Number: NH-017-1(22)
P.I. Number: 621990
County: Carroll

Comments:

Attachments:

1. Cost Estimates :
 - a. Construction including E&C: \$7,014,928
 - b. Right-of-Way: \$0 (*no Right-of-Way will be required*)
 - c. Utilities: \$310,000
2. Concept Layout
3. Typical sections
4. Capacity Analysis
5. Bridge Inventory
6. Minutes of Initial Concept Team Meeting – March 9, 2007
7. Minutes of the Concept Team Meeting – October 26, 2007
8. Benefit-Cost Ratio
9. Carroll County Non-attainment Letter

Project Concept Report, Page 13 of 13
Project Number: NH-017-1(22)
P.I. Number: 621990
County: Carroll

Approvals:

Concur: _____
Director of Preconstruction

Approve: _____
Chief Engineer

Estimate Report for file "621990 - Interchange_2008-02-07"

Section Roadway					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	150000.00	TRAFFIC CONTROL -	150000.00
153-1300	1	EA	76536.72	FIELD ENGINEERS OFFICE TP 3	76536.72
210-0100	1	LS	200000.00	GRADING COMPLETE -	200000.00
310-1101	1965	TN	22.05	GR AGGR BASE CRS, INCL MATL	43328.25
402-1812	165	TN	69.37	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	11446.05
402-3121	950	TN	63.93	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	60733.50
402-3141	1700	TN	74.24	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL	126208.00
402-3192	320	TN	81.96	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL	26227.20
413-1000	1057	GL	1.93	BITUM TACK COAT	2040.01
432-5010	15000	SY	1.93	MILL ASPH CONC PVMT, VARIABLE DEPTH	28950.00
433-1000	867	SY	153.28	REINF CONC APPROACH SLAB	132893.76
441-0004	500	SY	45.42	CONC SLOPE PAV, 4 IN	22710.00
441-0301	4	EA	2171.99	CONC SPILLWAY, TP 1	8687.96
441-6012	400	LF	30.94	CONC CURB & GUTTER, 6 IN X 24 IN, TP 2	12376.00
444-1000	400	LF	7.80	SAWED JOINTS IN EXIST PAVEMENTS - PCC	3120.00
446-1100	3000	LF	2.79	PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDTH	8370.00
550-1241	80	LF	61.28	STORM DRAIN PIPE, 24 IN, H 10-15	4902.40
550-3324	4	EA	926.46	SAFETY END SECTION 24 IN, STORM DRAIN, 4:1 SLOPE	3705.84
550-4424	4	EA	249.39	FLARED END SECTION, 24 IN, SLOPE DRAIN	997.56
603-7000	400	SY	5.15	PLASTIC FILTER FABRIC	2060.00
620-0100	2000	LF	30.23	TEMPORARY BARRIER, METHOD NO. 1	60460.00
641-1100	80	LF	45.20	GUARDRAIL, TP T	3616.00
641-1200	260	LF	15.79	GUARDRAIL, TP W	4105.40
641-5001	4	EA	631.99	GUARDRAIL ANCHORAGE, TP 1	2527.96
641-5012	4	EA	1819.10	GUARDRAIL ANCHORAGE, TP 12	7276.40
668-1100	4	EA	2853.52	CATCH BASIN, GP 1	11414.08
668-2100	4	EA	3123.36	DROP INLET, GP 1	12493.44
668-5000	2	EA	2354.76	JUNCTION BOX	4709.52
Section Sub Total:					\$1,031,896.05

Section Erosion Control - Permanent					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
700-6910	2	AC	1078.44	PERMANENT GRASSING	2156.88
700-7000	2	TN	59.99	AGRICULTURAL LIME	119.98
700-7010	10	GL	21.55	LIQUID LIME	215.50
700-8000	3	TN	294.72	FERTILIZER MIXED GRADE	884.16
700-8100	250	LB	2.50	FERTILIZER NITROGEN CONTENT	625.00
700-9100	500	SY	0.00	BLOCK SOD	0.00
Section Sub Total:					\$4,001.52

Section Erosion Control - Temp					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	1	AC	734.02	TEMPORARY GRASSING	734.02
163-0240	100	TN	184.73	MULCH	18473.00
163-0300	1	EA	1687.20	CONSTRUCTION EXIT	1687.20
163-0501	4	EA	839.38	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	3357.52
163-0520	200	LF	17.43	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	3486.00
163-0530	1500	LF	4.28	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	6420.00
165-0010	1000	LF	0.80	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	800.00
165-0030	1500	LF	1.60	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	2400.00
165-0040	20	EA	64.98	MAINTENANCE OF EROSION CONTROL CHECKDAMS/DITCH CHECKS	1299.60
165-0101	1	EA	557.45	MAINTENANCE OF CONSTRUCTION EXIT	557.45
171-0010	1000	LF	1.72	TEMPORARY SILT FENCE, TYPE A	1720.00
171-0030	1500	LF	3.92	TEMPORARY SILT FENCE, TYPE C	5880.00
716-2000	800	SY	1.20	EROSION CONTROL MATS, SLOPES	960.00
Section Sub Total:					\$47,774.79

Section Traffic Items

Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1020	120	SF	14.88	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	1785.60
636-1033	179	SF	19.17	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	3431.43
636-1041	54	SF	37.39	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	2019.06
636-2070	565	LF	8.05	GALV STEEL POSTS, TP 7	4548.25
636-2080	44	LF	9.37	GALV STEEL POSTS, TP 8	412.28
636-3010	2	EA	496.23	GROUND-MOUNTED BREAKAWAY SIGN SUPPORT	992.46
636-5100	2	EA	0.00	MILEPOST SIGNS	0.00
639-3004	8	EA	11138.65	STEEL STRAIN POLE, TP IV	89109.20
647-1000	2	LS	51680.38	TRAFFIC SIGNAL INSTALLATION NO -	103360.76
647-2140	2	EA	1499.79	PULL BOX, PB-4	2999.58
647-2150	2	EA	1793.84	PULL BOX, PB-5	3587.68
652-0094	6	EA	59.87	PAVEMENT MARKING, SYMBOL, TP 4	359.22
652-0110	6	EA	49.31	PAVEMENT MARKING, ARROW, TP 1	295.86
652-0120	6	EA	71.59	PAVEMENT MARKING, ARROW, TP 2	429.54
653-1501	650	LF	0.53	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	344.50
653-1502	750	LF	0.53	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	397.50
653-1704	300	LF	4.11	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	1233.00
653-1804	550	LF	2.13	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	1171.50
653-3501	550	GLF	0.51	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	280.50
653-4501	1	GLM	889.69	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	889.69
653-6004	600	SY	2.93	THERMOPLASTIC TRAF STRIPING, WHITE	1758.00
653-6006	600	SY	2.96	THERMOPLASTIC TRAF STRIPING, YELLOW	1776.00
654-1001	12	EA	3.10	RAISED PVMT MARKERS TP 1	37.20
654-1002	275	EA	3.04	RAISED PVMT MARKERS TP 2	836.00
682-6120	1000	LF	14.52	CONDUIT, RIGID, 2 IN	14520.00
682-6222	1200	LF	6.41	CONDUIT, NONMETL, TP 2, 2 IN	7692.00
682-6520	700	LF	17.84	CONDUIT, FIBERGLASS, 2 IN	12488.00
Section Sub Total:					\$256,754.81

Section Bridge (Northbound)

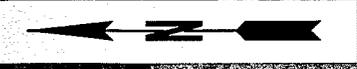
Item Number	Quantity	Units	Unit Price	Item Description	Cost
211-0200	143	CY	30.58	BRIDGE EXCAVATION, GRADE SEPARATION	4372.94
441-0004	270	SY	45.42	CONC SLOPE PAV, 4 IN	12263.40
500-0100	2155	SY	4.08	GROOVED CONCRETE	8792.40
500-1006	1	LS	605000.00	SUPERSTR CONCRETE, CL AA, BR NO -	605000.00
500-2100	292	LF	43.45	CONCRETE BARRIER	12687.40
500-3101	184	CY	529.28	CLASS A CONCRETE	97387.52
511-1000	37000	LB	0.91	BAR REINF STEEL	33670.00
511-3000	140000	LS	0.94	SUPERSTR REINF STEEL, BR NO -	131600.00
520-0573	24	EA	218.55	H-PILE POINTS, HP 14 X 73	5245.20
520-1147	720	LF	61.99	PILING IN PLACE, STEEL H, HP 14 X 73	44632.80
520-4147	2	EA	0.87	LOAD TEST, STEEL H, HP 14 X 73	1.74
535-1105	1	LS	310000.00	PAINT EXIST STEEL STRUCTURE, BR ID -	310000.00
540-1202	1	LS	325000.00	REMOVAL OF PARTS OF EXISTING BRIDGE, BR NO -	325000.00
Section Sub Total:					\$1,590,653.40

Section Bridge (Southbound)

Item Number	Quantity	Units	Unit Price	Item Description	Cost
211-0200	143	CY	30.58	BRIDGE EXCAVATION, GRADE SEPARATION	4372.94
441-0004	270	SY	45.42	CONC SLOPE PAV, 4 IN	12263.40
500-0100	2155	SY	4.08	GROOVED CONCRETE	8792.40
500-1006	1	LS	605000.00	SUPERSTR CONCRETE, CL AA, BR NO -	605000.00
500-2100	292	LF	43.45	CONCRETE BARRIER	12687.40
500-3101	184	CY	529.28	CLASS A CONCRETE	97387.52
511-1000	37000	LB	0.91	BAR REINF STEEL	33670.00
511-3000	140000	LS	0.94	SUPERSTR REINF STEEL, BR NO -	131600.00
520-0573	24	EA	218.55	H-PILE POINTS, HP 14 X 73	5245.20
520-1147	720	LF	61.99	PILING IN PLACE, STEEL H, HP 14 X 73	44632.80
520-4147	2	EA	0.87	LOAD TEST, STEEL H, HP 14 X 73	1.74
535-1105	1	LS	310000.00	PAINT EXIST STEEL STRUCTURE, BR ID -	310000.00
540-1202	1	LS	325000.00	REMOVAL OF PARTS OF EXISTING BRIDGE, BR NO -	325000.00
Section Sub Total:					\$1,590,653.40

Total Estimated Cost: \$4,521,733.97

Subtotal Construction Cost	\$4,521,733.97
E&C Rate 20.0 %	\$904,346.79
Inflation Rate 0.0 % @ 0.0 Years	\$0.00
	<hr/>
Total Construction Cost	\$5,426,080.76
Right Of Way	\$0.00
ReImb. Utilities	\$310,000.00
	<hr/>
Grand Total Project Cost	\$5,736,080.76



US 27

US 27

US 27

PROJECT NO. 07-1108
 MISSOURI DEPARTMENT OF TRANSPORTATION
 CONCEPT TEAM MEETING
 SERIES / US 27 INTERCHANGE RECONSTRUCTION
 CARROLL COUNTY PROJECT #07-1102
 DATE 11/11/08
 DMI/HM HARRIS | AECOM

SPURWAY LLC
COS 0100070

SPURWAY LLC
COS 0100070

TEMPLE AVENUE ASSOCIATES
COS 0420142

SPURWAY LLC
COS 0100070

CORPORATION #1073

SP 165

SP 166

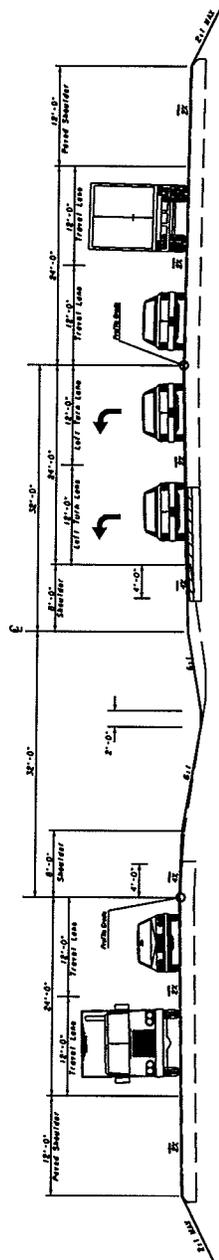
PAHEL K1807
COS 0100048

GENEY GROUP LLC
COS 0100049

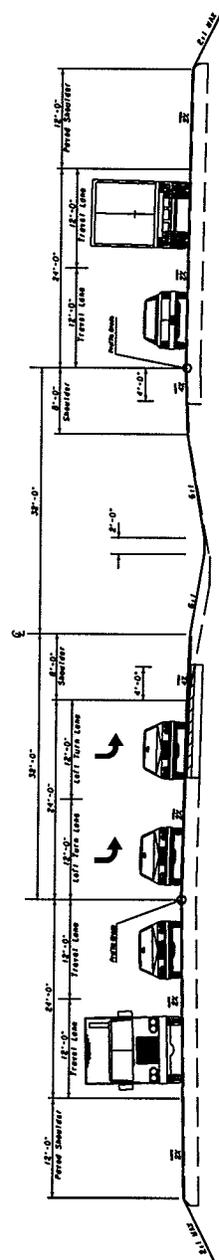
GENEY GROUP LLC
COS 0100049

GENEY GROUP LLC
COS 0100049

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
CHOCOMA	PH-012-11991		



US 27 OVER SR 166, NORTH OF BRIDGE,
DUAL LEFT TURNS ONTO WESTBOUND SR 166



US 27 OVER SR 166, SOUTH OF BRIDGE,
DUAL LEFT TURNS ONTO EASTBOUND SR 166

DMJM HARRIS AECOM	SCALE: NTS DATE:	REVISION DATES	STATE OF GEORGIA
			DEPARTMENT OF TRANSPORTATION
			OFFICE CONSULTANT DESIGN
			TYPICAL SECTIONS
			SR 166 / US 27
			INTERCHANGE RECONSTRUCTION
			PI 1-621990
			DRAWING NO.
			5-01

To: Dan Bodycomb, P.E., DMJM Harris
From: Scott Moore, Carter and Burgess, Inc.
Date: November 5, 2007
Subject: SR 166 @ SR 1 Capacity Analysis Results

Carter and Burgess, Inc. has conducted preliminary analysis as a part of the concept development for SR 166 at SR 1 interchange improvements (Carroll County), being prepared by DMJM Harris. The SR 166 at SR 1 interchange improvement project is concentrated on lengthening the existing SR 1 left-turn storage lanes to the SR 166 on-ramps. The analysis studied the impact the 2015 opening year and 2035 design year traffic volumes will have at the intersections. The following is a brief description of the assumptions and analysis findings.

Study Area

The SR 166 at SR1 diamond interchange is located south of the City of Carrollton in Carroll County. The interchange is located in an area along SR 1 that is primarily composed of retail land uses which generate a significant amount of traffic volume.

SR 166 is a limited access state route that traverses in an east-west orientation within the study area. SR 166 is composed of a four-lane divided cross section with single lane eastbound and westbound off-ramps. The lane configuration at westbound SR 166 off-ramp at SR 1 intersection is composed of a westbound shared left/through lane and a free flow right turn lane; the southbound SR 1 approach has two through lanes and one right turn lane; the northbound SR1 approach has two through lanes and one left turn lane with approximately 140-feet of storage. The lane configuration at eastbound SR 166 off-ramp at SR 1 intersection is composed of a eastbound shared left/through lane and a free flow right turn lane; the southbound SR 1 approach has two through lanes and one left turn lane with approximately 140-feet of storage; the northbound SR1 approach has two through lanes and one right turn lane. An illustration of the interchange lane configuration is shown on Figure 1.

Collision History

Corridor crash history analysis has been conducted for the most current three years. Table 1 shows the historical number of crashes at the segment of SR 1 between and including the SR 166 on-ramps.

Table 1 Historical Crash Data			
Segment	2003	2004	2005
SR 1 at the SR 166 interchange (Carroll County)	10	17	6

These crashes were used to calculate standard corridor crash rates per one hundred million vehicle-miles (100 MVM) traveled shown in Table 2.

Segment	100 MVM		
	2003	2004	2005
SR 1 at the SR 166 interchange (Carroll County)	470	865	402
Statewide Average	613	515	573

The functional classification of SR 1 at the SR 166 interchange in Carroll County is urban principal arterial. The statewide average crash rates per 100 MVM for urban principal arterial were 613 in 2003, 515 in 2004, and 573 in 2005. Comparing the statewide average to the Carroll County rates shows that SR 1 has a below average crash rate for two of the three study years.

Traffic Data Collection

A field inventory and observations of the SR 166 at SR 1 corridor were conducted to evaluate existing operating conditions. The field inventory included various conditions, such as existing roadway geometry, speed limits, and any additional details of importance particular to the study area. The AM, midday and PM peak hour traffic flows, congestion, and signal operations were also observed and recorded for use in the traffic analysis. Carter & Burgess collected traffic volume and turning movement data for the SR 166 at SR 1 project at the following locations:

Bi-directional Classification Traffic Volume Counts (1 location)

- SR 1 at the interchange with SR 166

24-hour Directional Traffic Volume Counts (6 locations)

- SR 1 southbound north of SR 166 westbound off-ramp.
- SR 1 northbound south of SR 166 westbound off-ramp.
- SR 166 westbound off-ramp.
- SR 1 southbound north of SR 166 eastbound off-ramp.
- SR 1 northbound south of SR 166 eastbound off-ramp.
- SR 166 eastbound off-ramp.

AM and PM Peak Period Turning Movement Counts (2 location) (7:00 – 9:00 AM, 12:00 – 1:00 PM, and 4:00 – 6:00 PM)

- SR 1 at SR 166 westbound off-ramp.
- SR 1 at SR 166 eastbound off-ramp.

Vehicle classification counts were taken on SR 1 between the SR 166 on-ramps. Additional classification counts were conducted along SR 166. Eastbound classification counts were performed west of the SR 1 off-ramp, and westbound counts performed east of the SR 1 off-ramp. Table 3 shows the 24 hour truck percentages for the two corridors.

Location	Passenger	S.U.	Comb.
SR 1	93%	4%	3%
SR 166	86%	11%	4%

Traffic flow diagram approved by the Office of Environment/Location (OEL) illustrating the 24-hour directional traffic volume counts (ADT) and peak hour turning movement counts (DHV) are shown in figures 2 and 3, respectively.

Traffic Volume Forecasts for Opening Year and Design Year

The historic traffic volume data was compared with travel demand model data and used to establish the traffic volume forecast. The ARC travel demand model's growth rate between the years 2005 to 2030 is higher than the historic 10 year annual growth rate at TC 0012. The ARC model may be reflecting the future demand that the historic growth factor is not reflecting. In an effort to be conservative, the higher annual growth factors of 1.13 and 1.52, which represents a compound average growth rate of 1.5%, will be applied to the existing traffic volumes to derive the 2015 opening and 2035 design year traffic volumes, respectively. Traffic flow diagram approved by OEL illustrating the 2015 opening year and 2035 design year 24-hour directional traffic volume counts (ADT) and peak hour turning movement counts (DHV) are shown in figures 4 and 5, respectively.

Capacity Analysis

The capacity and level of service (LOS) for the SR 166 at SR 1 interchange intersections were analyzed using Synchro traffic analysis software. Synchro software provides delay estimation and calculates LOS using threshold values similar to those used in the Highway Capacity Manual, Special Report 209, published by the Transportation Research Board, 2000. The capacity analysis examined the intersections under existing, 2015 and year 2035 traffic conditions.

Existing Conditions

Capacity analysis was performed for the typical AM, midday and PM peak periods. Signal operations observed in the field were utilized in the existing conditions analysis. Field observations indicated that the presence detector for the eastbound SR 166 ramp did not appear to be operable, resulting in reduced efficiency of the intersections. Additionally, the signal timing and progression through the interchange did not operate at optimal levels throughout the peak hours. Although peak hour observations occurred on several occasions, reported spillback through upstream ramp termini intersections was not observed. Queue lengths did exceed the available SR 1 left turn storage during the late afternoon and PM peak hours.

The capacity analysis for the existing AM, midday and PM peak hours indicate the signalized intersections operate at acceptable level of service (LOS D or above). Figure 6 illustrates the existing capacity analysis results.

Future Conditions

Traffic volumes were projected to determine the impact of future traffic demand at the interchange. A growth factor was applied to existing traffic count data to reflect 2015 opening year and 2035 design year conditions. Capacity analysis was performed for the typical AM, midday and PM peak periods.

2015 Opening Year

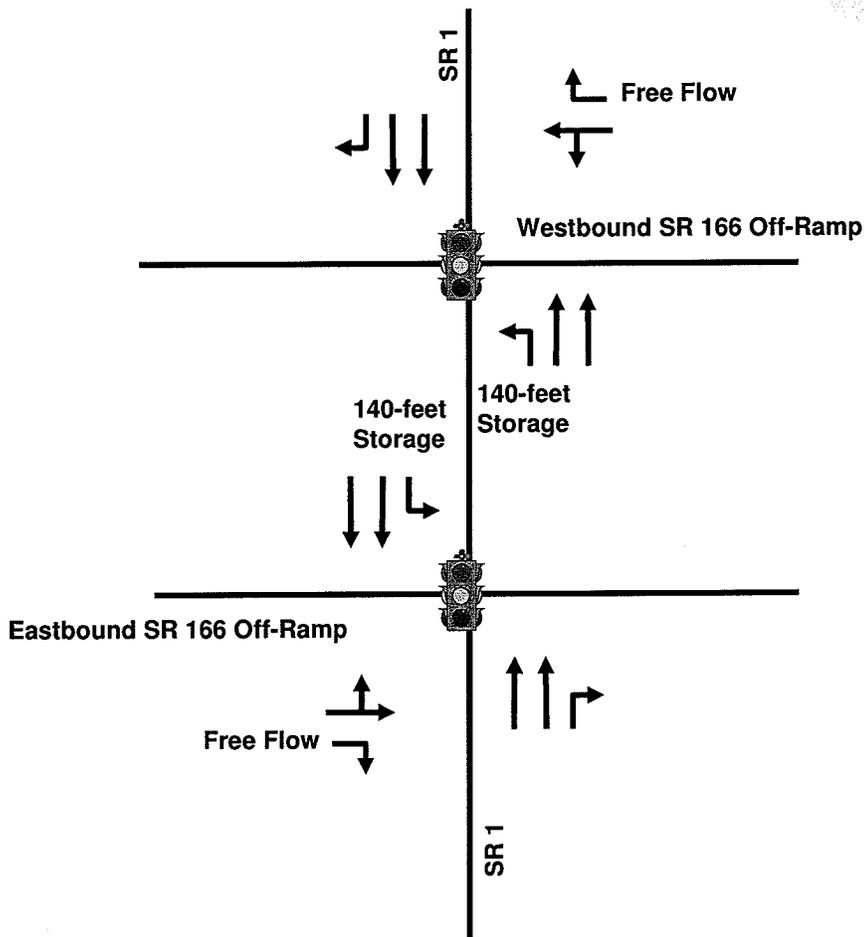
The capacity analysis for the 2015 AM, midday and PM peak hours indicate the signalized intersections operate at acceptable level of service (LOS D or above). Signal timings used in the analysis were optimized to provide optimal intersection operations with the existing intersection lane geometry. Although the intersection and approach LOS results were acceptable, some movements did fall below LOS D. The average queue length (180-ft) for the northbound SR 1 left turn movement exceeded the available storage during the PM peak hour analysis periods. Figure 7 illustrates the 2015 capacity analysis results.

2035 Design Year

The capacity analysis for the 2035 AM, midday and PM peak hours indicate the signalized intersections operate at acceptable level of service (LOS D or above) during the AM and midday peak periods. The PM peak period analysis resulted in LOS F for both the westbound and eastbound SR 166 ramp termini intersections. Signal timings used in the analysis were optimized to provide optimal intersection operations with the existing intersection lane geometry. Analysis indicates the average northbound left turn queue lengths exceeded the available storage during the PM peak hour and the average southbound left turn queue lengths exceeded the available storage during all peak analysis periods. Figure 8 illustrates the 2035 capacity analysis results.

Proposed Improvements

Intersection improvements were considered to improve the overall operation of the interchange for the 2035 design year traffic conditions. Improvement recommendations were analyzed that would provide acceptable intersection as well as approaches LOS (D and better) for all peak periods. Dual left turn lanes should be provided along northbound and southbound SR 1. Approximately 200-feet of full width vehicle storage should be provided. An additional left turn lane should also be constructed for the eastbound and westbound off-ramps. The eastbound and westbound left turn lane storage should be 300-feet. Figure 9 and 10 illustrate the 2015 and 2035 capacity analysis results with the recommended improvements.

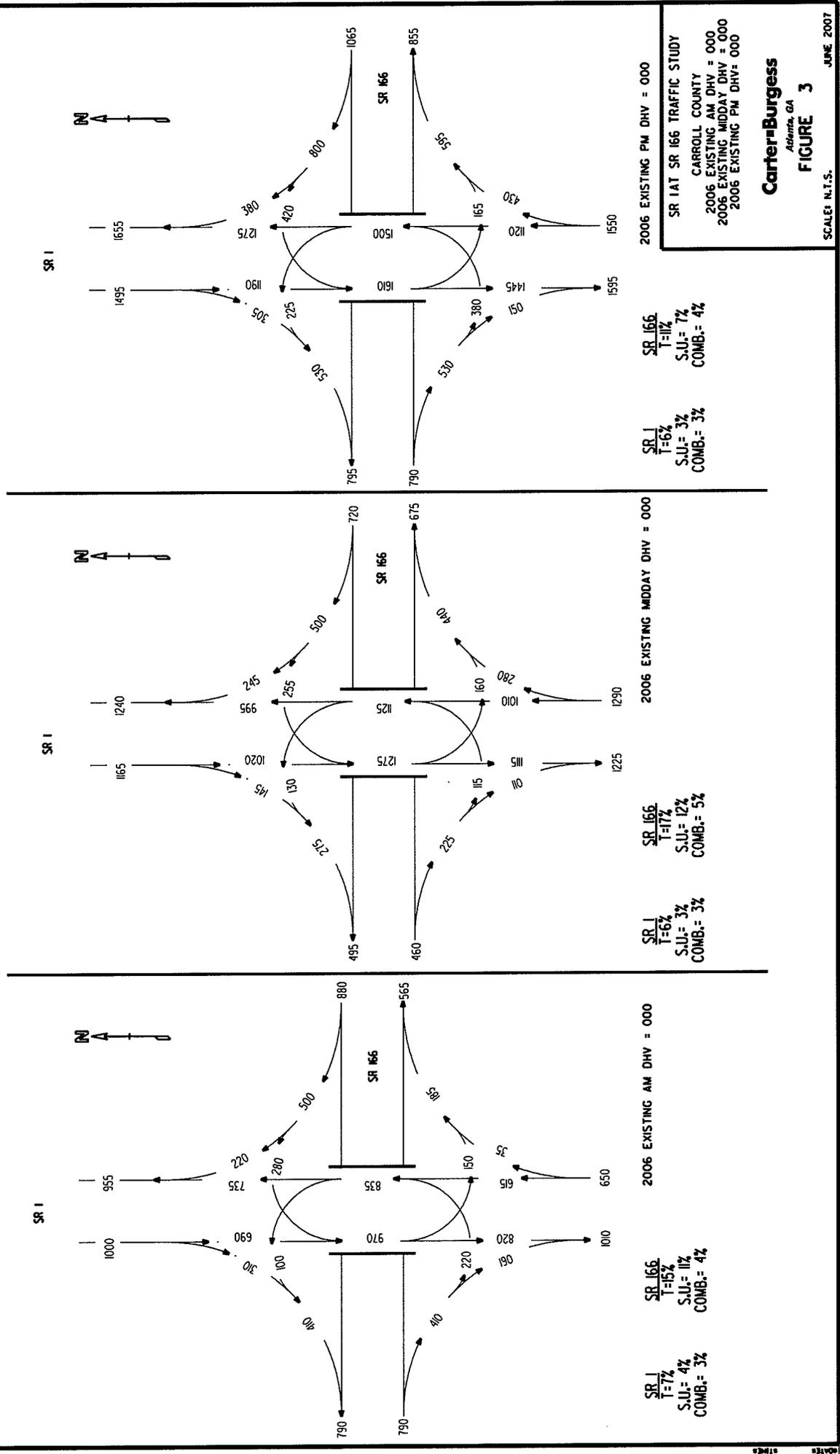


Legend

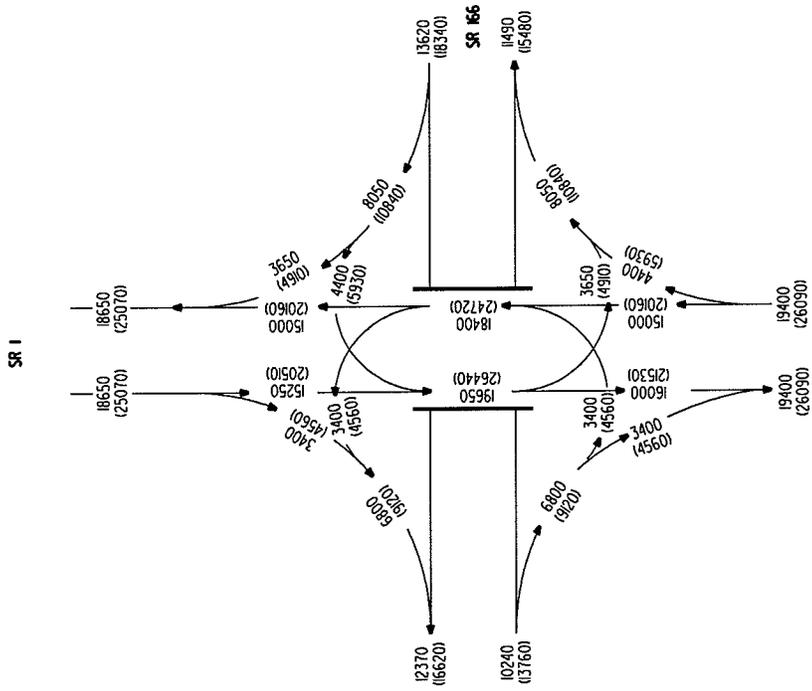
 Traffic Signal Control

 Lane Configuration

SR 166 at SR1 Intersection Analysis	
FIGURE 1	Existing Lane Configuration
Nov 2007	Carter=Burgess



CarterBurgess
 Atlanta, GA
FIGURE 3
 SCALE: N.T.S.
 JUNE 2007



SR 1
24 HR T=7%
S.U.= 4%
COMB.= 3%

SR 166
24 HR T=4%
S.U.= 10%
COMB.= 4%

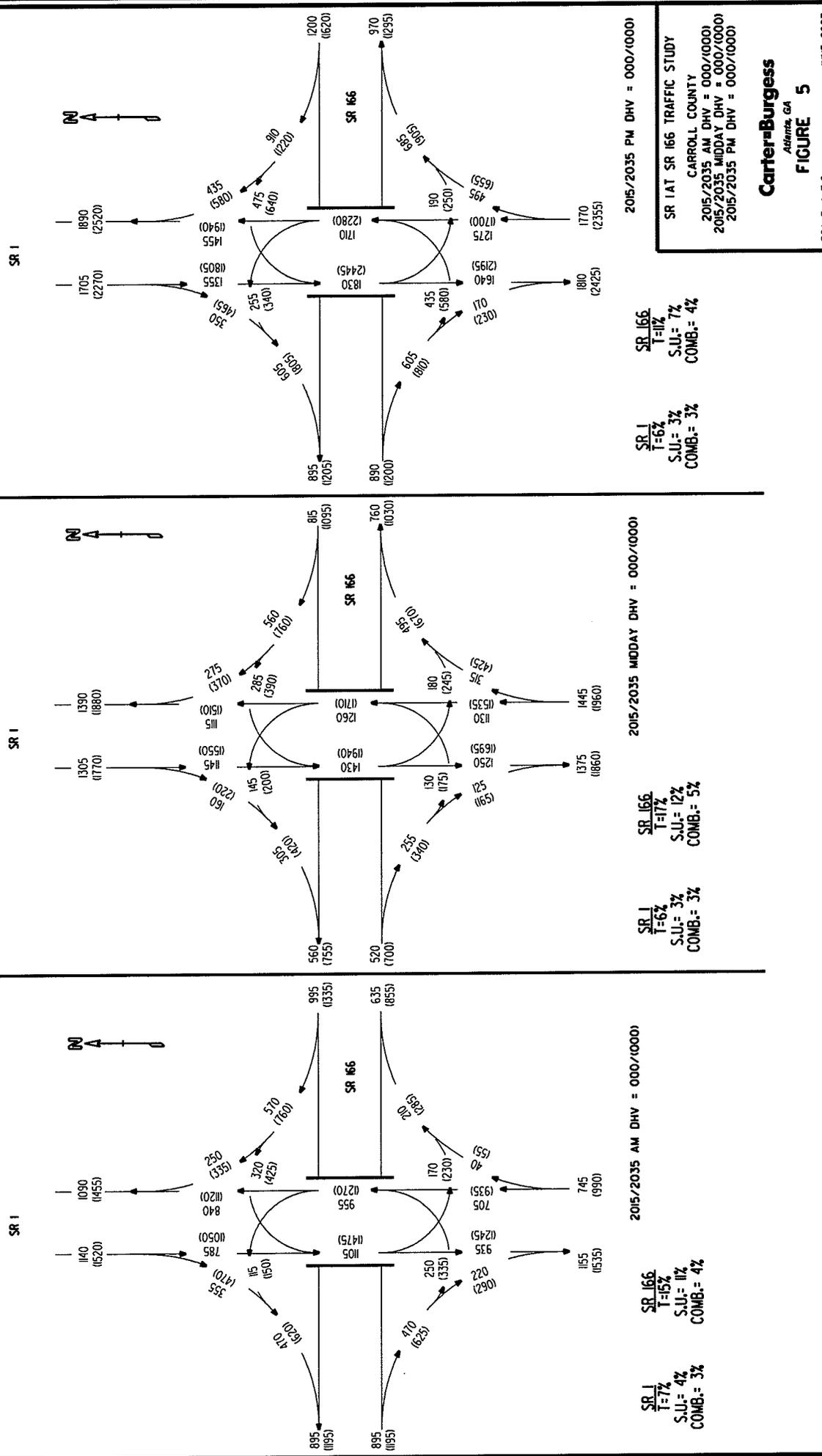
SR 1 AT SR 166 TRAFFIC STUDY
CARROLL COUNTY
2015/2035 ADT = 00010001

Carter Burgess
Atlanta, GA

FIGURE 4

SCALE: N.T.S.

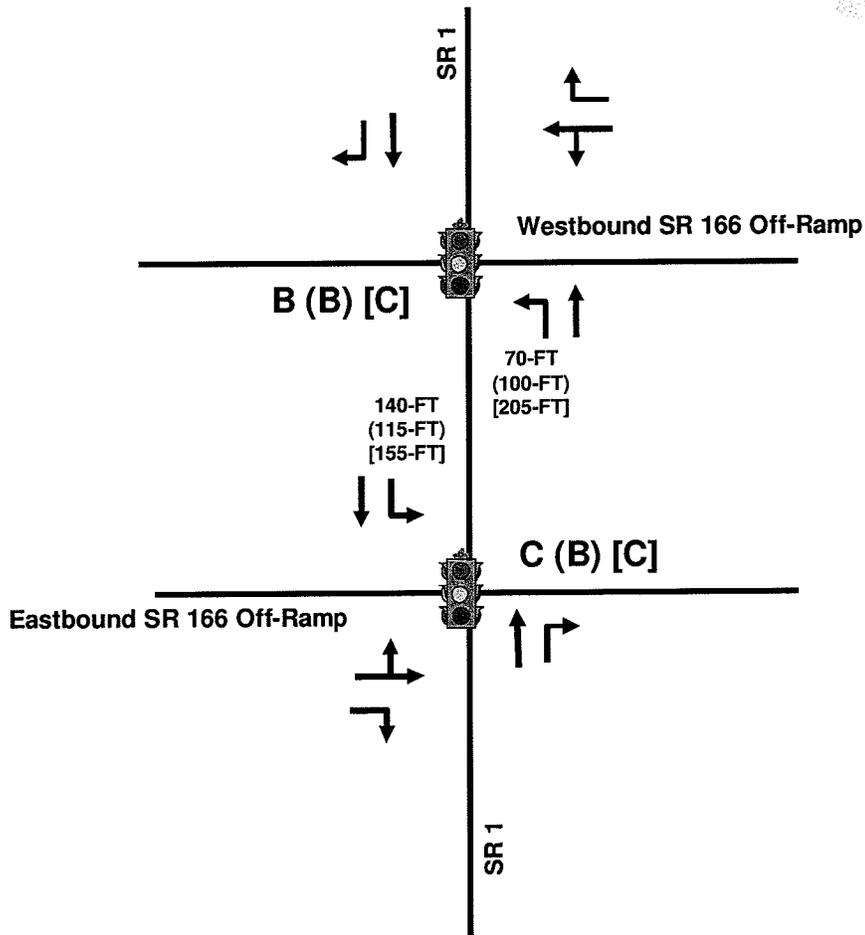
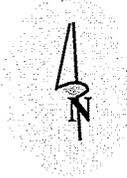
JUNE 2007



Carter Burgess
 Atlanta, GA
FIGURE 5

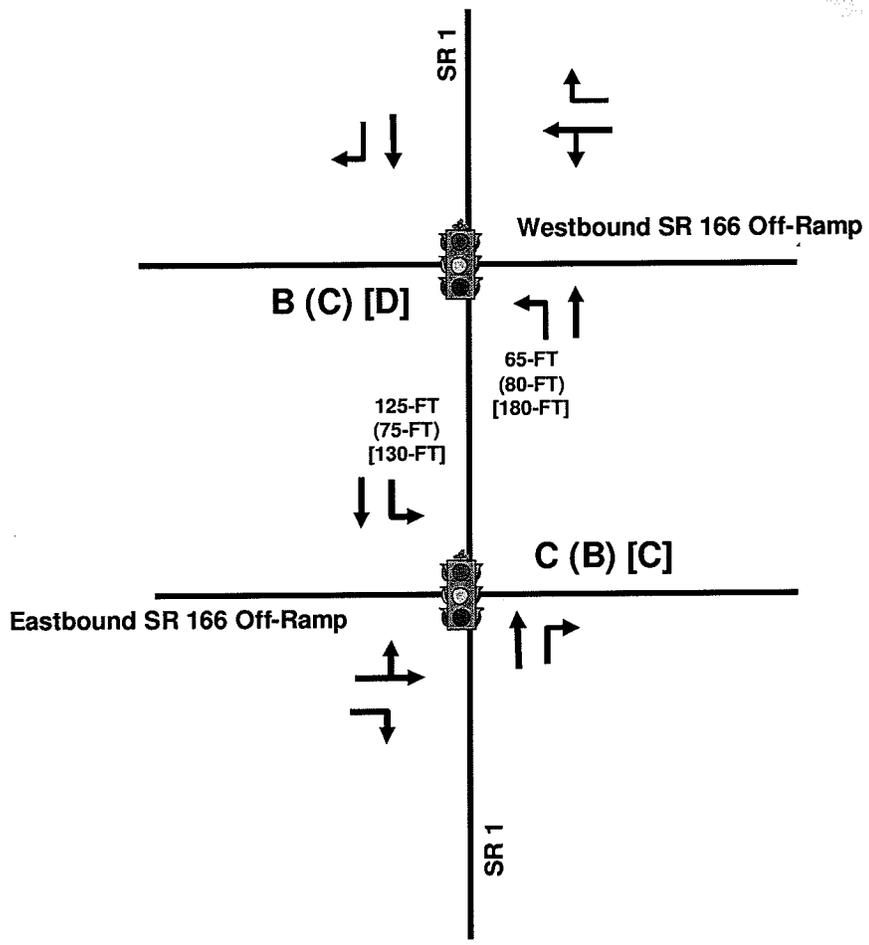
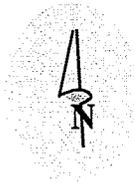
SCALE: N.T.S. JUNE 2007

SR 1 AT SR 166 TRAFFIC STUDY
 CARROLL COUNTY
 2015/2035 AM DHV = 000/0000
 2015/2035 MIDDAY DHV = 000/0000
 2015/2035 PM DHV = 000/0000



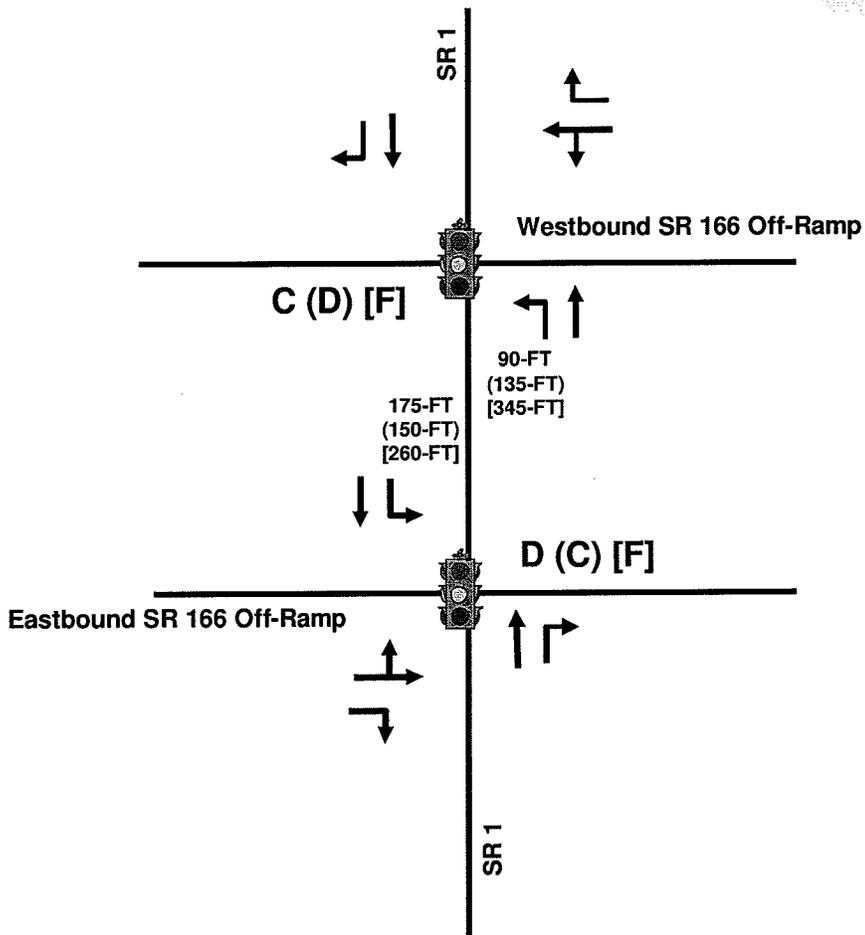
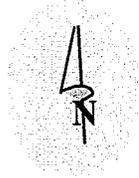
Legend	
	Traffic Signal Control
	Turning Movement
AM (MID) [PM]	Intersection LOS
100-FT	Movement Queue Length

SR 166 at SR1 Intersection Analysis	
FIGURE 6	Existing Lane Configuration 2007 Capacity Analysis
Nov 2007	Carter=Burgess



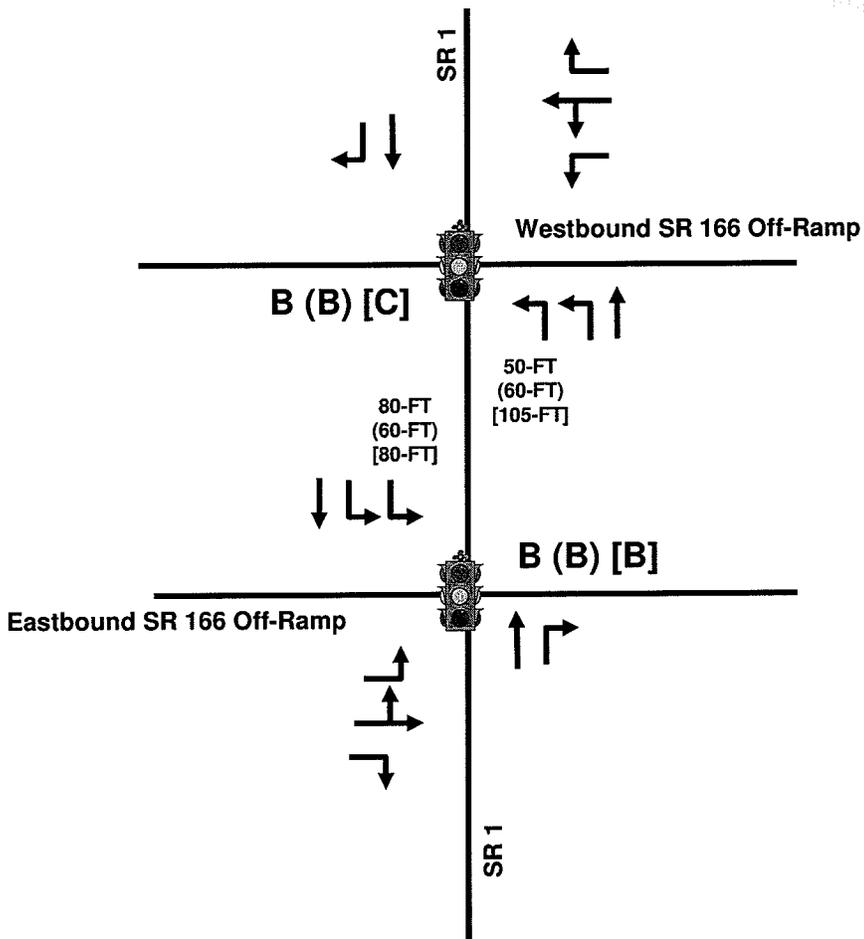
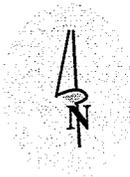
Legend	
	Traffic Signal Control
	Turning Movement
AM (MID) [PM]	Intersection LOS
100-FT	Movement Queue Length

SR 166 at SR1 Intersection Analysis	
FIGURE 7	Existing Lane Configuration 2015 Capacity Analysis
Nov 2007	Carter=Burgess



Legend	
	Traffic Signal Control
	Turning Movement
AM (MID) [PM]	Intersection LOS
100-FT	Movement Queue Length

SR 166 at SR1 Intersection Analysis	
FIGURE 8	Existing Lane Configuration 2035 Capacity Analysis
Nov 2007	Carter=Burgess



Legend

 Traffic Signal Control

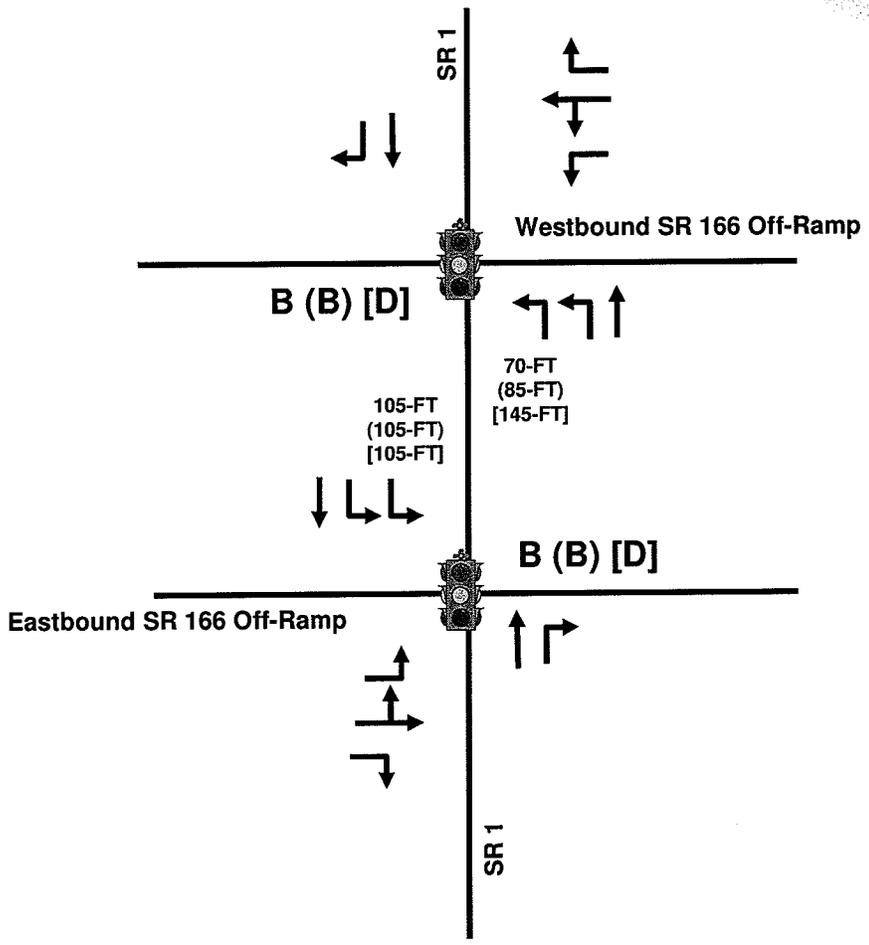
 Turning Movement

AM (MID) [PM] Intersection LOS

100-FT Movement Queue Length

**SR 166 at SR1
Intersection Analysis**

FIGURE 9	2015 Opening Year Lane Configuration & LOS
Nov 2007	Carter=Burgess



Legend

 Traffic Signal Control

 Turning Movement

AM (MID) [PM] Intersection LOS

100-FT Movement Queue Length

**SR 166 at SR1
Intersection Analysis**

FIGURE 10	2035 Design Year Lane Configuration & LOS
Nov 2007	Carter=Burgess

EXISTING GEOMETRY
7: EB SR 166 Off-Ramp & SR 1

2015 AM
2/8/2008

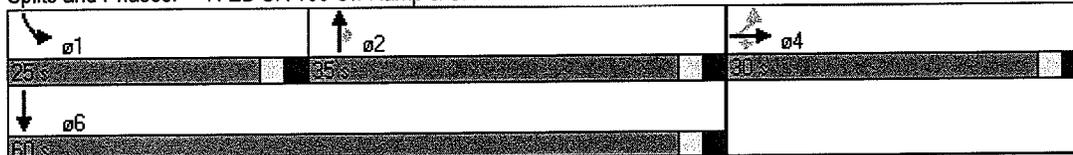


Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↕	↘	↙	↕
Volume (vph)	0	220	705	40	170	935
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	30.0	35.0	35.0	25.0	60.0
Total Split (%)	33.3%	33.3%	38.9%	38.9%	27.8%	66.7%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	23.1	23.1	38.3	38.3	16.6	58.9
Actuated g/C Ratio	0.26	0.26	0.43	0.43	0.18	0.65
v/c Ratio	0.84	0.68	0.64	0.08	0.72	0.56
Control Delay	50.7	27.7	24.9	6.7	55.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	27.7	24.9	6.7	55.2	8.9
LOS	D	C	C	A	E	A
Approach Delay	39.9		24.0			16.0
Approach LOS	D		C			B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 23.7
 Intersection LOS: C
 Intersection Capacity Utilization 57.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 7: EB SR 166 Off-Ramp & SR 1



EXISTING GEOMETRY
10: WB SR 166 off-Ramp & SR 1

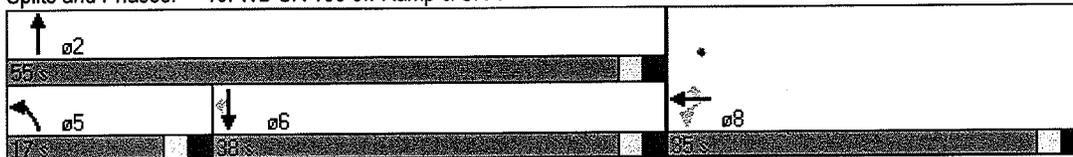
2015 AM
2/8/2008



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←	↖	↗	↑↑	↑↑	↗
Volume (vph)	0	250	115	840	785	355
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	35.0	35.0	17.0	55.0	38.0	38.0
Total Split (%)	38.9%	38.9%	18.9%	61.1%	42.2%	42.2%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	23.8	23.8	11.0	58.2	43.2	43.2
Actuated g/C Ratio	0.26	0.26	0.12	0.65	0.48	0.48
v/c Ratio	0.76	0.53	0.58	0.40	0.51	0.41
Control Delay	41.2	16.1	42.9	10.5	19.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	16.1	42.9	10.5	19.3	3.6
LOS	D	B	D	B	B	A
Approach Delay	30.2			14.4	14.4	
Approach LOS	C			B	B	

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 17.8
 Intersection LOS: B
 Intersection Capacity Utilization 57.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 off-Ramp & SR 1



EXISTING GEOMETRY
7: SR 166 Off Ramp & SR 1

2015 MID
2/8/2008



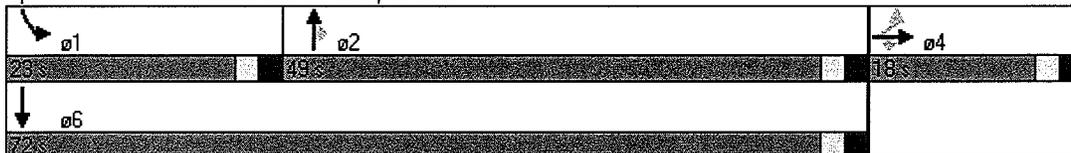
Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↑	↗	↙	↑↑
Volume (vph)	0	125	1130	315	180	1250
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	18.0	18.0	49.0	49.0	23.0	72.0
Total Split (%)	20.0%	20.0%	54.4%	54.4%	25.6%	80.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	12.1	12.1	50.3	50.3	15.6	69.9
Actuated g/C Ratio	0.13	0.13	0.56	0.56	0.17	0.78
v/c Ratio	0.67	0.48	0.67	0.35	0.72	0.56
Control Delay	53.1	17.1	17.7	2.7	38.9	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	17.1	17.7	2.7	38.9	6.3
LOS	D	B	B	A	D	A
Approach Delay	35.4		14.5			10.4
Approach LOS	D		B			B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 49 (54%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 14.3
 Intersection Capacity Utilization 65.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 7: SR 166 Off Ramp & SR 1



EXISTING GEOMETRY
10: WB SR 166 OffRamp & SR 1

2015 MID
2/8/2008



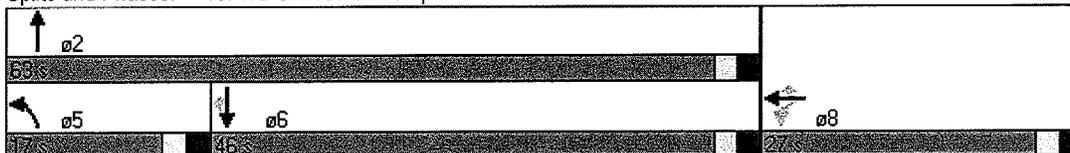
Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷	↶	↶↶	↶↶	↷
Volume (vph)	0	275	145	1115	1145	160
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	27.0	27.0	17.0	63.0	46.0	46.0
Total Split (%)	30.0%	30.0%	18.9%	70.0%	51.1%	51.1%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	20.1	20.1	11.7	61.9	46.2	46.2
Actuated g/C Ratio	0.22	0.22	0.13	0.69	0.51	0.51
v/c Ratio	0.80	0.70	0.68	0.50	0.72	0.20
Control Delay	49.4	29.7	42.2	11.5	21.0	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	29.7	42.2	11.5	21.0	2.9
LOS	D	C	D	B	C	A
Approach Delay	39.7			15.0	18.8	
Approach LOS	D			B	B	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 21.1
 Intersection Capacity Utilization 65.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 10: WB SR 166 OffRamp & SR 1



EXISTING GEOMETRY
7: SR 166 Off Ramp & SR 1

2015 PM
2/8/2008



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↗	↕	↖	↘	↕
Volume (vph)	0	170	1275	495	190	1640
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	32.0	32.0	50.0	50.0	18.0	68.0
Total Split (%)	32.0%	32.0%	50.0%	50.0%	18.0%	68.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	27.6	27.6	46.2	46.2	14.2	64.4
Actuated g/C Ratio	0.28	0.28	0.46	0.46	0.14	0.64
v/c Ratio	0.96	0.45	0.92	0.56	0.93	0.88
Control Delay	70.8	29.5	37.1	4.2	59.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.8	29.5	37.1	4.2	59.1	4.8
LOS	E	C	D	A	E	A
Approach Delay	58.0		27.9			10.4
Approach LOS	E		C			B

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 12 (12%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 24.1
 Intersection Capacity Utilization 87.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 7: SR 166 Off Ramp & SR 1

↖ φ1	↕ φ2	↘ φ4
18	50	32
↓ φ6		
68		

EXISTING GEOMETRY
10: WB SR 166 OffRamp & SR 1

2015 PM
2/8/2008



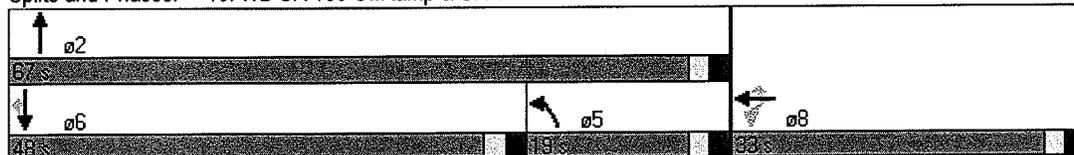
Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↕	↗	↘	↑↑	↑↑	↗
Volume (vph)	0	435	255	1455	1355	350
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	33.0	33.0	19.0	67.0	48.0	48.0
Total Split (%)	33.0%	33.0%	19.0%	67.0%	48.0%	48.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	29.0	29.0	15.0	63.0	44.0	44.0
Actuated g/C Ratio	0.29	0.29	0.15	0.63	0.44	0.44
v/c Ratio	1.03	0.99	1.04	0.71	0.99	0.45
Control Delay	85.9	73.0	84.1	9.0	50.4	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.9	73.0	84.1	9.0	50.4	4.7
LOS	F	E	F	A	D	A
Approach Delay	79.8			20.2	41.0	
Approach LOS	E			C	D	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 41.2
 Intersection Capacity Utilization 87.9%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 10: WB SR 166 OffRamp & SR 1



EXISTING GEOMETRY
7: EB SR 166 Off-Ramp & SR 1

2035 AM
2/8/2008

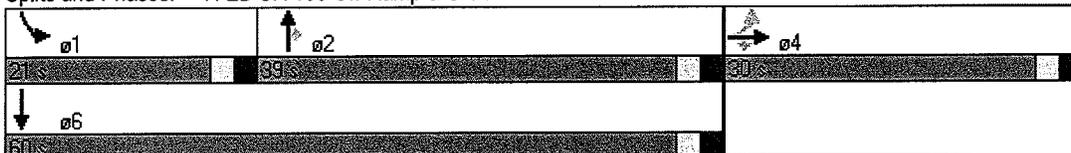


Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↗	↕	↖	↙	↕
Volume (vph)	0	290	935	55	230	1245
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	30.0	30.0	39.0	39.0	21.0	60.0
Total Split (%)	33.3%	33.3%	43.3%	43.3%	23.3%	66.7%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	26.4	26.4	34.6	34.6	17.0	55.6
Actuated g/C Ratio	0.29	0.29	0.38	0.38	0.19	0.62
v/c Ratio	0.98	0.88	0.93	0.11	0.96	0.79
Control Delay	71.4	50.8	42.1	5.4	78.2	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.4	50.8	42.1	5.4	78.2	12.5
LOS	E	D	D	A	E	B
Approach Delay	61.8		40.1			22.7
Approach LOS	E		D			C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 5 (6%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 36.6
 Intersection LOS: D
 Intersection Capacity Utilization 73.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: EB SR 166 Off-Ramp & SR 1



EXISTING GEOMETRY
10: WB SR 166 off-Ramp & SR 1

2035 AM
2/8/2008

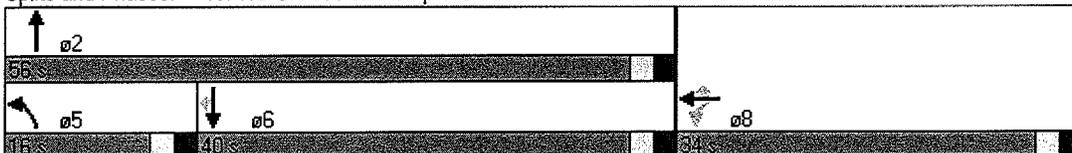


Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←	↖	↗	↑↑	↑↑	↗
Volume (vph)	0	335	150	1120	1050	470
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	34.0	34.0	16.0	56.0	40.0	40.0
Total Split (%)	37.8%	37.8%	17.8%	62.2%	44.4%	44.4%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	27.7	27.7	11.3	54.3	39.0	39.0
Actuated g/C Ratio	0.31	0.31	0.13	0.60	0.43	0.43
v/c Ratio	0.87	0.69	0.74	0.57	0.76	0.53
Control Delay	47.9	29.1	41.1	17.9	26.6	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	29.1	41.1	17.9	26.6	4.1
LOS	D	C	D	B	C	A
Approach Delay	39.6			20.6	19.6	
Approach LOS	D			C	B	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 24.3
 Intersection LOS: C
 Intersection Capacity Utilization 73.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 off-Ramp & SR 1



EXISTING GEOMETRY
7: eb SR 166 Off-Ramp & SR 1

2035 MID
2/8/2008



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑↑	↔	↔	↑↑
Volume (vph)	0	125	1535	425	245	1695
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	16.0	16.0	54.0	54.0	20.0	74.0
Total Split (%)	17.8%	17.8%	60.0%	60.0%	22.2%	82.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	12.1	12.1	49.9	49.9	16.0	69.9
Actuated g/C Ratio	0.13	0.13	0.55	0.55	0.18	0.78
v/c Ratio	0.92	0.60	0.94	0.46	0.96	0.77
Control Delay	85.3	36.0	31.3	2.7	56.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.3	36.0	31.3	2.7	56.5	6.9
LOS	F	D	C	A	E	A
Approach Delay	64.8		25.1			13.1
Approach LOS	E		C			B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 5 (6%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 22.3
 Intersection LOS: C
 Intersection Capacity Utilization 85.5%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: eb SR 166 Off-Ramp & SR 1

↔ φ1 20s	↑ φ2 54s	↔ φ4 16s
↓ φ6 74s		

EXISTING GEOMETRY
10: WB SR 166 Off-Ramp & SR 1

2035 MID
2/8/2008

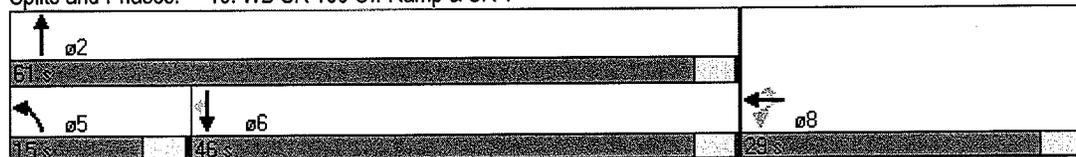


Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←	↖	↗	↑↑	↑↑	↗
Volume (vph)	0	370	200	1510	1550	220
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	29.0	29.0	15.0	61.0	46.0	46.0
Total Split (%)	32.2%	32.2%	16.7%	67.8%	51.1%	51.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	25.0	25.0	11.0	57.0	42.0	42.0
Actuated g/C Ratio	0.28	0.28	0.12	0.63	0.47	0.47
v/c Ratio	1.03	1.03	1.02	0.74	0.99	0.27
Control Delay	83.8	81.8	89.0	11.6	44.2	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.8	81.8	89.0	11.6	44.2	2.9
LOS	F	F	F	B	D	A
Approach Delay	82.8			20.7	39.1	
Approach LOS	F			C	D	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 40.8
 Intersection LOS: D
 Intersection Capacity Utilization 85.5%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 Off-Ramp & SR 1



EXISTING GEOMETRY
 10: WB SR 166 OffRamp & SR 1

2035 PM
 2/8/2008

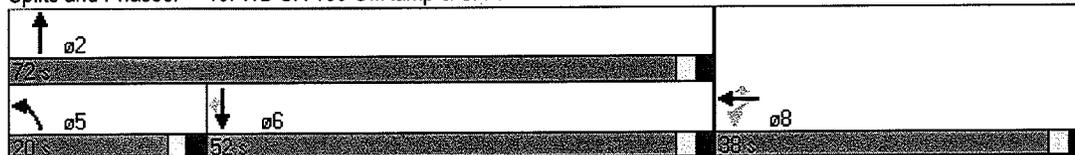


Lane/Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↕	↗	↘	↑↑	↑↑	↗
Volume (vph)	0	580	340	1940	1805	465
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	38.0	38.0	20.0	72.0	52.0	52.0
Total Split (%)	34.5%	34.5%	18.2%	65.5%	47.3%	47.3%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effect Green (s)	34.0	34.0	16.0	68.0	48.0	48.0
Actuated g/C Ratio	0.31	0.31	0.15	0.62	0.44	0.44
v/c Ratio	1.31	1.30	1.43	0.96	1.34	0.61
Control Delay	184.9	183.4	228.3	22.6	184.1	12.0
Queue Delay	0.0	0.0	0.0	5.4	0.0	0.0
Total Delay	184.9	183.4	228.3	28.0	184.1	12.0
LOS	F	F	F	C	F	B
Approach Delay	184.2			57.8	148.9	
Approach LOS	F			E	F	

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.43
 Intersection Signal Delay: 121.4
 Intersection Capacity Utilization 114.2%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service H

Splits and Phases: 10: WB SR 166 OffRamp & SR 1





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘ ↙		↗					↑↑	↗	↘ ↙	↑↑	
Volume (vph)	250	0	220	0	0	0	0	705	40	170	935	0
Satd. Flow (prot)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0
Flt Permitted	0.950								0.950			
Satd. Flow (perm)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0
Satd. Flow (RTOR)			289						47			
Lane Group Flow (vph)	329	0	289	0	0	0	0	829	47	205	1127	0
Turn Type	custom		Free						Perm		Prot	
Protected Phases							2				1 6	
Permitted Phases	4		Free						2			
Total Split (s)	30.0	0.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	20.0	90.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	4.0
Act Effct Green (s)	18.5		120.0					73.2	73.2	13.3	91.5	
Actuated g/C Ratio	0.15		1.00					0.61	0.61	0.11	0.76	
v/c Ratio	0.72		0.21					0.44	0.05	0.62	0.48	
Control Delay	57.2		0.4					14.4	3.7	53.4	6.5	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	57.2		0.4					14.4	3.7	53.4	6.5	
LOS	E		A				B		A		D A	
Approach Delay							13.8				13.7	
Approach LOS							B				B	
Queue Length 50th (ft)	126		0					170	0	81	191	
Queue Length 95th (ft)	138		0					237	16	88	72	
Internal Link Dist (ft)	468		477				346				689	
Turn Bay Length (ft)			300						300		150	
Base Capacity (vph)	619		1371					1870	855	380	2338	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.53		0.21					0.44	0.05	0.54	0.48	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 17.4
 Intersection LOS: B
 Intersection Capacity Utilization 47.5%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 7: EB SR 166 Off-Ramp & US 1

↘ ø1 20 s	↑ ø2 70 s	↗ ø4 30 s
↓ ø6 90 s		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↕	↔↔	↕↕			↕↕	↕
Volume (vph)	0	0	0	320	0	250	115	840	0	0	785	355
Satd. Flow (prot)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Satd. Flow (RTOR)						269						378
Lane Group Flow (vph)	0	0	0	344	0	269	121	884	0	0	835	378
Turn Type				custom		Free	Prot					Perm
Protected Phases							5	2			6	
Permitted Phases				8		Free						6
Total Split (s)	0.0	0.0	0.0	33.0	0.0	0.0	20.0	87.0	0.0	0.0	67.0	67.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0	5.0	5.0
Act Effct Green (s)				17.8		120.0	9.7	92.2			77.5	77.5
Actuated g/C Ratio				0.15		1.00	0.08	0.77			0.65	0.65
v/c Ratio				0.70		0.18	0.45	0.34			0.38	0.34
Control Delay				56.4		0.3	58.1	3.9			11.3	1.9
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				56.4		0.3	58.1	3.9			11.3	1.9
LOS				E		A	E	A			B	A
Approach Delay								10.4			8.4	
Approach LOS								B			A	
Queue Length 50th (ft)				131		0	48	62			147	0
Queue Length 95th (ft)				175		0	80	119			223	40
Internal Link Dist (ft)		485			343			689			407	
Turn Bay Length (ft)						300	150					
Base Capacity (vph)				771		1524	413	2617			2199	1118
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.45		0.18	0.29	0.34			0.38	0.34

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 14.1

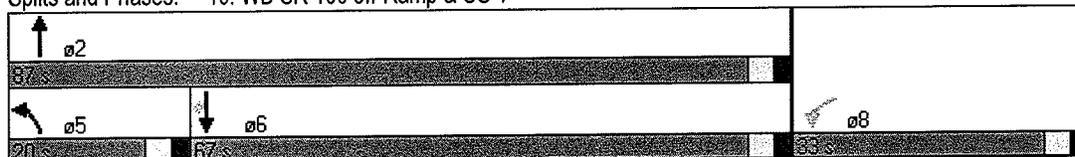
Intersection LOS: B

Intersection Capacity Utilization 47.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 off-Ramp & US 1



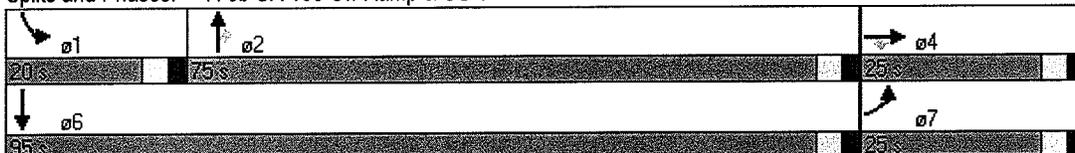


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	0	125	0	0	0	0	1130	315	180	1250	0
Satd. Flow (prot)	1456	1456	1371	0	0	0	0	3065	1371	2973	3065	0
Flt Permitted	0.950	0.950								0.950		
Satd. Flow (perm)	1456	1456	1371	0	0	0	0	3065	1371	2973	3065	0
Satd. Flow (RTOR)			104						321			
Lane Group Flow (vph)	69	69	133	0	0	0	0	1153	321	191	1330	0
Turn Type	Prot		Perm						Perm	Prot		
Protected Phases	7	4						2		1	6	
Permitted Phases			4						2			
Total Split (s)	25.0	25.0	25.0	0.0	0.0	0.0	0.0	75.0	75.0	20.0	95.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	4.0
Act Effct Green (s)	11.1	9.9	18.8					73.6	73.6	12.6	91.2	
Actuated g/C Ratio	0.09	0.08	0.16					0.61	0.61	0.10	0.76	
v/c Ratio	0.51	0.57	0.44					0.61	0.33	0.61	0.57	
Control Delay	63.4	68.7	19.1					16.5	2.1	52.0	10.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.3	
Total Delay	63.4	68.7	19.1					16.5	2.1	52.0	10.3	
LOS	E	E	B					B	A	D	B	
Approach Delay		43.0						13.4			15.5	
Approach LOS		D						B			B	
Queue Length 50th (ft)	55	55	22					211	0	62	270	
Queue Length 95th (ft)	96	96	78					378	39	100	483	
Internal Link Dist (ft)		468			477			346			689	
Turn Bay Length (ft)			300						300	150		
Base Capacity (vph)	245	120	369					1981	1000	372	2461	
Starvation Cap Reductn	0	0	0					0	0	0	442	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.28	0.57	0.36					0.58	0.32	0.51	0.66	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 20 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 56.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 7: eb SR 166 Off-Ramp & US 1





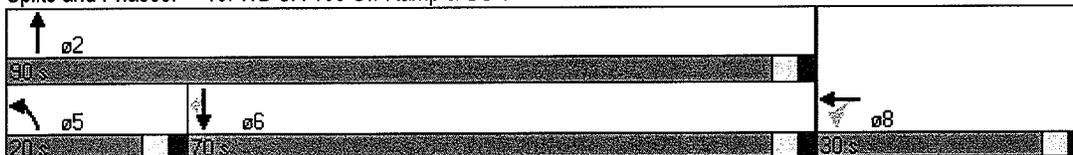
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗	↘	↙	↕			↕	↗
Volume (vph)	0	0	0	285	0	275	145	1115	0	0	1145	160
Satd. Flow (prot)	0	0	0	1618	1618	1524	3303	3406	0	0	3406	1524
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1618	1618	1524	3303	3406	0	0	3406	1524
Satd. Flow (RTOR)						296						176
Lane Group Flow (vph)	0	0	0	153	153	296	151	1161	0	0	1258	176
Turn Type				Perm		Free	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		Free						6
Total Split (s)	0.0	0.0	0.0	30.0	30.0	0.0	20.0	90.0	0.0	0.0	70.0	70.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0	5.0	5.0
Act Effct Green (s)				16.6	16.6	120.0	10.8	93.4			77.6	77.6
Actuated g/C Ratio				0.14	0.14	1.00	0.09	0.78			0.65	0.65
v/c Ratio				0.68	0.68	0.19	0.51	0.44			0.57	0.17
Control Delay				64.0	64.0	0.3	47.0	11.3			14.2	2.0
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				64.0	64.0	0.3	47.0	11.3			14.2	2.0
LOS				E	E	A	D	B			B	A
Approach Delay					32.7			15.4			12.7	
Approach LOS					C			B			B	
Queue Length 50th (ft)				120	120	0	58	112			265	0
Queue Length 95th (ft)				186	186	0	85	502			408	31
Internal Link Dist (ft)		485			343			689			407	
Turn Bay Length (ft)						300	150					
Base Capacity (vph)				337	337	1524	413	2651			2202	1047
Starvation Cap Reductn				0	0	0	0	0			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.45	0.45	0.19	0.37	0.44			0.57	0.17

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 84 (70%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 17.4
 Intersection Capacity Utilization 56.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 10: WB SR 166 Off-Ramp & US 1





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖				↖↗		↖	↖↗		↖↗
Volume (vph)	380	0	170	0	0	0	0	1275	495	190	1640	0
Satd. Flow (prot)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0
Satd. Flow (RTOR)			181						505			
Lane Group Flow (vph)	404	0	181	0	0	0	0	1301	505	202	1745	0
Turn Type	custom		Free					Perm		Prot		
Protected Phases								2		1	6	
Permitted Phases	4		Free					2				
Total Split (s)	30.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0	75.0	15.0	90.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	4.0
Act Effct Green (s)	21.0		120.0					72.5	72.5	11.5	89.0	
Actuated g/C Ratio	0.18		1.00					0.60	0.60	0.10	0.74	
v/c Ratio	0.78		0.13					0.70	0.49	0.71	0.77	
Control Delay	57.7		0.2					19.5	2.8	73.4	8.6	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.4	
Total Delay	57.7		0.2					19.5	2.8	73.4	9.0	
LOS	E		A					B		A		E
Approach Delay								14.8				15.7
Approach LOS								B				B
Queue Length 50th (ft)	155		0					363	0	81	119	
Queue Length 95th (ft)	204		0					450	44	m#121	162	
Internal Link Dist (ft)	468		477					346		689		
Turn Bay Length (ft)			300					300		150		
Base Capacity (vph)	619		1371					1851	1028	284	2272	
Starvation Cap Reductn	0		0					0	0	0	154	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.65		0.13					0.70	0.49	0.71	0.82	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 18.6
 Intersection Capacity Utilization 70.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: EB SR 166 Off Ramp & US 1

 ø1	 ø2	 ø4
15 s	75 s	30 s
 ø6		
90 s		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖↗		↖	↖↗	↖↗			↖↗	↖
Volume (vph)	0	0	0	475	0	435	255	1455	0	0	1355	350
Satd. Flow (prot)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Satd. Flow (RTOR)						307						354
Lane Group Flow (vph)	0	0	0	511	0	468	266	1516	0	0	1489	385
Turn Type				custom		Free	Prot					Perm
Protected Phases							5	2			6	
Permitted Phases				8		Free						6
Total Split (s)	0.0	0.0	0.0	30.0	0.0	0.0	20.0	90.0	0.0	0.0	70.0	70.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0	5.0	5.0
Act Effct Green (s)				22.6		120.0	13.8	87.4			68.6	68.6
Actuated g/C Ratio				0.19		1.00	0.12	0.73			0.57	0.57
v/c Ratio				0.82		0.31	0.70	0.61			0.76	0.38
Control Delay				58.4		0.5	56.7	10.2			23.6	3.2
Queue Delay				0.0		0.0	0.0	0.1			0.1	0.0
Total Delay				58.4		0.5	56.7	10.3			23.7	3.2
LOS				E		A	E	B			C	A
Approach Delay								17.2			19.5	
Approach LOS								B			B	
Queue Length 50th (ft)				195		0	104	194			459	10
Queue Length 95th (ft)				255		0	146	421			575	57
Internal Link Dist (ft)		485			343			689			407	
Turn Bay Length (ft)						300	150					
Base Capacity (vph)				688		1524	413	2481			1948	1023
Starvation Cap Reductn				0		0	0	177			0	0
Spillback Cap Reductn				0		0	0	0			39	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.74		0.31	0.64	0.66			0.78	0.38

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 21.0

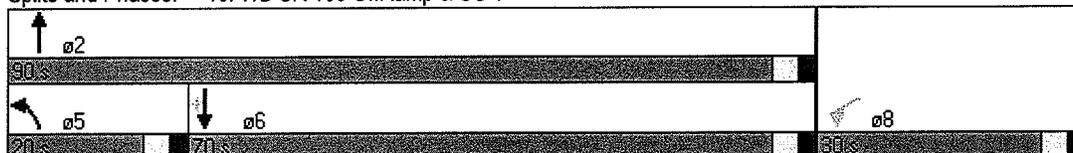
Intersection LOS: C

Intersection Capacity Utilization 70.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 OffRamp & US 1





Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR					
Lane Configurations	↔		↗	↔	↕	↕	↗					
Volume (vph)	425	0	335	150	1120	1050	470					
Satd. Flow (prot)	3303	0	1524	3303	3406	3406	1524					
Flt Permitted	0.950		0.950									
Satd. Flow (perm)	3303	0	1524	3303	3406	3406	1524					
Satd. Flow (RTOR)			360		516							
Lane Group Flow (vph)	457	0	360	156	1167	1154	516					
Turn Type	Prot		Free		Prot		Perm					
Protected Phases	3				5	2	6					
Permitted Phases			Free									
Total Split (s)	0.0	0.0	0.0	35.0	0.0	0.0	25.0	85.0	0.0	0.0	60.0	60.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0	5.0	5.0
Act Effct Green (s)	21.8		120.0		11.0	88.2	72.2	72.2				
Actuated g/C Ratio	0.18		1.00		0.09	0.74	0.60	0.60				
v/c Ratio	0.76		0.24		0.51	0.47	0.56	0.46				
Control Delay	55.0		0.4		56.4	6.9	16.7	2.6				
Queue Delay	0.0		0.0		0.0	0.0	0.0	0.0				
Total Delay	55.0		0.4		56.4	6.9	16.7	2.6				
LOS	D		A		E	A	B	A				
Approach Delay					12.8		12.4					
Approach LOS					B		B					
Queue Length 50th (ft)	174		0		66	178	267	0				
Queue Length 95th (ft)	221		0		103	204	392	51				
Internal Link Dist (ft)	485		343		689		407					
Turn Bay Length (ft)			300		150							
Base Capacity (vph)	826		1524		551	2502	2048	1122				
Starvation Cap Reductn	0		0		0	0	0	0				
Spillback Cap Reductn	0		0		0	0	0	0				
Storage Cap Reductn	0		0		0	0	0	0				
Reduced v/c Ratio	0.55		0.24		0.28	0.47	0.56	0.46				

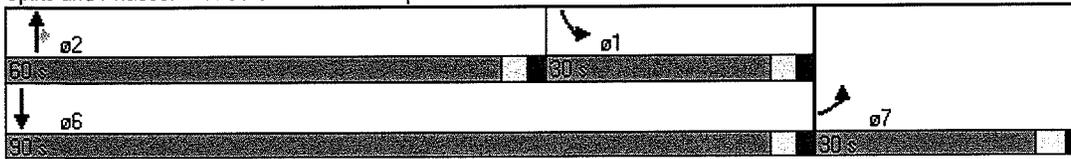
Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 16.5
 Intersection LOS: B
 Intersection Capacity Utilization 59.1%
 ICU Level of Service B
 Analysis Period (min) 15

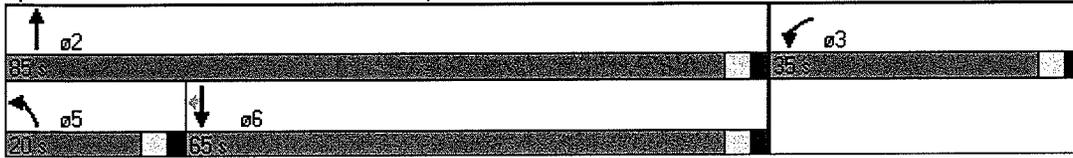
Splits and Phases: 10: WB SR 166 off-Ramp & US 1

↑ ø2 85s	↖ ø3 35s
↖ ø5 25s	↓ ø6 60s

Splits and Phases: 7: eb SR 166 Off-Ramp & US 1



Splits and Phases: 10: WB SR 166 Off-Ramp & US 1





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖↗		↗					↖↗		↖↗	↖↗	↖↗	
Volume (vph)	580	0	230	0	0	0	0	1700	655	250	2195	0	
Satd. Flow (prot)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0	
Flt Permitted	0.950									0.950			
Satd. Flow (perm)	2973	0	1371	0	0	0	0	3065	1371	2973	3065	0	
Satd. Flow (RTOR)			245						658				
Lane Group Flow (vph)	617	0	245	0	0	0	0	1735	668	266	2335	0	
Turn Type	Prot		Free						Perm	Prot			
Protected Phases	7							2		1	6		
Permitted Phases			Free						2				
Total Split (s)	31.0	0.0	0.0	0.0	0.0	0.0	0.0	73.0	73.0	16.0	89.0	0.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	4.0	
Act Effct Green (s)	26.0		120.0					68.0	68.0	11.0	84.0		
Actuated g/C Ratio	0.22		1.00					0.57	0.57	0.09	0.70		
v/c Ratio	0.96		0.18					1.00	0.63	0.97	1.09		
Control Delay	73.3		0.3					47.7	4.1	72.9	52.1		
Queue Delay	0.0		0.0					7.8	0.0	0.0	3.7		
Total Delay	73.3		0.3					55.5	4.1	72.9	55.8		
LOS	E		A					E		A		E	
Approach Delay								41.2			57.5		
Approach LOS								D			E		
Queue Length 50th (ft)	245		0					672	3	106	~1061		
Queue Length 95th (ft)	#361		0					#874	55	m100	m#960		
Internal Link Dist (ft)		468			477			346				689	
Turn Bay Length (ft)			300						300	150			
Base Capacity (vph)	644		1371					1737	1062	273	2146		
Starvation Cap Reductn	0		0					0	0	0	17		
Spillback Cap Reductn	0		0					46	0	0	0		
Storage Cap Reductn	0		0					0	0	0	0		
Reduced v/c Ratio	0.96		0.18					1.03	0.63	0.97	1.10		

Intersection Summary

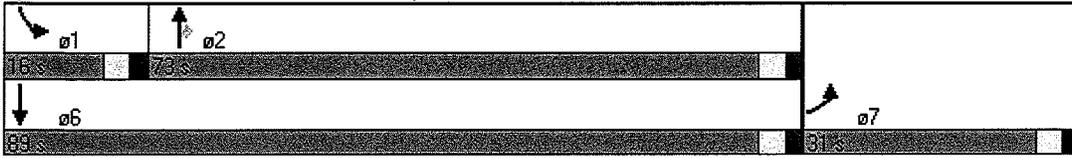
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.09
 Intersection Signal Delay: 50.1
 Intersection Capacity Utilization 94.1%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: EB SR 166 Off Ramp & US 1





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔↔		↔	↔↔	↕↕			↕↕	↔↔
Volume (vph)	0	0	0	640	0	580	340	1940	0	0	1805	465
Satd. Flow (prot)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3303	0	1524	3303	3406	0	0	3406	1524
Satd. Flow (RTOR)							277					352
Lane Group Flow (vph)	0	0	0	688	0	624	354	2021	0	0	1984	511
Turn Type				Prot		Free	Prot					Perm
Protected Phases				3			5	2			6	
Permitted Phases						Free						6
Total Split (s)	0.0	0.0	0.0	30.0	0.0	0.0	20.0	90.0	0.0	0.0	70.0	70.0
Total Lost Time (s)	4.0	4.0	4.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0	5.0	5.0
Act Effct Green (s)				25.2		120.0	14.8	84.8			65.0	65.0
Actuated g/C Ratio				0.21		1.00	0.12	0.71			0.54	0.54
v/c Ratio				0.99		0.41	0.87	0.84			1.08	0.52
Control Delay				80.1		0.8	56.3	11.1			72.3	6.9
Queue Delay				0.0		0.0	0.0	3.2			0.0	0.0
Total Delay				80.1		0.8	56.3	14.3			72.3	6.9
LOS				F		A	E	B			E	A
Approach Delay								20.5			58.9	
Approach LOS								C			E	
Queue Length 50th (ft)				276		0	145	271			~900	60
Queue Length 95th (ft)				#405		0	m148	m290			#1038	147
Internal Link Dist (ft)		485			343			689			407	
Turn Bay Length (ft)						300	150					
Base Capacity (vph)				693		1524	413	2413			1845	987
Starvation Cap Reductn				0		0	0	293			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.99		0.41	0.86	0.95			1.08	0.52

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 40.7
 Intersection Capacity Utilization 94.1%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: WB SR 166 OffRamp & US 1

↑ ø2 90s	↙ ø3 90s
↓ ø6 70s	↖ ø5 20s

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 045-0001-0
Location & Geography

Carroll

SUFF. RATING

81.83

* Structure I.D.No:	045-0001-0	* 104 Highway System:	1	Signs & Attachments	
* 200 Bridge Information	01	* 26 Functional Classification:	14	225 Expansion Joint Type:	02
* 6A Feature Int:	SR 166 (US 27 ALT)	* 204 Federal Route Type:	F	242 Deck Drains:	0
* 6B Critical Bridge:	0	* 105 Federal Lands Highway:	0	243 Parapet Location:	3
* 7A Route Number Carried:	SR00001	* 110 Truck Route:	0	Height:	2.00
* 7B Facility Carried:	US 27 NBL	* 206 School Bus Route:	1	Width:	1.00
* 9 Location:	IN SOUTH CARROLLTON	* 217 Benchmark Elevation:	0000.00	238 Curb:	0.00 0
* 2 DOT District:	6	* 218 Datum:	0	239 Handrail:	7 7
* 207 Year Photo:	2004	* 19 Bypass Length:	01	* 240 Median Barrier Rail:	0
* 91 Inspection Frequency:	24 Date: 06/16/2004	* 20 Toll:	3	241 Bridge Median Height:	0.00
* 92A Fract Crit Insp Freq:	00 Date: 02/01/1901	* 21 Maintenance:	01	Width:	0.00
* 92B Underwater Insp Freq:	00 Date: 02/01/1901	* 22 Owner:	01	* 230 Guardrail Loc Dir Rear:	3
* 92C Other Spc. Insp Freq:	00 Date: 02/01/1901	* 31 Design Load:	6	Fwd:	1
* 4 Place Code:	13492	* 37 Historical Significance:	5	Oppo Dir Rear:	0
* 5 Inventory Route (O/U):	1	* 205 Congressional District:	11	Fwd:	0
Type:	2	* 27 Year Constructed:	1977	244 Approach Slab:	3
Designation:	1	* 106 Year Reconstructed:	0000	224 Retaining Wall:	0
Number:	00027	33 Bridge Median:	1	233 Posted Speed Limit:	45
Direction:	0	34 Skew:	03	236 Warning Sign:	0
* 16 Latitude:	33-33.4	* 35 Structure Flared:	0	234 Delineator:	1
* 17 Longitude:	85-04.4	MMS Prefix:	SR	235 Hazard Boards:	0
98 Border Bridge:	000	MMS Suffix:	00	237 Utilities Gas:	00
99 ID Number:	0000000000000000	%Shared:	00	W	00
* 100 STRAHNET:	0	* 42 Type of Service on:	1	Ele:	00
12 Base Highway Network:	1	214 Movable Bridge:	0	Telephone:	22
13A LRS Inventory Route:	451000100	203 Type Bridge:	Z-O-M-O	St	00
13B Sub Inventory Route:	0	259 Pile Encasement:	3	Lighting Street:	0
* 101 Parallel Structure:	R	* 43 Structure Type Main:	4	Navigaion:	0
* 102 Direction of Traffic:	1	45 No. Spans Main:	004	Aerial:	0
* 264 Road Inventory Mile Post:	010.28	44 Structure Type Appr:	0	* 248 County Continuity No.:	12
* 208 Inspection Area:	09	46 No. Spans Appr:	0000		
Engineer's Initial:	SGM	226 Bridge Curve Horz:	0		
* Location I.D. No.:	045-00001D-010.48N	111 Pier Protection:	0		
		107 Deck Structure Type:	1		
		108 Wearing Surface Type:	1		
			Mt		
			F		
			0		

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 045-0001-0

Carroll

SUFF. RATING

81.83

Programming Data

201 Project No.: DP-RF-021-1 (8) LOOP
 202 Plans Available: 1
 249 Prop. Proj. No. 0000000000000000
 250 Approval Status: 0000
 251 P.I. No.: 0000000
 252 Contract Date: 02/01/1901
 260 Seismic No.: 00000
 75 Type Work: 00 0
 94 Bridge Imp. Cost: \$ 0
 95 Roadway Imp. Cost: \$ 0
 96 Total Imp Cost: \$ 0
 76 Imp. Length: 000000
 97 Imp. Year: 0000
 114 Future ADT: 042855 Year: 2023

Measurements

* 29 ADT: 028570 Year: 2003
 109 % Trucks: 5
 * 28 Lanes On: 02 Under: 04
 210 No. Tracks On: 00 Under: 00
 * 48 Max. Span Length: 0088
 * 49 Structure Length: 291
 51 Br. Rwdy. Width: 42.00
 52 Deck Width: 44.40
 * 47 Tot. Horz. Cl: 42.00
 50 Curb/Sdewlk Width: 0.00/0.00
 32 Approach Rdwy Width: 038
 * 229 Shoulder Width:
 Rear Lt: 4.00 Type: 2 Rt: 10.00
 Fwd Lt: 4.00 Type: 2 Rt: 10.00
 Pavement Width:
 Rear: 24.00 Type: 2
 Fwd: 24.00 Type: 2
 Intersection Rear: 1 Fwd: 1
 36 Safety Features Br. Rail:
 Transition: 1 1
 App. G. Rail: 1
 App. Rail End: 1
 53 Minimum Cl. Over:
 Under: H
 228 Min. Vertical Cl
 Act. Odm Dir: 99 ' 99 "
 Oppo. Dir: 99 ' 99 "
 Posted Odm. Dir: 00 ' 00 "
 Oppo. Dir: 00 ' 00 "
 55 Lateral Undercl. Rt: H 29.10
 56 Lateral Undercl. Lt: 29.90
 * 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
 39 Nav Vert Cl: 000 Horz: 0000
 116 Nav Vert Cl Closed: 000
 245 Deck Thickness Main: 7.80
 Deck Thick Approach: 0.00
 246 Overlay Thickness: 0.00
 212 Year Last Painted: Sup: 1998 Sub: 0000

Ratings

65 Inventory Rating Method: 1
 63 Inventory Rating Method: 1
 66 Inventory Type: 2 Rating: 22
 64 Operating Type: 2 Rating: 37
 231 Calculated Loads
 H-Modified: 20 0
 HS-Modified: 25 0
 Type 3: 28 0
 Type 3s2: 40 0
 Timber: 36 0
 Piggyback: 40 0

261 H Inventory Rating: 20
 262 H Operating Rating: 28
 67 Structural Evaluation: 5
 58 Deck Condition: 7
 59 Superstructure Condition: 8
 * 227 Collision Damage: 0
 60A Substructure Condition: 7
 60B Scour Condition: N
 60C Underwater Condition: N
 71 Waterway Adequacy: N
 61 Channel Protection Cond: N
 68 Deck Geometry: 8
 69 UnderClr. Horz/Vert: 7
 72 Appr. Alignment: 8
 62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
 41 Struct Open, Posted, Cl: A
 * 103 Temporary Structure: 0
 232 Posted Loads H-Modified: 00
 HS-Modified: 00
 Type 3: 00
 Type 3s2: 00
 Timber: 00
 Piggyback: 00
 253 Notification Date 02/01/1901
 253 Fed Notify Date: 02/01/1901

Hydraulic Data

215 Waterway Data
 Highwater Elev.: 0000.0 Year: 1900
 Avg. Streambed Elev.: 0000.0 Freq.: 00
 Drainage Area: 00000
 Area Of Opening: 000000
 113 Scour Critical: N
 216 Water Depth: 00.0 Br. Height: 00.0
 222 Slope Protection: 4
 221 Spur Dikes Rear: 0 Fwd: 0
 219 Fender System: 0
 220 Dolphin: 0
 223 Culvert Cover: 000
 Type: 0
 No. Barrels: 0
 Width: 0.00 Height: 0.00
 Length: 0 Apron: 0
 * 265 U/W Insp. Area: 0 Diver: ZZZ
 * Location I.D. No.: 045-00001D-010.48N

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 045-0002-0

Carroll

SUFF. RATING

81.61

Location & Geography

* Structure I.D.No: 045-0002-0
 200 Bridge Information
 * 6A Feature Int: SR 166 (US 27 ALT)
 * 6B Critical Bridge: 0
 * 7A Route Number Carried: SR00001
 * 7B Facility Carried: US 27 SBL
 * 9 Location: IN SOUTH CARROLLTON
 2 DOT District: 6
 207 Year Photo: 2004
 * 91 Inspection Frequency: 24 Date: 06/16/2004
 92A Fract Crit Insp Freq: 00 Date: 02/01/1901
 92B Underwater Insp Freq: 00 Date: 02/01/1901
 92C Other Spc. Insp Freq: 00 Date: 02/01/1901
 * 4 Place Code: 13492
 * 5 Inventory Route (OU):
 Type: 1
 Designation: 2
 Number: 1
 Direction: 00027
 * 16 Latitude: 33-33.4 MMS Prefix: SR
 * 17 Longitude: 85-04.4 MMS Suffix: 00 MP: 10.49
 98 Border Bridge: 000 %Shared: 00
 99 ID Number: 0000000000000000
 * 100 STRAHNET: 0
 12 Base Highway Network: 1
 13A LRS Inventory Route: 451000100
 13B Sub Inventory Route: 0
 * 101 Parallel Structure: L
 * 102 Direction of Traffic: 1
 * 264 Road Inventory Mile Post: 010.29
 * 208 Inspection Area: 09 Initials: JMC
 Engineer's Initial: SGM
 * Location I.D. No.: 045-00001D-010.49N

Signs & Attachments

* 104 Highway System:	1								
* 26 Functional Classification:	14								
* 204 Federal Route Type:	F	No.:	00171						
* 105 Federal Lands Highway:	0								
* 110 Truck Route:	0								
* 206 School Bus Route:	1								
* 217 Benchmark Elevation:	0000.00								
* 218 Datum:	0								
* 19 Bypass Length:	01								
* 20 Toll:	3								
* 21 Maintenance:	01								
* 22 Owner:	01								
* 31 Design Load:	6								
* 37 Historical Significance:	5								
* 205 Congressional District:	11								
* 27 Year Constructed:	1977								
* 106 Year Reconstructed:	0000								
* 33 Bridge Median:	1								
* 34 Skew:	03								
* 35 Structure Flared:	0								
* 38 Navigation Control:	N								
* 213 Special Steel Design:	0								
* 267 Type of Paint:	5								
* 42 Type of Service on:	1								
* 214 Movable Bridge:	0								
* 203 Type Bridge:	Z-O-M-O								
* 259 Pile Encasement:	3								
* 43 Structure Type Main:	4	02							
* 45 No. Spans Main:	004								
* 44 Structure Type Appr:	0	00							
* 46 No. Spans Appr:	0000								
* 226 Bridge Curve Horz:	0	Vert:	1						
* 111 Pier Protection:	0								
* 107 Deck Structure Type:	1								
* 108 Wearing Surface Type:	1								
		Mc	0						
		F	0						

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 045-0002-0

Carroll

SUFF. RATING

81.61

Programming Data

201 Project No.: DP-RF-021-1 (8) LOOP
 202 Plans Available: 1
 249 Prop. Proj. No. 000000000000000000
 250 Approval Status: 0000
 251 P.I. No.: 0000000
 252 Contract Date: 02/01/1901
 260 Seismic No.: 00000
 75 Type Work: 00 0
 94 Bridge Imp. Cost: \$ 0
 95 Roadway Imp. Cost: \$ 0
 96 Total Imp Cost: \$ 0
 76 Imp. Length: 000000
 97 Imp. Year: 0000
 114 Future ADT: 046320 Year: 2023

Measurements

* 29 ADT: 030880 Year: 2003
 109 % Trucks: 5
 * 28 Lanes On: 02 Under: 04
 210 No. Tracks On: 00 Under: 00
 * 48 Max. Span Length: 0088
 * 49 Structure Length: 291
 51 Br. Rwdy. Width: 42.00
 52 Deck Width: 44.40
 * 47 Tot. Horiz. Cl: 42.00
 50 Curb/Sdewlk Width: 0.00/0.00
 32 Approach Rwdy Width: 038
 * 229 Shoulder Width:
 Rear Lt: 4.00 Type: 2 Rt: 10.00
 Fwd Lt: 4.00 Type: 2 Rt: 10.00
 Pavement Width:
 Rear: 24.00 Type: 2
 Fwd: 24.00 Type: 2
 Intersection Rear: 1 Fwd: 1
 36 Safety Features Br. Rail:
 Transition: 2
 App. G. Rail: 1
 App. Rail End: 1
 53 Minimum Cl. Over:
 Under: H
 * 228 Min. Vertical Cl
 Act. Odm Dir: 99 ' 99 "
 Oppo. Dir: 99 ' 99 "
 Posted Odm. Dir: 00 ' 00 "
 Oppo. Dir: 00 ' 00 "
 55 Lateral Undercl. Rt: H 29.10
 56 Lateral Undercl. Lt: 29.90
 * 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
 39 Nav Vert Cl: 000 Horiz: 0000
 116 Nav Vert Cl Closed: 000
 245 Deck Thickness Main: 7.80
 Deck Thick Approach: 0.00
 246 Overlay Thickness: 0.00
 212 Year Last Painted: Sup: 1998 Sub: 0000

Hydraulic Data

215 Waterway Data
 Highwater Elev.: 0000.0 Year: 1900
 Avg. Streambed Elev.: 0000.0 Freq.: 00
 Drainage Area: 00000
 Area Of Opening: 000000
 113 Scour Critical: N
 216 Water Depth: 00.0 Br. Height: 00.0
 222 Slope Protection: 4
 221 Spur Dikes Rear: 0 Fwd: 0
 219 Fender System: 0
 220 Dolphini: 0
 223 Culvert Cover:
 Type: 0
 No. Barrels: 0
 Width: 0.00 Height: 0.00
 Length: 0 Apron: 0 Diver: ZZZ
 * 265 U/W Insp. Area: 0

Ratings

65 Inventory Rating Method: 1
 63 Inventory Rating Method: 1
 66 Inventory Type: 2 Rating: 22
 64 Operating Type: 2 Rating: 36
 231 Calculated Loads
 H-Modified: 20 0
 HS-Modified: 25 0
 Type 3: 28 0
 Type 3s2: 40 0
 Timber: 36 0
 Piggyback: 40 0

261 H Inventory Rating: 20
 262 H Operating Rating: 28
 67 Structural Evaluation: 5
 58 Deck Condition: 7
 * 59 Superstructure Condition: 8
 227 Collision Damage: 0
 60A Substructure Condition: 7
 60B Scour Condition: N
 60C Underwater Condition: N
 71 Waterway Adequacy: N
 61 Channel Protection Cond: N
 68 Deck Geometry: 8
 69 UnderClr. Horiz/Vert: 7
 72 Appr. Alignment: 8
 62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
 41 Struct Open, Posted, Cl: A
 * 103 Temporary Structure: 0
 232 Posted Loads H-Modified: 00
 HS-Modified: 00
 Type 3: 00
 Type3s2: 00
 Timber: 00
 Piggyback: 00
 253 Notification Date 02/01/1901
 253 Fed Notify Date: 02/01/1901 0

MEETING MINUTES

Subject: SR-166
NH-017-1(22), STP-021-1(24), and STP-021-1(25),
P.I. No. 621990, 631300, and 631310, Carroll County

Meeting Date: March 9, 2007 10:00 am

Location: GDOT – Downtown RM444

Transcription Date: March 12, 2007

Attendees: See Attached Sign In Sheet

Purpose: Initial Concept Team Meeting

Mohsen Tehrani opened the meeting.

All attendees introduced themselves and the firm or discipline they represented.

Mike Cates gave a presentation that reviewed the draft concept reports for all of the projects. During this presentation, existing conditions, areas of concerns, proposed and alternate designs were discussed.

During the environmental portion of the presentation, it was noted that there 158 properties are 50= years old and initial field work for the necessary permits has been completed.

The public hearing (PIOH) is scheduled for April 24th at the Jonesville Middle School from 4pm to 7pm.

Mr. Stanley Hill opened the floor to comments after Mike Cates' presentation. The following comments were made.

- **Rob Hambree (AGL):** There is an 8" 300lb steel main on the outside of the westernmost bridge at interchange US27. They would prefer any design does not require that main to be moved. His initial estimate shows that the cost to relocate the gas lines is approximately \$2,000,000. Relocation of all utilities could add 1.5 years to the construction schedule. He also asked DMJM Harris to consider existing utilities when designing SR166 bypass.
- **GDOT Utilities Representative:** DMJM Harris needs to contact the Office of Utilities for an estimate. The water and sewer are owned by the Carroll County Water Authority, City of Carrollton, and City of Bowdon.
- **Melanie Nables (GDOT/OEL):** Q. Will there be an individual permit for the ecology?
Angela Malta (DMJM): A. We think so. We are awaiting response from SHIPO.
- **Melanie Nables (GDOT/OEL):** Q. Will there be adverse impacts?
Angela Malta (DMJM): A. Possibly.
- **Melanie Nables (GDOT/OEL):** Q. Are there any historic bridges?
Angela Malta (DMJM): A. We do not think so.

The meeting was adjourned by Stanley Hill at 10:50 am.

SIGN IN SHEET - March 9, 2007

PROJECT P.I. No. 631310, 631300, 62990, Carroll County

NAME	ORGANIZATION	EMAIL ADDRESS	PHONE NO.
Stanley Hill	GDOT/OCD	Stanley.Hill@dot.state.ga.us	(404) 656-6109
Mohsen Tehrani	GDOT/OCD	Tehrani.Mohsen@dot.state.ga.us	(404) 463-2988
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Rob Hambro	ACL	Hambro - Daylr - sources.com	(4) 584-3363
Wayne Sucas	ACL	wsucas@agresources.com	(4) 584-4318
Melanie Nable	GDOT/OEL	melanie.nable@dot.state.ga.us	(4) 609,4432
Anthony Hughes	GSP	anthony-hughes@gspof.com	(205) 298-9200
Derrick J. Vincent	DMSM Harris	derrick.vincent@dmsmharris.com	(320) 980-6368
Leelle Brown	Edwards-Pitman	Leelle@edwards-pitman.com	(7) 333 9284
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hyan Pietak	Edwards-Pitman	hpietak@edwards-pitman.com	(7) 333 9484
Arife Mulla	DMSM	arife.mulla@dmsmharris.com	()
			()

MEETING MINUTES

Subject: NH-017-1(22), P.I. No. 621990
US27/SR166 Interchange Bridge Widening
Carroll County, Georgia
Concept Team Meeting

Meeting Date: October 26, 2007

Location: GDOT District 6 Office, Cartersville GA

Transcription Date: October 29, 2007

Attendees:

Steve Adewale	GDOT OCD
Stanley Hill	GDOT OCD
Dan Bodycomb	DMJM Harris
Angela Malta	DMJM Harris
Jennifer Deems	GDOT District 6 Utilities
Kerry Bonner	GDOT District 6 Utilities
David Moore	GDOT District 6 Design
Sebastian Nesbitt	GDOT Area 5 Construction
Mike Garrett	AT&T
Scott Moore	Carter and Burgess
Jon Jeffres	GA Power
Wayne Jacas	Atlanta Gas Light
Mike Davidson	GDOT District 6 Preconstruction
Dee Carson	GDOT District 6 Traffic Ops

Purpose: **Concept Team Meeting for US27/SR166 Interchange**

■ Welcome - Steve Adewale gave the opening remarks and welcomed everyone to the meeting. He described the project as NH-017-1(22), P.I. No. 621990, US 27 Interchange over SR 166 in Carroll County. He said the tentative approval date for the Concept is December 2007. The project let date is in 2010 and that the project is being design in English Units.

■ Introductions - Everyone present then introduced themselves

■ Presentation -

Dan Bodycomb then gave a presentation that covered the topics included in the Concept Report.

- Project Location – A location map was displayed that showed the project location being just south of downtown Carrollton, in Carroll County.
- Project Background – US 27 currently has dual through lanes in each direction. These lanes are carried on twin structures over SR 166. The left turns to enter SR

MEETING MINUTES

166 start at the ends of each bridge and provide about 140 feet of storage. At peak hours the queue lengths exceed the storage length and the traffic encroaches onto the inside through lane. This project proposes to widen each bridge to the inside by two lanes to lengthen the existing left lane and add a second left turn lane.

- This project conforms to the TIP. This project is not listed in the STIP. The current construction status is long range.
- The other projects in the area include NHS-0000-00(312), PI 0000312 which is the widening of US27 along the same mile markers as this project. This project is being led by Matt Sanders in the Office of Road Design. There is no developed plan for this project at this time.
- Another project is STP-0804(1) which is drainage improvements to SR16 from Columbia Road to SR1.
- Two other projects in the area are STP-021-1(24) and (25) which are the widening and bypass of SR166 near the City of Bowdon.
- The traffic projections show AADT on US 27 to be 38,800 in 2015 and 52,180 in 2035.
- The accident history shows that the crash rate exceeded the State Average in 2004. And was close to the State Average in 2003 and 2005.
- The project is located in a Non-attainment area, exempt from Federal oversight, and classified as an Urban Principal Arterial road.
- The Level of Service without improvements shows an existing Level of Service (LOS) of C, a 2015 LOS of D, and a 2035 LOS of F. Both intersections are currently signalized. This LOS doesn't accurately represent the problem at the interchange.
- After improvements the LOS is estimated to be C in 2015, and D in 2035.
- No IMR/IJR is required.
- The existing design features include four 12-ft. lanes, two in each direction, a single left turn lane, a 64-ft. depressed median, and rural shoulders with 4-ft paved inside and 12-ft paved outside.
- The two structures currently have a sufficiency rating of over 81 each.
- The proposed typical sections include dual 12-ft left turn lanes, 16-ft single lane ramps, and 28-ft (dual 14'ft) two lane ramps.
- The proposed design speed is 45 mph, proposed max grade is 4.5%
- No design exceptions or variances are anticipated

MEETING MINUTES

- Existing traffic will be maintained on the project during construction. The outside 12-ft. paved shoulder will be used to shift traffic away from the side of the bridge to be widened.
- The project is staying within existing Right-of-Way and no environmental impacts are anticipated. This project will be done as a Categorical Exclusion (CE)
- The utility companies are AT&T, Georgia Power, Atlanta Gas Light, Carroll County Water Authority, and City of Carrollton Sewer.
- A VE Study is not required (this was later corrected as being a potential project for a VE Study), a PAR is not required, and SUE is currently underway
- The initial concept team meeting was held on March 9, 2007. A PIOH was held on April 24, 2007 at the Jonesville Middle School.
- Alternates considered
 - Alternate A: included increasing left turn storage by widening each bridge by one lane. This resulted in a LOS of F in 2035 and thus didn't meet the Need and Purpose.
 - Alternate B: included increasing left turn storage by widening each bridge by one lane and adding an additional (third) thru lane. The required extending the length of the project and produced a higher construction cost estimate.
 - No Build didn't meet the Need and Purpose
- The preliminary cost estimate is \$7,333,840.

This concluded Dan's presentation and the floor was turned back over to Steve Adewale.

- Steve then opened the meeting for comments:
 - Stanley Hill said that the traffic Level of Service needs to be re-evaluated. The Need and Purpose mentions the queue backing into the through lanes but the existing LOS of C doesn't reflect this.
 - Stanley Hill said to delete the meeting minutes from the May 16, 2007 meeting with the Mayor of Bowdon since it didn't concern the interchange project.
 - Stanley Hill asked about the gas line across the bridge. Atlanta Gas Light confirmed the 8" gas line as being on the western side of the bridge. It was stated that this is the main feed into the City of Carrollton.
 - No comments from Office of Planning, Right-of-Way, Maintenance, Construction, OMR, OEL, or Bridge

MEETING MINUTES

- Georgia Power Representative – no conflicts with the project
- Atlanta Gas Light Representative – since the widening is to the inside there shouldn't be any impacts. The concern was raised regarding any ramp work to be done which might cross the gas line.
- AT&T Representative - stated that they had lines under the bridge and would like to remain on the bridge.
- A question regarding the signals and the need to be upgraded was raised. The question concerned the need to relocate the signals and whether or not upgrading the existing equipment had been considered. The design hasn't considered the relocation of signals yet but will consider upgrading existing equipment.
- District – This project is not in the RDC/ARC under their jurisdiction. This project is within the Chattahoochee Flint RDC.
- District – During a recent VE Study the question was raised regarding the LOS of the different Alternatives. It was stated this would apply if this project had a VE Study done in that the committee recommended a more expensive project because it provided a better LOS. The LOS for the alternates considered will be added to the concept report.
- District – This is a much needed project. The traffic does back up into the previous intersection. The addition of the dual left turn lanes will move the left turning traffic out of the way and allow for faster speeds through the intersection.

**Benefit Cost Analysis Work Sheet
CONGESTION Projects**

NH-017-1(22)
PI No. 621990
CARROLL COUNTY
S.R. 166 AT SR 1

Congestion Benefit = Tb + CMb + Fb

Person Time Savings Benefit (Tb)

*Db (hrs)	0.0419444
ADT	51,160.00
Tb (\$s)	\$73,764,470.45

Commercial or Truck Time Savings Benefit (CMb)

Db (hrs)	0.0419444
% Truck Traffic	0.06
ADT	51,160.00
CMb	\$23,384,678.30

Fuel Savings Benefit (Fb)

ADT	51,160.00
Fb (\$s)	\$25,705,800.31

Total Congestion Benefit	\$122,854,949.06
Total Project Cost	\$5,736,080.76
B/C Ratio	21.42

B/C Calculations

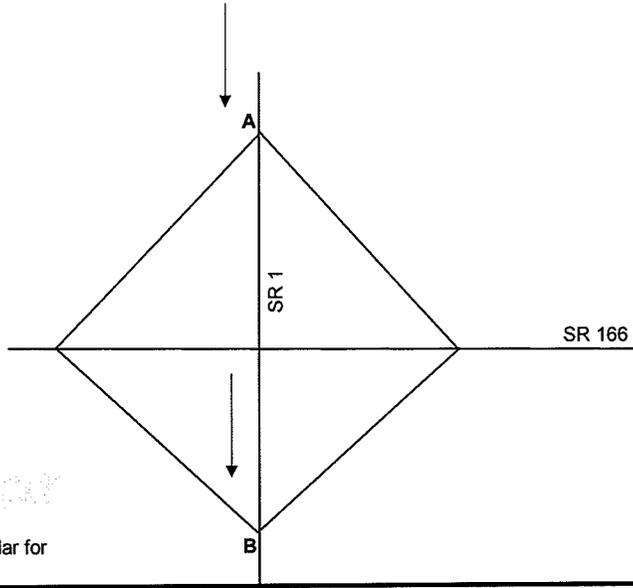
2035 ADT= 51,160
 SB PM DHV= 1,610
 NB PM DHV= 1,500

SB Approach Delay - Existing Geometry

Intersection	Delay
A	149 SEC/VEH
B	<u>119 SEC/VEH</u>
Total Delay	268 SEC/VEH (.074 HR/VEH)

SB Approach Delay - Modified Geometry

Intersection	Delay
A	59 SEC/VEH
B	<u>58 SEC/VEH</u>
Total Delay	117 SEC/VEH (.0325 HR/VEH)



Delay Improvement (0.074 - 0.0325 = 0.04194)

* Travel time between ramp termini is assumed to be the similar for both scenarios and therefore was omitted.

Timings

7: EB SR 166 Off Ramp & SR 1



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
	↑	↗	↑↑	↗	↖	↑↑
Volume (vph)	0	230	1700	655	250	2195
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Detector Phase	4	4	2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	36.0	36.0	56.0	56.0	18.0	74.0
Total Split (%)	32.7%	32.7%	50.9%	50.9%	16.4%	67.3%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	32.0	32.0	52.0	52.0	14.0	70.0
Actuated g/C Ratio	0.29	0.29	0.47	0.47	0.13	0.64
v/c Ratio	1.38	0.61	1.20	0.70	1.36	1.20
Control Delay	218.5	40.1	124.3	7.3	207.9	108.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.4
Total Delay	218.5	40.1	124.3	7.3	207.9	109.4
LOS	F	D	F	A	F	F
Approach Delay	167.8		91.8			
Approach LOS	F		F			F

Intersection Summary

Actuated Cycle Length: 110

Offset: 8 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.38

Intersection Signal Delay: 115.2

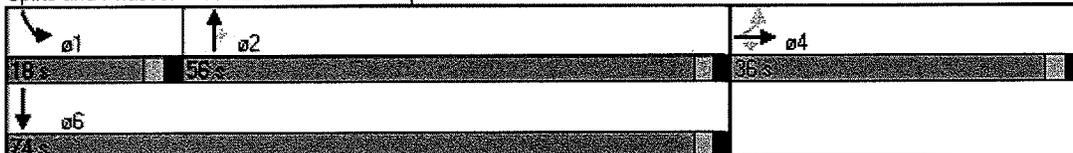
Intersection LOS: F

Intersection Capacity Utilization 114.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 7: EB SR 166 Off Ramp & SR 1



Timings

10: WB SR 166 OffRamp & SR 1



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
	↖	↗	↘	↑↑	↑↑	↗
Volume (vph)	0	580	340	1940	1805	465
Turn Type		Perm	Prot			Perm
Protected Phases	8		5	2	6	
Permitted Phases		8				6
Detector Phase	8	8	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	38.0	38.0	20.0	72.0	52.0	52.0
Total Split (%)	34.5%	34.5%	18.2%	65.5%	47.3%	47.3%
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	34.0	34.0	16.0	68.0	48.0	48.0
Actuated g/C Ratio	0.31	0.31	0.15	0.62	0.44	0.44
v/c Ratio	1.31	1.30	1.43	0.96	1.34	0.61
Control Delay	184.9	183.4	228.3	22.6	184.1	12.0
Queue Delay	0.0	0.0	0.0	5.4	0.0	0.0
Total Delay	184.9	183.4	228.3	28.0	184.1	12.0
LOS	F	F	F	C	F	B
Approach Delay	184.2			57.8		
Approach LOS	F			E	F	

Intersection Summary

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.43

Intersection Signal Delay: 121.4

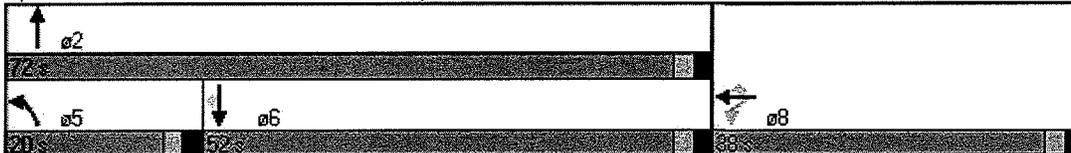
Intersection LOS: F

Intersection Capacity Utilization 114.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 OffRamp & SR 1



2035 PM
 10: WB SR 166 Off Ramp & SR 1



Lane Group	WBL	WBR	NBL	NBT	SBT	SBR
Volume (vph)	640	580	340	1940	1805	465
Turn Type	Prot	Free	Prot			Perm
Protected Phases	3		5	2	6	
Permitted Phases		Free				6
Detector Phase	3		5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.5		9.5	21.5	21.5	21.5
Total Split (s)	30.0	0.0	20.0	90.0	70.0	70.0
Total Split (%)	25.0%	0.0%	16.7%	75.0%	58.3%	58.3%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Min	C-Min	C-Min
Act Effect Green (s)	25.2	120.0	14.8	84.8	65.0	65.0
Actuated g/C Ratio	0.21	1.00	0.12	0.71	0.54	0.54
v/c Ratio	0.99	0.41	0.87	0.84	1.08	0.52
Control Delay	80.1	0.8	56.3	11.1	72.3	6.9
Queue Delay	0.0	0.0	0.0	3.2	0.0	0.0
Total Delay	80.1	0.8	56.3	14.3	72.3	6.9
LOS	F	A	E	B	E	A
Approach Delay				20.5		
Approach LOS				C	F	

Intersection Summary

Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.08
 Intersection Signal Delay: 40.7
 Intersection LOS: D
 Intersection Capacity Utilization 94.1%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 10: WB SR 166 Off Ramp & SR 1

02	03
06	05

2035 PM

7: EB SR 166 Off Ramp & SR 1



Lane Group	EBL	EBR	NBT	NBR	SBL	SBT
Volume (vph)	580	230	1700	655	250	2195
Turn Type	Prot	Free		Perm	Prot	
Protected Phases	7		2		1	6
Permitted Phases		Free		2		
Detector Phase	7		2	2	1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.5		21.5	21.5	9.5	21.5
Total Split (s)	31.0	0.0	73.0	73.0	16.0	89.0
Total Split (%)	25.8%	0.0%	60.8%	60.8%	13.3%	74.2%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Min	C-Min	None	C-Min
Act Effct Green (s)	26.0	120.0	68.0	68.0	11.0	84.0
Actuated g/C Ratio	0.22	1.00	0.57	0.57	0.09	0.70
v/c Ratio	0.96	0.18	1.00	0.63	0.97	1.09
Control Delay	73.3	0.3	47.7	4.1	72.9	52.1
Queue Delay	0.0	0.0	7.8	0.0	0.0	3.7
Total Delay	73.3	0.3	55.5	4.1	72.9	55.8
LOS	E	A	E	A	E	E
Approach Delay			41.2			
Approach LOS			D			E

Intersection Summary

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 50.1

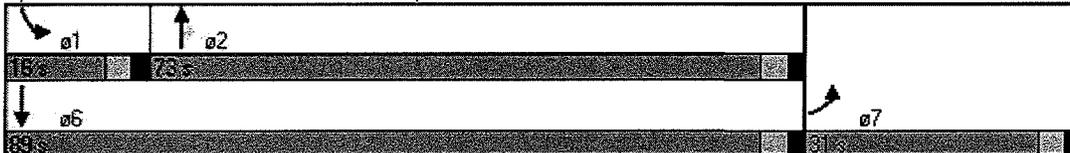
Intersection LOS: D

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 7: EB SR 166 Off Ramp & SR 1



**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENTAL CORRESPONDENCE

FILE: PI No. 621990
Carroll County

OFFICE: Planning

DATE: February 20, 2008

FROM:  Angela T. Alexander, State Transportation Planning Administrator

TO: Babs Abubakari, P.E., State Consultant Design Engineer
Attention: Steve Adewale

SUBJECT: Planning Certification Letter

Project PI 612990 is the reconstruction of the existing bridge along SR 1/ US 27 over SR 166 in Carrollton, GA. This project is exempt from air quality analysis based upon the project scope. Carroll County is included in the Atlanta Nonattainment Area. However it is not included within the Atlanta urbanized planning area boundary and is therefore not included in the Atlanta Regional Commission's Envision 6 Regional Transportation Plan.

If you have any questions or need additional information, please contact Krystal Fowler at (404) 463-7678.

ATA:KSF

cc: File

