ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. #0002882
CSSTP-0002-00(882)
GDOT District 3 - Thomaston
Henry County
SR 155 Improvements

OFFICE Design Policy & Support

DATE February 20, 2012

FROM for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT **APPROVED CONCEPT REPORT**

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Genetha Rice-Singleton, Program Control Administrator
Bobby Hilliard, State Program Delivery Engineer
Cindy VanDyke, State Transportation Planning Administrator
Angela Robinson, Financial Management Administrator
Glenn Bowman, State Environmental Administrator
Kathy Zahul, State Traffic Engineer
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Bill Rountree, District Preconstruction Engineer
Kerry Gore, District Utilities Engineer
Jonathan Cox, NEPA Section Chief
Charity Belford, Project Manager
BOARD MEMBER - 3rd Congressional District

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

Office of Program Delivery

PROJECT CONCEPT REPORT

Project Number: CSSTP-0002-00(882)
County: Henry
P. I. Number: 0002882
Federal Route Number: None
State Route Number: SR 155

SR 155 from Bill Gardner Parkway/Hampton-Locust Grove Road to I-75/ SR 401 Improvement Project

Submitted for approval:

DATE 1/24/2012 — Eric Rickert, Gresham, Smith & Partners

DATE 1-25-2012 — Bobby Hilliard, Office Head (Program Delivery)

DATE 1-24-2012 — Charity R Belford, Project Manager

Recommendation for approval:

DATE 7-30-2010 — * Genetha Rice-Singleton/KLP, Program Control Administrator

DATE 8-12-2010 — * Glenn Bowman/KLP, State Environmental Administrator

DATE 2-5-2010 — * Kathy Zahul/KLP, State Traffic Engineer

DATE 7-8-2010 — * Ron Wishon/KLP, Project Review Engineer

DATE _____ — State Utilities Engineer

DATE _____ — District Engineer

DATE _____ — State Transportation Financial Management Administrator

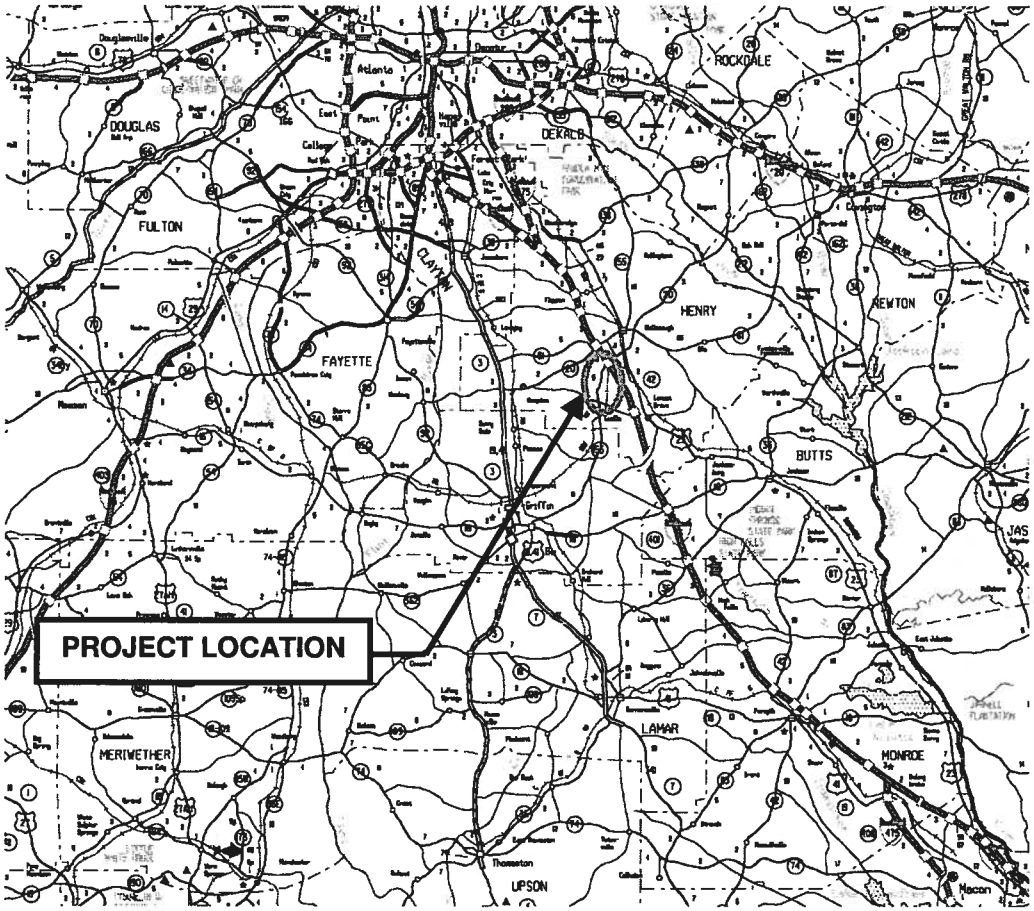
The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Program (RTP) and the State Transportation Improvement Program (STIP).

DATE 7-12-2010 — * Angela Alexander/KLP, State Transportation Planning Administrator

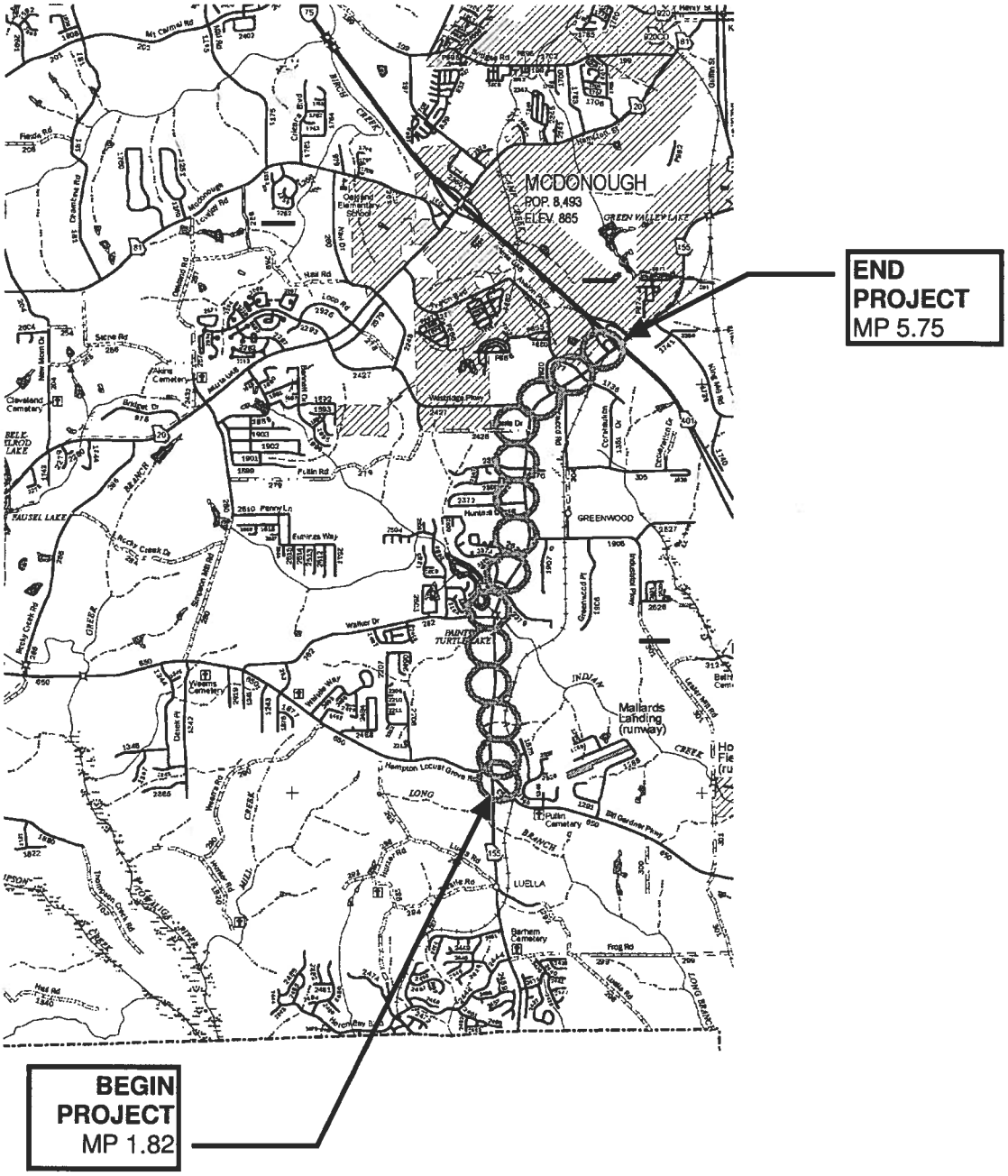
* Recommendations on file

Project Concept Report page 2
Project Number: CSSTP-0002-00(882)
P. I. Number: 0002882
County: Henry

Project Overview Map



Project Location Map



Need and Purpose:
SR 155 between the intersections of Hampton-Locust Grove Road/Bill Gardner Parkway and the I-75/SR 401 interchange in Henry County has had 1,140 total crashes from 2000 to 2009. 310 of these crashes were injury crashes and eight were fatality crashes which makes the injury, and fatality rates along this portion of SR 155 exceed the statewide average for similar facilities. The majority of these crashes occurred at or near several intersections on SR 155. The need therefore exists to improve the SR 155 corridor to address the crashes.

The purpose of this project is to reduce the crash frequency and severity at select locations on SR 155 corridor. These locations were found to have operational improvement opportunities such as improving lane configurations, adding turning lanes, and improving vertical curves.

Background
State Route 155 is a two-lane roadway with rural shoulders and has turn lanes at some intersections and commercial driveways. The land use along the project varies between residential, industrial, and commercial. The land use is predominately residential subdivisions constructed on former farmland at the beginning of the project. Starting at the Hampton-Locust Grove Road/Bill Gardner Parkway intersection, the land use changes to industrial as there are several large warehouses adjacent to SR 155. The land use transitions to commercial as SR 155 nears the I-75 interchange. State Route 155 is functionally classified as a rural minor arterial while intersecting side roads Hampton-Locust Grove Road/Bill Gardner Parkway and Walker Drive are classified as rural major and minor collectors, respectively. The remaining intersecting side roads are classified as local roadways.

Traffic Crash History
Crash data along the section of SR 155 within the project limits was obtained from GDOT for the period between January 1, 2000 and December 31, 2009. The crash data summarized by severity and by the manner of collision is provided in Tables 1 and 2.

Crash rates for this section of SR 155 were calculated and compared to statewide crash averages for rural minor arterials. Table 1 shows that the total crash rates, injury crash rates and fatal crash rates calculated for this section of SR 155 are considerably higher than the corresponding statewide averages for rural minor arterials. There were a total of eight fatal crashes during the years 2000 through 2009.

Table 1. Summary of Traffic Crash History by Severity along SR 155[1]

Year	Crashes			Crashes Per 100 Million Vehicle Miles[2]		
	Total	Injury	Fatal	Total	Injury	Fatal
2000	75	30	1	221 (182)	88 (58)	2.95 (1.76)
2001	90	27	0	265 (190)	80 (60)	0.00 (2.03)
2002	100	30	1	295 (199)	88 (64)	2.95 (2.21)
2003	114	25	1	336 (212)	74 (69)	2.95 (2.32)
2004	110	34	0	324 (243)	100 (80)	0.00 (2.43)
2005	133	26	1	392 (181)	77 (63)	2.95 (2.48)
2006	157	45	2	462 (179)	133 (62)	5.89 (2.41)
2007	143	32	2	421 (187)	94 (62)	5.89 (2.33)
2008	125	33	0	368 (181)	97 (60)	0.00 (2.30)
2009	93	28	0	274 (180)	82 (60)	0.00 (2.05)
Total	1,140	310	8			

Note: (1) The crash data provided is for the section of SR 155 between MP 1.82 to MP 5.75.
(2) The number in parentheses represents the statewide average crash rates for rural minor arterials.

A detailed analysis of the crashes was completed to determine the type of crashes along this section of roadway. The number of each type of crash was summarized to determine crash patterns. As shown in Table 2, there were 1,140 total crashes in this section of roadway over the 10 year period (2000 - 2009). The majority of the crashes recorded were rear end crashes, which accounted for about 42% of the total number of crashes. Of the total number of crashes about 31% were angle crashes, about 16% were "Single-Vehicle" crashes, 8% were sideswipe crashes and the remaining 3% were head-on type crashes.

Table 2. Summary of Traffic Crash History by Manner of Collision along SR 155

Year	Manner of Collision						Total
	Angle	Head On	Rear End	Sideswipe - Same Direction	Sideswipe - Opposite Direction	Other (Single-Vehicle)	
2000	25	3	22	4	2	19	75
2001	35	4	24	3	3	21	90
2002	33	3	32	6	3	23	100
2003	40	2	37	10	1	24	114
2004	35	5	45	7	2	16	110
2005	37	7	57	7	3	22	133
2006	58	2	68	7	2	20	157
2007	39	3	68	13	5	15	143
2008	35	3	65	6	3	13	125
2009	17	5	57	6	1	7	93
Total	354	37	475	69	25	180	1,140

Detailed Crash Analysis

A spatial analysis of the crash data was conducted to identify the high crash locations within the project limits. The crash data was plotted against the associated mile-log, to identify the peak crash locations. The plot with the high crash locations recorded is provided as an attachment (See attachment 4) with this report. As would be expected, crashes were more frequent at or near intersections where conflicts are more frequent. The following locations were found to have higher crash occurrences:

1. SR 155/ Hampton-Locust Grove Road/ Bill Gardner Parkway intersection
2. SR 155/ Walker Drive intersection
3. SR 155/ Greenwood Industrial Parkway intersection
4. SR 155/ Hunters Chase intersection
5. SR 155/ Stoney Brook Way/ Southside Court intersection
6. SR 155/ Farris Drive intersection
7. SR 155/ Interstate South Parkway intersection
8. SR 155/ Liberty Industrial Parkway intersection
9. SR 155/ I-75 Ramp intersections

Field site inspections were conducted at these locations to verify the conditions at these locations and improvements that might reduce the potential for crashes. The improvements considered were limited to those that could reasonably be implemented without extreme impacts to the environment, or the required right of way. The results of this exercise are documented in the following paragraphs.

SR 155/ Hampton-Locust Grove Road/ Bill Gardner Parkway intersection: There were about 135 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Hampton Locust Grove Road/ Bill Gardner Parkway intersection. The majority of these crashes were intersection-related crashes (angle and rear-end type crashes) and occurred before 2004. There was a sharp reduction in the number of crashes from year 2004 onwards. A subsequent investigation found that left/right turn lanes on Hampton Locust Grove Road/Bill Gardner Pkwy, left turn lanes on SR 155, and a traffic signal were added at this intersection around this time.

SR 155/ Walker Drive intersection: There were about 70 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Walker Drive intersection. The majority of these crashes appeared to be intersection-related crashes (angle and rear-end type crashes). Henry County DOT Project DTD212 was recently completed to provide a traffic signal, left and right turning lanes on Walker Drive, a right turning lane on SR 155 SB, and a left turn on SR 155 NB at this intersection. This is expected to reduce the potential for crashes in the future.

SR 155/ Greenwood Industrial Parkway intersection: There were about 45 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Greenwood Industrial Parkway intersection. The majority of these crashes were intersection-related crashes (angle and rear-end type crashes). Greenwood Industrial Parkway predominately serves heavy truck traffic which may also relate to the number of crashes involved at this intersection. Currently, there are left-turn and right-turn deceleration lanes present on SR 155 at this intersection.

SR 155/ Hunters Chase intersection: There were about 40 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Hunters Chase intersection. The majority of these crashes were found to be rear-end type crashes. It is possible that the addition of a left-turn lane on SR 155 at this intersection might reduce the potential for crashes at this intersection.

SR 155/ Stoney Brook Way/ Southside Court intersection: There were about 25 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Stoney Brook Way/ Southside Court intersection. The majority of these crashes were found to be rear-end and run-off-the-roadway type crashes. A recent field survey found that there is a crest vertical curve between Hunter's Chase and Stoney Brook Way on SR155, limiting sight distance at the Stoney Brook Way intersection. Changing the grade to improve the sight distance could offer some reduction for crash potential at this intersection.

SR 155/ Farris Drive intersection: There were about 25 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Farris Drive intersection. About half of these crashes were run-off-the-roadway type crashes and there were only a few reported accidents after the year 2003. A field survey found that the intersection was improved to add new turn lanes and new pavement markings. No other apparent geometric conditions were discovered at this intersection which would further reduce the potential for crashes.

SR 155/ Interstate South Parkway intersection: There were about 55 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Interstate South Parkway intersection. The majority of these crashes were found to be rear-end type crashes. A field survey found that the intersection was improved to add new turn lanes and new pavement markings. No apparent geometric conditions were observed at this intersection which would increase the potential for crashes. The aforementioned improvements are expected to reduce the number of crashes in the future.

SR 155/ Avalon Parkway/ Liberty Industrial Parkway intersection: There were about 205 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ Avalon Parkway/ Liberty Industrial Parkway intersection. The majority of these crashes were intersection-related crashes (angle and rear-end type crashes). An investigation found that turn lanes and a traffic signal were added at this intersection recently. No other apparent geometric conditions were discovered on a recent field survey which would cause crashes at this intersection. Hence the number of crashes at this intersection is expected to reduce in the future due to this improvement.

SR 155 from Liberty Industrial Parkway intersection to I-75 ramp intersections: There were more than 80 crashes (over the ten year period 2000 - 2009) found around this section of SR 155 between Liberty Industrial Parkway and the I-75 ramp intersections. The majority of these crashes were found to be angle and rear-end type crashes typical of roadways with frequent driveways. This section of SR 155 has numerous commercial driveways mostly without deceleration lanes. This lack of deceleration lanes would result in the conflict between the through traffic and the turning traffic along SR 155. The addition of deceleration lanes at driveways with significant traffic might reduce the potential for rear-end crashes. Georgia DOT Project CSSTP-M0030-0971 has recently reconfigured SR 155 from Liberty Industrial

Pkwy/Avalon Road to I-75 SB to have a continuous two-way left turn lane (see Concept Team Meeting minutes). The westbound right turn lanes between Liberty Industrial Pkwy and I-75 has been converted into a through lane while the right turn lane onto Avalon Road has been replaced. These improvements are anticipated to reduce the potential for turning movement conflict along this portion of SR 155 and thus reduce the number of crashes in the future.

SR 155/ I-75 ramp intersections: There were more than 185 crashes (over the ten year period 2000 - 2009) found near the vicinity of the SR 155/ I-75 ramp intersections. The majority of these crashes were found to be angle and rear-end type crashes. Typically, the predominate reason for this type of crashes is traffic congestion and consequently, the lack of gaps in the traffic stream for the turning movements. The intersection of SR 155 with the I-75 SB ramp has two acceptance lanes in the eastbound direction and the leftmost of these became a left turn lane at the SR 155/ I-75 NB ramp intersection. This lane was found not to be striped with a solid white line on the right, which would permit undesirable lane changes in this section of the roadway. Also, this intersection in the westbound direction formerly had two acceptance lanes which result in the right-turning traffic exiting from NB I-75 not yielding to the westbound traffic at this intersection and leading to an undesirable weaving movement here. Both these intersections are signalized with separate left-turn lanes and protected/permissive left-turn phasing. It was found during multiple field surveys that the left-turn lanes were blocked due to the queues in the through lanes and consequently, the protected part of the protected/permissive left-turn phase being under-utilized. The traffic congestion observed during the peak hours reduces the presence of adequate gaps in the through traffic stream for the left-turning vehicles during the permissive part of the left-turn phase. Georgia DOT Project CSSTP-M0030-0971 has recently placed striping and raised pavement markers in the right turn lane on SR 155 westbound to separate the traffic movements entering I-75 SB and exiting I-75 NB (see Concept Team Meeting minutes). This project has also recently restriped the SR 155 eastbound left turn lane onto I-75 NB to have a solid white line and left turn arrows. These improvements are anticipated to reduce the potential for turning movement conflict along this portion of SR 155 and thus reduce the number of crashes in the future.

Operational Analysis

A.M. and P.M. peak hour turning movement counts and 24-hour bi-directional counts were obtained at the major study area intersections and roadways by All Traffic Data, Inc. on September 10th, 2008. These "short-term" traffic counts were adjusted using day of the week, month of the year and axle adjustment factors (obtained from GDOT) to develop annual average daily traffic (AADT) volumes. For the purposes on the operational analysis, the opening year for this project was assumed to be 2015 and the design year to be 2035. The 2015 "Opening Year" and the 2035 "Design Year" AADT for the roadways where improvements are proposed are presented in Table 3.

Table 3. 2015 "Opening Year" and 2035 "Design Year" AADT

Roadway Segment	2015 "Opening Year" AADT	2035 "Design Year" AADT
SR 155	20,300	27,200
I-75/SR 401 SB Exit Ramp	13,400	18,025
I-75/SR 401 SB Entrance Ramp	2,700	3,625
I-75/SR 401 NB Exit Ramp	2,700	3,625
I-75/SR 401 NB Entrance Ramp	13,400	18,025
Hampton-Locust Grove Road/ Bill Gardner Parkway	10,450	14,050
Avalon Parkway/Liberty Industrial Boulevard – West of SR 155	4,800	6,450
Avalon Parkway/Liberty Industrial Boulevard – East of SR 155	4,350	5,850
Stoney Brook Way – West of SR 155	1,350	1,800
Southside Court – East of SR 155	100	100
Hunters Chase – West of SR 155	2,000	2,700
Greenwood Industrial Parkway – East of SR 155	750	1,000

The existing AM and PM peak hour turning movement volumes, existing AADT volumes, the design year AM and PM peak hour turning movement volumes and the opening year and design year AADT volumes are provided as an attachment (See attachment 6) with this report.

Capacity Analysis and Intersection Levels of Service

Capacity analysis was conducted at the intersections where the improvements are proposed, to determine the operational characteristics based on the existing and future conditions. The capacity analysis was undertaken using the methodologies outlined in the Highway Capacity manual (HCM) and the Synchro 7.0 software program. There are six levels of service (LOS) in the HCM by which the operational performance of an intersection may be described. These levels of service range between LOS "A", which indicates a free-flowing condition, and LOS "F", which indicates a forced/breakdown flow condition.

The HCM determines a LOS for the entire intersection if it's signalized. A LOS for all the minor movements at an unsignalized two-way-stop-controlled (TWSC) intersection is determined by computing their respective control delays. The LOS for the worst approach is reported here although the HCM computes LOS for all movements. The results of the capacity analysis are summarized in Table 4.

Table 4. 2015 "Opening Year" and 2035 "Design Year" Levels of Service

Intersection	Traffic Control	Level of Service (AM/PM)		
		2008	2015	2035
SR 155/ Hampton-Locust Grove Road/ Bill Gardner Parkway	Traffic Signal	E/D	D/C	F/F
SR 155/Greenwood Industrial Parkway	Two-Way Stop Control	D/D	F/F	F/F
SR 155/ Hunters Chase	Two-Way Stop Control	F/F	F/F	F/F
SR 155/ Stoney Brook Way/ Southside Court	Two-Way Stop Control	F/F	F/F	F/F
SR 155/ Avalon Parkway/Liberty Industrial Boulevard	Traffic Signal	B/B	B/B	F/F
SR 155/ I-75 SB Ramps	Traffic Signal	C/C	D/F	F/F
SR 155/ I-75 NB Ramps	Traffic Signal	B/B	C/C	F/F

Note: Level of service for signalized intersections is for the entire intersection; for unsignalized intersections the level of service provided is for the worst approach.

Right turn lanes were investigated at the Bill Gardner Pkwy/Hampton-Locust Grove Road intersection based on input from GDOT District 3 Traffic Operations. It was subsequently determined that right turn lanes on both directions at this intersection on SR 155 are justified to improve the operating efficiency and reduce the potential for rear end crashes.

Project Description:
The proposed project begins on SR 155 (MP 1.82) just south of the Bill Gardner Pkwy/Hampton-Locust Grove Road intersection and ends at the intersection with the I-75/ SR 401 interchange northbound ramp (MP 5.75) which is also the city limits of McDonough. The project has a total project length of 3.93 miles which is all within Henry County.

The project improvements satisfy the purpose by proposing to reduce the crash frequency and severity at select locations on the SR 155 corridor. The proposed multipoint improvements are as follows:

- Right turn lanes are proposed in both directions on SR 155 at the Bill Gardner Pkwy/Hampton-Locust Grove Road intersection in order to separate right turning movements from the mainline. The addition of right turn lanes will reduce the potential for rear end crashes and will improve the operating efficiency of this signalized intersection. Additional right-of-way will be acquired to facilitate the proposed addition of the northbound right turn lane from SR155 onto Bill Gardner Parkway.
- A center two-way left turn lane is proposed from the existing southbound left turn lane at Greenwood Industrial Pkwy to the Hunter's Chase intersection, where it will become a northbound left turn deceleration lane to provide refuge for left-turning motorists.
- The crest vertical curve between Hunter's Chase and Stoney Brook Way on SR 155 will be flattened to comply with AASHTO stopping sight distance guidelines for northbound motorists on SR 155. Associated shoulder improvements at this location will also allow

the intersection sight distance for left turning motorists onto SR 155 southbound at the Southside Court intersection to be in compliance with AASHTO guidelines.

Is the project located in a PM 2.5 Non-attainment area? __X__Yes ____No
(The proposed project is exempt from conformity due to the potential reduction of crash frequency and severity.)

Is the project located in an Ozone Non-attainment area? __X__Yes ____No
(The proposed project is exempt from conformity due to the potential reduction of crash frequency and severity.)

PDP Classification: Major_____ Minor __X___

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

Functional Classification: Rural Minor Arterial

U. S. Route Number(s): None **State Route Number(s):** SR 155

Traffic (AADT):
Base Year: (2015): 20,300 Design Year: (2035): 27,200

Existing design features:
- Typical Section: Rural section with two 12 ft wide travel lanes and +/- 2 ft wide paved shoulders.
- Posted speed: 55 mph Minimum radius for curve: 1,250 ft
- Maximum super-elevation rate for curve: 5.9%
- Maximum grade Mainline: 4.3%
- Width of right-of-way: varies from 60-100 ft.
- Major structures: None
- Major interchanges or intersections along the project: SR 155 at Hampton-Locust Grove Road/Bill Gardner Parkway; SR 155 at I-75/SR 401
- The existing roadway is entirely within Henry County. The project begins at MP 1.82 and ends at MP 5.75 on the existing alignment for a length of 3.93 miles .

Proposed Design Features:
- Proposed typical section(s): At Hampton Locust Grove Road/Bill Gardner Pkwy – 12 ft right turn lanes and 10 ft shoulders (6.5 ft paved and 3.5 ft grass).
  From Hunter's Chase to Stoney Brook Way – (2) 12 ft lanes with a 12 ft left turn lane and 10 ft shoulders (6.5 ft paved and 3.5 ft grass).
- Proposed Design Speed: 55 mph
- Proposed Maximum grade Mainline: 4.3%
- Maximum grade allowable: 5.0%
- Proposed Maximum grade driveways: 10.0% commercial / 17.0% residential
- Proposed Minimum radius of curve: 1,250 ft
- Minimum radius allowable: 1,060 ft

- Maximum allowable superelevation rate: 6.0%
- Proposed maximum superelevation rate: 5.9%
- Right-of-Way:
  - Width: Approximately 130 ft with a miter will be required at the intersection SR155 and Bill Gardner Parkway
  - Easements: Temporary (X) Permanent (X) Utility ( ) Other ( )
  - Type of access control: Full ( ) Partial ( ) By Permit (X) Other ( )
  - Number of parcels: 4 Number of displacements: None
- Structures: None
- Major intersections, interchanges, median openings and signal locations: None.
- Transportation Management Plan Anticipated: Yes ( ) No (X)

- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	( )	( )	(X)
LANE WIDTH:	( )	( )	(X)
SHOULDER WIDTH:	( )	( )	(X)
VERTICAL GRADES:	( )	( )	(X)
CROSS SLOPES:	( )	( )	(X)
STOPPING SIGHT DISTANCE:	( )	( )	(X)
SUPERELEVATION RATES:	( )	( )	(X)
VERTICAL ALIGNMENT:	( )	( )	(X)
SPEED DESIGN:	( )	( )	(X)
VERTICAL CLEARANCE:	( )	( )	(X)
BRIDGE WIDTH:	( )	( )	(X)
BRIDGE STRUCTURAL CAPACITY:	( )	( )	(X)
LATERAL OFFSET TO OBSTRUCTION:	( )	( )	(X)

- Design Variances: None anticipated
- Environmental concerns: historic resources, waters of the US and USTs
- Anticipated Level of environmental analysis:
  - o Are Time Savings Procedures appropriate? Yes (X), No ( ),
  - o Categorical Exclusion anticipated (X),
  - o Environmental Assessment/Finding of No Significant Impact (FONSI) ( ), or
  - o Environmental Impact Statement (EIS) ( ).
- Utility involvements:
  - *Cable*
  - *Electrical*
  - *Water*
  - *Sewer*
  - *Gas*
  - *Signal*
  - *Telephone*
- VE Study Anticipated: Yes ( ) No (X)
- Benefit/Cost Ratio 5.25

Project Cost Estimate and Funding Responsibilities:

	PE	ROW	UTILITY	CST	MITIGATION
By Whom	GDOT	GDOT	GDOT	GDOT	N/A
$ Amount	$365,000	$117,000	**$ 502 ,803**	$1,475,835	$0

CST Cost includes: Construction, Engineering and Inspection, Fuel Cost Adjustment, and Asphalt Cement Cost Adjustment.

Project Activities Responsibilities:

- Design –GDOT / Consultant
- Right-of-Way Acquisition – GDOT
- Right-of-Way funding (real property) - GDOT
- Relocation of Utilities - GDOT
- Letting to contract - GDOT
- Supervision of construction – GDOT
- Providing material pits – GDOT/Contractor
- Providing detours – N/A
- Environmental Studies/Documents/Permits – GDOT / Consultant
- Environmental Mitigation – GDOT

Coordination

- Concept meeting date and brief summary. *See attachments*
- Other projects in the area.
    - Georgia DOT Project CSSTP-M0030-0971 consists of resurfacing and maintenance to SR 155 from the Spalding County line to the City of McDonough. It is presently under construction.
    - Georgia DOT Project STP00-0754-00(009) consists of constructing a passing lane and intersection improvements to SR 155 from the City of Griffin to the Henry County line. It is presently under construction.
    - Georgia DOT Project BRS00-0754-00(010) consists of replacing the bridge the Towaliga River on SR 155 in Spalding County. It is presently under construction.
    - Georgia DOT Project CSSTP-00007-00(870) proposes to widen SR 155 from the City of Griffin to the Henry County line. It is presently in long range planning.
    - Georgia DOT Project CSSTP-00007-00(856) proposes to widen SR 155 from the I-75/SR 401 interchange to the City of McDonough. It is presently in long range planning.
- Railroads: A route of the Norfolk Southern Railway parallels the project's east side just south of and through the I-75/ SR 401 interchange. However, none of the project's select location improvements coincide or are adjacent to the railroad right of way, so railroad coordination will not be needed.

Other alternates considered:

- None

Comments: *None*

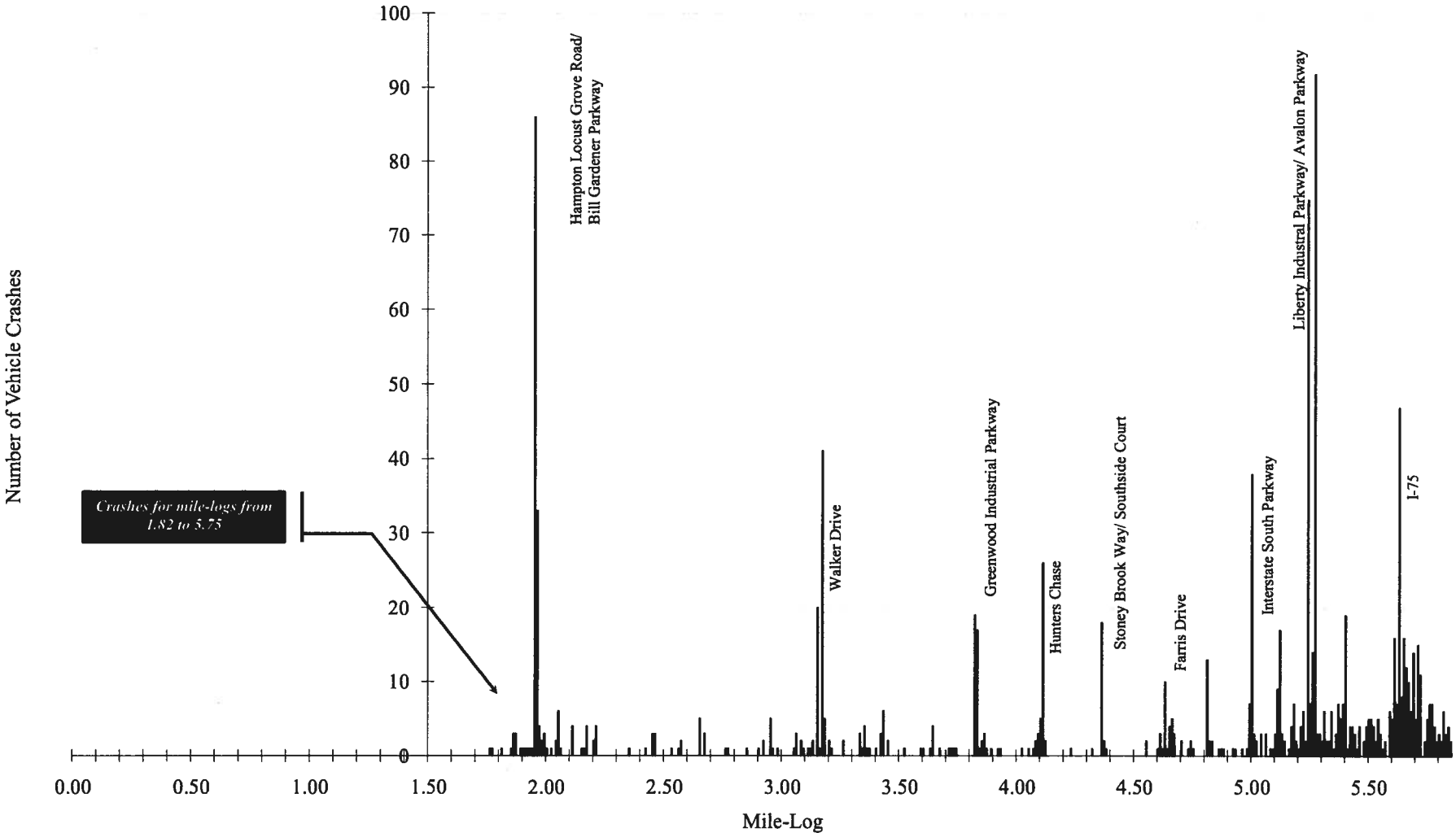
Attachments:

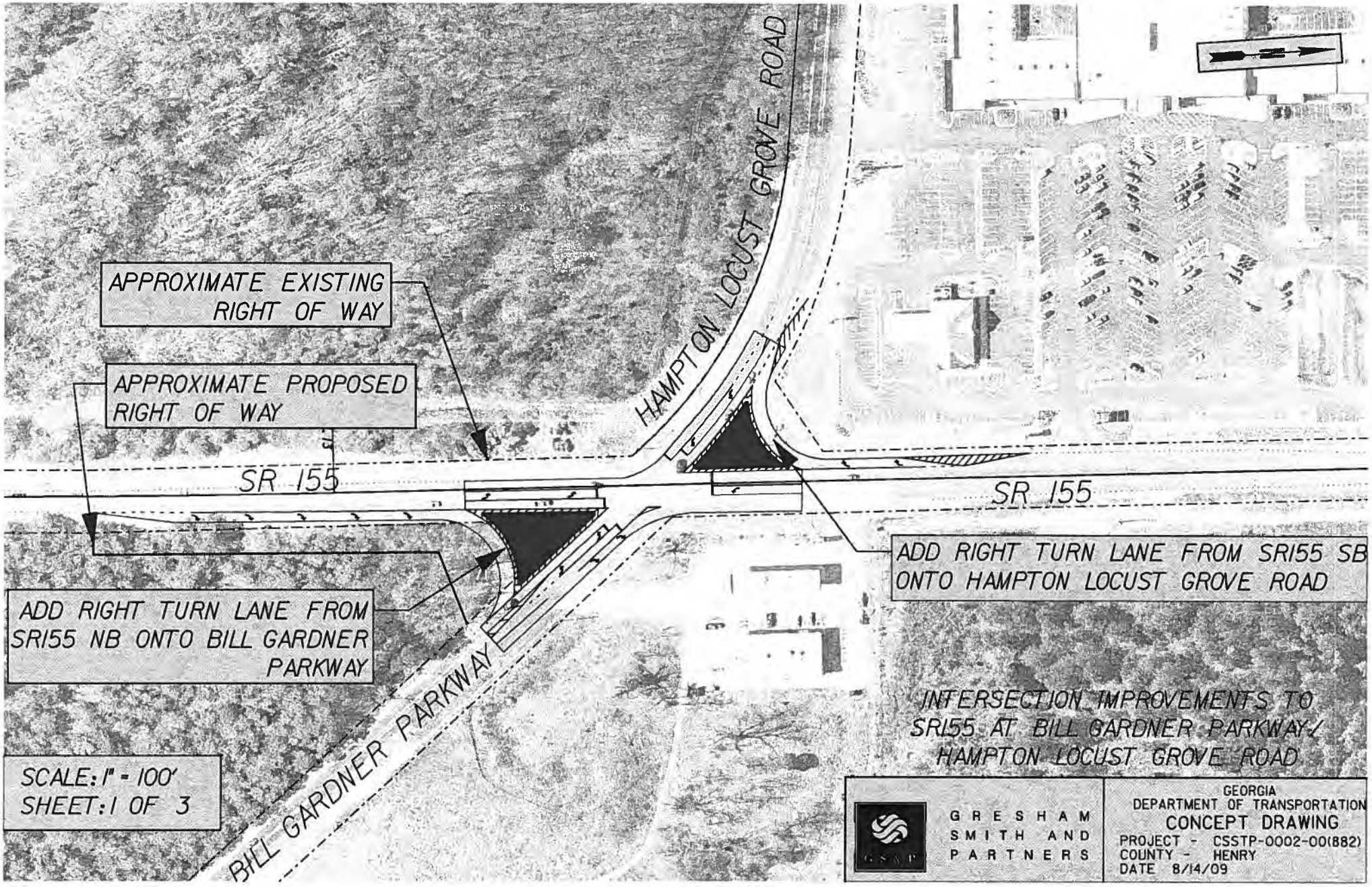
1. Detailed Cost Estimates:
    a. Construction including, Engineering and Inspection.
    b. Completed Fuel/Asphalt price adjustment form.
    c. Right of Way.
    d. Utilities.
2. Concept Layout plan of Improvements.
3. Typical sections.
4. Accident summary.
5. Traffic Diagrams.
6. Capacity analysis summary.
7. Minutes of Concept Team Meeting.

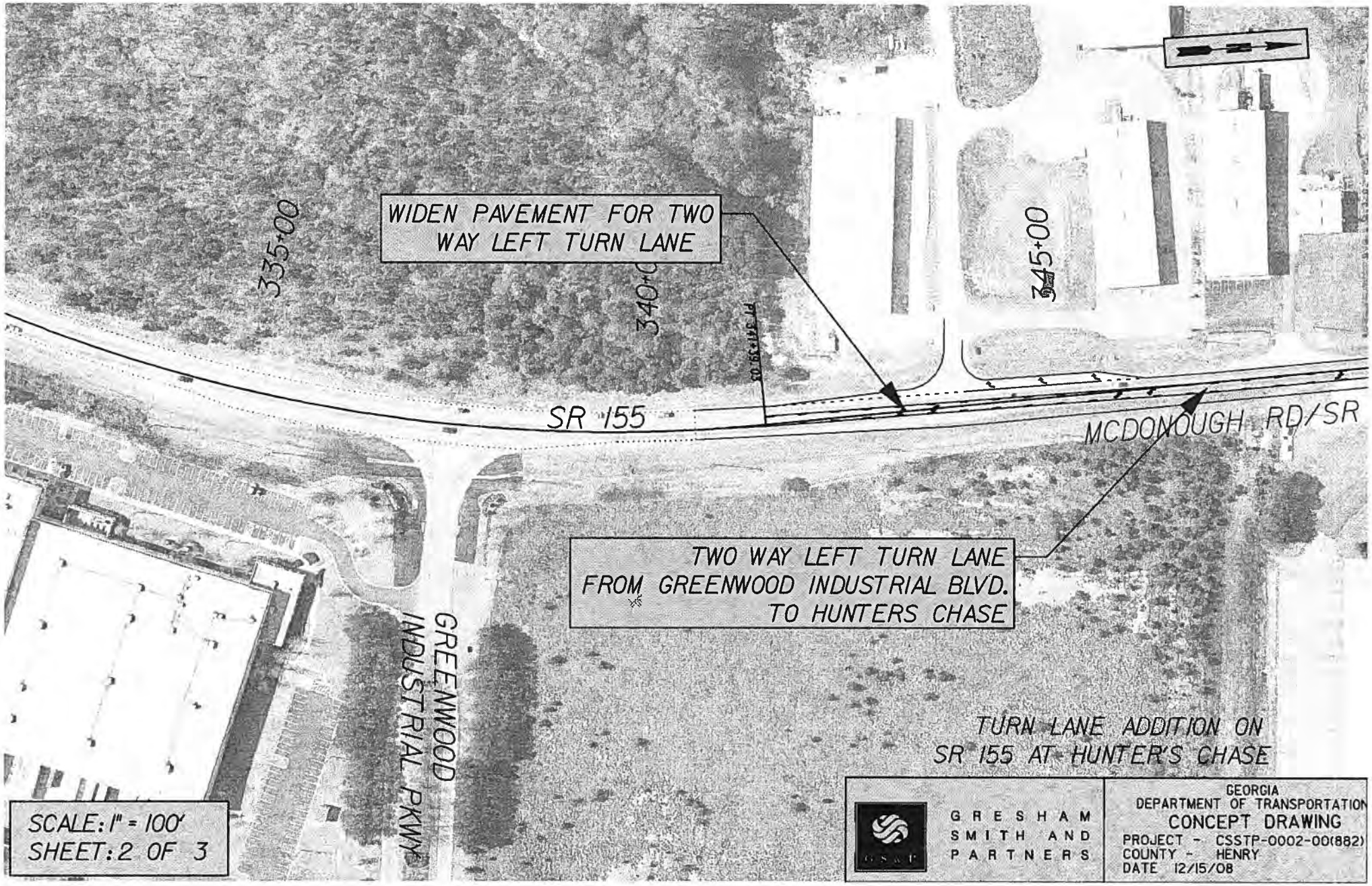
Concur: _____
Director of Engineering

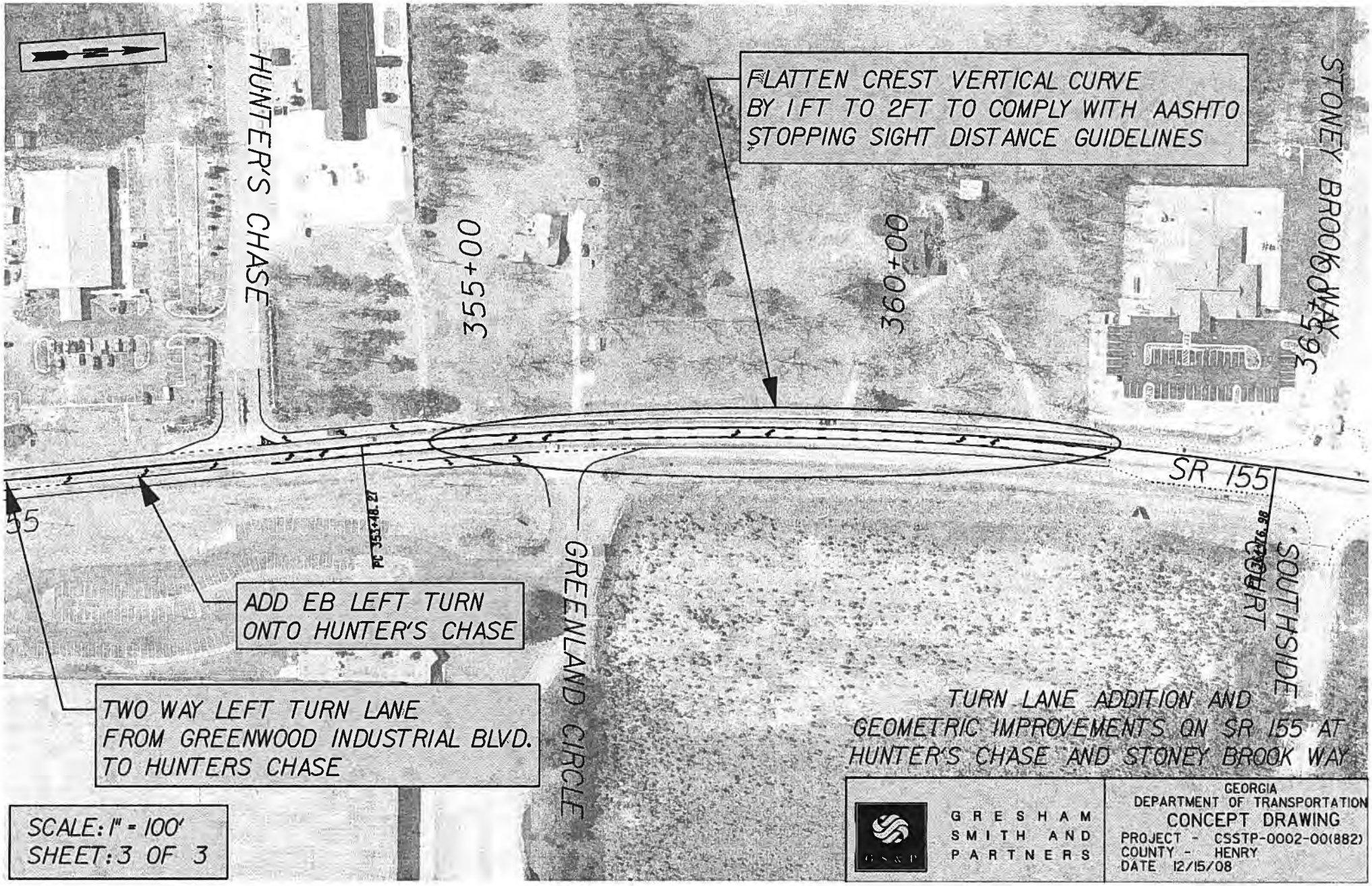
Approve: _____ Date: 2-17-12
Chief Engineer

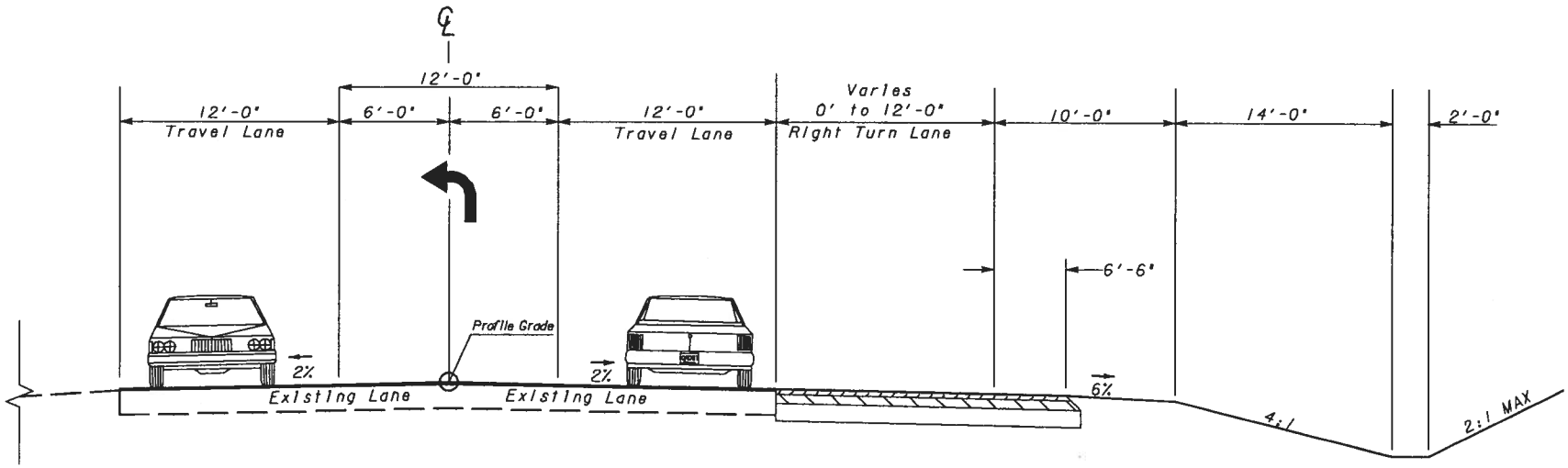
Vehicle Crashes Along SR 155 in Henry County - Years 2000 through 2009




APPROXIMATE EXISTING RIGHT OF WAY
APPROXIMATE PROPOSED RIGHT OF WAY
HAMPTON LOCUST GROVE ROAD
SR 155
SR 155
ADD RIGHT TURN LANE FROM SR155 SB ONTO HAMPTON LOCUST GROVE ROAD
ADD RIGHT TURN LANE FROM SR155 NB ONTO BILL GARDNER PARKWAY
BILL GARDNER PARKWAY
INTERSECTION IMPROVEMENTS TO SR155 AT BILL GARDNER PARKWAY/ HAMPTON LOCUST GROVE ROAD
SCALE: 1" = 100'
SHEET: 1 OF 3
GRESHAM SMITH AND PARTNERS
GEORGIA DEPARTMENT OF TRANSPORTATION
CONCEPT DRAWING
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE 8/14/09


WIDEN PAVEMENT FOR TWO WAY LEFT TURN LANE
335+00
340+00
345+00
SR 155
MCDONOUGH RD/SR
TWO WAY LEFT TURN LANE FROM GREENWOOD INDUSTRIAL BLVD. TO HUNTERS CHASE
GREENWOOD INDUSTRIAL PKWY
TURN LANE ADDITION ON SR 155 AT HUNTER'S CHASE
SCALE: 1" = 100'
SHEET: 2 OF 3
GRESHAM SMITH AND PARTNERS
GEORGIA DEPARTMENT OF TRANSPORTATION
CONCEPT DRAWING
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE 12/15/08


FLATTEN CREST VERTICAL CURVE
BY 1 FT TO 2FT TO COMPLY WITH AASHTO
STOPPING SIGHT DISTANCE GUIDELINES
HUNTER'S CHASE
355+00
360+00
STONEY BROOK WAY
SR 155
SOUTHSIDE
GREENLAND CIRCLE
ADD EB LEFT TURN
ONTO HUNTER'S CHASE
TWO WAY LEFT TURN LANE
FROM GREENWOOD INDUSTRIAL BLVD.
TO HUNTERS CHASE
TURN LANE ADDITION AND
GEOMETRIC IMPROVEMENTS ON SR 155 AT
HUNTER'S CHASE AND STONEY BROOK WAY
SCALE: 1" = 100'
SHEET: 3 OF 3
GRESHAM
SMITH AND
PARTNERS
GEORGIA
DEPARTMENT OF TRANSPORTATION
CONCEPT DRAWING
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE 12/15/08

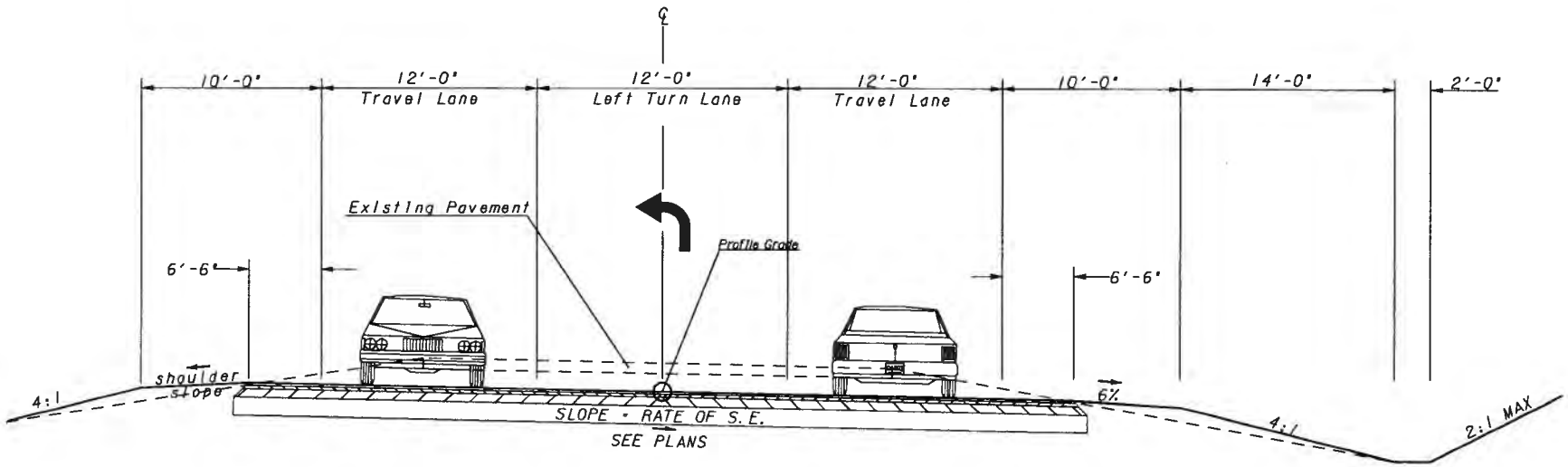


SR 155/McDONOUGH RD
TYPICAL SECTION
RIGHT TURN LANE ADDITION
AT BILL GARDNER PKWY/
HAMPTON-LOCUST GROVE ROAD

NOTE: TYPICAL DEPICTS
SR 155 SOUTH OF INTERSECTION.
FLIP THE TYPICAL ABOUT THE
CENTERLINE TO REFLECT SR 155
NORTH OF THE INTERSECTION

GRESHAM
SMITH AND
PARTNERS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TYPICAL SECTION
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE 12/15/08



SR 155/McDONOUGH RD
TYPICAL SECTION
LEFT TURN LANE ADDITION
FROM HUNTER'S CHASE TO STONEY BROOK WAY

GRESHAM SMITH AND PARTNERS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TYPICAL SECTION
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE 12/15/08

Processed Date: 1/19/12

DETAILED COST ESTIMATE

Georgia Department of Transportation

Job: 0002882

JOB NUMBER: *0002882* **FED/STATE PROJECT NUMBER** *CSSTP-0002-00(882)*

SPEC YEAR: *01*

DESCRIPTION: *SR 155 HENRY COUNTY*

ITEMS FOR JOB 0002882

1 - ROADWAY

line Numbe	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0005	150-1000	1.000	LS	$50,000.00	TRAFFIC CONTROL - CSSTP-0002-00(882)	$50,000.00
					SUBTOTAL FOR ROADWAY:	**$50,000.00**

line Numbe	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0010	150-5010	2.000	EA	$6,579.66	TRAF CTRL,PORTABLE IMPACT ATTN	$13,159.32
0097	163-0232	1.000	AC	$131.33	TEMPORARY GRASSING	$131.33
0080	163-0240	50.000	TN	$208.92	MULCH	$10,445.94
0102	163-0300	4.000	EA	$1,087.38	CONSTRUCTION EXIT	$4,349.50
0112	165-0010	1155.000	LF	$0.62	MAINT OF TEMP SILT FENCE, TP A	$710.73
0212	165-0030	4950.000	LF	$0.61	MAINT OF TEMP SILT FENCE, TP C	$2,997.18
0117	165-0101	4.000	EA	$431.16	MAINT OF CONST EXIT	$1,724.63
0127	171-0010	2310.000	LF	$1.71	TEMPORARY SILT FENCE, TYPE A	$3,938.57
0207	171-0030	9900.000	LF	$2.65	TEMPORARY SILT FENCE, TYPE C	$26,232.13
0015	210-0100	1.000	LS	$100,000.00	GRADING COMPLETE - CSSTP-0002-00(882)	$100,000.00
0020	310-1101	12400.000	TN	$15.27	GR AGGR BASE CRS, INCL MATL	$189,297.90
0025	402-1812	50.000	TN	$77.05	RECYL AC LEVELING,INC BM&HL	$3,852.38
0030	402-3121	8200.000	TN	$56.28	RECYL AC 25MM SP,GP1/2,BM&HL	$461,530.52
0035	402-3130	1400.000	TN	$67.43	RECYL AC 12.5MM SP,GP2,BM&HL	$94,396.78
0040	402-3190	2100.000	TN	$65.51	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	$137,562.85
0045	413-1000	2900.000	GL	$2.60	BITUM TACK COAT	$7,526.28
0055	441-0740	1085.000	SY	$23.77	CONC MEDIAN, 4 IN	$25,792.08
0060	441-6022	200.000	LF	$15.47	CONC CURB & GUTTER, 6"X30"TP2	$3,093.21
0197	550-1180	100.000	LF	$32.90	STM DR PIPE 18",H 1-10	$3,289.57
0065	550-2180	75.000	LF	$28.87	SIDE DR PIPE 18",H 1-10	$2,165.40
0070	550-3418	6.000	EA	$453.17	SAFETY END SECTION 18",SD,4:1	$2,719.02
0075	620-0100	2000.000	LF	$21.53	TEMP BARRIER, METHOD NO. 1	$43,054.06
0132	636-1020	212.000	SF	$13.23	HWY SGN,TP1MAT,REFL SH TP3	$2,803.86
0137	636-2080	345.000	LF	$9.02	GALV STEEL POSTS, TP 8	$3,110.61
0142	653-0120	41.000	EA	$66.74	THERM PVMT MARK, ARROW, TP 2	$2,736.34
0152	653-1501	8600.000	LF	$0.34	THERMO SOLID TRAF ST 5 IN, WHI	$2,943.87
0157	653-1502	4300.000	LF	$0.35	THERMO SOLID TRAF ST, 5 IN YEL	$1,491.84
0162	653-1704	320.000	LF	$3.54	THERM SOLID TRAF STRIPE,24",WH	$1,131.22
0167	653-3501	1300.000	GLF	$0.23	THERMO SKIP TRAF ST, 5 IN, WHI	$293.67
0172	653-3502	3800.000	GLF	$0.17	THERMO SKIP TRAF ST, 5 IN, YEL	$662.45
0177	653-6004	505.000	SY	$2.92	THERM TRAF STRIPING, WHITE	$1,473.23
0182	653-6006	61.000	SY	$3.30	THERM TRAF STRIPING, YELLOW	$201.51
0187	654-1001	17.000	EA	$4.34	RAISED PVMT MARKERS TP 1	$73.74
0192	654-1003	52.000	EA	$3.46	RAISED PVMT MARKERS TP 3	$179.66
0202	668-1100	2.000	EA	$2,002.73	CATCH BASIN, GP 1	$4,005.46
0081	700-6910	1.000	AC	$495.27	PERMANENT GRASSING	$495.27
					SUBTOTAL FOR :	**$1,159,572.11**

TOTALS FOR JOB 0002882

ITEMS COST:	$1,209,572.11
COST GROUP COST:	$0.00
ESTIMATED COST:	$1,209,572.11
CONTINGENCY PERCENT:	0.00
ENGINEERING AND INSPECTION:	0.05
ESTIMATED COST WITH CONTINGENCY AND E&I:	$1,270,050.72

File Location: Div of Preconstruction > CES

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Preliminary Right of Way Cost Estimate

Phil Copeland
Right of Way Administrator
By: LaShone B. Alexander

Date: May 12, 2011
Project: CSSTP-0002-00(882) Henry County **P.I. Number:** 0002882
Existing/Required R/W: Varies/Varies **No. Parcels:**
Project Termini : SR 155@ CR 134 Spalding to E of I-75/Henry County
Project Description: SR 155@ CR 134 Spalding to E of I-75/ Henry County

Land:

Req RW.: 0.6 acres @ $50,000		$ 30,000

Improvements : landscaping,
misc. site improvements $ 17,000

Relocation: Residential (0)	$		
Commercial (0)	$	$	
Damage : Proximity (0)		$	
Cost to Cure (0)		$	
		$	0,000
		$	47,000
	Net Cost	$	47,000

Net Cost		$ 47,000
Scheduling Contingency	55 %	25,850
Adm/Court Cost	60 %	43,710
		$ 116,560

Total Cost $117,000

Note: The Market Appreciation (40%) is not included in the updated Preliminary Cost Estimate.

PROJ. NO.	CSSTP-0002-00(882)	CALL NO.
P.I. NO.	0002882	
DATE	8/25/2011	

INDEX (TYPE)	**DATE**	**INDEX**
REG. UNLEADED	Aug-11	$ 3.714
DIESEL		$ 3.959
LIQUID AC		$ 580.00

Link to Fuel and AC Index:
http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)				**204450**	**$**	**204,450.00**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	928.00		
Monthly Asphalt Cement Price month project let (APL)			$	580.00		
Total Monthly Tonnage of asphalt cement (TMT)				587.5		

ASPHALT	**Tons**	**%AC**	**AC ton**
Leveling	50	5.0%	2.5
12.5 OGFC		5.0%	0
12.5 mm	1400	5.0%	70
9.5 mm SP		5.0%	0
25 mm SP	8200	5.0%	410
19 mm SP	2100	5.0%	105
	11750		**587.5**

BITUMINOUS TACK COAT

Price Adjustment (PA)			**$**	**4,334.62**	**$**	**4,334.62**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	928.00		
Monthly Asphalt Cement Price month project let (APL)			$	580.00		
Total Monthly Tonnage of asphalt cement (TMT)				12.45579267		

Bitum Tack Gals	gals/ton	tons
2900	232.8234	12.4557927

PROJ. NO.	CSSTP-0002-00(882)		CALL NO.
P.I. NO.	0002882		
DATE	8/25/2011		

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)				**0**	**$ -**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	928.00	
Monthly Asphalt Cement Price month project let (APL)			$	580.00	
Total Monthly Tonnage of asphalt cement (TMT)				0	

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0
					0

TOTAL LIQUID AC ADJUSTMENT	**$**	**208,784.62**

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE **CSSTP-0002-00(882), Henry County, P.I. # 0002882**
SR-155 from Spalding Co Line to East of I-75/Henry

OFFICE Thomaston

DATE November 17, 2011

FROM Kerry Gore, District Utilities Engineer

TO Charity Belford, Project Manager

SUBJECT **PRELIMINARY UTILITY COST (ESTIMATE) - REVISED**

As requested by your office, we are furnishing you with a Preliminary Utility Cost estimate for each utility with facilities potentially located within the project limits.

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
Atlanta Gas Light	319,700	0
BellSouth d/b/a AT&T Georgia	225,000	0
Central Georgia EMC	0	12,063
Charter Communications	12,690	0
Georgia Power (Distribution)	0	90,000
Henry County Water & Sewer	0	400,740
TOTALS	**$557,390**	**$502,803**

Total Preliminary Utility Cost Estimate **$1,060,193**.

If you have any questions, please contact Harland Smith at 706-646-6696.

KG/pls

cc: Jeff Baker, P.E., State Utilities Engineer *(via: e-mail)*
Angela Robinson, Office of Financial Management *(via: e-mail)*
Michael Williams, Area Engineer *(via: e-mail)*

GDOT responded that additional raised pavement markings should be placed at the SR 155 intersection with Greenwood Industrial Parkway should be considered instead of lighting in order to reduce costs. Further, the existing SR 155 southbound left turn lane should be extended back to the proposed northbound left turn lane at Hunter's Chase forming a two way left turn lane in between. GDOT also advised that intersection sight distance be investigated on the crest vertical curve on SR 155 between Hunter's Chase and Stoney Brook Way.

GDOT also recommended that a right turn lane from SR 155 northbound to Bill Gardner Parkway be investigated. This intersection formerly had several crashes, but the number significantly decreased upon the installation of a traffic signal.

GDOT stated that the proposed raised concrete island on SR 155 between the intersections with I-75 SB ramps and I-75 NB ramps would be susceptible to truck damage. As an alternative, hatching and GDOT Type 10 'tortoise' raised pavement markers should be used for the island.

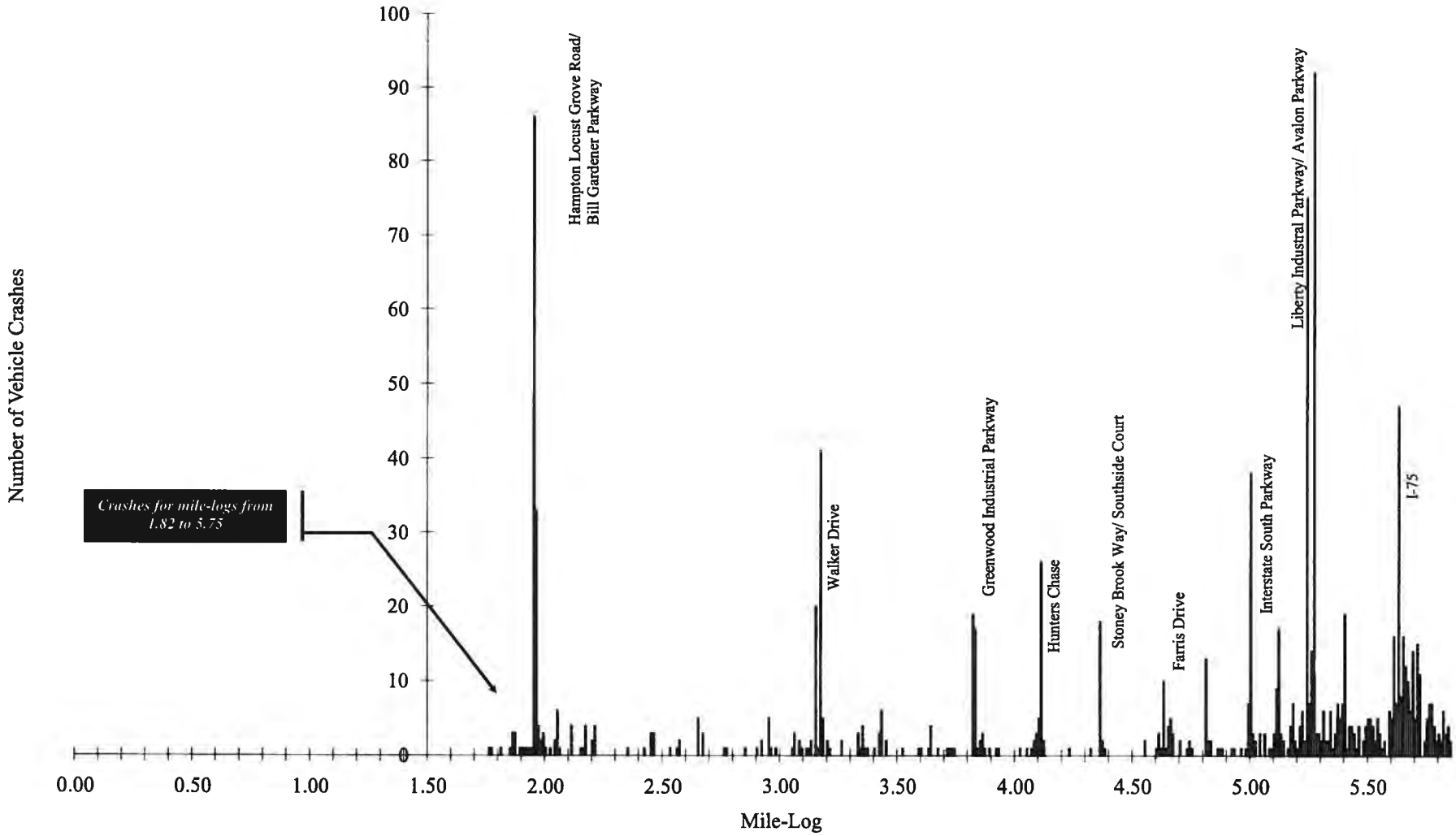
Lastly, GDOT noted that a maintenance pavement resurfacing project along this portion of SR 155 was to be let for construction in early May. Because of the recommendations in the draft concept report, GDOT will modify this project contract so that the resurfacing contractor will add the separation island between the I-75 SB ramps and I-75 NB ramps as well as reconfigure the striping along SR 155 from Liberty Industrial Pkwy/Avalon Pkwy to the I-75 NB ramps. GDOT then requested that GS&P prepare striping details in the above locations to be used as part of the resurfacing project.

This represents our understanding of the items discussed at this meeting. If you have any questions or comments concerning any of the information contained herein, please contact me.

Prepared by: Eric Rickert, PE
Project Engineer

Copy File, Attendees

Vehicle Crashes Along SR 155 in Henry County - Years 2000 through 2009



Department of Transportation
State of Georgia

INTERDEPARTMENT CORRESPONDENCE

FILE CSSTP-0002-00(882), Henry County
P.I. # 0002882

OFFICE Planning

DATE August 30, 2011

FROM Cindy L. Van Dyke, State Transportation Planning Administrator

TO Bobby K. Hilliard, P.E., State Program Delivery Engineer
Attention: Charity Belford

SUBJECT **Reviewed** Updated Design Traffic for SR 155 FROM SPALDING COUNTY LINE TO E OF I-75/HENRY.

As per your request, we reviewed the consultant's Design Traffic for the above project.

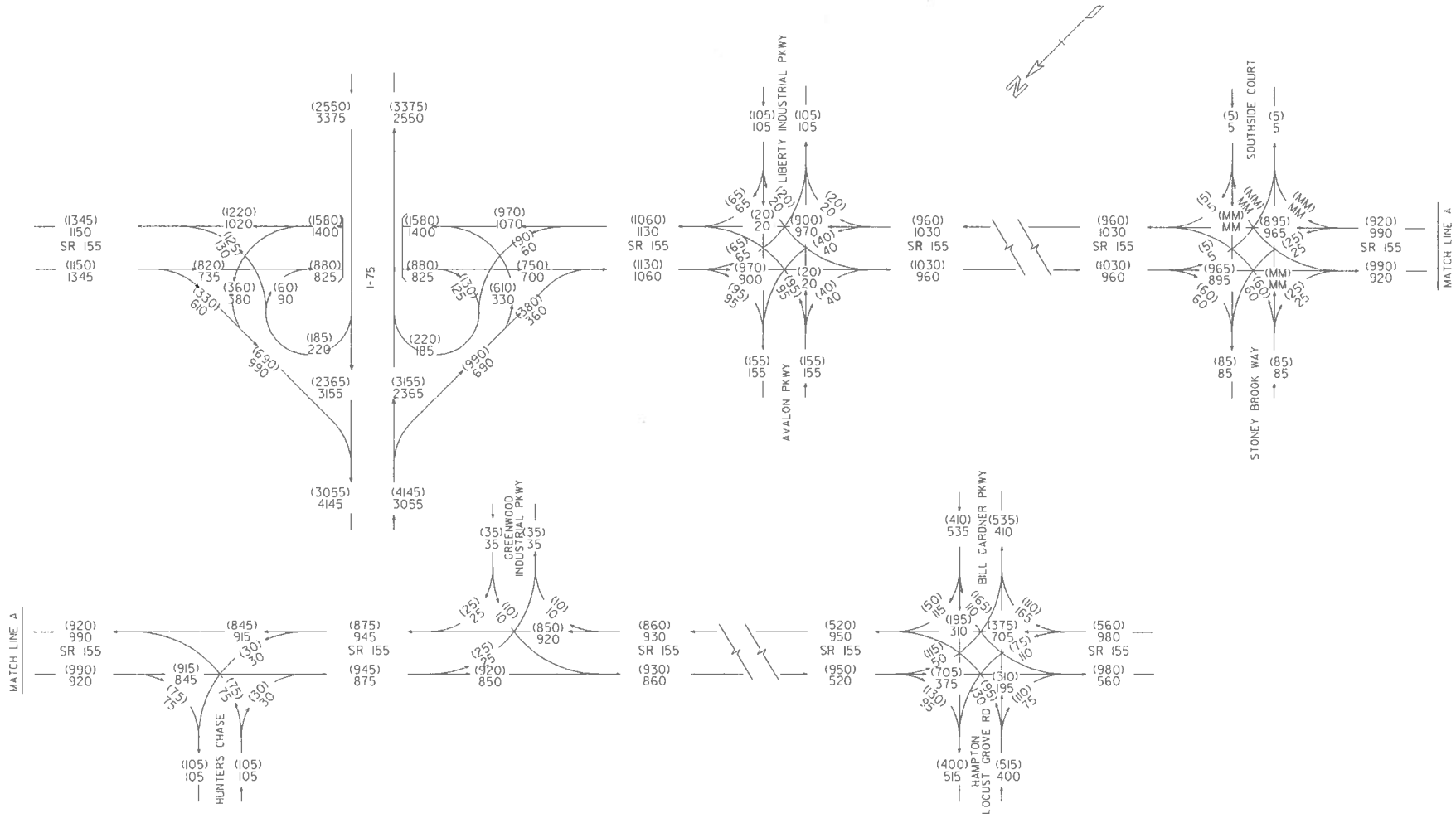
The Updated Design Traffic is approved based on the information furnished. If you have any questions concerning this information please contact Abby Ebodaghe at (404) 631-1923.

CLV/AFE

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2008 "EXISTING YEAR" A.M. AND P.M. PK HR TRAFFIC VOLUMES

LEGEND

2008 PM DHV = (000)
2008 AM DHV = 000
T = 12%
S.U. = 6%, COMB. = 6%

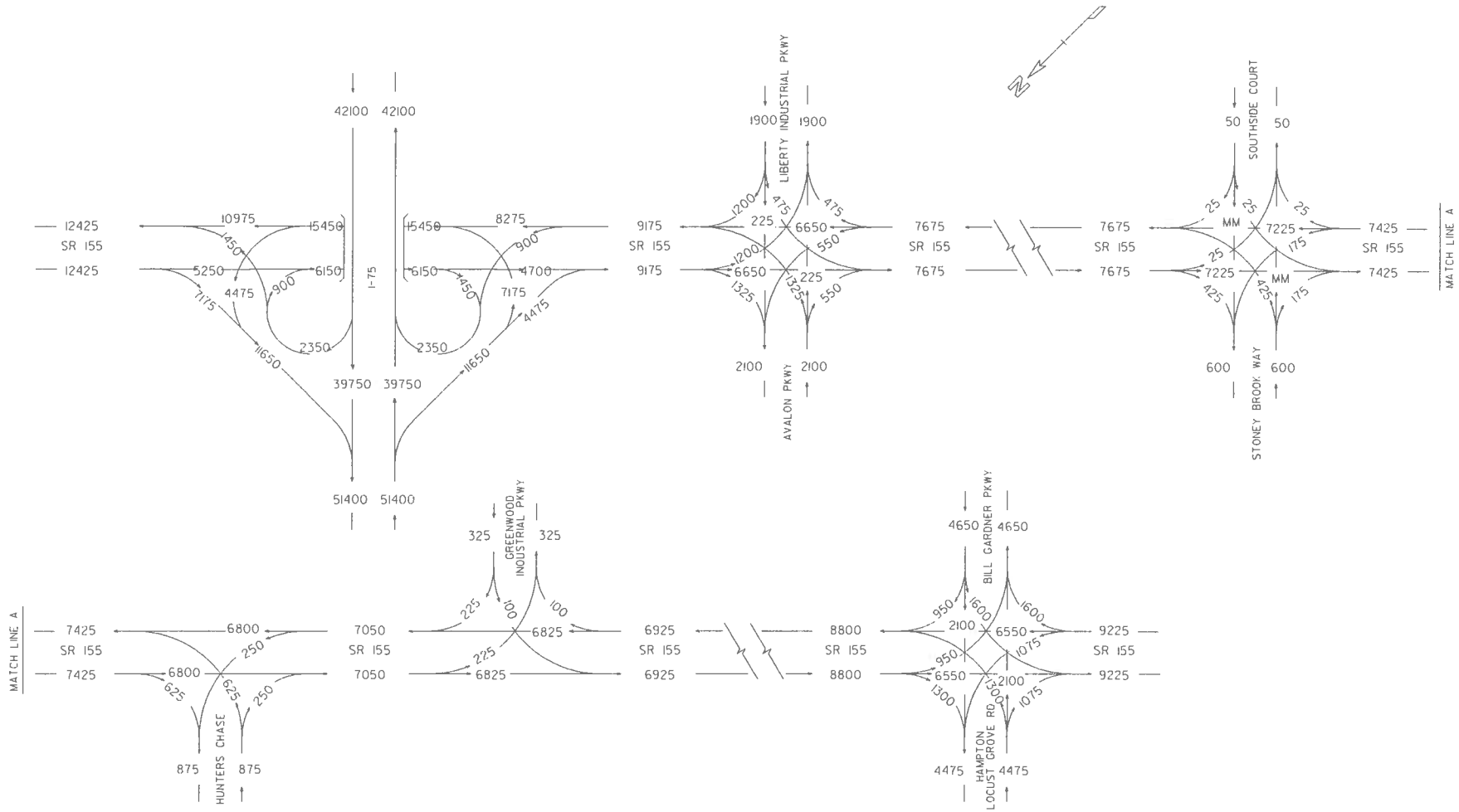
DATE	REVISIONS	DATE	REVISIONS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIAGRAM
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011 NMG

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY



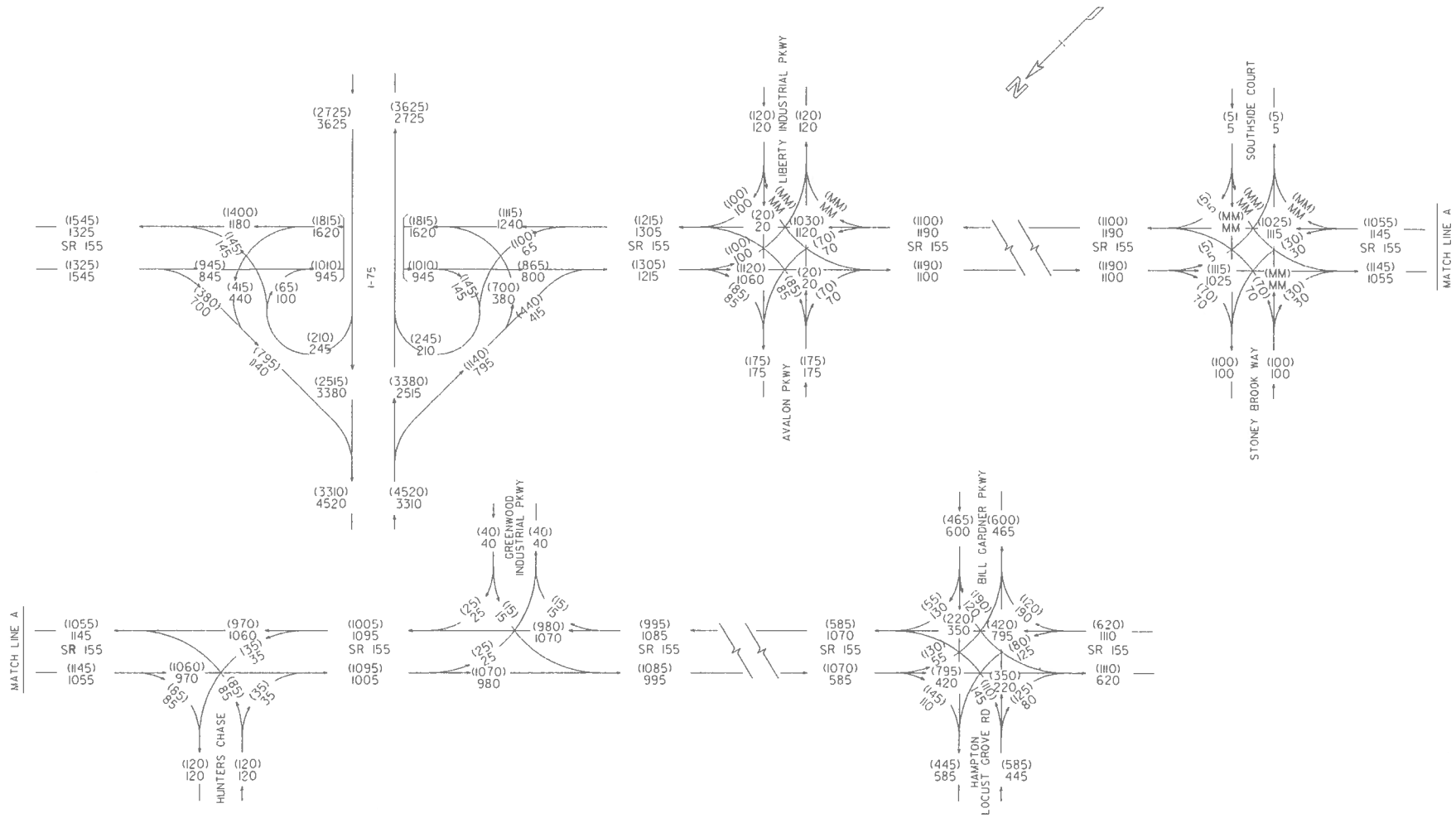
GRESHAM SMITH AND PARTNERS	2008 EXISTING YEAR AADT VOLUMES	LEGEND 2008 AADT = (000) 24 HR. T = 13% S.U. = 6%, COMB. = 7%	DATE	REVISIONS	DATE	REVISIONS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIAGRAM
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011 NMG

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2015 "OPENING YEAR" NO BUILD A.M. AND P.M. PK HR TRAFFIC VOLUMES

LEGEND

2015 PM DHV = (000)
2015 AM DHV = 000
T = 12%
S.U. = 6%, COMB. = 6%

DATE	REVISIONS	DATE	REVISIONS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIAGRAM
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011
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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

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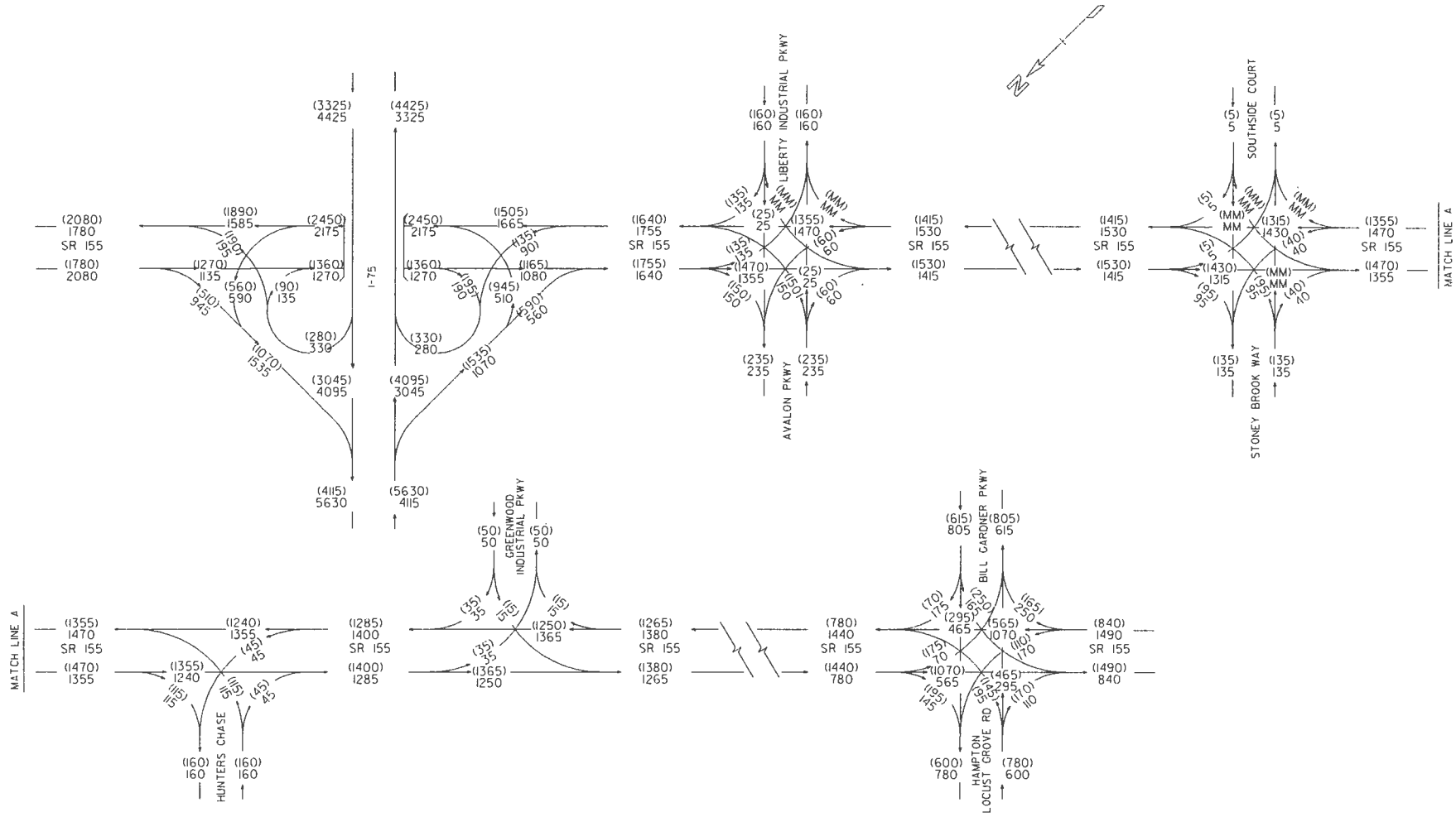
HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2035 "DESIGN YEAR" NO BUILD
A.M. AND P.M. PK HR
TRAFFIC VOLUMES

LEGEND

2035 PM DHV = (000)
2035 AM DHV = 000
T = 12%
S.U. = 6%, COMB. = 6%

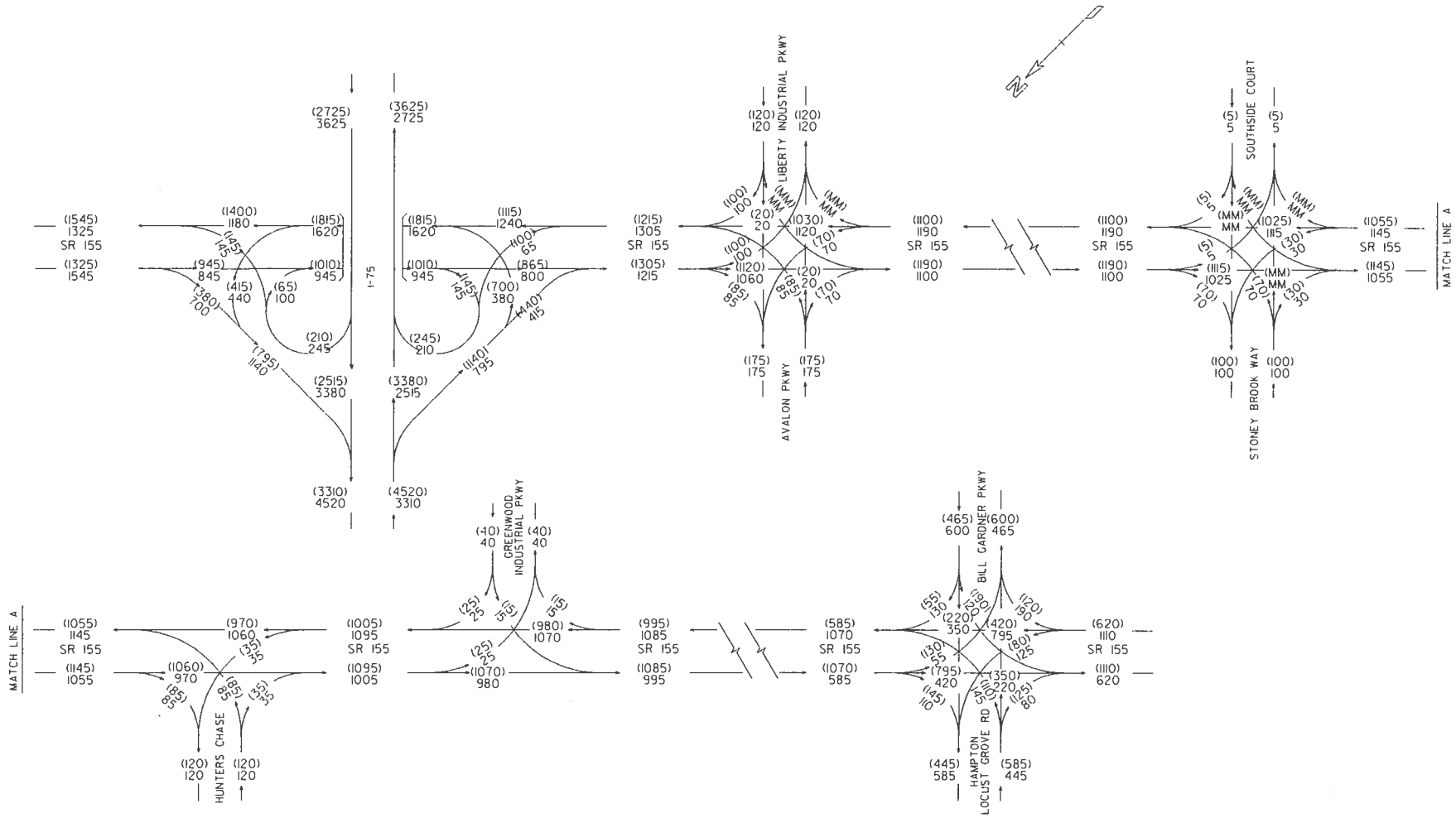
DATE	REVISIONS	DATE	REVISIONS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIAGRAM
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011 NMG

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY

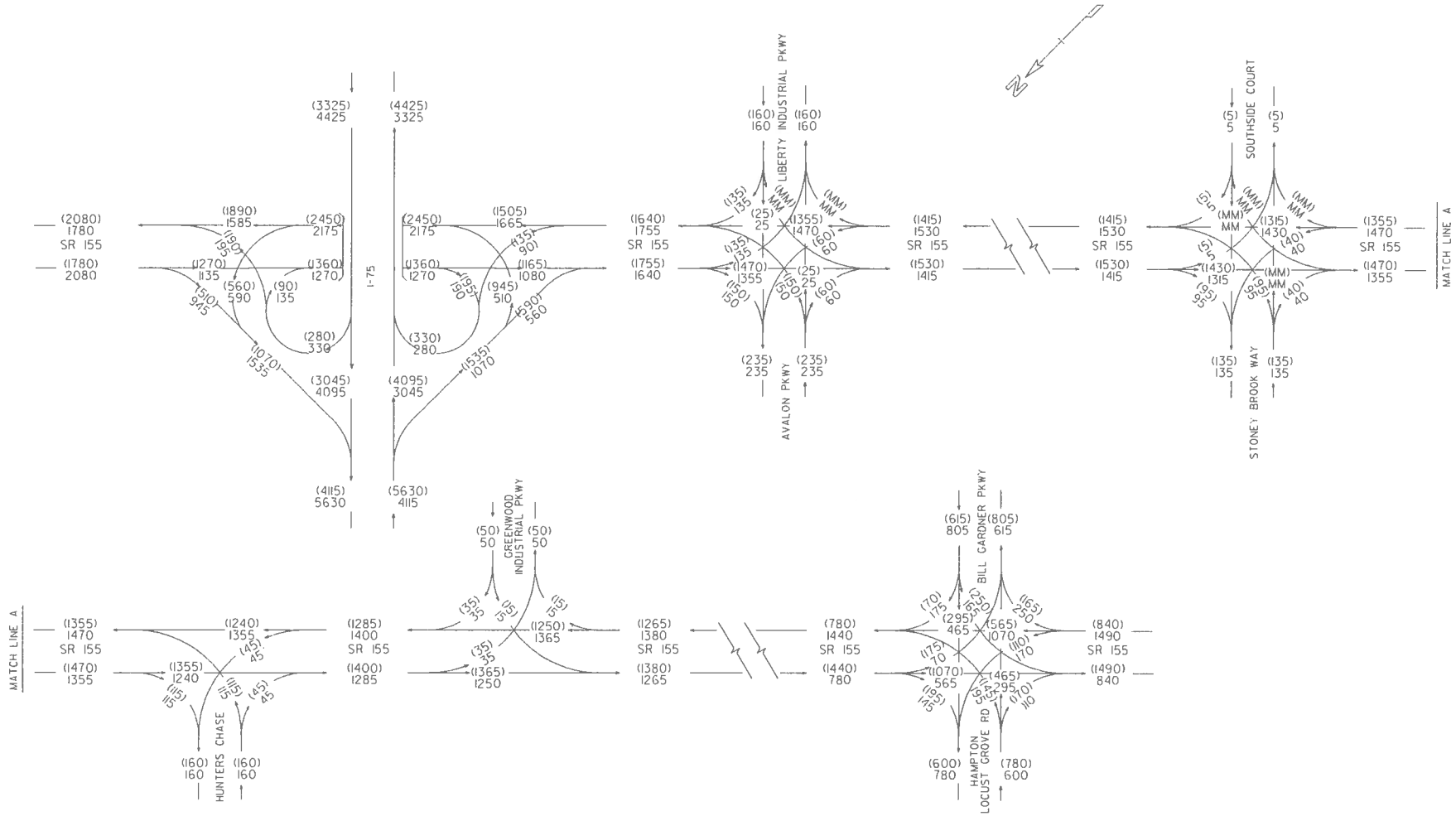


GRESHAM SMITH AND PARTNERS	2015 "OPENING YEAR" BUILD A.M. AND P.M. PK HR TRAFFIC VOLUMES	LEGEND 2015 PM DHV = (000) 2015 AM DHV = 000 T = 12% S.U. = 6%, COMB. = 6%	DATE / REVISIONS	DATE / REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION TRAFFIC DIAGRAM PROJECT - CSSTP-0002-00(882) COUNTY - HENRY DATE: 08/30/2011 NMG

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2035 "DESIGN YEAR" BUILD
A.M. AND P.M. PK HR
TRAFFIC VOLUMES

LEGEND

2035 PM DHV = (000)
2035 AM DHV = 000
T = 12%
S.U. = 6%, COMB. = 6%

DATE	REVISIONS	DATE	REVISIONS

GEORGIA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIAGRAM
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011 NMG

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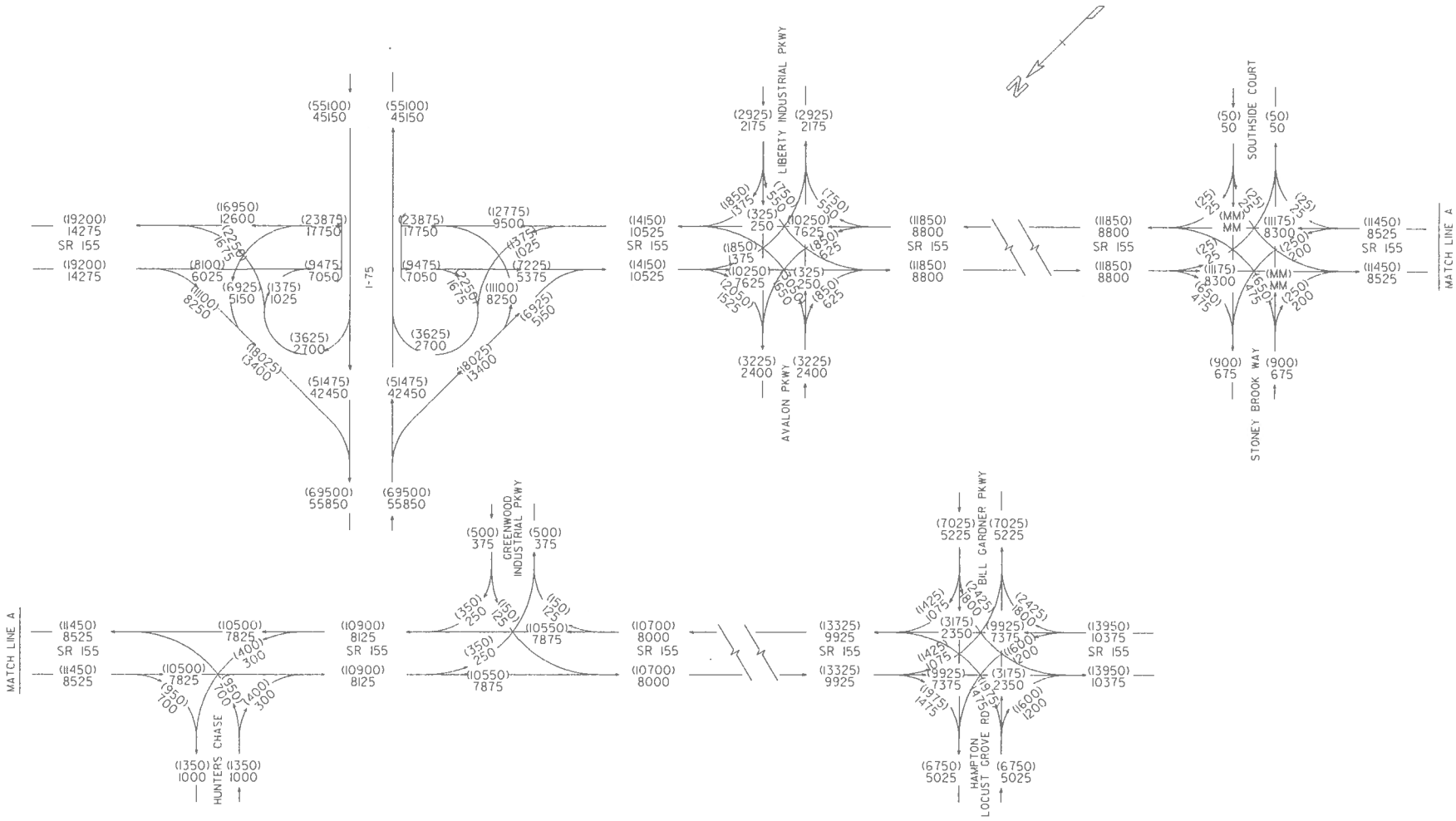
HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2015 "OPENING YEAR" AND 2035 "DESIGN YEAR" NO BUILD AADT VOLUMES

LEGEND

2035 AADT = (000)
2015 AADT = 000
24 HR. T = 13%
S.U. = 6%, COMB. = 7%

DATE	REVISIONS	DATE	REVISIONS

GEORGIA DEPARTMENT OF TRANSPORTATION

TRAFFIC DIAGRAM

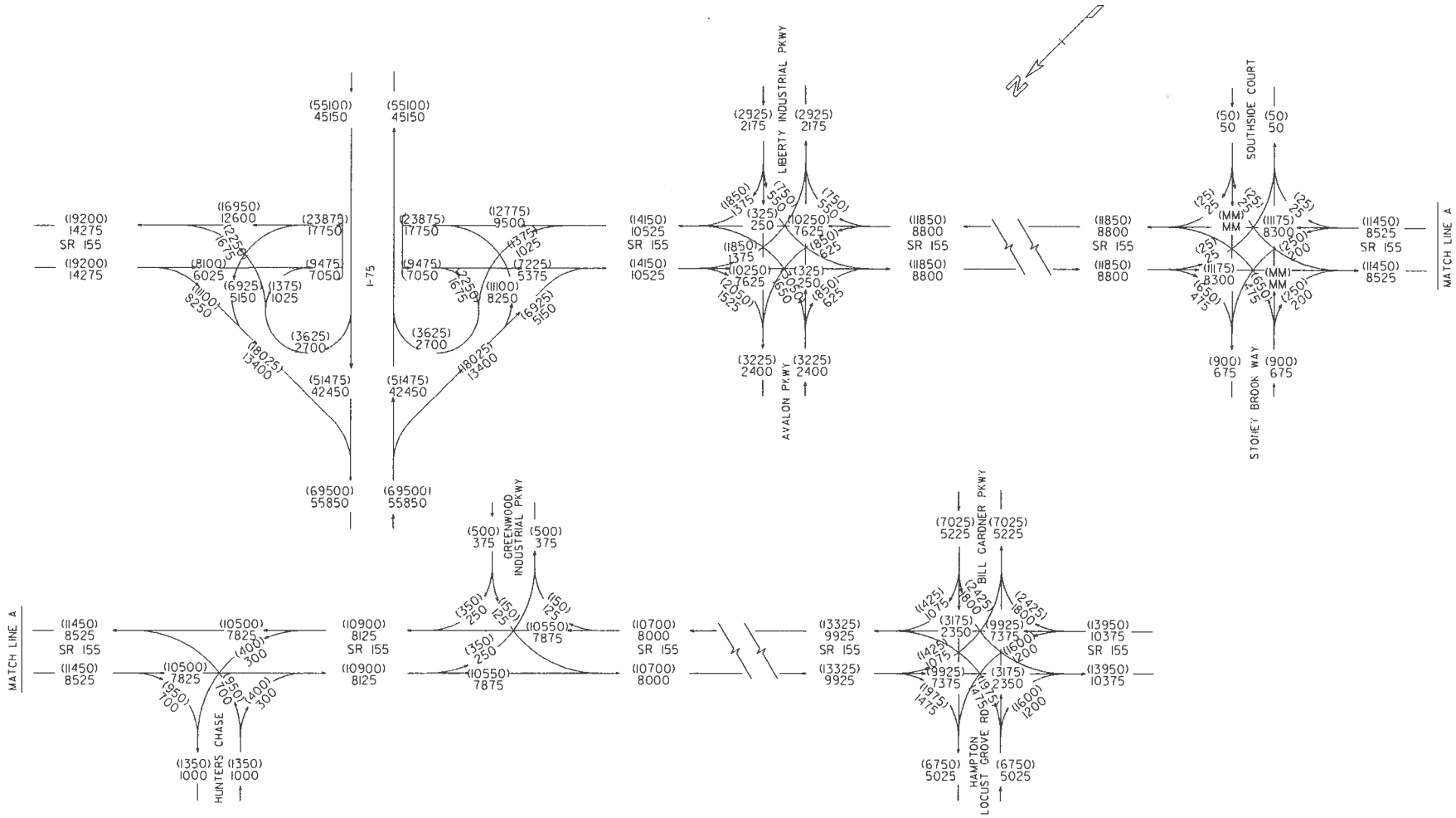
PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011

NMG

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSSTP-0002-00(882)		

P.I. NUMBER: 0002882

HENRY COUNTY



GRESHAM SMITH AND PARTNERS

2015 "OPENING YEAR" AND 2035 "DESIGN YEAR" BUILD AADT VOLUMES

LEGEND

2035 AADT = (000)
2015 AADT = 000
24 HR. T = 13%
S.U. = 6%, COMB. = 7%

DATE	REVISIONS	DATE	REVISIONS

GEORGIA DEPARTMENT OF TRANSPORTATION

TRAFFIC DIAGRAM

PROJECT - CSSTP-0002-00(882)
COUNTY - HENRY
DATE: 08/30/2011 NMG

Intersection Capacity Analyses Worksheets

2008 Existing Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	100	82	188	1198	682	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1530	1369	1703	1792	1827	1553
Flt Permitted	0.95	1.00	0.27	1.00	1.00	1.00
Satd. Flow (perm)	1530	1369	483	1792	1827	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	106	87	200	1274	726	615
RTOR Reduction (vph)	0	76	0	0	0	229
Lane Group Flow (vph)	106	11	200	1274	726	386
Heavy Vehicles (%)	18%	18%	6%	6%	4%	4%
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	11.5	11.5	70.5	70.5	56.5	56.5
Effective Green, g (s)	11.5	11.5	70.5	70.5	56.5	56.5
Actuated g/C Ratio	0.13	0.13	0.78	0.78	0.63	0.63
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	196	175	514	1404	1147	975
v/s Ratio Prot	c0.07		0.04	c0.71	0.40	
v/s Ratio Perm		0.01	0.26			0.25
v/c Ratio	0.54	0.06	0.39	0.91	0.63	0.40
Uniform Delay, d1	36.8	34.5	11.3	7.3	10.3	8.3
Progression Factor	1.00	1.00	0.79	0.91	1.00	1.00
Incremental Delay, d2	3.0	0.2	0.3	7.3	2.7	1.2
Delay (s)	39.8	34.7	9.3	13.9	13.0	9.5
Level of Service	D	C	A	B	B	A
Approach Delay (s)	37.5			13.3	11.4	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	365	503	68	837	665	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1671	1495	1719	1810	1792	1524
Flt Permitted	0.95	1.00	0.18	1.00	1.00	1.00
Satd. Flow (perm)	1671	1495	317	1810	1792	1524
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	401	553	75	920	731	108
RTOR Reduction (vph)	0	168	0	0	0	50
Lane Group Flow (vph)	401	385	75	920	731	58
Heavy Vehicles (%)	8%	8%	5%	5%	6%	6%
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	26.1	26.1	55.9	55.9	48.2	48.2
Effective Green, g (s)	26.1	26.1	55.9	55.9	48.2	48.2
Actuated g/C Ratio	0.29	0.29	0.62	0.62	0.54	0.54
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	485	434	255	1124	960	816
v/s Ratio Prot	0.24		0.01	c0.51	0.41	
v/s Ratio Perm		c0.26	0.17			0.04
v/c Ratio	0.83	0.89	0.29	0.82	0.76	0.07
Uniform Delay, d1	29.8	30.6	11.8	13.1	16.4	10.1
Progression Factor	1.00	1.00	1.00	1.00	0.50	0.16
Incremental Delay, d2	11.0	19.2	0.6	6.7	4.7	0.1
Delay (s)	40.9	49.8	12.5	19.8	12.8	1.8
Level of Service	D	D	B	B	B	A
Approach Delay (s)	46.1			19.3	11.4	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	20	40	20	20	65	40	970	20	65	900	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1690	1495		1716	1495	1719	1743	1538	1703	1667	1524
Flt Permitted		0.73	1.00		0.83	1.00	0.21	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)		1290	1495		1466	1495	382	1743	1538	316	1667	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	22	43	22	22	71	43	1054	22	71	978	103
RTOR Reduction (vph)	0	0	37	0	0	61	0	0	3	0	0	15
Lane Group Flow (vph)	0	125	6	0	44	10	43	1054	19	71	978	88
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	5%	9%	5%	6%	14%	6%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		12.8	12.8		12.8	12.8	66.1	66.1	66.1	66.1	66.1	66.1
Effective Green, g (s)		12.8	12.8		12.8	12.8	66.1	66.1	66.1	66.1	66.1	66.1
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		190	220		216	220	291	1326	1170	240	1268	1159
v/s Ratio Prot								c0.60			0.59	
v/s Ratio Perm		c0.10	0.00		0.03	0.01	0.11		0.01	0.22		0.06
v/c Ratio		0.66	0.03		0.20	0.05	0.15	0.79	0.02	0.30	0.77	0.08
Uniform Delay, d1		35.0	31.7		32.6	31.8	2.8	6.3	2.5	3.2	6.0	2.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.0	0.1		0.5	0.1	1.1	5.0	0.0	3.1	4.6	0.1
Delay (s)		43.0	31.8		33.0	31.9	3.9	11.3	2.5	6.3	10.6	2.8
Level of Service		D	C		C	C	A	B	A	A	B	A
Approach Delay (s)		40.1			32.3			10.8			9.6	
Approach LOS		D			C			B			A	

Intersection Summary

HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	86.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	0	25	0	0	5	25	965	0	5	895	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	0	27	0	0	5	27	1049	0	5	973	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2087	2087	973	2114	2087	1049	973			1049		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2087	2087	973	2114	2087	1049	973			1049		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	0	100	91	100	100	98	96			99		
cM capacity (veh/h)	35	48	298	31	48	269	697			648		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	92	5	27	1049	0	5	973	65
Volume Left	65	0	27	0	0	5	0	0
Volume Right	27	5	0	0	0	0	0	65
cSH	47	135	697	1700	1700	648	1700	1700
Volume to Capacity	1.95	0.04	0.04	0.62	0.00	0.01	0.57	0.04
Queue Length 95th (ft)	233	3	3	0	0	1	0	0
Control Delay (s)	628.9	32.9	10.4	0.0	0.0	10.6	0.0	0.0
Lane LOS	F	D	B			B		
Approach Delay (s)	628.9	32.9	0.3			0.1		
Approach LOS	F	D						

Intersection Summary			
Average Delay	26.4		
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	75	30	30	915	845	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	33	33	995	918	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1978	918	918			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1978	918	918			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	0	90	96			
cM capacity (veh/h)	62	321	731			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	114	1027	918	82
Volume Left	82	33	0	0
Volume Right	33	0	0	82
cSH	81	731	1700	1700
Volume to Capacity	1.41	0.04	0.54	0.05
Queue Length 95th (ft)	223	3	0	0
Control Delay (s)	331.7	1.4	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	331.7	1.4	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	18.3		
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	10	25	920	10	25	850
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	1000	11	27	924
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1978	1000			1000	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1978	1000			1000	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	83	91			96	
cM capacity (veh/h)	63	287			677	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	1000	11	27	924
Volume Left	11	0	0	27	0
Volume Right	27	0	11	0	0
cSH	220	1700	1700	677	1700
Volume to Capacity	0.17	0.59	0.01	0.04	0.54
Queue Length 95th (ft)	15	0	0	3	0
Control Delay (s)	34.6	0.0	0.0	10.5	0.0
Lane LOS	D			B	
Approach Delay (s)	34.6	0.0		0.3	
Approach LOS	D				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway 9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	151	183	42	118	369	105	124	691	208	48	368	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.97		1.00	0.97	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1835			1836		1805	1834		1805	1837	
Flt Permitted		0.50			0.81		0.28	1.00		0.06	1.00	
Satd. Flow (perm)		927			1496		541	1834		109	1837	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	193	44	124	388	111	131	727	219	51	387	109
RTOR Reduction (vph)	0	3	0	0	5	0	0	7	0	0	7	0
Lane Group Flow (vph)	0	393	0	0	618	0	131	939	0	51	489	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		58.0			58.0		82.8	74.8		73.2	70.0	
Effective Green, g (s)		58.0			58.0		82.8	74.8		73.2	70.0	
Actuated g/C Ratio		0.38			0.38		0.55	0.50		0.48	0.46	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		356			575		364	908		89	852	
v/s Ratio Prot							c0.02	c0.51		0.01	0.27	
v/s Ratio Perm		c0.42			0.41		0.18			0.27		
v/c Ratio		1.10			1.07		0.36	1.03		0.57	0.57	
Uniform Delay, d1		46.5			46.5		20.2	38.1		35.4	29.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		78.6			59.3		0.6	39.0		8.6	2.8	
Delay (s)		125.1			105.8		20.8	77.1		44.1	32.4	
Level of Service		F			F		C	E		D	C	
Approach Delay (s)		125.1			105.8			70.2			33.5	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM Average Control Delay	79.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	151.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: SR 155 & I-75 NB Ramps 9/6/2011

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	147	44	217	1051	738	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1556	1392	1703	1792	1792	1524
Flt Permitted	0.95	1.00	0.23	1.00	1.00	1.00
Satd. Flow (perm)	1556	1392	418	1792	1792	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	48	236	1142	802	318
RTOR Reduction (vph)	0	41	0	0	0	114
Lane Group Flow (vph)	160	7	236	1142	802	204
Heavy Vehicles (%)	16%	16%	6%	6%	6%	6%
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	13.4	13.4	68.6	68.6	57.6	57.6
Effective Green, g (s)	13.4	13.4	68.6	68.6	57.6	57.6
Actuated g/C Ratio	0.15	0.15	0.76	0.76	0.64	0.64
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	207	419	1366	1147	975
v/s Ratio Prot	c0.10		0.04	c0.64	0.45	
v/s Ratio Perm		0.01	0.39			0.13
v/c Ratio	0.69	0.03	0.56	0.84	0.70	0.21
Uniform Delay, d1	36.3	32.8	16.5	7.0	10.6	6.7
Progression Factor	1.00	1.00	0.95	0.99	1.00	1.00
Incremental Delay, d2	8.3	0.1	0.8	2.9	3.6	0.5
Delay (s)	44.6	32.8	16.5	9.8	14.1	7.2
Level of Service	D	C	B	A	B	A
Approach Delay (s)	41.9			11.0	12.2	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	641	571	91	722	672	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553	1656	1743	1759	1495
Flt Permitted	0.95	1.00	0.11	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553	197	1743	1759	1495
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	654	583	93	737	686	154
RTOR Reduction (vph)	0	133	0	0	0	87
Lane Group Flow (vph)	654	450	93	737	686	67
Heavy Vehicles (%)	4%	4%	9%	9%	8%	8%
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	35.5	35.5	46.5	46.5	39.3	39.3
Effective Green, g (s)	35.5	35.5	46.5	46.5	39.3	39.3
Actuated g/C Ratio	0.39	0.39	0.52	0.52	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	685	613	154	901	768	653
v/s Ratio Prot	c0.38		0.02	c0.42	c0.39	
v/s Ratio Perm		0.29	0.29			0.04
v/c Ratio	0.95	0.73	0.60	0.82	0.89	0.10
Uniform Delay, d1	26.5	23.2	17.4	18.2	23.4	15.0
Progression Factor	1.00	1.00	1.00	1.00	0.57	0.24
Incremental Delay, d2	23.6	4.5	6.5	8.2	11.6	0.2
Delay (s)	50.1	27.8	23.9	26.4	24.9	3.9
Level of Service	D	C	C	C	C	A
Approach Delay (s)	39.6			26.1	21.0	
Approach LOS	D			C	C	

Intersection Summary

HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	20	40	20	20	65	40	900	20	65	970	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1755	1553		1716	1495	1656	1712	1482	1671	1727	1495
Flt Permitted		0.73	1.00		0.83	1.00	0.18	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)		1340	1553		1464	1495	309	1712	1482	373	1727	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	22	43	22	22	71	43	978	22	71	1054	103
RTOR Reduction (vph)	0	0	37	0	0	61	0	0	3	0	0	14
Lane Group Flow (vph)	0	125	6	0	44	10	43	978	19	71	1054	89
Heavy Vehicles (%)	4%	4%	4%	8%	8%	8%	9%	11%	9%	8%	10%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		12.6	12.6		12.6	12.6	66.1	66.1	66.1	66.1	66.1	66.1
Effective Green, g (s)		12.6	12.6		12.6	12.6	66.1	66.1	66.1	66.1	66.1	66.1
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		195	226		213	217	236	1305	1130	284	1317	1140
v/s Ratio Prot								0.57			c0.61	
v/s Ratio Perm		c0.09	0.00		0.03	0.01	0.14		0.01	0.19		0.06
v/c Ratio		0.64	0.03		0.21	0.05	0.18	0.75	0.02	0.25	0.80	0.08
Uniform Delay, d1		34.9	31.8		32.6	31.9	2.8	5.7	2.5	3.0	6.3	2.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.0	0.0		0.5	0.1	1.7	4.0	0.0	2.1	5.2	0.1
Delay (s)		41.9	31.8		33.1	32.0	4.5	9.7	2.5	5.1	11.5	2.7
Level of Service		D	C		C	C	A	A	A	A	B	A
Approach Delay (s)		39.4			32.4			9.3			10.4	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	0	25	0	0	5	25	895	0	5	965	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	0	27	0	0	5	27	973	0	5	1049	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2087	2087	1049	2114	2087	973	1049			973		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2087	2087	1049	2114	2087	973	1049			973		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	0	100	90	100	100	98	96			99		
cM capacity (veh/h)	36	49	274	31	48	298	637			685		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	92	5	27	973	0	5	1049	65
Volume Left	65	0	27	0	0	5	0	0
Volume Right	27	5	0	0	0	0	0	65
cSH	48	149	637	1700	1700	685	1700	1700
Volume to Capacity	1.91	0.04	0.04	0.57	0.00	0.01	0.62	0.04
Queue Length 95th (ft)	231	3	3	0	0	1	0	0
Control Delay (s)	609.0	30.1	10.9	0.0	0.0	10.3	0.0	0.0
Lane LOS	F	D	B			B		
Approach Delay (s)	609.0	30.1	0.3			0.0		
Approach LOS	F	D						

Intersection Summary			
Average Delay	25.6		
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	75	30	30	845	915	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	33	33	918	995	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1978	995	995			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1978	995	995			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	0	89	95			
cM capacity (veh/h)	64	295	669			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	114	951	995	82
Volume Left	82	33	0	0
Volume Right	33	0	0	82
cSH	82	669	1700	1700
Volume to Capacity	1.39	0.05	0.59	0.05
Queue Length 95th (ft)	221	4	0	0
Control Delay (s)	323.3	1.5	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	323.3	1.5	0.0	
Approach LOS	F			

Intersection Summary			
Average Delay	17.9		
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	10	25	850	10	25	920
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	924	11	27	1000
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1978	924			924	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1978	924			924	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	83	91			96	
cM capacity (veh/h)	63	318			715	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	924	11	27	1000
Volume Left	11	0	0	27	0
Volume Right	27	0	11	0	0
cSH	220	1700	1700	715	1700
Volume to Capacity	0.17	0.54	0.01	0.04	0.59
Queue Length 95th (ft)	15	0	0	3	0
Control Delay (s)	33.5	0.0	0.0	10.2	0.0
Lane LOS	D			B	
Approach Delay (s)	33.5	0.0		0.3	
Approach LOS	D				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway 9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	243	94	121	203	44	99	374	94	121	713	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.98		1.00	0.97		1.00	0.98	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1825			1839		1805	1843		1805	1865	
Flt Permitted		0.81			0.60		0.10	1.00		0.28	1.00	
Satd. Flow (perm)		1491			1127		195	1843		537	1865	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	89	261	101	130	218	47	106	402	101	130	767	108
RTOR Reduction (vph)	0	11	0	0	5	0	0	10	0	0	5	0
Lane Group Flow (vph)	0	440	0	0	390	0	106	493	0	130	870	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0		43.0	39.0		47.0	41.0	
Effective Green, g (s)		30.0			30.0		43.0	39.0		47.0	41.0	
Actuated g/C Ratio		0.33			0.33		0.48	0.43		0.52	0.46	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		497			376		165	799		365	850	
v/s Ratio Prot							c0.03	0.27		0.02	c0.47	
v/s Ratio Perm		0.29			c0.35		0.28			0.16		
v/c Ratio		0.88			1.04		0.64	0.62		0.36	1.02	
Uniform Delay, d1		28.4			30.0		20.2	19.7		12.9	24.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		16.9			56.1		8.3	3.6		0.6	36.8	
Delay (s)		45.3			86.1		28.5	23.3		13.5	61.3	
Level of Service		D			F		C	C		B	E	
Approach Delay (s)		45.3			86.1			24.2			55.1	
Approach LOS		D			F			C			E	

Intersection Summary			
HCM Average Control Delay	50.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2015 Opening Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	115	94	216	1376	783	664
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1530	1369	1703	1792	1827	1553
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1530	1369	1703	1792	1827	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	122	100	230	1464	833	706
RTOR Reduction (vph)	0	87	0	0	0	285
Lane Group Flow (vph)	122	13	230	1464	833	421
Heavy Vehicles (%)	18%	18%	6%	6%	4%	4%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.1	12.1	15.6	69.9	50.3	50.3
Effective Green, g (s)	12.1	12.1	15.6	69.9	50.3	50.3
Actuated g/C Ratio	0.13	0.13	0.17	0.78	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	184	295	1392	1021	868
v/s Ratio Prot	c0.08		0.14	c0.82	0.46	
v/s Ratio Perm		0.01				0.27
v/c Ratio	0.59	0.07	0.78	1.05	0.82	0.49
Uniform Delay, d1	36.6	34.0	35.6	10.0	16.1	12.0
Progression Factor	1.00	1.00	0.98	0.76	1.00	1.00
Incremental Delay, d2	4.5	0.2	6.5	32.7	7.2	1.9
Delay (s)	41.1	34.2	41.2	40.3	23.3	14.0
Level of Service	D	C	D	D	C	B
Approach Delay (s)	38.0			40.4	19.0	
Approach LOS	D			D	B	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	419	578	78	961	764	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1671	1495	1719	1810	1792	1524
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1671	1495	1719	1810	1792	1524
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	460	635	86	1056	840	124
RTOR Reduction (vph)	0	149	0	0	0	62
Lane Group Flow (vph)	460	486	86	1056	840	62
Heavy Vehicles (%)	8%	8%	5%	5%	6%	6%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	28.0	28.0	5.0	54.0	45.0	45.0
Effective Green, g (s)	28.0	28.0	5.0	54.0	45.0	45.0
Actuated g/C Ratio	0.31	0.31	0.06	0.60	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	520	465	96	1086	896	762
v/s Ratio Prot	0.28		0.05	c0.58	0.47	
v/s Ratio Perm		c0.33				0.04
v/c Ratio	0.88	1.05	0.90	0.97	0.94	0.08
Uniform Delay, d1	29.5	31.0	42.2	17.3	21.2	11.7
Progression Factor	1.00	1.00	1.00	1.00	0.54	0.98
Incremental Delay, d2	16.3	54.2	58.9	21.4	13.4	0.1
Delay (s)	45.8	85.2	101.1	38.7	24.8	11.7
Level of Service	D	F	F	D	C	B
Approach Delay (s)	68.6			43.4	23.1	
Approach LOS	E			D	C	

Intersection Summary

HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	20	70	0	20	100	70	1120	0	100	1030	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1691	1495		1759	1495	1719	1743		1703	1667	1524
Flt Permitted		0.75	1.00		1.00	1.00	0.16	1.00		0.12	1.00	1.00
Satd. Flow (perm)		1324	1495		1759	1495	294	1743		212	1667	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	22	76	0	22	109	76	1217	0	109	1120	92
RTOR Reduction (vph)	0	0	67	0	0	96	0	0	0	0	0	11
Lane Group Flow (vph)	0	114	9	0	22	13	76	1217	0	109	1120	81
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	5%	9%	5%	6%	14%	6%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		10.4	10.4		10.4	10.4	66.6	66.6		66.6	66.6	66.6
Effective Green, g (s)		10.4	10.4		10.4	10.4	66.6	66.6		66.6	66.6	66.6
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.78	0.78		0.78	0.78	0.78
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		162	183		215	183	230	1366		166	1306	1194
v/s Ratio Prot					0.01			c0.70			0.67	
v/s Ratio Perm		c0.09	0.01			0.01	0.26			0.51		0.05
v/c Ratio		0.70	0.05		0.10	0.07	0.33	0.89		0.66	0.86	0.07
Uniform Delay, d1		35.8	32.9		33.2	33.0	2.7	6.6		4.1	6.1	2.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		13.0	0.1		0.2	0.2	3.8	9.1		18.5	7.4	0.1
Delay (s)		48.8	33.1		33.4	33.2	6.5	15.7		22.6	13.5	2.2
Level of Service		D	C		C	C	A	B		C	B	A
Approach Delay (s)		42.5			33.2			15.1			13.5	
Approach LOS		D			C			B			B	

Intersection Summary

HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	0	30	0	0	5	30	1115	0	5	1025	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	0	33	0	0	5	33	1212	0	5	1114	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2402	2402	1114	2435	2402	1212	1114			1212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2402	2402	1114	2435	2402	1212	1114			1212		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	0	100	87	100	100	97	95			99		
cM capacity (veh/h)	20	30	246	17	30	216	616			562		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	109	5	33	1212	0	5	1114	76
Volume Left	76	0	33	0	0	5	0	0
Volume Right	33	5	0	0	0	0	0	76
cSH	28	108	616	1700	1700	562	1700	1700
Volume to Capacity	3.86	0.05	0.05	0.71	0.00	0.01	0.66	0.04
Queue Length 95th (ft)	Err	4	4	0	0	1	0	0
Control Delay (s)	Err	40.2	11.2	0.0	0.0	11.5	0.0	0.0
Lane LOS	F	E	B			B		
Approach Delay (s)	9999.0	40.2	0.3			0.1		
Approach LOS	F	E						

Intersection Summary			
Average Delay	425.7		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	85	35	35	1060	970	85
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	38	38	1152	1054	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2283	1054	1054			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2283	1054	1054			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	0	86	94			
cM capacity (veh/h)	39	267	649			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	130	38	1152	1054	92
Volume Left	92	38	0	0	0
Volume Right	38	0	0	0	92
cSH	52	649	1700	1700	1700
Volume to Capacity	2.49	0.06	0.68	0.62	0.05
Queue Length 95th (ft)	335	5	0	0	0
Control Delay (s)	843.1	10.9	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	843.1	0.3		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	44.7		
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	25	1070	15	25	980
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	1163	16	27	1065
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2283	1163			1163	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2283	1163			1163	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	59	88			95	
cM capacity (veh/h)	40	230			586	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	1163	16	27	1065
Volume Left	16	0	0	27	0
Volume Right	27	0	16	0	0
cSH	106	1700	1700	586	1700
Volume to Capacity	0.41	0.68	0.01	0.05	0.63
Queue Length 95th (ft)	43	0	0	4	0
Control Delay (s)	69.4	0.0	0.0	11.4	0.0
Lane LOS	F			B	
Approach Delay (s)	69.4	0.0		0.3	
Approach LOS	F				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway

9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	207	48	133	416	119	140	779	235	55	415	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	1805	1837		1805	1900	1615	1805	1900	1615
Flt Permitted	0.12	1.00	1.00	0.52	1.00		0.32	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	238	1900	1615	995	1837		611	1900	1615	162	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	218	51	140	438	125	147	820	247	58	437	124
RTOR Reduction (vph)	0	0	36	0	9	0	0	0	106	0	0	71
Lane Group Flow (vph)	180	218	15	140	554	0	147	820	141	58	437	53
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	39.0	32.0	32.0	37.0	31.0		55.8	49.8	49.8	50.2	47.0	47.0
Effective Green, g (s)	39.0	32.0	32.0	37.0	31.0		55.8	49.8	49.8	50.2	47.0	47.0
Actuated g/C Ratio	0.35	0.29	0.29	0.33	0.28		0.50	0.45	0.45	0.45	0.42	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	182	548	466	375	513		372	852	725	121	805	684
v/s Ratio Prot	c0.06	0.11		0.02	c0.30		c0.02	c0.43		0.01	0.23	
v/s Ratio Perm	0.29		0.01	0.10			0.18		0.09	0.20		0.03
v/c Ratio	0.99	0.40	0.03	0.37	1.08		0.40	0.96	0.19	0.48	0.54	0.08
Uniform Delay, d1	32.3	31.8	28.4	27.0	40.0		16.7	29.7	18.5	25.8	24.0	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.8	0.5	0.0	0.6	62.8		0.7	23.0	0.6	3.0	2.6	0.2
Delay (s)	95.1	32.2	28.4	27.6	102.8		17.4	52.6	19.1	28.8	26.6	19.3
Level of Service	F	C	C	C	F		B	D	B	C	C	B
Approach Delay (s)		57.0			87.8			41.6			25.3	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: SR 155 & I-75 NB Ramps 9/6/2011

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	169	51	249	1207	848	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1556	1392	1703	1792	1792	1524
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1556	1392	1703	1792	1792	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	55	271	1312	922	366
RTOR Reduction (vph)	0	46	0	0	0	173
Lane Group Flow (vph)	184	9	271	1312	922	193
Heavy Vehicles (%)	16%	16%	6%	6%	6%	6%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.3	14.3	16.3	67.7	47.4	47.4
Effective Green, g (s)	14.3	14.3	16.3	67.7	47.4	47.4
Actuated g/C Ratio	0.16	0.16	0.18	0.75	0.53	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	247	221	308	1348	944	803
v/s Ratio Prot	c0.12		0.16	c0.73	0.51	
v/s Ratio Perm		0.01				0.13
v/c Ratio	0.74	0.04	0.88	0.97	0.98	0.24
Uniform Delay, d1	36.1	32.0	35.9	10.3	20.8	11.5
Progression Factor	1.00	1.00	0.92	0.96	1.00	1.00
Incremental Delay, d2	11.5	0.1	2.9	3.4	24.2	0.7
Delay (s)	47.6	32.1	36.0	13.3	44.9	12.2
Level of Service	D	C	D	B	D	B
Approach Delay (s)	44.1			17.2	35.6	
Approach LOS	D			B	D	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	736	656	105	829	772	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553	1656	1743	1759	1495
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553	1656	1743	1759	1495
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	751	669	107	846	788	177
RTOR Reduction (vph)	0	160	0	0	0	89
Lane Group Flow (vph)	751	509	107	846	788	89
Heavy Vehicles (%)	4%	4%	9%	9%	8%	8%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	28.0	28.0	5.0	54.0	45.0	45.0
Effective Green, g (s)	28.0	28.0	5.0	54.0	45.0	45.0
Actuated g/C Ratio	0.31	0.31	0.06	0.60	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	540	483	92	1046	880	748
v/s Ratio Prot	c0.43		c0.06	0.49	c0.45	
v/s Ratio Perm		0.33				0.06
v/c Ratio	1.39	1.05	1.16	0.81	0.90	0.12
Uniform Delay, d1	31.0	31.0	42.5	14.0	20.4	12.0
Progression Factor	1.00	1.00	1.00	1.00	0.56	1.12
Incremental Delay, d2	187.0	56.0	144.3	6.7	5.6	0.1
Delay (s)	218.0	87.0	186.8	20.7	17.0	13.5
Level of Service	F	F	F	C	B	B
Approach Delay (s)	156.3			39.4	16.4	
Approach LOS	F			D	B	

Intersection Summary			
HCM Average Control Delay	82.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	20	70	0	20	100	70	1030	0	100	1120	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1756	1553		1759	1495	1656	1712		1671	1727	1495
Flt Permitted		0.75	1.00		1.00	1.00	0.12	1.00		0.16	1.00	1.00
Satd. Flow (perm)		1374	1553		1759	1495	209	1712		289	1727	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	22	76	0	22	109	76	1120	0	109	1217	92
RTOR Reduction (vph)	0	0	67	0	0	96	0	0	0	0	0	10
Lane Group Flow (vph)	0	114	9	0	22	13	76	1120	0	109	1217	82
Heavy Vehicles (%)	4%	4%	4%	8%	8%	8%	9%	11%	9%	8%	10%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		10.2	10.2		10.2	10.2	66.6	66.6		66.6	66.6	66.6
Effective Green, g (s)		10.2	10.2		10.2	10.2	66.6	66.6		66.6	66.6	66.6
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.79	0.79		0.79	0.79	0.79
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		165	187		212	180	164	1345		227	1356	1174
v/s Ratio Prot					0.01			0.65			c0.70	
v/s Ratio Perm		c0.08	0.01			0.01	0.36			0.38		0.06
v/c Ratio		0.69	0.05		0.10	0.07	0.46	0.83		0.48	0.90	0.07
Uniform Delay, d1		35.8	33.0		33.2	33.1	3.1	5.6		3.1	6.6	2.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		11.8	0.1		0.2	0.2	9.1	6.2		7.1	9.6	0.1
Delay (s)		47.6	33.1		33.4	33.3	12.2	11.8		10.2	16.2	2.2
Level of Service		D	C		C	C	B	B		B	B	A
Approach Delay (s)		41.8			33.3			11.8			14.9	
Approach LOS		D			C			B			B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	0	30	0	0	5	30	1025	0	5	1115	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	0	33	0	0	5	33	1114	0	5	1212	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2402	2402	1212	2435	2402	1114	1212			1114		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2402	2402	1212	2435	2402	1114	1212			1114		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	0	100	85	100	100	98	94			99		
cM capacity (veh/h)	21	31	220	17	30	246	552			605		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	109	5	33	1114	0	5	1212	76
Volume Left	76	0	33	0	0	5	0	0
Volume Right	33	5	0	0	0	0	0	76
cSH	29	123	552	1700	1700	605	1700	1700
Volume to Capacity	3.77	0.04	0.06	0.66	0.00	0.01	0.71	0.04
Queue Length 95th (ft)	Err	3	5	0	0	1	0	0
Control Delay (s)	Err	35.6	11.9	0.0	0.0	11.0	0.0	0.0
Lane LOS	F	E	B			B		
Approach Delay (s)	9999.0	35.6	0.3			0.0		
Approach LOS	F	E						

Intersection Summary			
Average Delay	425.7		
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	85	35	35	970	1060	85
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	38	38	1054	1152	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2283	1152	1152			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2283	1152	1152			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	0	84	93			
cM capacity (veh/h)	40	238	582			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	130	38	1054	1152	92
Volume Left	92	38	0	0	0
Volume Right	38	0	0	0	92
cSH	53	582	1700	1700	1700
Volume to Capacity	2.46	0.07	0.62	0.68	0.05
Queue Length 95th (ft)	333	5	0	0	0
Control Delay (s)	827.6	11.6	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	827.6	0.4		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	43.9		
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	25	980	15	25	1070
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	1065	16	27	1163
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2283	1065			1065	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2283	1065			1065	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	59	90			96	
cM capacity (veh/h)	40	263			632	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	1065	16	27	1163
Volume Left	16	0	0	27	0
Volume Right	27	0	16	0	0
cSH	107	1700	1700	632	1700
Volume to Capacity	0.41	0.63	0.01	0.04	0.68
Queue Length 95th (ft)	42	0	0	3	0
Control Delay (s)	67.6	0.0	0.0	11.0	0.0
Lane LOS	F			B	
Approach Delay (s)	67.6	0.0		0.3	
Approach LOS	F				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway

9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	274	106	137	229	50	112	422	106	137	803	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	1805	1849		1805	1900	1615	1805	1900	1615
Flt Permitted	0.31	1.00	1.00	0.23	1.00		0.09	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	595	1900	1615	428	1849		177	1900	1615	675	1900	1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	101	295	114	147	246	54	120	454	114	147	863	122
RTOR Reduction (vph)	0	0	93	0	9	0	0	0	60	0	0	61
Lane Group Flow (vph)	101	295	21	147	291	0	120	454	54	147	863	61
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	19.9	16.7	16.7	23.5	18.5		47.0	43.0	43.0	51.0	45.0	45.0
Effective Green, g (s)	19.9	16.7	16.7	23.5	18.5		47.0	43.0	43.0	51.0	45.0	45.0
Actuated g/C Ratio	0.22	0.18	0.18	0.26	0.20		0.52	0.47	0.47	0.56	0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	173	350	297	187	377		164	901	766	454	943	801
v/s Ratio Prot	0.02	0.16		c0.04	0.16		c0.03	0.24		0.02	c0.45	
v/s Ratio Perm	0.11		0.01	c0.16			0.35		0.03	0.16		0.04
v/c Ratio	0.58	0.84	0.07	0.79	0.77		0.73	0.50	0.07	0.32	0.92	0.08
Uniform Delay, d1	31.3	35.7	30.6	29.5	34.1		19.0	16.5	13.0	10.6	21.1	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	16.6	0.1	19.2	9.5		15.4	2.0	0.2	0.4	14.8	0.2
Delay (s)	36.2	52.4	30.7	48.7	43.6		34.5	18.5	13.2	11.0	35.9	12.1
Level of Service	D	D	C	D	D		C	B	B	B	D	B
Approach Delay (s)		44.3			45.3			20.4			30.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2035 Design Year

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	155	127	291	1853	1055	894
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1530	1369	1703	1792	1827	1553
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1530	1369	1703	1792	1827	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	135	310	1971	1122	951
RTOR Reduction (vph)	0	121	0	0	0	177
Lane Group Flow (vph)	165	14	310	1971	1122	774
Heavy Vehicles (%)	18%	18%	6%	6%	4%	4%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	16.0	16.0	28.0	126.0	94.0	94.0
Effective Green, g (s)	16.0	16.0	28.0	126.0	94.0	94.0
Actuated g/C Ratio	0.11	0.11	0.19	0.84	0.63	0.63
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	163	146	318	1505	1145	973
v/s Ratio Prot	c0.11		0.18	c1.10	0.61	
v/s Ratio Perm		0.01				0.50
v/c Ratio	1.01	0.10	0.97	1.31	0.98	0.80
Uniform Delay, d1	67.0	60.5	60.6	12.0	27.1	20.8
Progression Factor	1.00	1.00	0.97	0.84	1.00	1.00
Incremental Delay, d2	73.7	0.3	10.0	139.8	22.2	6.7
Delay (s)	140.7	60.8	68.6	149.8	49.3	27.6
Level of Service	F	E	E	F	D	C
Approach Delay (s)	104.8			138.8	39.3	
Approach LOS	F			F	D	

Intersection Summary			
HCM Average Control Delay	92.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	565	778	105	1295	1029	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1671	1495	1719	1810	1792	1524
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1671	1495	1719	1810	1792	1524
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	621	855	115	1423	1131	167
RTOR Reduction (vph)	0	103	0	0	0	79
Lane Group Flow (vph)	621	752	115	1423	1131	88
Heavy Vehicles (%)	8%	8%	5%	5%	6%	6%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	51.0	51.0	8.0	91.0	79.0	79.0
Effective Green, g (s)	51.0	51.0	8.0	91.0	79.0	79.0
Actuated g/C Ratio	0.34	0.34	0.05	0.61	0.53	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	568	508	92	1098	944	803
v/s Ratio Prot	0.37		0.07	c0.79	0.63	
v/s Ratio Perm		c0.50				0.06
v/c Ratio	1.09	1.48	1.25	1.30	1.20	0.11
Uniform Delay, d1	49.5	49.5	71.0	29.5	35.5	17.8
Progression Factor	1.00	1.00	1.00	1.00	0.48	0.23
Incremental Delay, d2	65.7	226.6	175.3	140.0	93.7	0.1
Delay (s)	115.2	276.1	246.3	169.5	110.7	4.2
Level of Service	F	F	F	F	F	A
Approach Delay (s)	208.4			175.3	97.0	
Approach LOS	F			F	F	

Intersection Summary			
HCM Average Control Delay	163.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	25	60	0	25	135	60	1470	0	135	1355	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1687	1495		1759	1495	1719	1743		1703	1667	1524
Flt Permitted		0.74	1.00		1.00	1.00	0.03	1.00		0.03	1.00	1.00
Satd. Flow (perm)		1297	1495		1759	1495	58	1743		58	1667	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	27	65	0	27	147	65	1598	0	147	1473	163
RTOR Reduction (vph)	0	0	25	0	0	73	0	0	0	0	0	11
Lane Group Flow (vph)	0	190	40	0	27	74	65	1598	0	147	1473	152
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	5%	9%	5%	6%	14%	6%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		18.0	18.0		18.0	18.0	124.0	124.0		124.0	124.0	124.0
Effective Green, g (s)		18.0	18.0		18.0	18.0	124.0	124.0		124.0	124.0	124.0
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.83	0.83		0.83	0.83	0.83
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		156	179		211	179	48	1441		48	1378	1260
v/s Ratio Prot					0.02			0.92			0.88	
v/s Ratio Perm		c0.15	0.03			0.05	1.11			c2.54		0.10
v/c Ratio		1.22	0.23		0.13	0.41	1.35	1.11		3.06	1.07	0.12
Uniform Delay, d1		66.0	59.7		59.0	61.1	13.0	13.0		13.0	13.0	2.5
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		142.5	0.6		0.3	1.5	250.6	59.5		980.8	45.0	0.2
Delay (s)		208.5	60.3		59.3	62.7	263.6	72.5		993.8	58.0	2.7
Level of Service		F	E		E	E	F	E		F	E	A
Approach Delay (s)		170.7			62.1			80.0			130.1	
Approach LOS		F			E			E			F	

Intersection Summary

HCM Average Control Delay	108.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	0	40	0	0	5	40	1430	0	5	1315	95
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	0	43	0	0	5	43	1554	0	5	1429	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3082	3082	1429	3125	3082	1554	1429			1554		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3082	3082	1429	3125	3082	1554	1429			1554		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.3		
p0 queue free %	0	100	73	100	100	96	91			99		
cM capacity (veh/h)	6	10	160	4	10	135	466			415		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	147	5	43	1554	0	5	1429	103
Volume Left	103	0	43	0	0	5	0	0
Volume Right	43	5	0	0	0	0	0	103
cSH	9	67	466	1700	1700	415	1700	1700
Volume to Capacity	17.17	0.08	0.09	0.91	0.00	0.01	0.84	0.06
Queue Length 95th (ft)	Err	6	8	0	0	1	0	0
Control Delay (s)	Err	63.1	13.5	0.0	0.0	13.8	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	Err	63.1	0.4			0.0		
Approach LOS	F	F						

Intersection Summary			
Average Delay	446.5		
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	115	45	45	1355	1240	115
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	49	49	1473	1348	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2918	1348	1348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2918	1348	1348			
tC, single (s)	6.5	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	0	73	90			
cM capacity (veh/h)	15	179	501			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	174	49	1473	1348	125
Volume Left	125	49	0	0	0
Volume Right	49	0	0	0	125
cSH	20	501	1700	1700	1700
Volume to Capacity	8.85	0.10	0.87	0.79	0.07
Queue Length 95th (ft)	Err	8	0	0	0
Control Delay (s)	Err	13.0	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	Err	0.4		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	549.0		
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	35	1365	15	35	1250
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	38	1484	16	38	1359
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2918	1484			1484	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2918	1484			1484	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	0	74			91	
cM capacity (veh/h)	15	149			442	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	54	1484	16	38	1359
Volume Left	16	0	0	38	0
Volume Right	38	0	16	0	0
cSH	47	1700	1700	442	1700
Volume to Capacity	1.16	0.87	0.01	0.09	0.80
Queue Length 95th (ft)	125	0	0	7	0
Control Delay (s)	320.7	0.0	0.0	13.9	0.0
Lane LOS	F			B	
Approach Delay (s)	320.7	0.0		0.4	
Approach LOS	F				

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway

9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	229	278	64	179	560	159	188	1048	315	73	558	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	1805	1837		1805	1900	1615	1805	1900	1615
Flt Permitted	0.10	1.00	1.00	0.33	1.00		0.18	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	181	1900	1615	627	1837		334	1900	1615	119	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	241	293	67	188	589	167	198	1103	332	77	587	166
RTOR Reduction (vph)	0	0	48	0	7	0	0	0	79	0	0	75
Lane Group Flow (vph)	241	293	19	188	749	0	198	1103	253	77	587	91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	52.1	42.1	42.1	59.9	46.0		79.0	70.0	70.0	68.0	64.0	64.0
Effective Green, g (s)	52.1	42.1	42.1	59.9	46.0		79.0	70.0	70.0	68.0	64.0	64.0
Actuated g/C Ratio	0.35	0.28	0.28	0.40	0.31		0.53	0.47	0.47	0.45	0.43	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	171	533	453	360	563		274	887	754	99	811	689
v/s Ratio Prot	c0.09	0.15		0.05	c0.41		c0.05	c0.58		0.02	0.31	
v/s Ratio Perm	0.40		0.01	0.16			0.33		0.16	0.33		0.06
v/c Ratio	1.41	0.55	0.04	0.52	1.33		0.72	1.24	0.33	0.78	0.72	0.13
Uniform Delay, d1	41.3	45.9	39.3	31.8	52.0		26.4	40.0	25.3	35.9	35.7	26.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	215.2	1.2	0.0	1.4	160.6		9.1	119.1	1.2	31.0	5.6	0.4
Delay (s)	256.5	47.1	39.3	33.2	212.6		35.5	159.1	26.5	66.9	41.2	26.5
Level of Service	F	D	D	C	F		D	F	C	E	D	C
Approach Delay (s)		130.2			176.9			117.2			40.7	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	117.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	127.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	227	68	336	1626	1142	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1556	1392	1703	1792	1792	1524
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1556	1392	1703	1792	1792	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	247	74	365	1767	1241	492
RTOR Reduction (vph)	0	64	0	0	0	197
Lane Group Flow (vph)	247	10	365	1767	1241	295
Heavy Vehicles (%)	16%	16%	6%	6%	6%	6%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	17.0	17.0	23.0	105.0	78.0	78.0
Effective Green, g (s)	17.0	17.0	23.0	105.0	78.0	78.0
Actuated g/C Ratio	0.13	0.13	0.18	0.81	0.60	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	203	182	301	1447	1075	914
v/s Ratio Prot	c0.16		0.21	c0.99	0.69	
v/s Ratio Perm		0.01				0.19
v/c Ratio	1.22	0.05	1.21	1.22	1.15	0.32
Uniform Delay, d1	56.5	49.5	53.5	12.5	26.0	12.9
Progression Factor	1.00	1.00	0.99	0.99	1.00	1.00
Incremental Delay, d2	133.8	0.1	98.7	100.1	80.3	0.9
Delay (s)	190.3	49.6	151.4	112.6	106.3	13.8
Level of Service	F	D	F	F	F	B
Approach Delay (s)	157.9			119.2	80.1	
Approach LOS	F			F	F	

Intersection Summary

HCM Average Control Delay	106.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	992	883	141	1117	1040	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553	1656	1743	1759	1495
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553	1656	1743	1759	1495
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1012	901	144	1140	1061	239
RTOR Reduction (vph)	0	93	0	0	0	132
Lane Group Flow (vph)	1012	808	144	1140	1061	107
Heavy Vehicles (%)	4%	4%	9%	9%	8%	8%
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	53.0	53.0	7.0	69.0	58.0	58.0
Effective Green, g (s)	53.0	53.0	7.0	69.0	58.0	58.0
Actuated g/C Ratio	0.41	0.41	0.05	0.53	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	708	633	89	925	785	667
v/s Ratio Prot	c0.58		c0.09	0.65	c0.60	
v/s Ratio Perm		0.52				0.07
v/c Ratio	1.43	1.28	1.62	1.23	1.35	0.16
Uniform Delay, d1	38.5	38.5	61.5	30.5	36.0	21.5
Progression Factor	1.00	1.00	1.00	1.00	0.52	0.40
Incremental Delay, d2	201.3	136.4	323.6	114.1	159.0	0.0
Delay (s)	239.8	174.9	385.1	144.6	177.7	8.6
Level of Service	F	F	F	F	F	A
Approach Delay (s)	209.3			171.5	146.7	
Approach LOS	F			F	F	

Intersection Summary			
HCM Average Control Delay	180.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	25	60	0	25	135	60	1355	0	135	1470	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1752	1553		1759	1495	1656	1712		1671	1727	1495
Flt Permitted		0.74	1.00		1.00	1.00	0.04	1.00		0.04	1.00	1.00
Satd. Flow (perm)		1347	1553		1759	1495	66	1712		66	1727	1495
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	27	65	0	27	147	65	1473	0	147	1598	163
RTOR Reduction (vph)	0	0	28	0	0	88	0	0	0	0	0	11
Lane Group Flow (vph)	0	190	37	0	27	59	65	1473	0	147	1598	152
Heavy Vehicles (%)	4%	4%	4%	8%	8%	8%	9%	11%	9%	8%	10%	8%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		16.0	16.0		16.0	16.0	106.0	106.0		106.0	106.0	106.0
Effective Green, g (s)		16.0	16.0		16.0	16.0	106.0	106.0		106.0	106.0	106.0
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.82	0.82		0.82	0.82	0.82
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		166	191		216	184	54	1396		54	1408	1219
v/s Ratio Prot					0.02			0.86			0.93	
v/s Ratio Perm		c0.14	0.02			0.04	0.99			c2.21		0.10
v/c Ratio		1.14	0.19		0.12	0.32	1.20	1.06		2.72	1.13	0.12
Uniform Delay, d1		57.0	51.2		50.8	52.0	12.0	12.0		12.0	12.0	2.5
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		114.0	0.5		0.3	1.0	187.8	40.1		824.5	70.0	0.2
Delay (s)		171.0	51.7		51.0	53.1	199.8	52.1		836.5	82.0	2.7
Level of Service		F	D		D	D	F	D		F	F	A
Approach Delay (s)		140.6			52.8			58.3			133.4	
Approach LOS		F			D			E			F	

Intersection Summary

HCM Average Control Delay	100.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.52		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	0	40	0	0	5	40	1315	0	5	1430	95
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	0	43	0	0	5	43	1429	0	5	1554	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3082	3082	1554	3125	3082	1429	1554			1429		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3082	3082	1554	3125	3082	1429	1554			1429		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	0	100	68	100	100	97	89			99		
cM capacity (veh/h)	6	10	138	4	10	160	406			457		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	147	5	43	1429	0	5	1554	103
Volume Left	103	0	43	0	0	5	0	0
Volume Right	43	5	0	0	0	0	0	103
cSH	9	80	406	1700	1700	457	1700	1700
Volume to Capacity	16.68	0.07	0.11	0.84	0.00	0.01	0.91	0.06
Queue Length 95th (ft)	Err	5	9	0	0	1	0	0
Control Delay (s)	Err	53.2	14.9	0.0	0.0	13.0	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	Err	53.2	0.4			0.0		
Approach LOS	F	F						

Intersection Summary			
Average Delay	446.5		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	115	45	45	1240	1355	115
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	49	49	1348	1473	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2918	1473	1473			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2918	1473	1473			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	0	68	89			
cM capacity (veh/h)	15	154	437			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	174	49	1348	1473	125
Volume Left	125	49	0	0	0
Volume Right	49	0	0	0	125
cSH	20	437	1700	1700	1700
Volume to Capacity	8.74	0.11	0.79	0.87	0.07
Queue Length 95th (ft)	Err	9	0	0	0
Control Delay (s)	Err	14.3	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	Err	0.5		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	549.1		
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	35	1250	15	35	1365
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	38	1359	16	38	1484
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		3				
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2918	1359			1359	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2918	1359			1359	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	0	78			92	
cM capacity (veh/h)	15	176			487	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	54	1359	16	38	1484
Volume Left	16	0	0	38	0
Volume Right	38	0	16	0	0
cSH	48	1700	1700	487	1700
Volume to Capacity	1.14	0.80	0.01	0.08	0.87
Queue Length 95th (ft)	124	0	0	6	0
Control Delay (s)	312.1	0.0	0.0	13.0	0.0
Lane LOS	F			B	
Approach Delay (s)	312.1	0.0		0.3	
Approach LOS	F				

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: SR 155 & Bill Gardner Parkway

9/6/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	369	143	184	308	67	150	567	143	184	1081	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1615	1805	1849		1805	1900	1615	1805	1900	1615
Flt Permitted	0.15	1.00	1.00	0.14	1.00		0.05	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	281	1900	1615	262	1849		104	1900	1615	461	1900	1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	135	397	154	198	331	72	161	610	154	198	1162	163
RTOR Reduction (vph)	0	0	112	0	6	0	0	0	70	0	0	40
Lane Group Flow (vph)	135	397	42	198	397	0	161	610	84	198	1162	123
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	34.0	27.0	27.0	38.0	29.0		79.0	73.0	73.0	89.0	78.0	78.0
Effective Green, g (s)	34.0	27.0	27.0	38.0	29.0		79.0	73.0	73.0	89.0	78.0	78.0
Actuated g/C Ratio	0.24	0.19	0.19	0.27	0.21		0.56	0.52	0.52	0.64	0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	144	366	311	170	383		132	991	842	399	1059	900
v/s Ratio Prot	0.05	0.21		c0.07	0.21		c0.05	0.32		0.04	c0.61	
v/s Ratio Perm	0.18		0.03	c0.24			c0.64		0.05	0.28		0.08
v/c Ratio	0.94	1.08	0.13	1.16	1.04		1.22	0.62	0.10	0.50	1.10	0.14
Uniform Delay, d1	48.8	56.5	46.8	46.5	55.5		39.9	23.6	16.9	16.0	31.0	14.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.8	71.6	0.2	120.3	56.1		149.1	2.9	0.2	1.0	58.2	0.3
Delay (s)	104.6	128.1	47.0	166.8	111.6		188.9	26.5	17.1	17.0	89.2	15.2
Level of Service	F	F	D	F	F		F	C	B	B	F	B
Approach Delay (s)		105.3			129.8			53.2			71.9	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	82.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	111.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

GRESHAM
SMITH AND
PARTNERS

March 27, 2009

MEETING MINUTES

SR 155 from Spalding County line to east of I-75 Safety Improvement Concept
CSSTP-0002-00(882), Henry County, PI No. 0002882
GS&P Project No. 24643.06

MEETING DATE: March 27, 2009

PARTICIPANTS: Derrick Cameron - Georgia Department of Transportation (GDOT), Office of Traffic Operations
Landon Perry - Georgia Department of Transportation (GDOT), Office of Traffic Operations
Thomas Howell - Georgia Department of Transportation (GDOT), District 3
Bill Rountree - Georgia Department of Transportation (GDOT), District 3
Mike England - Georgia Department of Transportation (GDOT), District 3
Kerry Gore - Georgia Department of Transportation (GDOT), District 3
Jody Braswell - Gresham, Smith and Partners (GS&P)
Eric Rickert - Gresham, Smith and Partners (GS&P)

DISCUSSION: PROJECT TEAM CONCEPT MEETING

A meeting was held on March 27, 2009 for the SR 155 Safety Improvement Project in Henry County. The project begins at Henry/Spalding County line and ends past the I-75/SR 401 interchange.

GS&P began by discussing the design methodology used to create the findings in the draft concept report. GS&P then discussed the following locations along the project where they recommended improvements.

1. SR 155 intersection with Greenwood Industrial Parkway. It is proposed to add lighting improvements at this intersection.
2. SR 155 intersection with Hunters Chase. It is proposed to add a northbound left turn lane at this intersection.
3. SR 155 between intersections with Hunters Chase and Stoney Brook Way. It is proposed to lower a nearby crest vertical curve on SR 155 to comply with AASHTO sight distance requirements at this intersection.
4. SR 155 between intersections with Liberty Industrial Pkwy/Avalon Pkwy and I-75 SB ramps. It is proposed to shift the southbound through lane onto the adjacent existing commercial right turn lanes at this intersection. The former southbound through lane would then be restriped as a two-way left turn lane.
5. SR 155 between the intersections with I-75 SB ramps and I-75 NB ramps It is proposed to construct a raised concrete island along SR 155 that separates the southbound free flow right turn lane at this intersection . In addition, there would also be minor striping revisions here.