ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. # 262027-
EDS00-0441-00(020)
Laurens County
GDOT District 2 - Tennille
SR 31/US 441 Widening
North of CR 272 to South of I-16 @ CR 354

OFFICE Design Policy & Support

DATE 8/5/2013

FROM for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT **APPROVED REVISED CONCEPT REPORT**

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

Attachment

DISTRIBUTION:

Bobby Hilliard, Program Control Administrator
Genetha Rice-Singleton, State Program Delivery Engineer
Glenn Bowman, State Environmental Administrator
Cindy VanDyke, State Transportation Planning Administrator
Ben Rabun, State Bridge Engineer
Kathy Zahul, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Charles "Chuck" Hasty, State Materials Engineer
Mike Bolden, State Utilities Engineer
Paul Tanner, Asst. State Transportation Data Administrator
Attn: Systems & Classification Branch
Ken Thompson, Statewide Location Bureau Chief
Jimmy Smith, District Engineer
Neal O'Brien, District Preconstruction Engineer
Lynn Bean, District Utilities Engineer
Peter Emmanuel, Project Manager
BOARD MEMBER - 12th Congressional District
FHWA – attn: Rodney Barry, Georgia Division Administrator

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
REVISED PROJECT CONCEPT REPORT

Project Type:	Widening	P.I. Number:	262027
GDOT District:	District 2	County:	Laurens
Federal Route Number:	U.S. 441	State Route Number:	S.R. 31
Project Number:	EDS-441(20)		

The revised concept design reduces the widening/ upgrading of US 441/SR 31 from 7.6 miles to 4.6 miles in order to establish logical termini at SR 117. In addition, the reconstruction of CR 302 and CR 292/CR 521 were reevaluated to retain as much of the existing alignment as possible. These changes significantly reduce construction costs.

Submitted for approval:

Ben Cline , Florence & Hutcheson, Inc. — 5/30/13
Consultant Designer and Firm — DATE

Brent Rice, P.E. — 6/4/2013
Office Head — DATE

R. B. Eamand — 5/30/13
GDOT Project Manager — DATE

Recommendation for approval:

** Glenn Bowman /GMOST — 6/17/13
State Environmental Administrator — DATE

** Kathy Zahul /GMOST — 6/6/13
State Traffic Engineer — DATE

** Ben Rabun /GMOST — 6/5/13
State Bridge Design Engineer — DATE

** Recommendations on file – GMOST

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

* Cynthia L Vanke — 6-7-13
State Transportation Planning Administrator — DATE

* Upon approval of this concept report, the STIP will be amended to show these revised project limits.

PLANNING, APPROVED CONCEPT, & BACKGROUND DATA

Project Justification Statement:

The proposed US 441 project corridor serves as a north-south roadway for middle Georgia south of I-16 towards McRae and is classified as a Principal Rural Arterial. Project PI Number 262027, EDS000-0441-00(20) in Laurens County is the widening of SR 31/US 441 from SR 117 to just south of I-16 at CR 354 for a total length of approximately four miles. This project is listed in the current STIP with right-of-way funds programmed within the FY 2013-2016 timeframe and construction planned for long-range. US 441 is designated a Governor's Road Improvement Program (GRIP) route. Improvements to GRIP routes are intended to enhance connectivity and economic development opportunities for rural Georgia.

Two additional projects to the south are planned to extend the widening of SR 31/US 441 to McRae, PI 262064 and PI 262061. These projects are currently unfunded and are planned for long range.

Within the proposed project corridor limits, US 441 is a two-lane roadway from SR 117 to CR 521/Scotland Road for a distance of approximately 1.7 miles. Approximately 500 feet north of CR 521/Scotland Road, US 441 transitions to a four-lane undivided roadway with double yellow pavement striping separating the directional traffic for approximately two miles to approximately 0.4 mile south of I-16; there is an existing four-lane bridge over Turkey Creek. The four-lane undivided roadway then transitions to a four-lane divided roadway with a concrete median at the I-16 interchange.

Under the no build condition, annual average daily traffic (ADT) on the US 441 project corridor is expected to range from 13,740 to 16,660 vehicles per day (VPD) in the design year (2040), a 49 percent increase over existing year volumes. Truck volumes are estimated at 17 percent of total traffic. During peak hours, traffic currently operates at LOS "B" and "C" in the southern portion of the project area and LOS "C" and "D" in the northern portion. Without improvements, year 2040 peak hour conditions are anticipated to worsen to LOS "D" and "E", which represents unacceptable level-of-service, in accordance with statewide performance measures.

Crash statistics for the most recent three year period show a need to improve operations along the corridor. Examination of crash data shows that most of the crashes within the proposed project limits were either rear end (approximately 20 percent) and occurred at or near the intersecting county roads or were "run off the road" type crashes (approximately 20 percent). The principle roadway conditions contributing to these types of crashes are heavier congestion and the absence of dedicated turn lanes, which forces drivers to execute turns from a through lane. In 2009, crash rates on this section of US 441 were above the statewide average for similar facilities.

In the year 2040, traffic on US 441 is anticipated to operate an LOS 'C' or better south of SR 117, the proposed southern project limit. The proposed northern project limit ties into an existing four-lane divided roadway section with a raised median. The logical termini of this project will be confirmed by the NEPA document.

Improvements are needed within these project limits to reduce the frequency and severity of crashes, accommodate future traffic growth, and to maintain an acceptable level-of-service in accordance with statewide performance measures. This project is also needed to continue the completion of the US 441 GRIP corridor, which is intended to improve connectivity, provide safe travel, and spur opportunities for economic development in rural Georgia.

Description of the approved concept: The project includes widening and reconstruction of SR 31/US 441 from approximately 1500 ft. north of CR 272/Barron Farm Road to just south of I-16 at CR 354/Pine Hill Road. The roadway is proposed to be four 12 ft. travel lanes (two in each direction) divided with variable width median (44 ft. depressed grassed median from the beginning of the project to CR 302 and 20 ft. raised median from CR 302 to CR 354/Pine Hill Road). 10 ft. wide rural shoulders on the outside will be provided (6.5 ft. paved and 3.5 ft. graded).

PDP Classification: ☒ Major ☐ Minor

Federal Oversight: ☒ Full Oversight ☐ Exempt ☐ State Funded ☐ Other

Projected Traffic as shown in the approved Concept Report: AADT
Open Year (2000): 11,300 Design Year (2020): 22,000

Updated Traffic: AADT
Open Year (2020): 12,530 Design Year (2040): 16,660

Functional Classification (Mainline): Rural Arterial

VE Study anticipated: ☐ No ☐ Yes ☒ Completed – Date: 10/31/2007

PROPOSED REVISIONS

Approved Features:	Proposed Features:
• Project termini, Widening and reconstruction of SR 31/US 441 from approximately 1500 ft. North of CR 272/Barron Farm Road to just South of I-16 at CR 354/Pine Hill Road.	• Project termini, Widening and reconstruction of SR 31/US 441 from South of SR 117 to just South of I-16 at CR 354/Pine Hill Road
• Revised alignment, The following intersecting roads are proposed to be realigned with median crossovers at the intersection: CR 302 and CR 292.	• Revised alignment, The following side roads are proposed to be re-aligned with skew angles of less than 90 degrees in order to maintain more of the existing alignment and reduce construction impacts. CR 302 is tied in immediately behind the radius return
• Bridge Widening Existing bridge over Turkey Creek to be widened 19.35’ (5.9m)	• Bridge Widening No work on the bridge is proposed

Reason(s) for change: These changes incorporate the comments from the VE Study and establish the new project end point that aligns with the Logical Termini Report.

ENVIRONMENTAL

Project Air Quality:

Is the project located in a PM 2.5 Non-attainment area?	☒ No	☐ Yes
Is the project located in an Ozone Non-attainment area?	☒ No	☐ Yes
Is a Carbon Monoxide hotspot analysis required?	☒ No	☐ Yes

Potential environmental impacts of proposed revision: This revision proposes a shorter alignment; therefore, the potential environmental impacts are reduced. It is anticipated that this revision will have a minor effect on the environmental/project schedule.

Have proposed revisions been reviewed by environmental staff? ☒ No ☐ Yes

Environmental responsibilities (Studies/Documents/Permits): Responsibility for the reevaluation of the environmental document has not yet been determined.

Environmental impacts by section:

NEPA: The draft EA will need to be updated to reflect the revised special studies.
Ecology: It is anticipated that there will be reduced impacts to ecological resources.
Archeology: It is anticipated that there will be no additional effects on the archeological resources. The re-aligned sideroads shall be surveyed and included in the archeological report.
History: It is anticipated that there will be no additional effects on the historic resources.
Air & Noise: Air/Noise analysis will need to be updated to reflect new standards and traffic data.
Public Involvement: There will be no additional public outreach required.

PROJECT COST & ADDITIONAL INFORMATION

Updated Cost Estimate		Date of Estimate
Base Construction Cost:	$14,423,200.28	7/12/2013
Engineering and Inspection:	$721,160.01	7/12/2013
Liquid AC Adjustment:	$2,283,335.85	7/12/2013
Total Construction Cost:	$17,427,696.14	
Right-of-Way:	$9,492,417.50	5/20/2013
Utilities (reimbursable costs):	$1,075,625.00	5/13/2013

Environmental Mitigation:	$107,365.00	5/29/2013
TOTAL PROJECT COST:	**$28,103,103.64**	

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

Comments: None

Attachments:

1. Revised Concept Layout
2. Cost Estimate(s)
   a. Construction including Engineering and Inspection
   b. Completed Fuel & Asphalt Price Adjustment forms
   c. Right-of-Way
   d. Utilities
   e. Mitigation
3. Logical Termini Form
4. VE Implementation Letter
5. Traffic Diagrams
6. Traffic Report

APPROVALS

Concur: K. Joe Carpenter 7/19/2013
Director of Engineering

Approve: for Melinda Rust 7/29/13
Division Administrator, FHWA — Date

Approve: R M McMurray 8-2-13
Chief Engineer — Date

BEGIN PROJECT
EDS - 441(20)
PI NO. 262027

EMILY CURRIE RD/ CR 248

EASTMAN-DUBLIN HWY / SR 117

MATCHLINE A

DOYLE TAYLOR RD/ CR 195

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1300 Ridenour Blvd., Suite 300 • Kennesaw, GA 30152

Georgia Department of Transportation

LEGEND

- PROPOSED LAYOUT (EXISTING BRIDGE, LANE, MEDIAN, LANE)
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY AND PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT
- DISPLACEMENT
- STREAM
- WETLANDS
- CULTURAL RESOURCES

REVISED CONCEPT LAYOUT

EDS-441(20)
P.I. 262027

LAURENS COUNTY

US 441 FROM CR 248 TO CR 354

JULY 11, 2013

SHEET 1 OF 4

SCALE IN FEET
0 400 800 1600

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1300 Ridenour Blvd, Suite 300 • Kennesaw, GA 30152

GDOT
Georgia Department of Transportation

LEGEND

REVISED CONCEPT LAYOUT
EDS-441(20)
P.I. 262027
LAURENS COUNTY
US 441 FROM CR 248 TO CR 354
JULY 11, 2013
SHEET 2 OF 4

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GDOT
Georgia Department of Transportation

LEGEND
- PROPOSED LAYOUT
- EXISTING BRIDGE
- LANE
- MEDIAN
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY AND PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT
- DISPLACEMENT
- STREAM
- WETLANDS
- CULTURAL RESOURCES

REVISED CONCEPT LAYOUT

EDS-441(20)
P.I. 262027
LAURENS COUNTY
US 441 FROM CR 248 TO CR 354
JULY 11, 2013
SHEET 3 OF 4

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Georgia Department of Transportation

LEGEND

PROPOSED LAYOUT
EXISTING BRIDGE
LANE
MEDIAN
LANE
PROPOSED RIGHT OF WAY
EXISTING RIGHT OF WAY AND PROPERTY LINE
TEMPORARY CONSTRUCTION EASEMENT
DISPLACEMENT
STREAM
WETLANDS
CULTURAL RESOURCES

REVISED CONCEPT LAYOUT

EDS-441(20)
P.I. 262027

LAURENS COUNTY

US 441 FROM CR 248 TO CR 354

JULY 11, 2013

SHEET 4 OF 4

STATE HIGHWAY AGENCY

DATE : 07/12/2013
PAGE : 1

JOB DETAIL ESTIMATE

JOB NUMBER : 0262027 SPEC YEAR: 01
DESCRIPTION: US 441 LAURENS COUNTY

ITEMS FOR JOB 0262027

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0005	150-1000		LS	TRAFFIC CONTROL – EDS-441(20)	1.000	187500.00	187500.00
0010	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	71690.71	71690.72
0015	201-1500		LS	CLEARING & GRUBBING – EDS-441(20)	1.000	154000.00	154000.00
0020	205-0001		CY	UNCLASS EXCAV	168843.000	3.93	664886.85
0025	206-0002		CY	BORROW EXCAV, INCL MATL	41720.000	5.88	245313.60
0030	207-0203		CY	FOUND BKFILL MATL, TP II	258.000	51.89	13387.72
0035	310-1101		TN	GR AGGR BASE CRS, INCL MATL	129353.000	17.49	2262867.75
0040	318-3000		TN	AGGR SURF CRS	3562.000	19.17	68311.18
0045	402-1812		TN	RECYL AC LEVELING,INC BM&HL	28875.000	64.90	1874140.54
0050	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	48772.000	56.28	2744794.52
0055	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	22845.000	71.03	1622754.37
0060	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	31242.000	74.05	2313400.43
0065	413-1000		GL	BITUM TACK COAT	15454.000	2.55	39482.50
0070	433-1000		SY	REINF CONC APPROACH SLAB	635.000	144.40	91695.04
0075	441-0014		SY	DRIVEWAY CONCRETE, 4 IN TK	423.000	22.98	9721.15
0080	441-0016		SY	DRIVEWAY CONCRETE, 6 IN TK	148.000	34.47	5101.88
0085	441-0748		SY	CONC MEDIAN, 6 IN	13200.000	30.23	399104.11
0090	441-6740		LF	CONC CURB & GUTTER/ 8"X30" TP7	8600.000	13.49	116048.23
0095	500-3800		CY	CL A CONC, INCL REINF STEEL	35.000	856.48	29976.94
0100	550-1180		LF	STM DR PIPE 18",H 1-10	4342.000	36.73	159483.61
0105	550-1240		LF	STM DR PIPE 24",H 1-10	1340.000	45.20	60575.79
0110	550-1300		LF	STM DR PIPE 30",H 1-10	1168.000	48.73	56918.49
0115	550-1360		LF	STM DR PIPE 36",H 1-10	1230.000	55.86	68717.79
0120	550-1420		LF	STM DR PIPE 42",H 1-10	505.000	87.49	44186.52
0125	550-1421		LF	STM DR PIPE 42",H 10-15	148.000	87.49	12949.71
0130	550-1480		LF	STM DR PIPE 48",H 1-10	93.000	82.09	7635.10
0135	550-2150		LF	SIDE DR PIPE 15",H 1-10	1752.000	24.00	42048.00
0140	550-2180		LF	SIDE DR PIPE 18",H 1-10	388.000	28.41	11026.00
0145	550-2240		LF	SIDE DR PIPE 24",H 1-10	113.000	32.04	3621.35
0150	550-4115		EA	FLARED END SECT 15 IN, SIDE DR	92.000	280.16	25775.53
0155	550-4118		EA	FLARED END SECT 18 IN, SIDE DR	43.000	280.16	12047.26
0160	550-4124		EA	FLARED END SECT 24 IN, SIDE DR	3.000	339.17	1017.52
0165	550-4218		EA	FLARED END SECT 18 IN, ST DR	41.000	509.73	20899.29
0170	550-4224		EA	FLARED END SECT 24 IN, ST DR	25.000	598.90	14972.59

JOB DETAIL ESTIMATE

0175	550-4230	EA	FLARED END SECT 30 IN, ST DR	23.000	717.55	16503.73
0180	550-4236	EA	FLARED END SECT 36 IN, ST DR	23.000	1007.74	23178.14
0185	550-4242	EA	FLARED END SECT 42 IN, ST DR	10.000	1410.51	14105.19
0190	573-2006	LF	UNDDR PIPE INCL DRAIN AGGR 6"	2061.000	15.89	32758.79
0195	634-1200	EA	RIGHT OF WAY MARKERS	160.000	101.63	16261.38
0200	635-1000	LF	BARRICADES	50.000	76.02	3801.35
0205	641-1100	LF	GUARDRAIL, TP T	400.000	44.38	17755.35
0210	641-1200	LF	GUARDRAIL, TP W	3500.000	17.10	59881.29
0215	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	8.000	665.34	5322.73
0220	641-5012	EA	GUARDRAIL ANCHORAGE, TP 12	7.000	1971.43	13800.03
0225	668-1100	EA	CATCH BASIN, GP 1	9.000	2209.86	19888.81
0230	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	5.000	230.66	1153.34
0235	668-2100	EA	DROP INLET, GP 1	32.000	1823.43	58349.78
0240	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	2.000	200.18	400.37
0245	668-2200	EA	DROP INLET, GP 2	1.000	2515.32	2515.33
0250	668-5000	EA	JUNCTION BOX	1.000	1772.00	1772.01
0255	441-0204	SY	PLAIN CONC DITCH PAVING, 4 IN	77.000	38.93	2997.97
0260	603-2024	SY	STN DUMPED RIP RAP, TP 1, 24"	34.000	52.66	1790.68
0265	603-2182	SY	STN DUMPED RIP RAP, TP 3, 24"	721.000	44.26	31914.58
0270	603-7000	SY	PLASTIC FILTER FABRIC	755.000	3.14	2377.96
0275	700-6910	AC	PERMANENT GRASSING	58.000	511.38	29660.12
0280	700-7000	TN	AGRICULTURAL LIME	172.000	48.47	8337.22
0285	700-8000	TN	FERTILIZER MIXED GRADE	52.000	470.77	24480.20
0290	700-8100	LB	FERTILIZER NITROGEN CONTENT	2861.000	1.80	5175.21
0295	710-9000	SY	PERM SOIL REINFORCING MAT	344.000	4.93	1696.92
0300	716-2000	SY	EROSION CONTROL MATS, SLOPES	62964.000	1.05	66221.76
0310	163-0232	AC	TEMPORARY GRASSING	29.000	68.19	1977.69
0315	163-0240	TN	MULCH	258.000	211.55	54579.95
0320	163-0300	EA	CONSTRUCTION EXIT	7.000	1308.50	9159.57
0325	163-0503	EA	CONSTR AND REMOVE SILT CONTROL GATE,TP 3	106.000	338.66	35898.13
0330	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	158.000	17.15	2710.18
0335	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	275.000	2.83	780.58
0340	163-0531	EA	CONSTR & REM SEDIMENT BASIN,TP 1,STA NO - VARIOUS	13.000	8529.41	110882.40
0345	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	45.000	164.76	7414.31
0350	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	11834.000	0.61	7218.98
0355	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	10034.000	0.63	6340.48
0360	165-0060	EA	MAINT OF TEMP SEDIMENT BASIN,STA NO -	13.000	1107.46	14397.09
0365	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	275.000	1.25	345.68
0370	165-0087	EA	MAINT OF SILT CONTROL GATE, TP 3	106.000	33.83	3586.50
0375	165-0101	EA	MAINT OF CONST EXIT	7.000	496.31	3474.19
0380	167-1000	EA	WATER QUALITY MONITORING AND SAMPLING	2.000	274.67	549.35
0385	167-1500	MO	WATER QUALITY INSPECTIONS	24.000	421.08	10106.13
0390	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	11834.000	1.82	21637.88
0395	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	10034.000	2.84	28588.57

JOB DETAIL ESTIMATE

0400	636-1020	SF	HWY SGN,TP1MAT,REFL SH TP3	894.000	11.92	10657.03
0405	636-1029	SF	HWY SGN,TP2 MATL,REFL SH TP 3	82.000	16.06	1317.58
0410	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	612.000	14.72	9012.12
0415	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	12.000	30.46	365.62
0420	636-2070	LF	GALV STEEL POSTS, TP 7	1889.000	5.43	10259.67
0425	636-2080	LF	GALV STEEL POSTS, TP 8	1474.000	8.39	12381.35
0430	636-3010	EA	GROUND-MOUNTED BREAKAWAY SIGN SUPPORT	27.000	463.24	12507.52
0435	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	105.000	69.24	7270.69
0440	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	5.000	85.46	427.32
0445	653-0170	EA	THERM PVMT MARK, ARROW, TP 7	22.000	85.83	1888.39
0450	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	80595.000	0.36	29783.08
0455	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	79836.000	0.37	30282.59
0460	653-1704	LF	THERM SOLID TRAF STRIPE,24",WH	275.000	6.04	1661.45
0465	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	52260.000	0.25	13223.87
0470	653-6004	SY	THERM TRAF STRIPING, WHITE	8113.000	2.67	21675.50
0475	653-6006	SY	THERM TRAF STRIPING, YELLOW	3569.000	2.92	10434.76
0480	654-1001	EA	RAISED PVMT MARKERS TP 1	440.000	2.84	1249.61
0485	654-1003	EA	RAISED PVMT MARKERS TP 3	1479.000	3.05	4513.33
0490	654-1010	EA	RAISED PVMT MARKERS TP 10	76.000	34.95	2656.83
0495	657-1054	LF	PRF PL SD PVMT MKG,5",WH,TP PB	275.000	6.75	1857.26
0500	657-3054	GLF	PRF PL SK PVMT MKG,5",WH,TP PB	275.000	2.46	678.91
0505	657-6054	LF	PRF PL SD PVMT MKG,5",YW,TP PB	275.000	4.71	1295.82

ITEM TOTAL	14423200.28
INFLATED ITEM TOTAL	14423200.28

TOTALS FOR JOB 0262027

ESTIMATED COST:	14423200.28
CONTINGENCY PERCENT (0.0):	0.00
ESTIMATED TOTAL:	14423200.28

PROJ. NO.	EDS-441(20)
P.I. NO.	262027
DATE	7/12/2013

CALL NO.

INDEX (TYPE)	DATE	INDEX
REG. UNLEADED	Apr-13	$ 3.352
DIESEL		$ 3.772
LIQUID AC		$ 572.00

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)			**2260555.44**	**$ 2,260,555.44**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$ 915.20	
Monthly Asphalt Cement Price month project let (APL)			$ 572.00	
Total Monthly Tonnage of asphalt cement (TMT)			6586.7	

ASPHALT	Tons	%AC	AC ton
Leveling	28875	5.0%	1443.75
12.5 OGFC		5.0%	0
12.5 mm	22845	5.0%	1142.25
9.5 mm SP		5.0%	0
25 mm SP	48772	5.0%	2438.6
19 mm SP	31242	5.0%	1562.1
	131734		**6586.7**

BITUMINOUS TACK COAT

Price Adjustment (PA)			**$ 22,780.41**	**$ 22,780.41**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$ 915.20	
Monthly Asphalt Cement Price month project let (APL)			$ 572.00	
Total Monthly Tonnage of asphalt cement (TMT)			66.37648965	

Bitum Tack Gals	gals/ton	tons
15454	232.8234	66.3764896

PROJ. NO.	EDS-441(20)		CALL NO.
P.I. NO.	262027		
DATE	7/12/2013		

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)				**0**	**$ -**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	915.20	
Monthly Asphalt Cement Price month project let (APL)			$	572.00	
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	**$**	**2,283,335.85**

GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 5/20/2013 Project: 262027
Revised: County: Laurens
PI: 0262027
Description: SR 31/US 441 FM N of CR 272 to just S of I-16@CR 364
Project Termini: SR 31/US 441 FM N of CR 272 to just S of I-16@CR 364
Existing ROW: Varies
Parcels: 94 Required ROW: Varies

Land and Improvements		$7,186,717.50
Proximity Damage	*$200,000.00*	
Consequential Damage	*$275,000.00*	
Cost to Cures	*$0.00*	
Trade Fixtures	*$0.00*	
Improvements	*$1,760,000.00*	
Valuation Services		$123,750.00
Legal Services		$625,950.00
Relocation		$588,000.00
Demolition		$150,000.00
Administrative		$818,000.00
TOTAL ESTIMATED COSTS		$9,492,417.50
TOTAL ESTIMATED COSTS (ROUNDED)		***$9,493,000.00***

Preparation Credits	Hours	Signature

Prepared By: CG#: 286999 05/20/2013 (DATE)
Approved By: CG#: 286999 05/20/2013 (DATE)

NOTE: No Market Appreciation is included in this Preliminary Cost Estimate

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE EDS00-0441-00(020) Laurens County
P.I. No. 262027
SR 31/US 441 From North of CR 272 to Just South of I-16 @ CR 354

OFFICE Tennille

DATE May 13, 2013

FROM Lynn Bean
District Utilities Engineer

TO Peter Emmanuel, Project Manager

SUBJECT UPDATED PRELIMINARY UTILITY COST (ESTIMATE)

As requested by your office, we are furnishing you with an UPDATED Preliminary Utility Cost estimate for the subject project.

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
AT&T	$ 813,215.00	$ 101,250.00
Little Ocmulgee EMC	$ 555,000.00	$ 795,000.00
Progressive Rural Telephone	$ 335,625.00	$ 525.00
City of Dublin	$ 815,100.00	$ 78,850.00
Charter Communications	$ 141,900.00	$ 0.00
Georgia Power Company (Trans.)	$ 0.00	$ 100,000.00
TOTAL	**$2,660,840.00**	**$1,075,625.00**

TOTAL ESTIMATED REIMBURSABLE UTILITY COST = $1,075,625.00

** If the City of Dublin-Gas requests and is granted utility aid then the $815,100.00 would move to the Reimbursable Column.

If you have any questions, please contact Lynn Bean at 478-552-4646.

LB/MS

cc: Mike Bolden, P.E., State Utilities Engineer (email only)
Daniel Smith, Area Engineer (email only)

File

Widening of US 441/SR 31 - Laurens County
EDS-441(20)
P.I. 262027
Environmental Mitigation Cost Estimate
5/29/2013

Impacts	Acres	Linear Feet	Cost per acre	Cost per lf	Total
Wetland 47	0.08	N/A	$ 7,500.00	$ 70.00	$ 600.00
Wetland 47A	0.51	N/A	$ 7,500.00	$ 70.00	$ 3,825.00
Wetland 48	0.17	N/A	$ 7,500.00	$ 70.00	$ 1,275.00
Stream 38	N/A	206	$ 7,500.00	$ 70.00	$ 14,420.00
Stream 39	N/A	275	$ 7,500.00	$ 70.00	$ 19,250.00
Wetland 48A	0.79	N/A	$ 7,500.00	$ 70.00	$ 5,925.00
Stream 40	N/A	168	$ 7,500.00	$ 70.00	$ 11,760.00
Stream 41	N/A	98	$ 7,500.00	$ 70.00	$ 6,860.00
Wetland 49	0.96	N/A	$ 7,500.00	$ 70.00	$ 7,200.00
Wetland 50	0.35	N/A	$ 7,500.00	$ 70.00	$ 2,625.00
Wetland 51	0.17	N/A	$ 7,500.00	$ 70.00	$ 1,275.00
Wetland 51A	0.60	N/A	$ 7,500.00	$ 70.00	$ 4,500.00
Wetland 52	0.18	N/A	$ 7,500.00	$ 70.00	$ 1,350.00
Stream 44	N/A	113	$ 7,500.00	$ 70.00	$ 7,910.00
Wetland 53	0.40	N/A	$ 7,500.00	$ 70.00	$ 3,000.00
Stream 45	N/A	212	$ 7,500.00	$ 70.00	$ 14,840.00
Open Water Parcel 135	0.10	N/A	$ 7,500.00	$ 70.00	$ 750.00
TOTAL	**4.31**	**1072**			**$ 107,365.00**

PROJECT NEED, EFFECTIVENESS, AND LOGICAL TERMINI JUSTIFICATION FORM
Project Number: EDS000-0441-00(20)
County: Laurens
P.I. Number 262027
Description: US 441 from Barron Farm/Mayberry Road to Scotland Road

PROJECT DESCRIPTION

The current programmed project PI Number 262017, EDS000-0441-00(20) in Laurens County is defined as the widening of SR 31/US 441 from north of CR 272 to just south of I-16 at CR 354 for a total length of 7.93 miles. The section of US 441 from just north of CR 521/Scotland Road to the interchange with I-16 has already been widened to four lanes so for the purposes of this study, project PI 262027 would consist of widening improvements to the existing two and three lane US 441/SR 31 roadway corridor from CR 272/Barron Farm Road/CR 176/Mayberry Road to the existing four-lane section just north of CR 521/Scotland Road in Laurens County for a project length of approximately 5.3 miles (see Attachment 1: Figure 1 – Project Location Map). The existing two and three lane rural roadway would be widened to four lanes and would include a grassed median, rural shoulders, and at-grade intersections. The four-lane undivided roadway from just north of CR 521/Scotland Road to CR 354 would be widened to include a raised median; however no improvements would be made to capacity.

The US 441 corridor travels north-south throughout the State of Georgia from Florida to North Carolina and serves as a major transportation artery in the east/central part of Georgia. The proposed US 441 project corridor serves as a north-south roadway for middle Georgia south of I-16 towards McRae and is classified as a Principal Rural Arterial. Existing land use along the proposed project corridor is largely forestry, with small pockets of agriculture, residential, and park/recreation/conservation scattered along the corridor and primarily located at side road intersections.

Within the proposed project corridor limits, US 441 is a three-lane undivided roadway with two northbound lanes and one southbound lane from CR 272/Barron Farm Road/CR 176/Mayberry Road to JJ Club Road for a

distance of approximately two miles and a two-lane roadway from JJ Club Road to CR 521/Scotland Road for a distance of approximately 3.3 miles. Approximately 500 feet north of CR 521/Scotland Road US 441 transitions to a four-lane undivided roadway with double yellow pavement striping separating the directional traffic for approximately two miles to approximately 0.4 mile south of I-16; there is an existing four-lane bridge over Turkey Creek. The four-lane undivided roadway then transitions to a four-lane divided roadway with a raised concrete median at the I-16 interchange.

Existing right-of-way along the proposed project corridor is approximately 100 feet; proposed right-of-way is anticipated to be 200 feet. The Right-of-Way phase is scheduled for Fiscal Year (FY) 2016 and the Construction phase for FY 2018.

NEED AND EFFECTIVENESS

The proposed project is needed to relieve congestion and reduce the potential for crashes and crash related injuries and fatalities. These needs and the effectiveness of the project for addressing them are analyzed in this section. Although data for the existing year (2012) and opening year (2020) are presented, the analysis focuses primarily on the design year (2040, the planning horizon).

Annual Daily Traffic (ADT) and Peak-hour Traffic

Under the no build condition, annual average daily traffic (ADT) on the US 441 project corridor is expected to range from 5,520 to 14,200 vehicles per day (vpd) in the design year, a 48.8 percent increase over existing year volumes (see Table 1). The proposed project is not expected to generate any additional growth and development; therefore, build condition ADT is the same as no-build condition ADT.

Traffic projections assume that both the existing and proposed typical sections would fully accommodate demand for peak hour travel; therefore, peak hour traffic as a percentage of ADT is assumed to be the same (approximately 28 percent) under the build and no-build conditions.

Traffic Operations and Congestion

The primary measure of traffic operations and congestion used by GDOT is level-of-service (LOS) grades. Generally, grades of A-C are viewed as acceptable, while LOS E and F are unacceptable. LOS D is regarded as minimally acceptable in urban areas and unacceptable in rural areas. Exceptions to these standards may be recommended if no prudent alternatives are available and if the project would yield some improvement in LOS relative to the no-build alternative or a substantial improvement in the quantitative determinants of LOS—seconds of delay for intersections and average travel speed for road segments – in traffic operations over the No-Build alternative.

No-build and build condition LOS grades for the project corridor road segments are shown in Tables 1, 2, and 3, while data for the project corridor intersections are displayed in Tables 4 and 5. The no-build condition data evidence a need for capacity improvements. However the need for improvements does not extend throughout the project limits as currently proposed; rather the no-build condition data evidence a need for capacity improvements from SR 117 north to the existing four-lane section just north of CR 521/Scotland Road. The analysis presented in the following paragraphs is limited to the corridor from SR 117 to the existing four-lane section just north of CR 521/Scotland Road as evidenced by the no-build condition data.

For the roadway, the average no-build condition LOS grade in the design year is E (1.5) in the am and D (2.0) in the pm.[1] For the three major intersections on the corridor, the average LOS grade is D in both the am and pm. Overall, design year LOS is expected to be unacceptable by rural standards (D or worse) for 100 percent of the roadway movements and 28 percent of the intersection movements.

Build condition data indicate that the proposed project would be effective for providing acceptable LOS grades for the roadway movements. All of the roadway grades reach the acceptable level of LOS A, and improvement by an average of 3.25 letter grades. For the intersection analysis in the build condition SR 117 is realigned to

[1] Average LOS is calculated on a scale in which LOS F=0 and LOS A=5.

form a four-leg intersection with a minor roadway, and Springhaven Road and CR 521/Scotland Road are realigned with each other to form a four-leg intersection; both are designed as stop condition for the minor side roads. The overall LOS at the SR 117 intersection improves by one letter grade from LOS D to C and the overall LOS at the new Springhaven Road and CR 521/Scotland Road intersection degrades by two letter grades from LOS D to F.

The one intersection where build condition LOS would be unacceptable is listed in Table 6. The table identifies the causes of congestion at this location and cites the most reasonable alternative for bringing LOS up to a minimally acceptable grade. As can be seen, the substandard grades are for a stop-controlled intersection. The LOS grade for this intersection is for the side street (stop-controlled) left turning movement rather than the mainline. Although signalizing this intersection would improve the LOS to A by assisting side street turning movements, a full signal warrant analysis has not yet been completed.

Crashes

A quantitative methodology for predicting future crash rates under the no-build and build conditions has recently been put forth in the Highway Safety Manual (HSM). The release of the first edition of the Highway Safety Manual (HSM) by the American Association of State Highway and Transportation Officials (AASHTO) provides a science-based method for estimating safety performance in meaningful quantitative terms; however, there are limitations to the types of facilities that can be analyzed by this first edition of the HSM. GDOT recognizes how integrating the HSM into the disciplines of Planning, Environment, Design, Operations and Maintenance will add value to the project development process, and the agency is committed to establishing a statewide policy. At this time, however, HSM has not been fully implemented and is not available for use in preparing this form. If HSM has been has been made available to OES at the time the Environmental Assessment is prepared, the analysis will be included in that document. For purposes of this form, recent crash statistics will be examined to document project need, and research and other qualitative discussion will be provided to predict project effectiveness.

Table 7 compares crash, injury, and fatality rates on the project corridor to statewide rates for similarly classified roadways. The rates are presented for the most recent three year period available. As can be seen, crash and injury rates exceed statewide averages for similar facilities in at least one out of the three years examined. The fatality rates exceed statewide averages for similar facilities in just one out of the three years examined.

Not only do statistics show that crashes are already a concern on the project corridor, traffic growth could increase the frequency and severity of crashes over time unless roadway conditions are improved. Examination of crash data shows that most of the crashes within the proposed project limits were either rear end (approximately 20 percent) and occurred at or near the intersecting county roads or were "run off the road" type crashes (approximately 20 percent). The principle roadway conditions contributing to these types of crashes are heavier congestion and the absence of dedicated turn lanes, which forces drivers to execute turns from a through lane. The proposed project would address this condition by adding capacity along the corridor from SR 117 north to the existing four-lane section just north of CR 521/Scotland Road, adding a raised median to the existing four-lane corridor from just north of CR 521/Scotland Road to CR 354, and turn lanes as needed at intersections along the entire corridor.

Conclusion

Based on this analysis, GDOT requests FHWA's concurrence that the proposed project would effectively address a valid need and purpose for capacity improvements to the corridor from SR 117 to the existing four-lane section just north of CR 521/Scotland Road and operational improvements to the corridor from just north of CR 521/Scotland Road to CR 354 . GDOT understands that the project's need and effectiveness must be reexamined in the NEPA document, and that FHWA may withdraw its concurrence based on the analysis provided in that document.

LOGICAL TERMINI

As previously noted, the proposed improvements to US 441 were initially proposed to begin at CR 272/Barron Farm Road/CR 176/Mayberry Road and end at CR 354. However the need for improvements does not extend throughout the project limits as currently proposed; rather the no-build condition data evidence a need for capacity improvements from SR 117 north to the existing four-lane section just north of CR 521/Scotland Road and operational improvements to the existing four-lane section from just north of CR 521/Scotland Road to CR 354. The logical termini analysis presented in the following paragraphs is limited to the corridor from SR 117 to the existing four-lane section just north of CR 521/Scotland Road. The existing typical section is two lane beyond the beginning terminus and four lane beyond the ending terminus.

Logical termini must be demonstrated for capacity adding projects such as the one under consideration. For a project to have logical termini, it must have logical ending points that allow for the consideration of environmental impacts on a sufficiently broad scope, must have independent utility, and must not restrict the consideration of avoidance alternatives on reasonably foreseeable projects. This "three pronged test" has been applied to the proposed termini of this project, and the results are discussed in this section. As with the analysis of the project's need and effectiveness, the logical termini analysis centers on the design year data.

Logical Ending Points and Evaluation of Environmental Impacts on a Sufficiently Broad Scope

This analysis defines "logical ending points" as points on the project route where no-build condition LOS reaches an acceptable grade level. In accordance with FHWA guidance, GDOT assumes that even if LOS is unacceptable beyond a terminus, the terminus may be deemed logical provided the project stands on its own

(has independent utility) and there is no likelihood of improving the entire corridor in the near future (i.e., there are no projects planned to continue improvements beyond either terminus).[2]

No build condition LOS grades for the road segment and next major intersection beyond the project beginning termini are shown in Table 9. As can be seen, the grades are acceptable (C or better) beyond the beginning terminus thus signifying that the proposed beginning terminus serves as a logical ending point.

The ending terminus for the proposed project connects to the existing four-lane section approximately 500 feet north of CR 521/Scotland Road. A raised median is proposed to be constructed within the limits of the existing four-lane section from north of CR 521/Scotland Road to CR 354; no capacity improvements would be made to this section of corridor. The proposed four-lane facility from SR 117 to 500 feet north of CR 521/Scotland Road would provide continuity of capacity and operations for traffic traveling to and from I-16 along the proposed corridor and would eliminate a traffic bottleneck for southbound vehicles. The elimination of this bottleneck and the connection to an existing improved facility with the same typical section provide for a logical ending terminus; therefore no further analysis is required of the ending terminus.

There are no projects planned to further widen US 441 beyond the ending terminus (northern). Since the data for the US 441 corridor beyond the beginning terminus (southern) to CR 272/Barron Farm Road/CR 176/Mayberry Road does not evidence the need for capacity improvements in the design year, it is proposed that this portion of the project be reprogrammed with the proposed project PI 262064, the long range plan to widen US 441 from SR 46 to CR 272. A full traffic analysis of this section is necessary to determine the need for this project, however the data available for US 441 north of CR 272 clearly indicates that no improvements are required along US 441 south of SR 117 prior to the year 2040. Attachment 1, Table 8 lists planned projects in the vicinity of the proposed project.

[2] Case #2 of FHWA's guidance paper, "The Development of Logical Project Termini," specifies that a terminus on an existing facility can be logical even in the absence of a traffic drop provided the three conditions are met. This analysis substitutes "no-build condition LOS" for "no-build condition traffic" as a measure of whether the need for improvements continues beyond the terminus."

Independent Utility

Logical termini guidance requires that a project be able to stand on its own—not requiring other improvements to meet its need and purpose and not forcing a need for improvements beyond its termini or on other routes.

Analysis demonstrates that the proposed project would meet these requirements. That other improvements are not required for this project to achieve its need and purpose has been demonstrated in the effectiveness analysis, which examined project performance independently of the effect of any other planned project. Table 10 shows build and no build condition ADT and LOS grades and the quantitative determinants of LOS for the road segment immediately beyond the beginning termini and the next intersection beyond the beginning termini. The potential for the project to force improvements outside of the project corridor does not exist since the project would not cause an increase in ADT and peak hour traffic that could spill over beyond the termini or onto intersecting routes. Hence, the proposed demonstrates independent utility.

Planned Projects and the Restriction of the Consideration of Alternatives for Reasonably Foreseeable Projects

To be consistent with logical termini criteria, a project must not be planned to continue improving the corridor beyond the termini and the proposed project must not preclude the consideration of alternatives for any intersecting project.

Table 8 lists planned projects in the vicinity of the proposed project. There are two long range projects (PI 262064 and PI 262061) planned to continue widening US 441 south to CR 132 in McRae. Whether or not these long range planned projects move forward, neither would affect flexibility in setting the alignment or typical section for the US 441 project from SR 117 to the existing four-lane section just north of CR 521/Scotland Road or the addition of a raised median from just north of CR 521/Scotland Road to CR 354; and the widening from SR 117 to the existing four-lane section just north of CR 521/Scotland Road nor the addition of a raised median

from just north of CR 521/Scotland Road to CR 354 would not affect flexibility in setting the alignment of typical section for the two long range planned projects.

Conclusion

Based on the above analysis, OES requests FHWA's determination that that the proposed termini are logical.

Logical Termini Form

Attachment 1

Figures and Tables

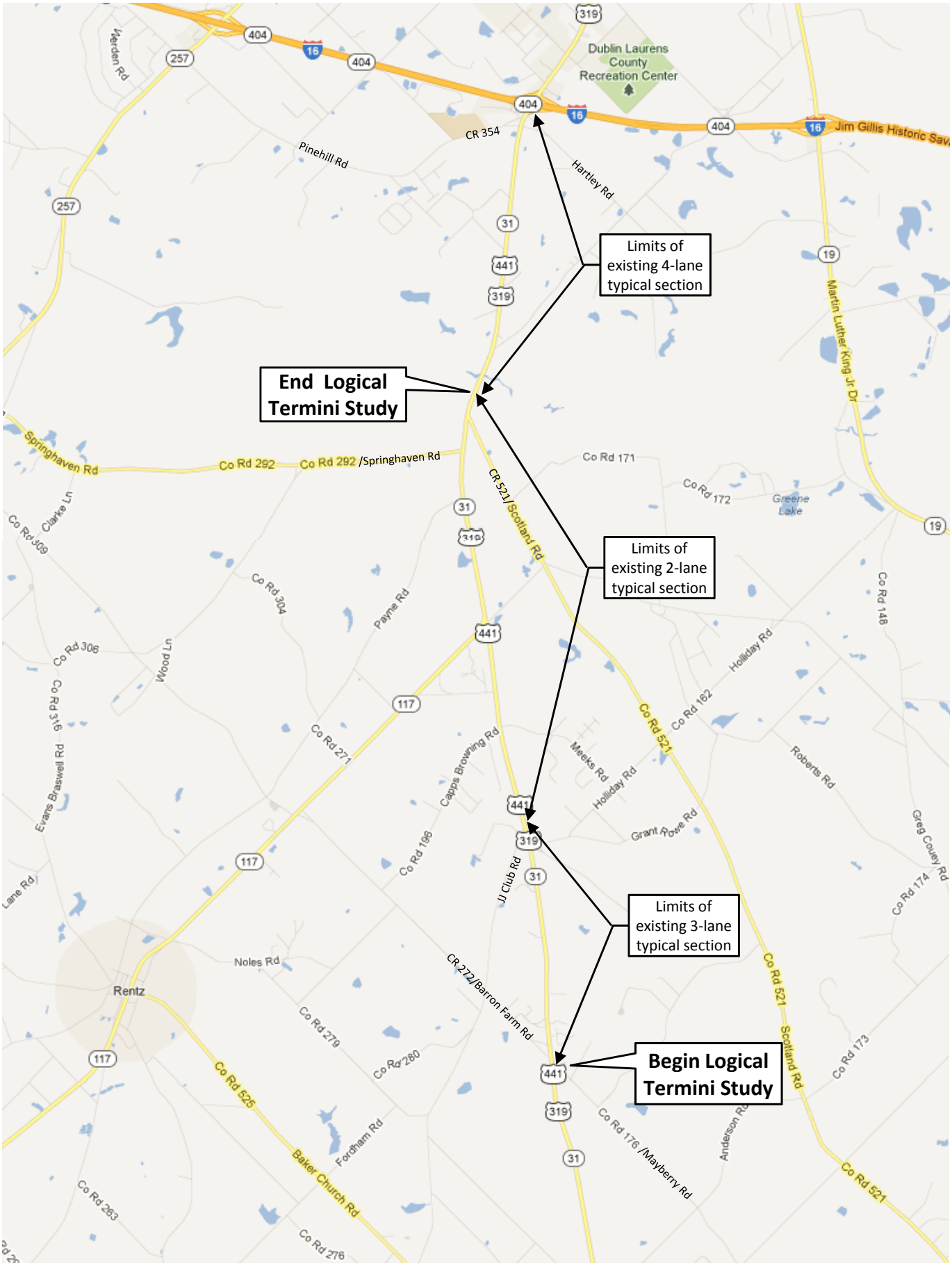


Figure 1:
Project Location Map

Not to Scale
Source: Google Maps

US 441 from CR 272/Barron Farm/CR 176Mayberry Road to Scotland Road
Project No: EDS000-0441-00(20)
PI No: 262027
Laurens County, Georgia

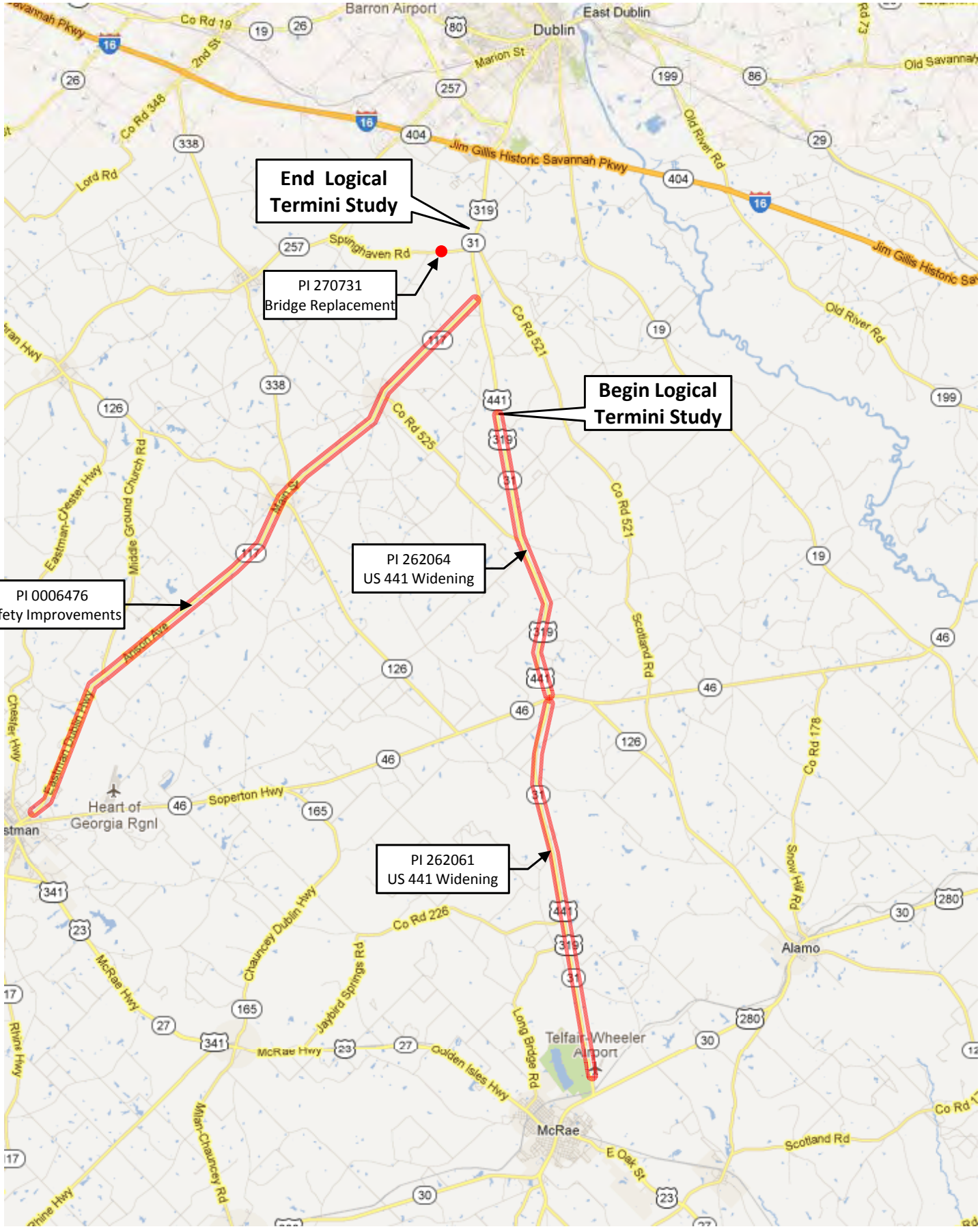


Figure 2:
Planned Area Projects

Not to Scale
Source: Google Maps

US 441 from CR 272/Barron Farm/CR 176Mayberry Road to Scotland Road
Project No: EDS000-0441-00(20)
PI No: 262027
Laurens County, Georgia

Table 1: Average Daily Traffic

Roadway Segment Limits	*2012 Existing*	*2020 (Open)*		*2040 (Design)*	
		No Build	*Build*	*No Build*	*Build*
CR 272/Barron Farm Road/CR 176/Mayberry Road to JJ Club Road	4,480	5,020	5,020	6,680	6,680
JJ Club Road to SR 117	6,160	6,910	6,910	9,910	9,910
SR 117 to Springhaven Road	9,240	10,350	10,350	13,770	13,770
Springhaven Road to CR 521/Scotland Road[1]	9,540	10,680	-	14,200	-
CR 521/Scotland Road to existing four-lane section	11,190	12,530	12,530	16,660	16,660

1. In the Build Condition Springhaven Road and Scotland Road are realigned to form a four-leg intersection.

Table 2: Roadway Segment Analysis for Open Year (2020)

Roadway Segment Limits	*2020 No Build Condition*				*2020 Build Condition*			
	# Lanes	AADT	*AM Peak Hour LOS*	*PM Peak Hour LOS*	*# Lanes*	AADT	*AM Peak Hour LOS*	*PM Peak Hour LOS*
CR 272/Barron Farm Road/CR 176/Mayberry Road to JJ Club Road	3	5,020	B	B	3	5,020	B	B
JJ Club Road to SR 117	3	6,910	C	B	3	6,910	C	B
SR 117 to Springhaven Road	2	10,350	D	C	4	10,350	A	A
Springhaven Road to CR 521/Scotland Road[1]	2	10,680	D	C	4	10,680	-	-
CR 521/Scotland Road to existing four-lane section	2	12,530	D	D	4	12,530	A	A

1. In the Build Condition Springhaven Road and Scotland Road are realigned to form a four-leg intersection.

Table 3: Roadway Segment Analysis for Design Year (2040)

Roadway Segment Limits	*2040 No Build Condition*				*2040 Build Condition*			
	# Lanes	AADT	*AM Peak Hour LOS*	*PM Peak Hour LOS*	*# Lanes*	AADT	*AM Peak Hour LOS*	*PM Peak Hour LOS*
CR 272/Barron Farm Road/CR 176/Mayberry Road to JJ Club Road	3	6,680	C	B	3	6,680	C	B
JJ Club Road to SR 117	3	9,910	C	C	3	9,910	C	C
SR 117 to Springhaven Road	2	13,770	D	D	4	13,770	A	A
Springhaven Road to CR 521/Scotland Road[1]	2	14,200	D	D	4	14,200	-	-
CR 521/Scotland Road to existing four-lane section	2	16,660	E	D	4	16,660	A	A

1. In the Build Condition the intersections of Barron Farms Road and Mayberry Road are realigned to form a four-leg intersection.

Table 4: Intersection Analysis for Open Year (2020)

Intersection of US 441 at:	*2020 No Build Condition*		*2020 Build Condition*	
	AM Peak Hour LOS	*PM Peak Hour LOS*	*AM Peak Hour LOS*	*PM Peak Hour LOS*
CR 272/Barron Farm Road/CR 176/Mayberry Road	A	A	A	A
JJ Club Road	A	B	A	B
SR 117	C	B	C[1]	B[1]
Springhaven Road	C	C	D[2]	D[2]
CR 521/Scotland Road	C	B	D[2]	D[2]

1. In the Build Condition SR 117 is realigned to form a four-leg intersection with a minor roadway.
2. In the Build Condition Springhaven Road and Scotland Road are realigned to form a four-leg intersection.

Table 5: Intersection Analysis for Design Year (2039)

Intersection of US 441 at:	*2040 No Build Condition*		*2040 Build Condition*	
	AM Peak Hour LOS	*PM Peak Hour LOS*	*AM Peak Hour LOS*	*PM Peak Hour LOS*
CR 272/Barron Farm Road/CR 176/Mayberry Road	A	B	A	B
JJ Club Road	B	B	B	B
SR 117	D	D	C[1]	C[1]
Springhaven Road	D	D	F[2]	F[2]
CR 521/Scotland Road	D	C	F[2]	F[2]

1. In the Build Condition SR 117 is realigned to form a four-leg intersection with a minor roadway.
2. In the Build Condition Springhaven Road and Scotland Road are realigned to form a four-leg intersection.

Table 6: Causes of Substandard LOS and Restriction of Alternatives

Location	Year	Period	Cause of Poor LOS	Alternative to Improve LOS	Results of Alternative
Springhaven Road and CR 521/Scotland Road	Design	AM & PM	Stopped controlled for side street movements. Delay for low volume side road eastbound and westbound left turning traffic is in excess of 48 seconds in the build condition.	Signal	Springhaven Road and CR 521/Scotland Road volumes are low in comparison to US 441. A full signal warrant analysis should be completed; with signalization the intersection would improve to an overall LOS A.

Table 7: Crash, Injury and Fatality Rates Compared to Statewide Rates

Year	Total Crashes/Crash Rate	Total Injuries/Injury Rate	Total Fatalities/Fatality Rate
	Statewide Avg. Crash Rate	Statewide Avg. Injury Rate	Statewide Avg. Fatality Rate
2009	32/258	16/129	1/8.05
	113	37	1.45
2010	29/213	18/132	0/0.00
	Not available[1]	Not available[1]	Not available[1]
2011	22/153	9/63	0/0.00
	Not available[1]	Not available[1]	Not available[1]

1. As of the writing of this report, the 2010 and 2011 statewide crash averages are not available. If the 2010 and 2011 statewide rates are similar to that of 2009 then the crash and injury rates for 2010 and 2011 would exceed the statewide averages.

Table 8: Planned Projects in Area

Project Numbers	Description	Schedule/Status	Geographic Relationship to Proposed Project
PI 270731	CR 292 at Blue Water Creek, bridge replacement	ROW: Local CST: LR	Project approx. 1 mile west of US 441
PI 0006476	SR 117 from Eastman City to SR 29/US 441 south of Dublin, safety improvements (rumble strips and guardrail)	ROW: 2012 CST: Lump	Project intersects terminates at US 441
PI 262064	SR 31/US 441 from SR 46 north to SR 272/Barron Farm Road, widening	ROW: LR1 CST: LR1	Project south of beginning terminus of study.
PI 262061	SR 31/US 441 from north of CR 132 thru Dodge to SR 46, widening	ROW: LR1 CST: LR1	Project south of beginning terminus of study.

Table 9: Test for Logical End Points - - No Build Condition Beyond the Termini

Location	Opening Year (2020)		Design Year (2040)	
	ADT	LOS	ADT	LOS
Beyond Beginning Terminus (beginning terminus = SR 117)				
Roadway (JJ Club Road to SR 117)	6,910	C	9,910	C
Intersection (US 441 at JJ Club Road)	N/A	B[1]	N/A	B[1]

1. The AM and PM Peak intersection grades listed in Tables 4 and 5 have been condensed into a single LOS grade.

Table 10: Test for Independent Utility
No-build Condition LOS Compared to Build Condition LOS Beyond the Termini

Location	Opening Year (2020)				Design Year (2040)			
	No-build Condition		Build Condition		No-build Condition		Build Condition	
	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
Beyond Beginning Terminus (Beginning Terminus = SR 117)								
Roadway (JJ Club Road to SR 117)	6,910	C	6,910	C	9,910	C	9,910	C
Intersection (US 441 at JJ Club Road)	N/A	B[1]	N/A	B[1]	N/A	B[1]	N/A	B[1]

1. The AM and PM Peak intersection grades listed in Tables 4 and 5 have been condensed into a single LOS grade.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: EDS-441(20) Laurens
P. I. No.: 262027
U.S. 441/S.R. 31Widening/Reconstruction

OFFICE: Engineering Services

DATE: October 31, 2007

FROM: Brian Summers, P.E., Project Review Engineer RCW

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

SUBJECT: **IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES**

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT No.	Description	Savings PW & LCC	Implement	Comments
PAVEMENT (A)				
A-2.1	Reevaluate the width on C.R. 249/CR 165 – delete left turn lanes	$134,000	Yes	This should be done.
A-2.2	Reevaluate the reconstruction on C.R. 248 – use existing alignment and typical section	$122,100	Yes	This should be done.
A-2.3	Reevaluate the width on S.R. 117/CR 195 – delete left turn lanes and shift intersection to the south to minimize the realignment on S.R. 117	$335,700	No	The Stopping Sight Distance would be compromised on S.R. 117 if the alignment were shifted. In addition, there would be additional impacts to wetlands adjacent to CR 195 if the alignment were shifted as recommended.
A-2.4	Reevaluate the reconstruction on C.R. 302 – use existing alignment and typical section	$88,500	Yes	This should be done.

ALT No.	Description	Savings PW & LCC	Implement	Comments
PAVEMENT (A) - continued				
A-2.5	Reevaluate the reconstruction and widening on C.R. 292/CR 521 – use existing alignment and typical section	$318,600 (Proposed) $174,000 (Revised)	Yes	This should be modified by keeping as much of the CR 292 existing alignment as possible.
A-2.6	Reevaluate the alignment on C.R. 157 – shift alignment to the north to minimize the length of realignment and relocate the median opening accordingly	$152,600	No	This would result in additional impacts to a Public Camping Area on Parcel 94.
A-2.7	Reevaluate the median opening location at Dominy Camphouse Road/CR 355 – Delete median opening	$89,000	No	This particular Median Opening location has been shown to the public on three separate occasions.
A-4	Delete Leveling for removal of adverse crowns on existing pavement in areas noted in the VE Report	$219,000	No	This would result in a typical section that is not uniform. Part of the existing roadway would have a crown while the parts that are to be reconstructed would have a consistent cross slope.
A-5	Revise pavement design for Side Roads – reduce pavement thickness	$1,060,000	Yes	This should be done.
RIGHT OF WAY (B)				
B-1	Reduce median width from 44' to 20'	$367,000 (Proposed) $325,000 (Revised)	No	Based on information from the Design Consultant, the costs for redesign will exceed the VE Savings. Would result in an 18 month delay in the schedule.
BASE MATERIAL (C)				
C-1	Use Soil-Cement Base Course Material as an Alternate to the Graded Aggregate Base Course	$1,023,000	Yes	This should be done.

ALT No.	Description	Savings PW & LCC	Implement	Comments
EARTHWORK (D)				
D-1	Reduce the Design Speed on the south end of the project from 65 mph to 55 mph	$109,000	No	Due to the possibility of this route being signed at 65 mph, the Design Office recommends that the Design Speed not be changed.
BRIDGE WIDENING (I)				
I-1	Retain the existing width for the Turkey Creek Bridge – don't widen at this time	$459,400	Yes	This should be done.
I-2	Replace Turkey Creek Bridge with a new one now	-$505,500 cost increase	No	This results in a cost increase.

A meeting was held on October 17, 2007 to discuss the above recommendations. Raju Shah with R.K. Shah and Associates, Mike Haithcock with Consultant Design, and Brian Summers, Ron Wishon and Lisa Myers with Engineering Services were in attendance. Additional information was provided on October 30 and 31, 2007.

Approved: Dale M R. **Date:** 11/6/07

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

BKS/REW

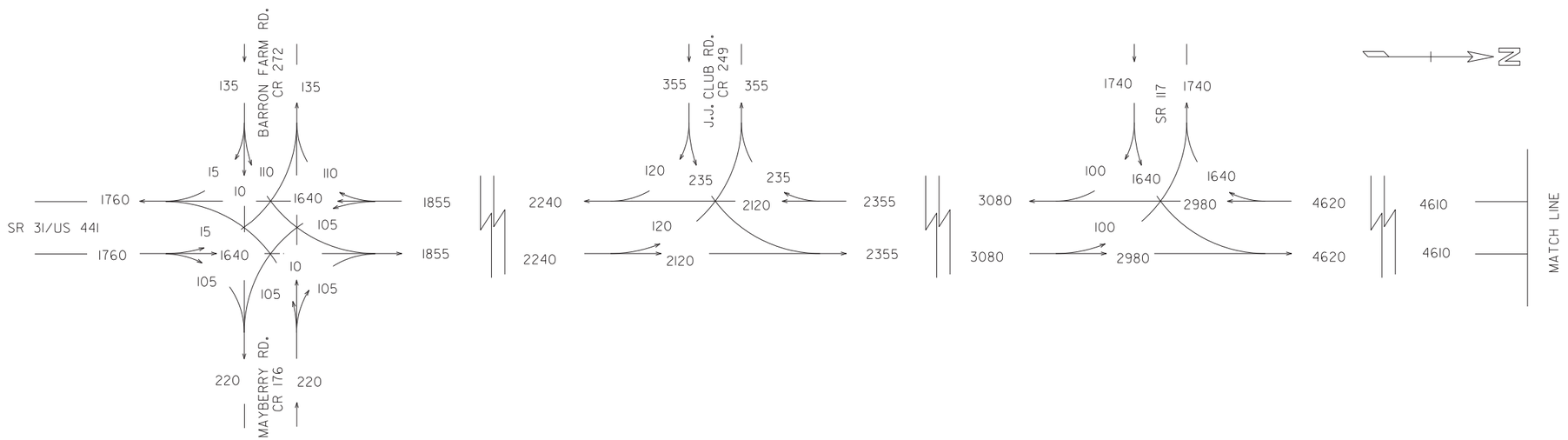
Attachments

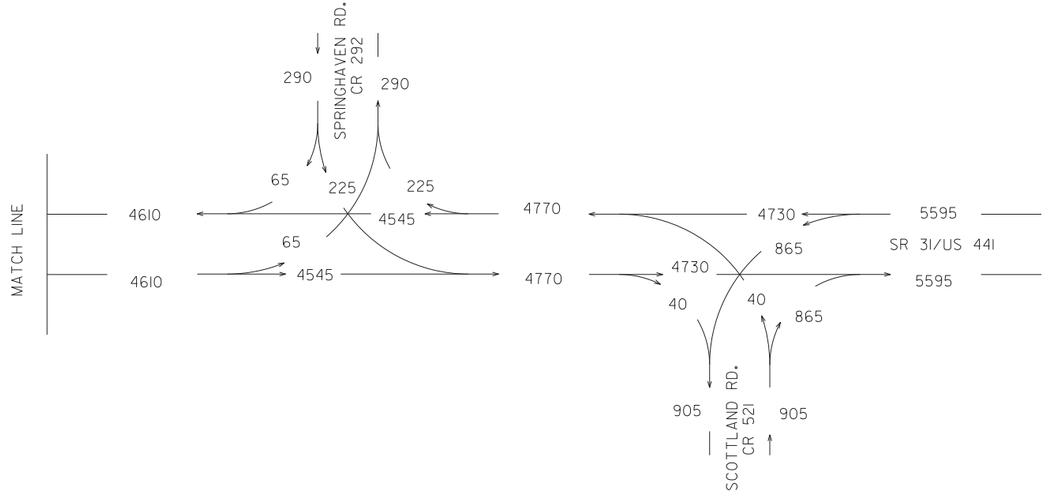
c: Gus Shanine
Todd Long
James Magnus
Mike Haithcock
Joe King
Rusty Merritt
Daniel Smith
Ken Werho
Nabil Raad
Paul Condit
Lisa Myers

DATE$$	TIME$$	$PRFB$	DGN	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
$USER$		$$PENTABLE$$		GA	EDS000-0441-00(20)		

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 1 OF 6





EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441

EXISTING YEAR
2012 ADT = 000

24 HR. T = 17%
S.U. = 3%
COMB. = 14%

TAG
11/12

Florence & Hutcheson
An ICA Company
1300 RIDENOUR BLVD. NW SUITE 300, KENNESAW, GA 30152

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: OFFICE OF PLANNING

US 441/SR 31 WIDENING
LAUREN COUNTY

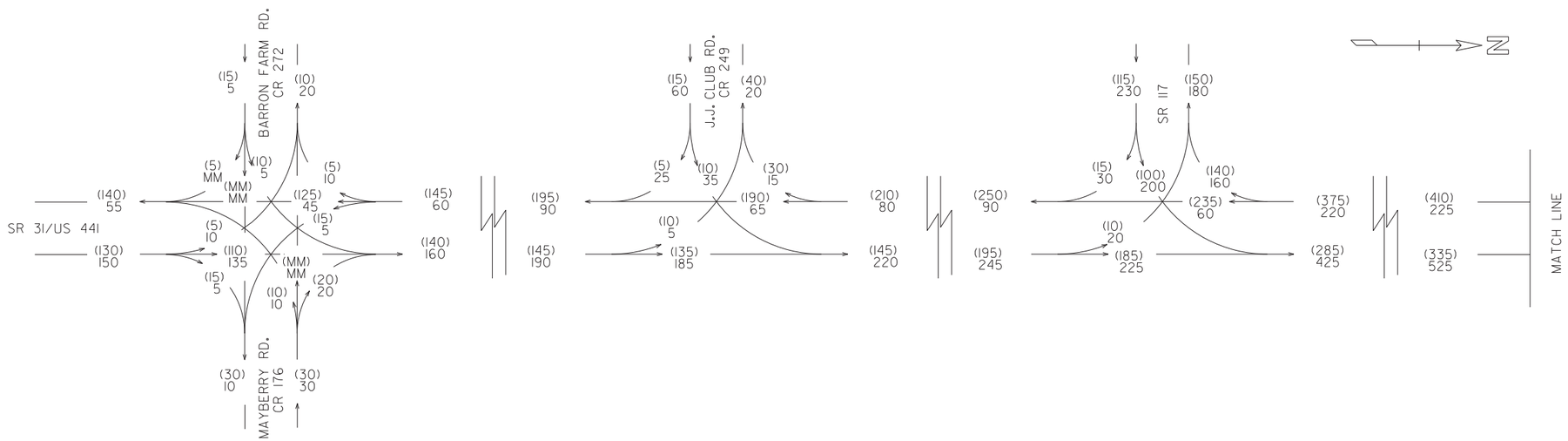
DRAWING No.

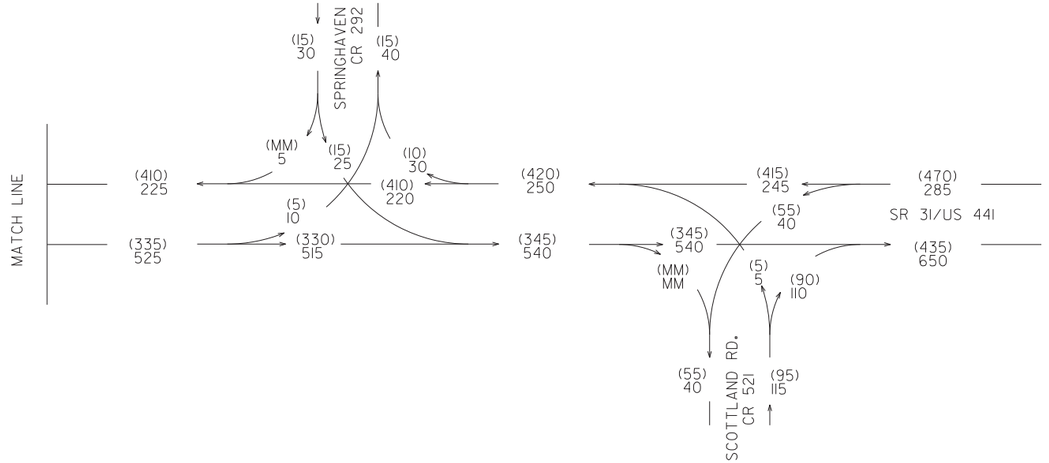
4/27/2012 GPLN

DATE$$S	TIME$$S	$PRF8$	DGN	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
$USER$		$$PENTABLE$$		GA	EDS000-0441-00(20)		

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 2 OF 6





EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441

EXISTING YEAR
2012 AM DHV = 000
2012 PM DHV = (000)

T = 16%
S.U. = 6%
COMB. = 10%

TAG
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REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: OFFICE OF PLANNING

US 441/SR 31 WIDENING
LAUREN COUNTY

DRAWING No.

4/27/2012 GPLN

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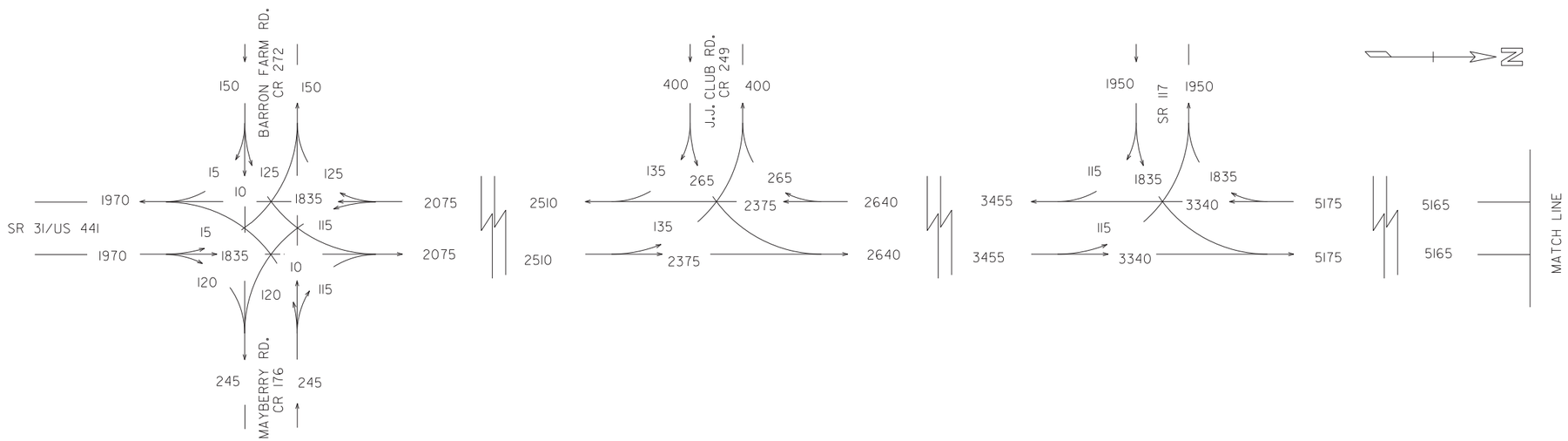
$USER$		$$PENTABLE$$		GA	EDS000-0441-00(20)		

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 3 OF 6



EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441
BASE YEAR
2020 ADT = 000
BUILD AND NO-BUILD
24 HR. T = 17%
S.U. = 3%
COMB. = 14%

TAG
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US 441/SR 31 WIDENING
LAUREN COUNTY

DRAWING No.

4/27/2012 GPLN

DATE$$S	TIME$$S	$PRF8$	DGN	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
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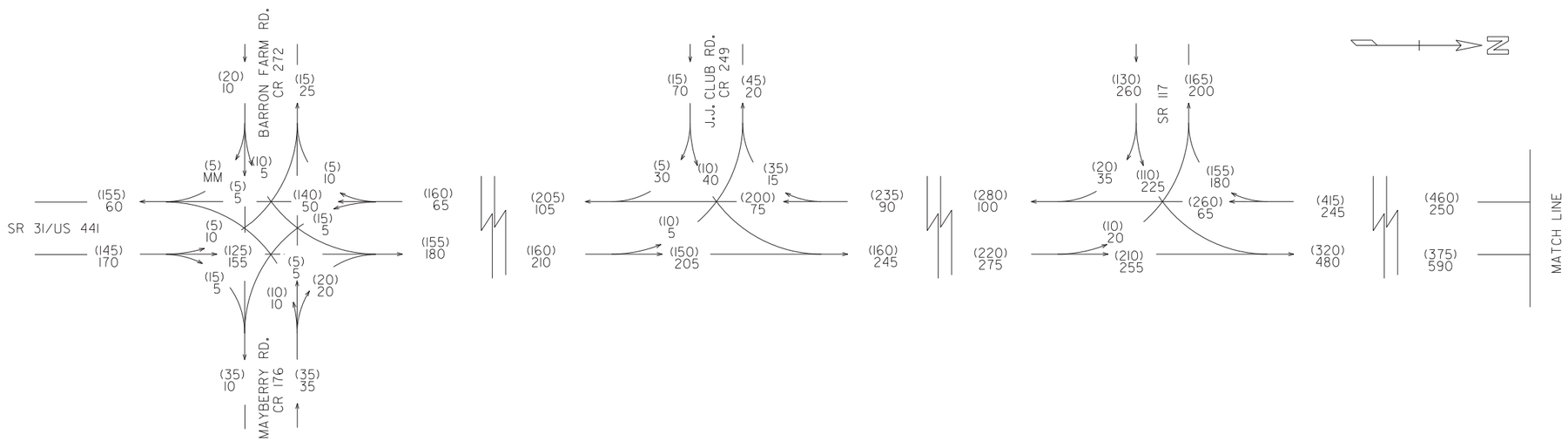
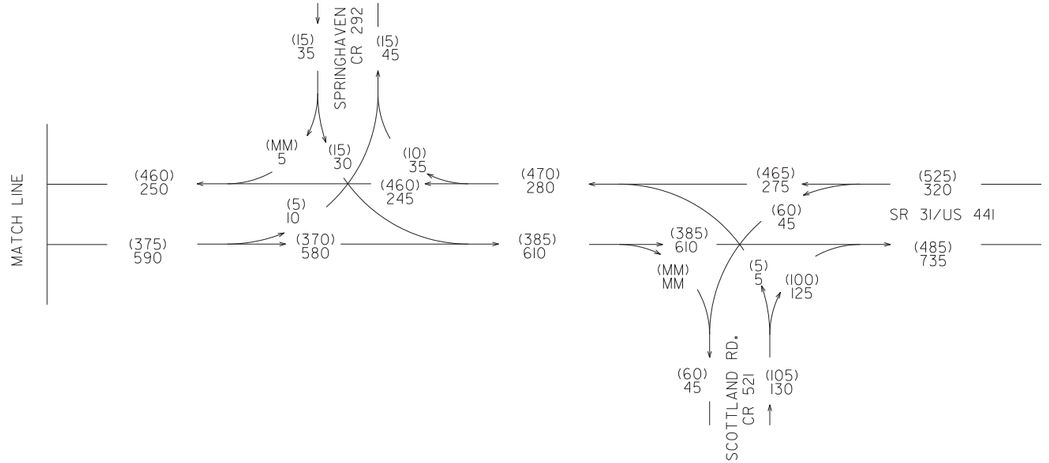
GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 4 OF 6





EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441

BASE YEAR
2020 AM DHV = 000
2020 PM DHV = (000)
BUILD AND NO BUILD
T = 16%
S.U. = 6%
COMB. = 10%

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REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: OFFICE OF PLANNING

US 441/SR 31 WIDENING
LAUREN COUNTY

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4/27/2012 GPLN

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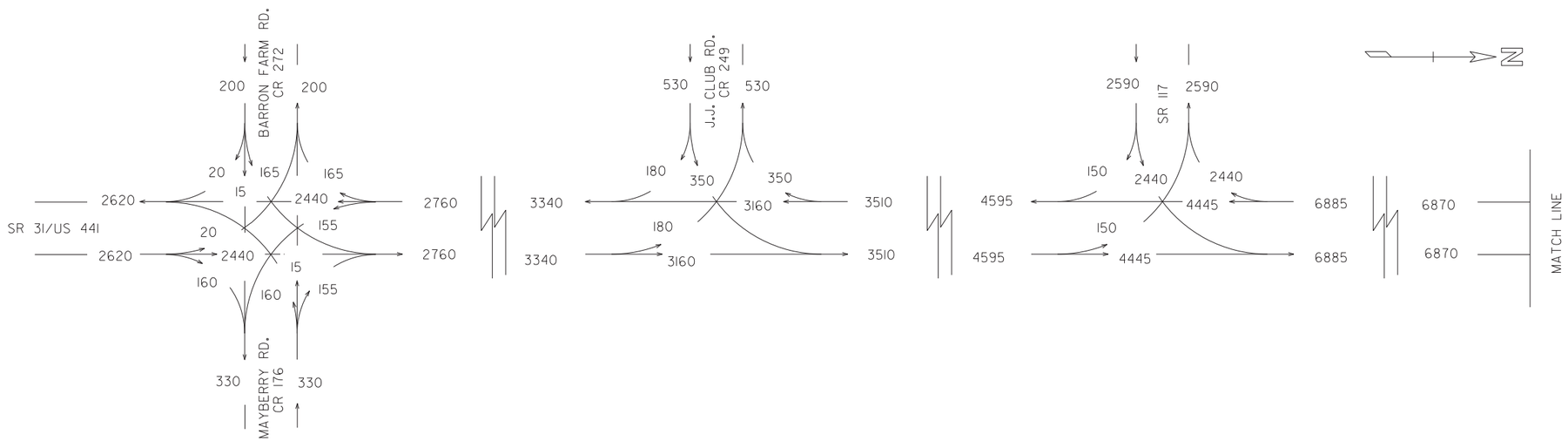
GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 5 OF 6



EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441
DESIGN YEAR
2040 ADT = 000
BUILD AND NO-BUILD
24 HR. T = 17%
S.U. = 3%
COMB. = 14%

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STATE OF GEORGIA
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US 441/SR 31 WIDENING
LAUREN COUNTY

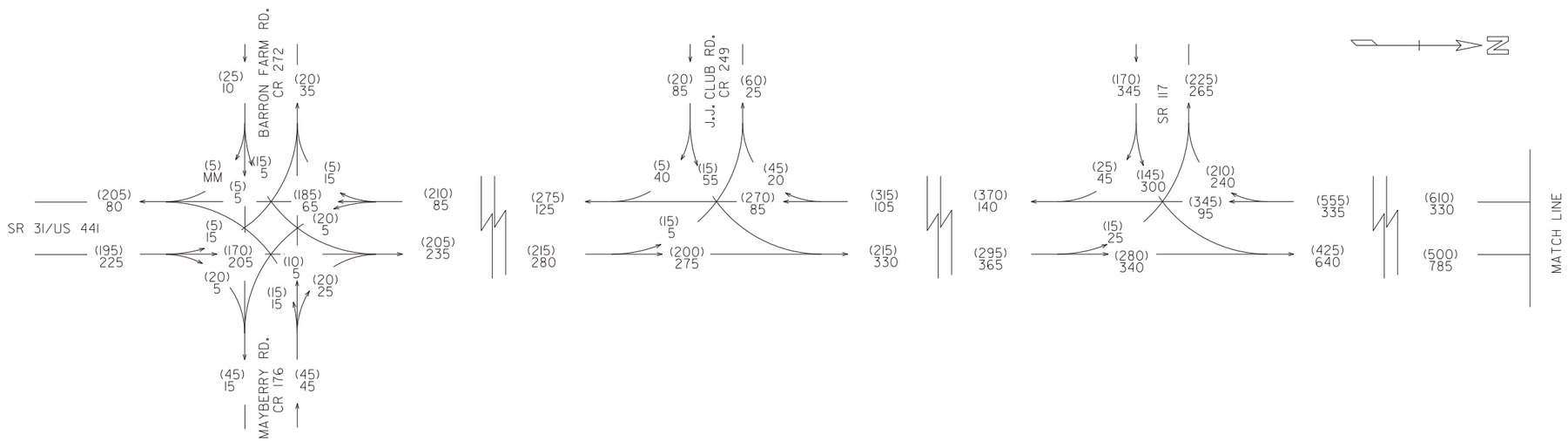
DRAWING No.

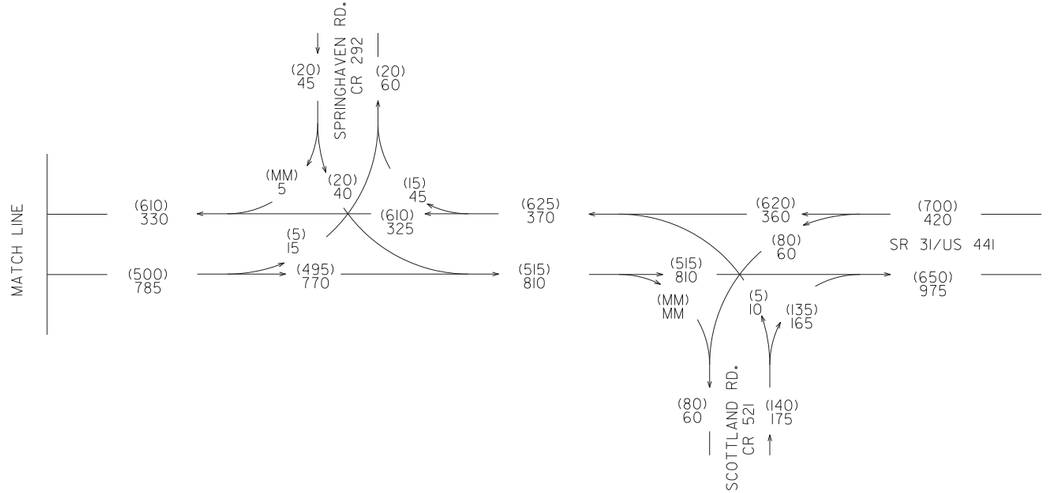
4/27/2012 GPLN

DATE$$$	TIME$$$	$PRF8$	DGN	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
$USER$		$$PENTABLE$$		GA	EDS000-0441-00(20)		

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

SHEET 6 OF 6





EDS000-0441-00(20)
P.I.# 262027
LAURENS COUNTY

SR 31/US 441

DESIGN YEAR
2040 AM DHV = 000
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STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: OFFICE OF PLANNING

US 441/SR 31 WIDENING
LAUREN COUNTY

DRAWING No.

4/27/2012 GPLN

TRAFFIC STUDY
FOR
US 441
FROM BARRON FARM/MAYBERRY ROAD TO SCOTLAND ROAD
EDS000-0441-00(20), PI No. 262027

LAURENS COUNTY, GEORGIA

Prepared for:

Prepared by:

1300 Ridenour Boulevard
Suite 300
Kennesaw, GA 30152
Tel. (770) 428-0157
Fax. (770) 428-8957

December 2012
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1. INTRODUCTION

This study presents the existing and future traffic operating conditions for the proposed US 441 project in Laurens County. The proposed project is an existing 2 and 3 lane roadway beginning at Barron Farm Road/Mayberry Road and ending at Scotland Road. The proposed roadway improvements will include four lanes median and rural shoulders and at grade intersections.

The purpose of this traffic study is to identify the future year traffic operating conditions for both the No-Build (without widening) and Build (with widening) conditions. The existing year (2012) conditions, opening year traffic conditions (2020), and design year traffic conditions (2040) were evaluated for the proposed new roadway. Figure 1 shows the location of the subject corridor.

Historic crash information was also analyzed for the major roadways within the study area. The crash data was summarized and compared to the statewide average for similar facilities.

Figure 1. Site Location

2. EXISTING ROADWAY CONDITIONS

Roadway Inventory

To determine existing traffic conditions for the study intersections, an inventory was made of the roads involved. The following is a description of major roadways:

- **US 441** is a 3-lane undivided roadway with 2 lanes Northbound and 1 lane Southbound between Barron Farm Road/Mayberry Road and JJ Club Road. North of JJ Club Road, US 441 is a two lane roadway with a 55 mph speed limit. US 441 is classified as a Principal Rural Arterial.

- **All intersecting roadways** are 2-lane undivided roadways.

Planned Roadway Improvements

The proposed project is to widen US 441 to a 4 lane divided facility between Barron Farm Road/Mayberry Road and Scotland Road. The proposed roadway will include four lanes with a 20’ raised or 44’ depressed median and rural shoulders.

No other programmed roadway improvements have been identified within the study area.

3. STUDY METHODOLOGY

Intersection capacity and roadway segment analyses were performed using procedures in the Transportation Research Board's *Highway Capacity Manual (HCM), Millennium Edition*. *Synchro 7* was used to perform the intersection analyses.

Operating conditions at intersections and along roadway segments are evaluated in terms of Levels of Service (LOS). The Levels of Service for an intersection is based on vehicular delay at the intersection, and for a roadway it is based on travel speed or density. Generally, in the opening year of a project, Levels of Service A through D are considered to be acceptable peak hour operations. Levels of Service E and F are generally considered to be undesirable conditions during the peak hour. The Levels of Service criteria for signalized and unsignalized intersections, and roadway segments are shown in Tables 1 and 2, respectively.

Table 1. Intersection Levels of Service Delay Criteria

Levels of Service	Control Delay (seconds per vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Source: Highway Capacity Manual.

Table 2. Roadway Levels of Service Criteria

Levels of Service	Two-lane Avg. Travel Speed (mi/h)	Multi-lane Density (pc/mi/ln)
A	> 55	≤ 11
B	> 50-55	> 11 and ≤ 18
C	> 45-50	> 18 and ≤ 26
D	> 40-45	> 26 and ≤ 35
E	≤ 40	> 35 and ≤ 45
F	-	> 45

Source: Highway Capacity Manual.

4. EXISTING TRAFFIC CONDITIONS

Existing Traffic Volumes

24 Hour bi-directional counts and Peak hour turning movement counts were performed by GDOT in May 2012 and provided to Florence and Hutcheson to perform the Traffic Projections for the project. Additionally, historic traffic counts were gathered from GDOT's Traffic Count Database System (TCDS).

All turning movement counts were provided during the weekday morning and evening peak times, from 7:00-9:00 AM and 4:00-6:00 PM, respectively. The four consecutive 15-minute interval volumes, summed to produce the highest volume at each intersection, were then determined. These volumes make up the peak hour traffic volumes for the intersections counted.

The existing year (2012) design hourly traffic volumes are shown in Figure 2 and existing year (2012) Average Daily Traffic (ADT) volumes are shown in Figures 3.

Figure 2 Existing Year (2012) Design Hourly Traffic Volumes

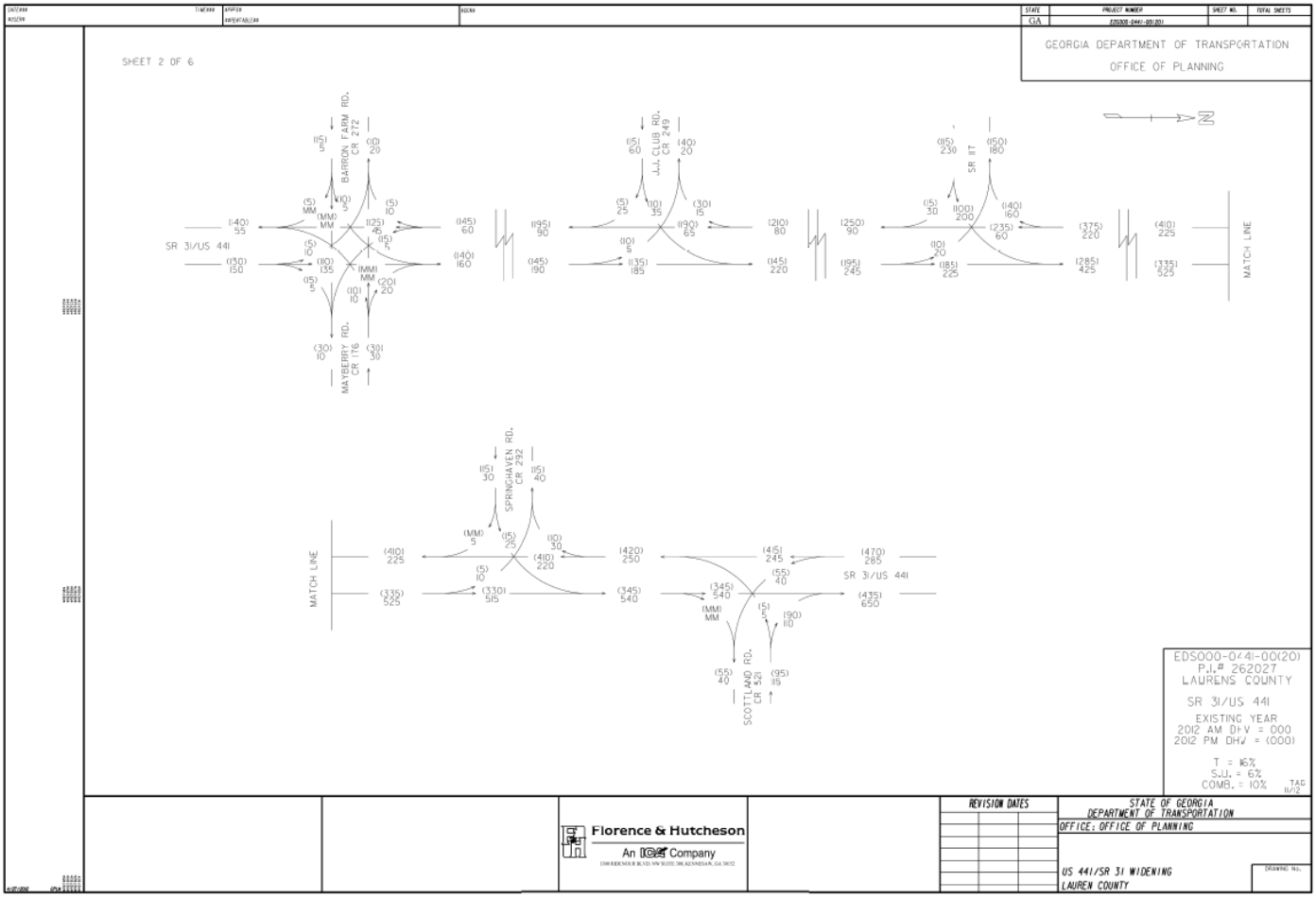
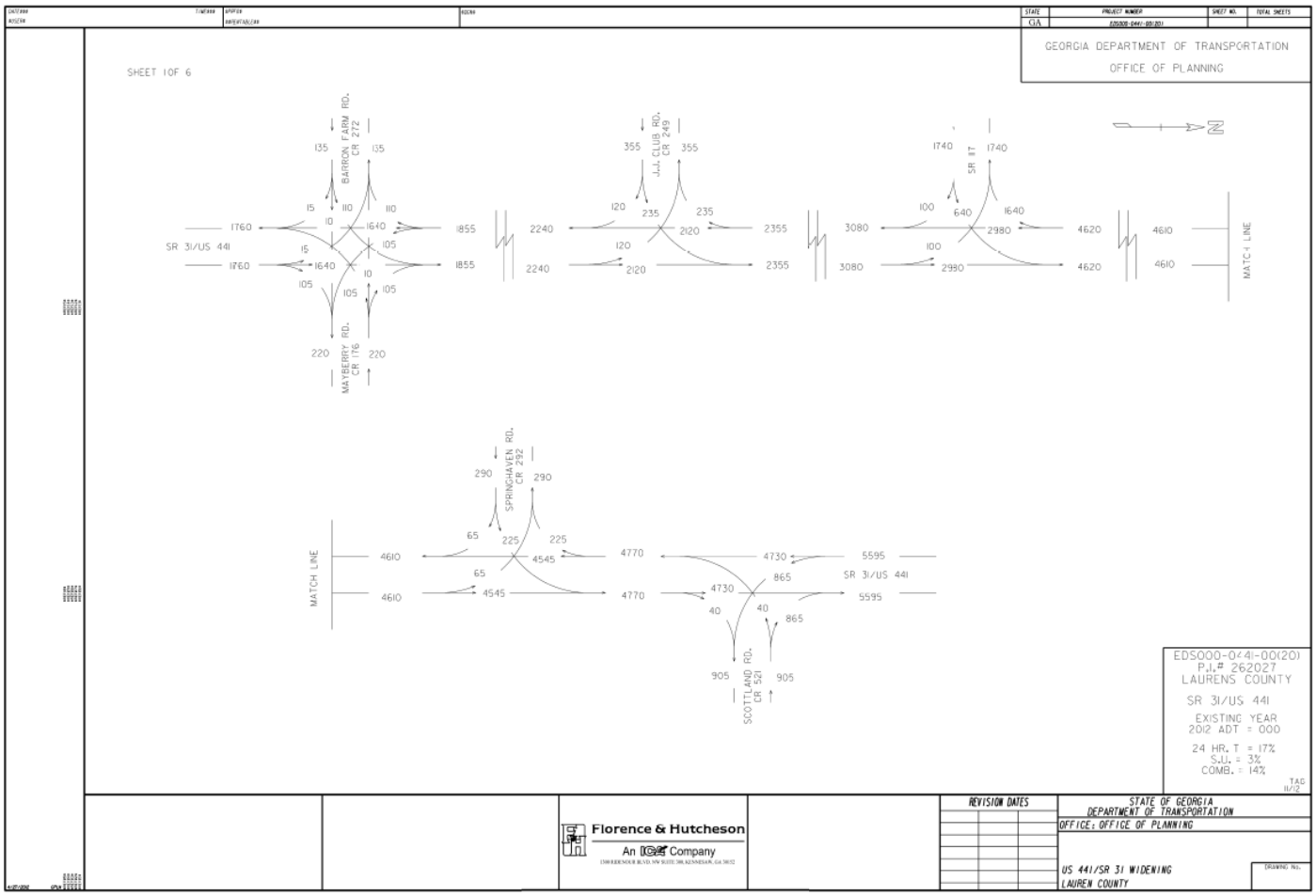


Figure 3 Existing Year (2012) ADT Volumes



Existing Conditions

The existing year design hourly traffic volumes were used for the traffic analysis. Peak hour analyses were performed for the study intersections and roadway sections in the vicinity of the proposed Waycross East Bypass.

Intersection Analysis

Intersection capacity analyses were performed for the study intersections. The results of the capacity analyses for existing conditions (using the existing year design hourly traffic counts and the intersection geometries) at the study intersections are presented in Table 3. The capacity analysis printouts are included in the Appendix.

Table 3. Existing Conditions Intersection Levels of Service

Existing 2012	AM				PM			
US 441 Intersections	Direction	LOS	Delay (s)	v/c	Direction	LOS	Delay (s)	v/c
Mayberry Road	NB	A	7.4	0.007	NB	A	7.5	0.004
	SB	-	-	-	SB	-	-	-
	EB	A	9.4	0.032	EB	A	9.6	0.032
	WB	-	-	-	WB	-	-	-
Barron Farm Road	NB	-	-	-	NB	-	-	-
	SB	A	7.6	0.004	SB	A	7.5	0.011
	EB	-	-	-	EB	-	-	-
	WB	A	9.3	0.037	WB	A	9.5	0.039
JJ Club Road	NB	A	7.4	0.004	NB	A	7.7	0.008
	SB	-	-	-	SB	-	-	-
	EB	A	9.6	0.077	EB	B	10.2	0.038
	WB	-	-	-	WB	-	-	-
SR 117	NB	A	7.5	0.008	NB	A	7.2	0.008
	SB	A	7.7	0.008	SB	A	7.7	0.008
	EB	B	13.5	0.242	EB	B	13.5	0.242
	WB	B	11.3	0.054	WB	B	11.3	0.054
Springhaven Road	NB	A	7.8	0.008	NB	A	8.3	0.005
	SB	-	-	-	SB	-	-	-
	EB	C	15.8	0.089	EB	B	13.9	0.074
	WB	-	-	-	WB	-	-	-
Scotland Rd	NB	-	-	-	NB	-	-	-
	SB	A	8.8	0.044	SB	A	8.9	0.061
	EB	-	-	-	EB	-	-	-
	WB	C	18.2	0.017	WB	C	20.8	0.107

As seen in Table 3, all of the study intersections currently operate at acceptable overall Levels of Service during the peak hours.

Roadway Analysis

Roadway analyses were performed for the roadway segments on US 441 between the intersections and at the beginning and ending of the project for existing conditions using the existing year design hourly traffic volumes and the existing roadway configuration. The results of the roadway segment analyses are presented in Tables 4.

Table 4. Existing Conditions Roadway Levels of Service (Two-lane)

	Location	Time	LOS	v/c
US 441	Just South of Barron Farm/Mayberry Road	AM	B	0.11
		PM	B	0.09
	Just South of JJ Club Road	AM	B	0.13
		PM	B	0.11
	Just South of SR 117	AM	B	0.17
		PM	B	0.14
	Just South of Springhaven Road	AM	B	0.17
		PM	C	0.23
	Just North of Scotland Road	AM	D	0.43
		PM	C	0.29

As seen in Table 4, the studied roadway segments are expected to operate with acceptable Levels of Service during the AM and PM peak hours, with the exception of just north of Scotland Road, where the AM LOS is D.

5. FUTURE YEAR TRAFFIC CONDITIONS

Traffic Projections

Historic AADT count data of Laurens Count data spanned the years 1990 to 2009. 2010 and 2011 data were obtained from GDOT's Traffic Count Database System (TCDS). Since 2012 data was available only for select locations, only the 1990-2011 data was used in the calculations.

For the project, we found the count locations that were closest to the project.

Count location utilized:

1750103	Located south of the project on US 441
1750107	Located south of Capps Browning Road on the project
1750109	Located south of Springhaven Road, on the project
1750112	Located north of the project on US 441
1750158	Located west of the project on SR 117
1750312	Located east of the project on Scotland Road

Two locations (1750107, and 1750109) are located on the project, the others are to the north, south, and west and east of the project within close proximity.

Utilizing the traffic forecasting methodology outlined in Chapter 13 of GDOT's Design Policy Manual, the review of the historical counts identified a growth rate of 1.45% per year.

Opening Year 2020 Traffic Volumes

The base year 2020 No-Build and build traffic volumes were developed by applying the growth rate for 8 years to the existing year (2012) traffic volumes. The base year 2020 No-Build and Build design hourly traffic volumes are shown in Figures 4, and the ADT volumes are shown on Figure 5.

Figure 4 Base Year 2020 Design Hourly Traffic Volumes

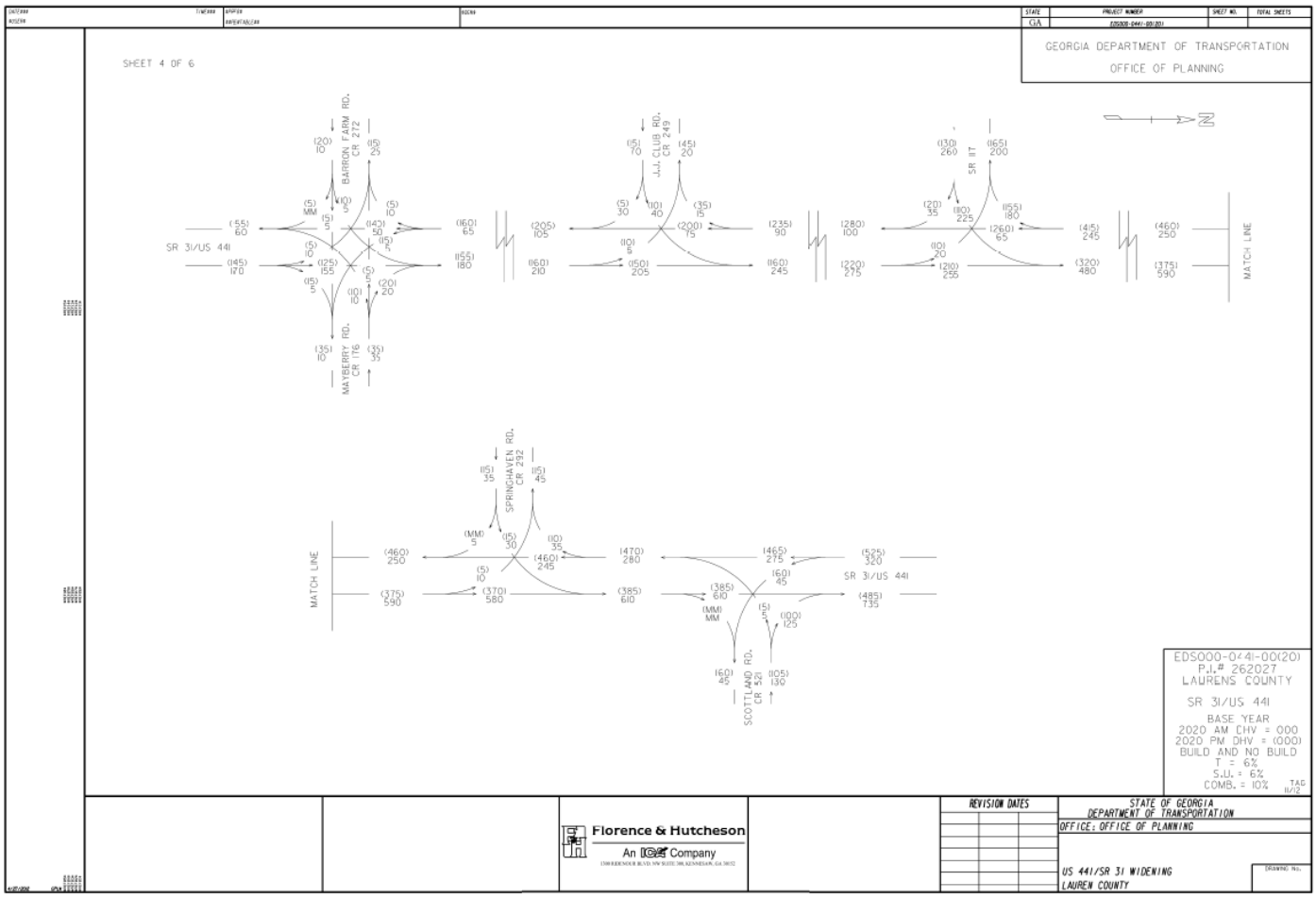
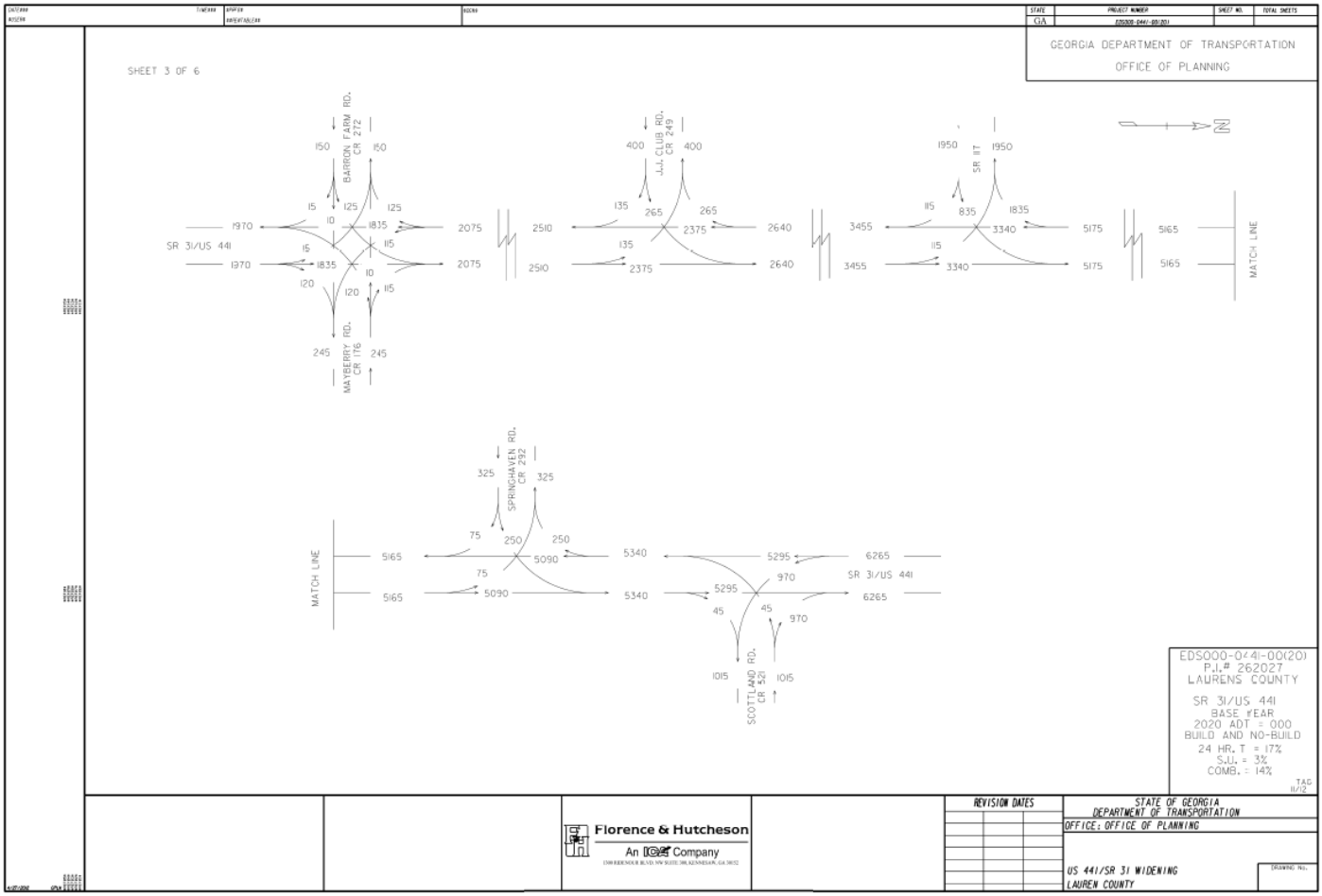


Figure 5 Base Year 2020 Build Design Hourly Traffic Volumes



Base Year 2020 Conditions

The 2020 design hourly volumes were used for the traffic analysis. Peak hour analyses were performed for the study intersections for US 441.

Intersection Analysis

Intersection capacity analyses were performed for the study intersections for Year 2020 No-Build conditions (without the widening) using the opening year 2020 design hourly traffic volumes and the existing intersection geometries. The results of the capacity analyses at the study intersections are presented in Table 5.

Table 5. Opening Year 2020 No-Build Conditions Intersection Levels of Service

Mayberry/Barron Farm @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.4	0.007	PM	NB	A	7.5	0.004
	SB	A	7.7	0.004		SB	A	7.6	0.012
	EB	A	9.4	0.038		EB	A	9.8	0.021
	WB	A	7.6	0.004		WB	A	9.7	0.041
JJ Club Road @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.4	0.004	2020	NB	A	7.8	0.008
	SB	-	-	-		SB	-	-	-
	EB	A	9.8	0.092		EB	B	10.6	0.025
	WB	-	-	-		WB	-	-	-
SR 117 @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.4	0.014	PM	NB	A	7.6	0.008
	SB	A	7.9	0.009		SB	A	7.7	0.008
	EB	C	18.7	0.533		EB	B	14.7	0.29
	WB	B	11.7	0.057		WB	B	11.8	0.058
Springhaven @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.9	0.009	PM	NB	A	8.4	0.005
	SB	-	-	-		SB	-	-	-
	EB	C	17.9	0.12		EB	C	15	0.083
	WB	-	-	-		WB	-	-	-
Scotland @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.3	0.003	PM	NB	A	7.4	0.004
	SB	B	9.1	0.053		SB	A	8.3	0.057
	EB	-	-	-		EB	-	-	-
	WB	C	15.9	0.283		WB	B	11.8	0.071

As seen in Table 5, all movements in the intersections perform acceptably.

Roadway analyses were performed for the roadway segments on US 441 between the intersections and at the beginning and ending of the project for **no-build** conditions using the base year design hourly traffic volumes and the existing roadway configuration. The results of the roadway segment analyses are presented in Table 6.

Table 6. Base Year 2020 Conditions Roadway Levels of Service (Two-lane)

	Location	Time	LOS	v/c
US 441	Just South of Barron Farm/Mayberry Road	AM	B	0.12
		PM	B	0.11
	Just South of JJ Club Road	AM	B	0.15
		PM	B	0.11
	Just South of SR 117	AM	C	0.19
		PM	B	0.16
	Just South of Springhaven Road	AM	D	0.39
		PM	C	0.26
	Just North of Scotland Road	AM	D	0.49
		PM	D	0.33

As seen in Table 6, the studied roadway segments are expected to operate with acceptable Levels of Service during the AM and PM peak hours, with the exceptions of just north of Scotland Road for AM and PM LOS D, and just south of Springhaven Road where the AM LOS is D.

Intersection capacity analyses were performed for the study intersections for Year 2020 **Build** conditions using the base year 2020 Build design hourly traffic volumes and the implementation of the US 441 widening. In the Build condition, the intersections of Barron Farm Road and Mayberry Road are realigned to form a 4-legged intersection. Similarly, JJ Club road and SR 117 are realigned to form 4-legged intersections with minor roadways at each of their locations. Finally, Springhaven Road and Scotland Road are realigned to form a 4-legged intersection. The results of the intersection capacity analyses at the study intersections in the Build conditions are presented in Table 7.

Table 7. Base Year 2020 Build Conditions Intersection Levels of Service

Mayberry/Barron Farm @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.5	0.007	PM	NB	A	7.7	0.004
	SB	A	7.7	0.004		SB	A	7.7	0.012
	EB	B	10.3	0.017		EB	B	10.5	0.032
	WB	A	9.8	0.048		WB	A	9.9	0.049
JJ Club Road @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.5	0.004	2020	NB	A	7.9	0.009
	SB	A	7.8	0.001		SB	A	7.7	0.025
	EB	B	10.1	0.001		EB	B	10.9	0.035
	WB	B	10.4	0.024		WB	B	10.6	0.025
SR 117 @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	7.96	0.018	PM	NB	A	8.5	0.01
	SB	A	7.96	0.004		SB	A	7.8	0.004
	EB	C	16	0.047		EB	B	14.8	0.286
	WB	A	9.9	0.022		WB	B	10.1	0.023
Springhaven/Scotland @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (	v/c
AM	NB	A	8.1	0.009	PM	NB	A	8.6	0.005
	SB	A	9.5	0.057		SB	A	8.5	0.059
	EB	D	25.7	0.158		EB	D	25.5	0.085
	WB	C	24	0.028		WB	C	20	0.022

As seen in Table 7, the study intersections are expected to operate with acceptable overall Levels of Service with the exception of the intersection of Springhaven/Scotland and US 441. LOS for both AM and PM is D, with delays of 25.7 and 25.5 respectively.

One mitigation method for improving the LOS D for the Springhaven/Scotland intersection is to install a traffic signal for the build condition in 2020. This intersection when analyzed as a signalized intersection has an overall LOS of A for both AM and PM conditions.

A signal warrant analysis will be necessary to fully study this option, however, this is beyond the scope of this study.

Roadway analyses were performed for the roadway segments on US 441 between the intersections and at the beginning and ending of the project for the **build** conditions using the base year design hourly traffic volumes and the proposed roadway configuration. The results of the roadway segment analyses are presented in Table 8.

Table 8. Base Year 2020 Conditions Roadway Levels of Service (Multi-lane)

	Location	Time	LOS NB	LOS SB
US 441	Just South of Barron Farm/Mayberry Road	AM	A	A
		PM	A	A
	Just South of JJ Club Road	AM	A	A
		PM	A	A
	Just South of SR 117	AM	A	A
		PM	A	A
	Just South of Springhaven Road	AM	A	A
		PM	A	A
	Just North of Scotland Road	AM	A	A
		PM	A	A

As seen in Table 8, the studied roadway segments are expected to operate with acceptable Levels of Service during the AM and PM peak hours.

Design Year 2040 Traffic Volumes

The design year 2040 No-Build (without widening of US 441 to 4 lanes) traffic volumes were developed by applying the growth rate for 28 years to the existing year (2012) traffic volumes. The design year 2040 No-Build design hourly traffic volumes are shown in Figure 7, and the 2040 No-Build ADT traffic volumes are shown in Figures 7.

The design year 2040 Build (with widening of US 441 to 4 lanes) traffic volumes were developed using the design year 2040 No-Build traffic volumes and reassigning traffic to the new intersection configurations.

Figure 6 Design Year 2040 No-Build Design Hourly Traffic Volumes

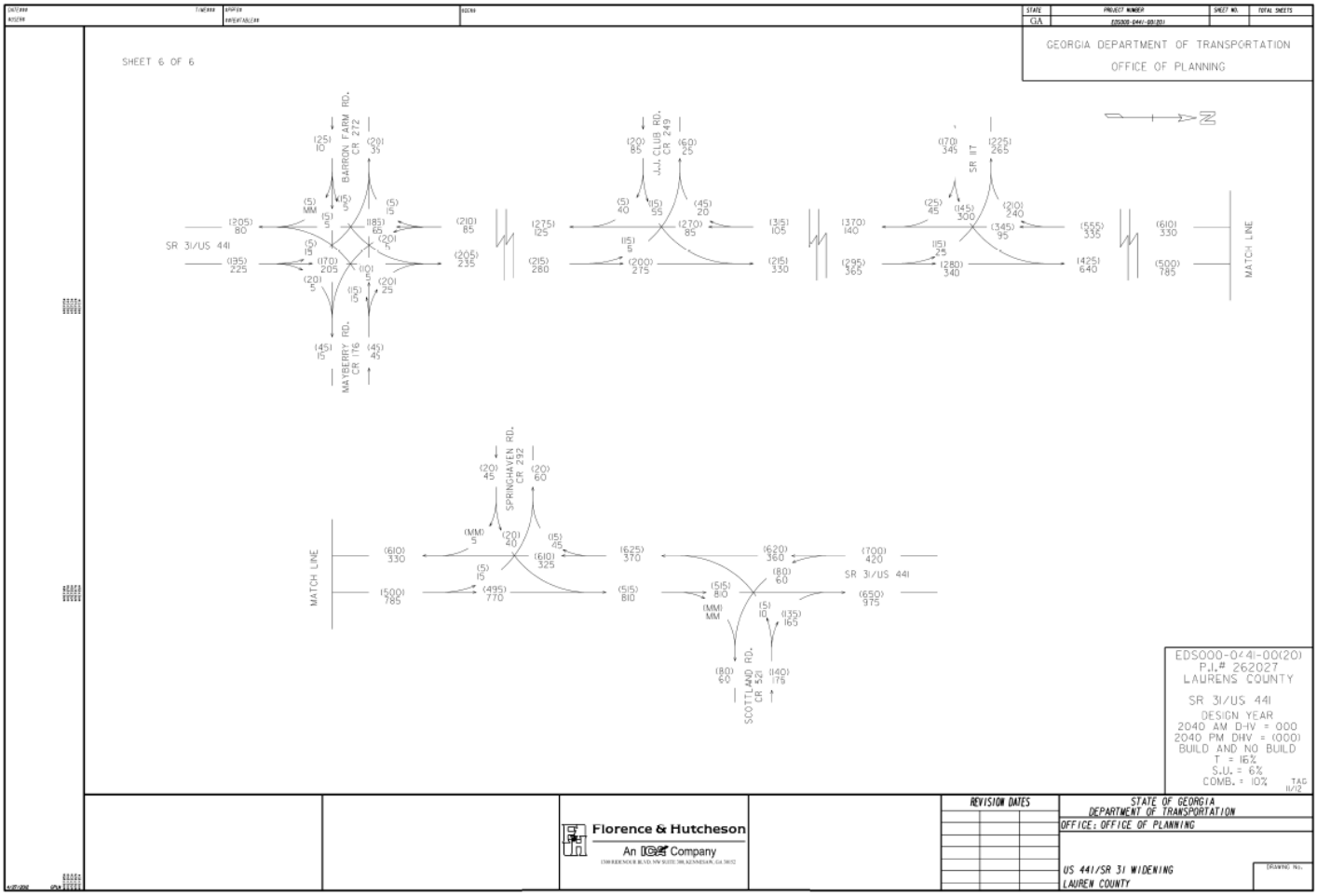
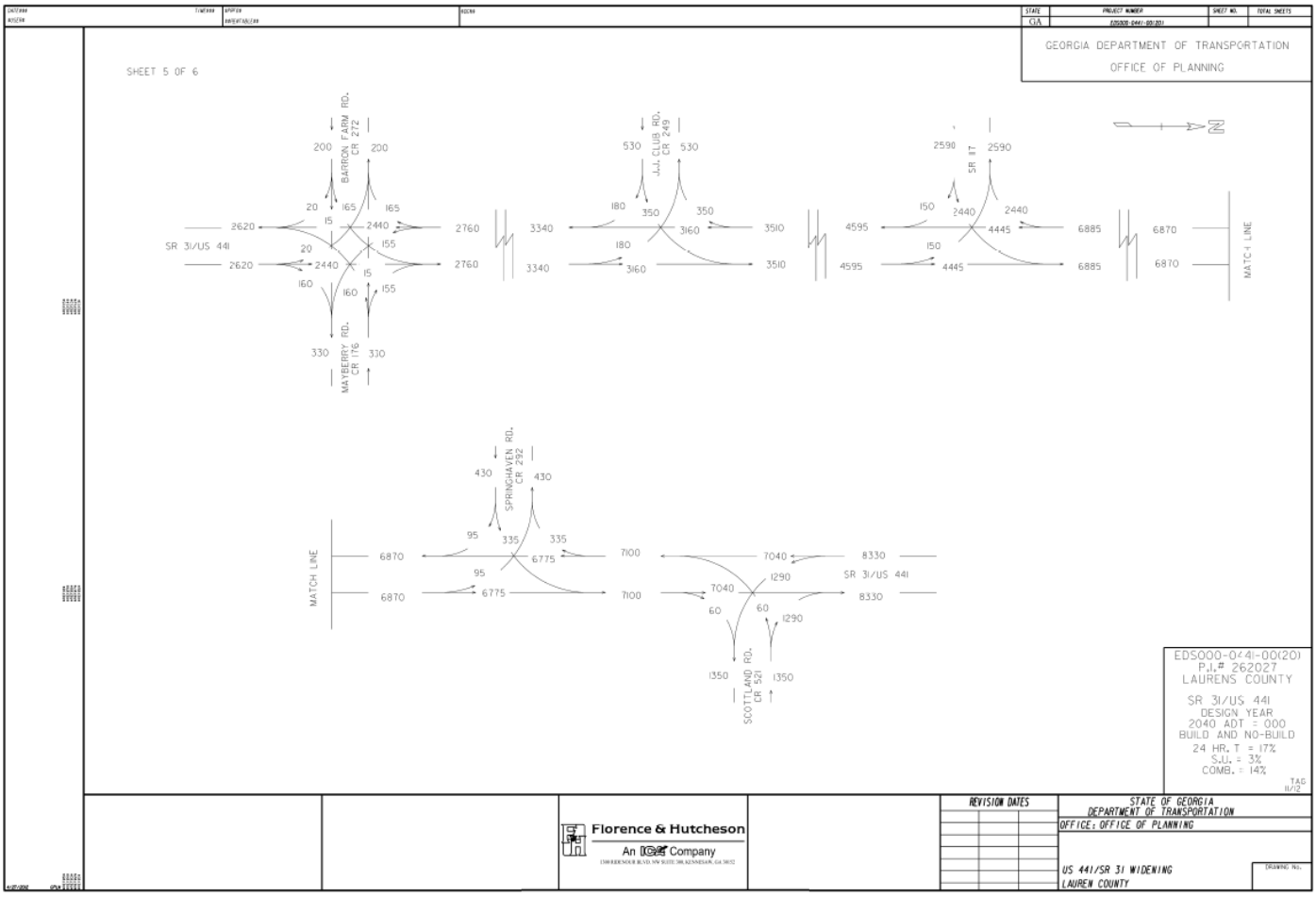


Figure 7. 2040 No-Build ADT Volumes



Design Year 2040 Conditions

The 2040 design hourly volumes were used for the traffic analysis. Peak hour analyses were performed for the study intersections and roadway sections on US 441.

Intersection Analysis

Intersection capacity analyses were performed for the study intersections for Year 2040 No-Build conditions (without widening) using the design year 2040 design hourly traffic volumes and the existing intersection geometries. The results of the capacity analyses at the study intersections are presented in Table 9.

Table 9. Design Year 2040 No-Build Conditions Intersection Levels of Service

Mayberry/Barron Farm @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.7	0.011	PM	NB	A	7.7	0.004
	SB	A	7.7	0.004		SB	A	7.9	0.015
	EB	A	9.7	0.009		EB	B	10.7	0.034
	WB	A	9.9	0.055		WB	B	10.8	0.058
JJ Club Road @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.5	0.004	2020	NB	A	8	0.013
	SB	-	-	-		SB	-	-	-
	EB	B	10.3	0.132		EB	B	11.8	0.039
	WB	-	-	-		WB	-	-	-
SR 117 @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	8.2	0.024	PM	NB	A	8.1	0.014
	SB	A	8.2	0.005		SB	A	7.9	0.009
	EB	D	26.6	0.711		EB	D	29.8	0.584
	WB	B	10.8	0.026		WB	C	15.1	0.084
Springhaven @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	8.2	0.014	PM	NB	A	9	0.006
	SB	-	-	-		SB	-	-	-
	EB	D	28.3	0.241		EB	D	25.1	0.113
	WB	-	-	-		WB	-	-	-
Scotland @ US 441									
	No Build					No Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.4	0.007	PM	NB	A	7.4	0.004
	SB	B	10.1	0.045		SB	A	8.9	0.086
	EB	-	-	-		EB	-	-	-
	WB	D	26.1	0.518		WB	C	24	0.028

As seen in Table 9, the US 441 intersections at SR 117, Springhaven, and Scotland Road experience degradation in LOS below C in either the AM, PM, or both time frames.

Roadway analyses were performed for the roadway segments on US 441 between the intersections and at the beginning and ending of the project for **no-build** conditions using the base year design hourly traffic volumes and the existing roadway configuration. The results of the roadway segment analyses are presented in Tables 10.

Table 10. Design Year 2040 Conditions Roadway Levels of Service (Two-lane)

	Location	Time	LOS	v/c
US 441	Just South of Barron Farm/Mayberry Road	AM	B	0.16
		PM	B	0.10
	Just South of JJ Club Road	AM	C	0.20
		PM	B	0.15
	Just South of SR 117	AM	C	0.25
		PM	C	0.21
	Just South of Springhaven Road	AM	D	0.51
		PM	D	0.33
	Just North of Scotland Road	AM	E	0.64
		PM	D	0.43

As seen in Table 10, the studied roadway segments are expected to operate with acceptable Levels of Service during the AM and PM peak hours, with the exceptions of just north of Scotland Road having AM LOS E and PM LOS D, and just south of Springhaven Road where the AM and PM LOS is D.

Intersection capacity analyses were performed for the study intersections for Year 2040 Build conditions using the design year 2040 Build traffic volumes and the widening of US 441 to 4 lanes and realignment of intersections as described in the 2020 Build analysis. The results of the intersection capacity analyses at the study intersections are presented in Table 10.

Table 10. Design Year 2040 Build Conditions Intersection Levels of Service

Mayberry/Barron Farm @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.3	0.01	PM	NB	A	7.8	0.004
	SB	A	7.8	0.004		SB	A	7.8	0.017
	EB	B	10.8	0.019		EB	C	11.2	0.045
	WB	B	10.3	0.067		WB	B	10.7	0.072
JJ Club Road @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.5	0.004	2020	NB	A	8.2	0.014
	SB	A	8	0.005		SB	A	7.8	0.004
	EB	B	10.6	0.145		EB	B	11.9	0.05
	WB	B	11	0.026		WB	B	11.3	0.028
SR 117 @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	7.96	0.018	PM	NB	A	9	0.018
	SB	A	7.96	0.004		SB	A	8	0.014
	EB	C	16	0.047		EB	C	20.2	0.449
	WB	A	9.9	0.022		WB	B	11.3	0.028
Springhaven/Scotland @ US 441									
	Build					Build			
	Direction	LOS	Delay (s)	v/c		Direction	LOS	Delay (s)	v/c
AM	NB	A	8.4	0.013	PM	NB	A	9.3	0.006
	SB	B	13.4	0.302		SB	A	9.4	0.097
	EB	F	55.5	0.785		EB	F	50.2	0.215
	WB	E	37.7	0.09		WB	D	32.4	0.04

As seen in Table 10, all of the study intersections are expected to operate with LOS C or better, with the exception of Springhaven/Scotland. In comparison No-Build conditions, the intersections perform as well as in the no-build with some improvements, however the Springhaven/Scotland intersection degrades to have LOS ranges from D-F in the EB and WB directions.

Similarly as with the 2020 analysis, analyzing this intersection with signalization improves the overall LOS A.

A signal warrant analysis will be needed for this intersection, however, that is beyond the scope of this study.

Roadway analyses were performed for the roadway segments on US 441 between the intersections and at the beginning and ending of the project for the **build** conditions using the base year design hourly traffic volumes and the proposed roadway configuration. The results of the roadway segment analyses are presented in Table 11.

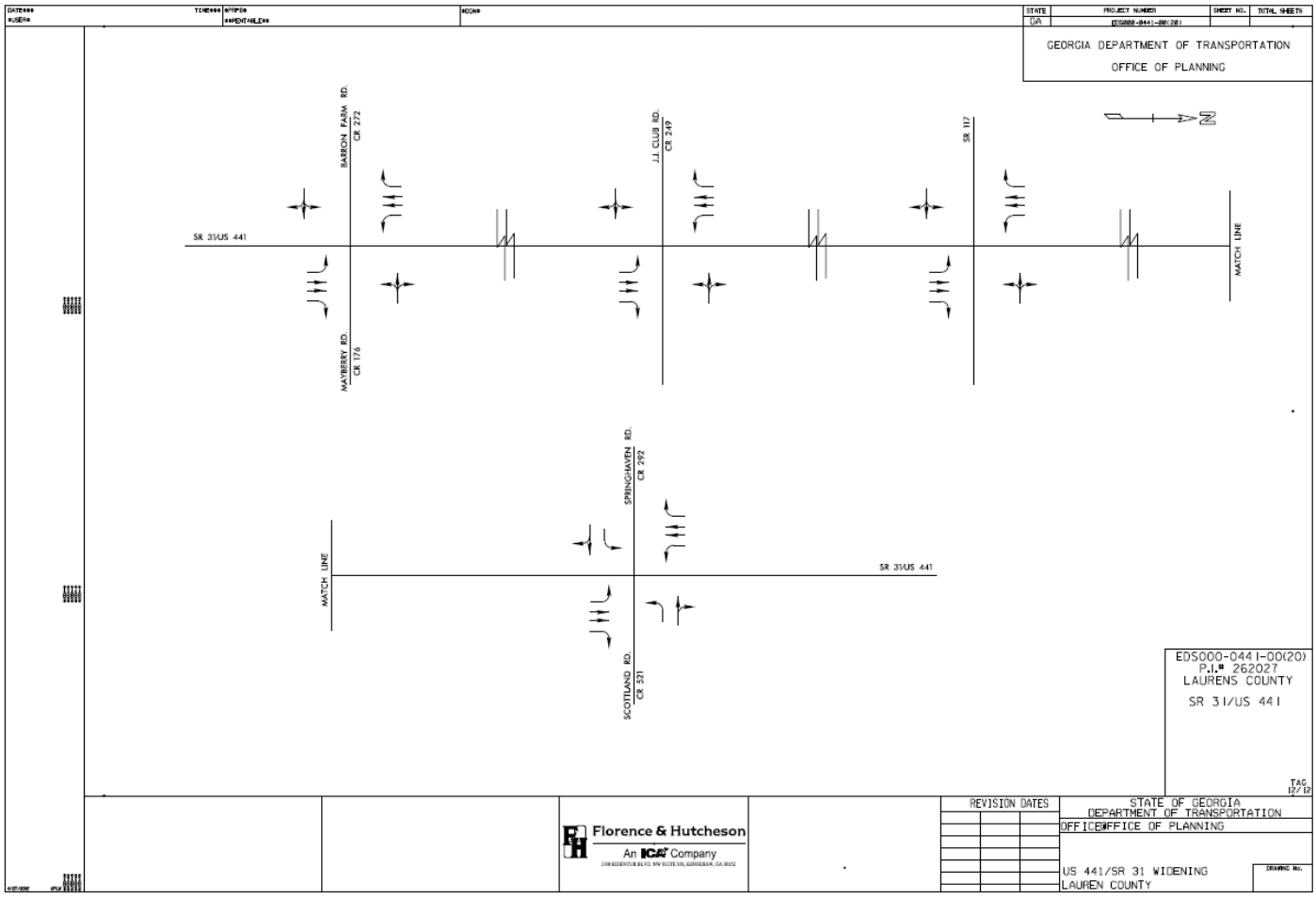
Table 11. Design Year 2040 Conditions Roadway Levels of Service (Multi-lane)

	Location	Time	LOS NB	LOS SB
US 441	Just South of Barron Farm/Mayberry Road	AM	A	A
		PM	A	A
	Just South of JJ Club Road	AM	A	A
		PM	A	A
	Just South of SR 117	AM	A	A
		PM	A	A
	Just South of Springhaven Road	AM	A	A
		PM	A	A
	Just North of Scotland Road	AM	A	A
		PM	A	A

As seen in Table 11, the studied roadway segments are expected to operate with acceptable Levels of Service during the AM and PM peak hours.

Figure 8 shows graphically the recommended lane geometry and the traffic control at the study intersections for design year 2040.

Figure 8 Recommended Lane Geometry and Traffic Control



Crash Data Analysis

Historic crash data was analyzed for years 2009-2011 for the study corridor. The summary of crash history along the corridor is shown in Figure 9. The 2009-2011 crash data records provided by GDOT are contained in the Appendix.

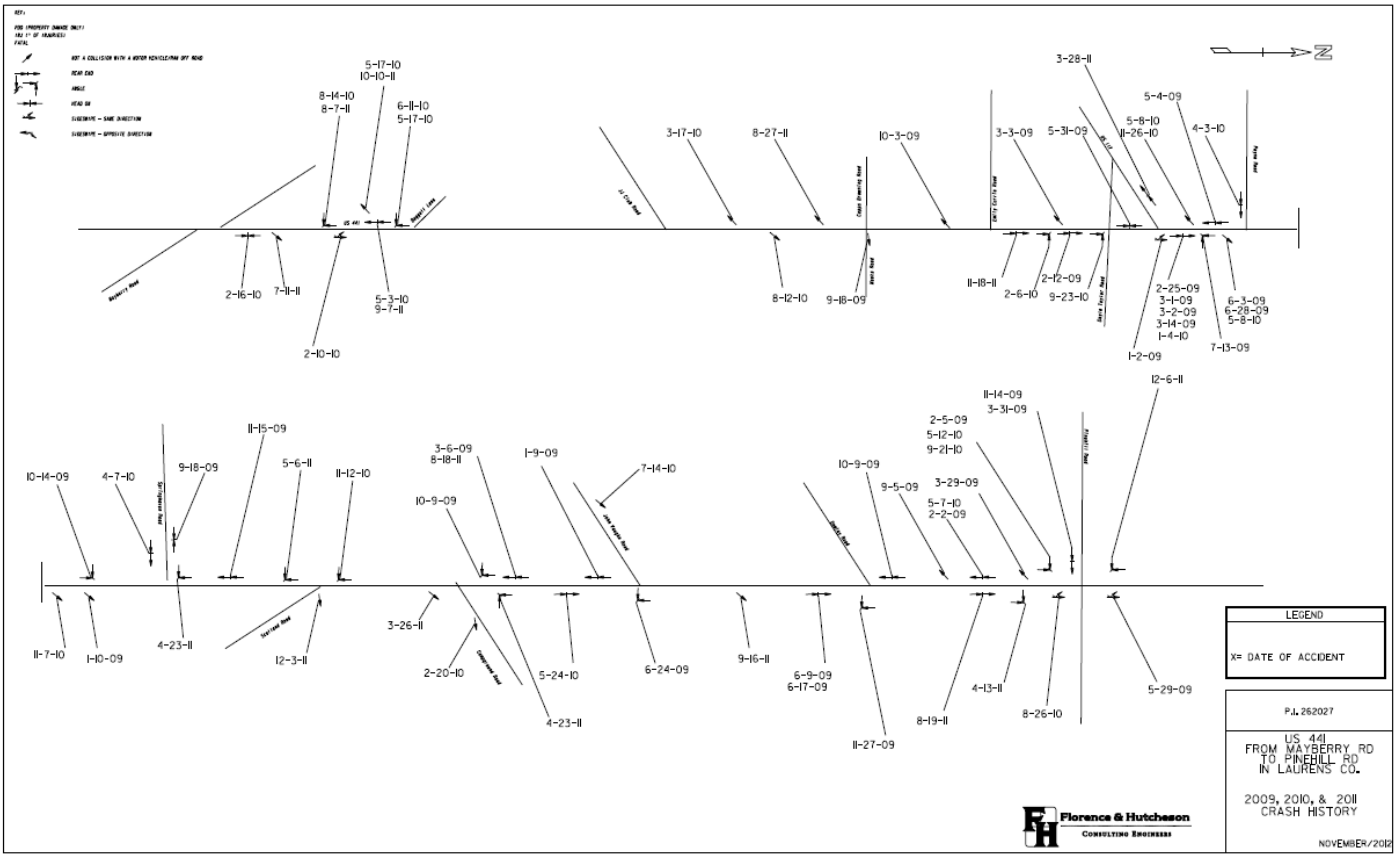
In summary, over the three year period 83 crashes occurred on US 441 Barron Farm Road to Pinehill Road.

In order to gauge the frequency of collisions occurring in the study area, crash rates were calculated for the US 441 corridor and were compared to the statewide average for similar facilities. The US 441 corridor was compared with Principal Arterial, NHS Rural routes. Table 13 summarizes how the compiled 2009 crash data compare with statewide averages for crash, injury and fatality rates. As of this writing, the 2010 and 2011 Statewide crash averages are not available.

Table 13. Crash Rates for US 1 Corridor

Year	Total			Injury			Fatal		
	# of Crashes	Crash Rate per 100 MVM	Statewide Average Crash Rate per 100 MVM	# of Crashes	Crash Rate per 100 MVM	Statewide Average Crash Rate per 100 MVM	# of Crashes	Crash Rate per 100 MVM	Statewide Average Crash Rate per 100 MVM
2009	32	258	113	16	129	37	1	8.05	1.45
2010	29	213		18	132		0	0.00	
2011	22	153		9	63		0	0.00	

Figure 9 Three Year Crash History on the corridor



As shown in Table 13, the statewide total crash rate averages are exceeded for the Total Crashes, the Injury Crashes, and the Fatal crashes for 2009.

In the three year period, one fatality crash occurred in the study area.

From the collision diagram, about 20% of the crashes are rear end crashes, and another 20% are run off the road type of crashes. The actual crash reports were not studied, but with this many run off the road crashes, many of them could be the result of motorist trying to avoid rear end collisions. The higher number of the rear end crashes and run off the road crashes occurred in the vicinity of US 117 to Scotland road. This coincides with the heavier congestion around these intersections described in the capacity analysis.

7. CONCLUSIONS

The purpose of this traffic study is to identify the future year traffic operating conditions for both the No-Build (without widening) and Build (with widening) conditions. The existing year (2012) conditions, opening year traffic conditions (2020), and design year traffic conditions (2040) were evaluated for the proposed new roadway.

The results of the existing conditions analyses indicated that all of the study intersections and roadway segments currently operate at acceptable overall Levels of Service during the peak hours.

In the base year 2020 No-Build condition, the intersections and roadway segments along US 441 are expected to operate with acceptable Levels of Service, with some degradation of the LOS near Springhaven Road and Scotland Road. For the Build condition, all intersections and roadway segments are expected to operate with acceptable Levels of Service, with the exception of turning movements at Spinghaven/Scotland Road.

In the design year 2040 No-Build condition, the major intersections from SR 117 north will operate with an unacceptable LOS. For the Build condition, all intersections and roadway segments are expected to operate with acceptable Levels of Service with the exception of Springhaven/Scotland Road.

In order to mitigate the Springhaven/Scotland Road intersection, a signalized intersection will improve the LOS to acceptable levels. A signal warrant analysis was beyond the scope of this study.

In summary, over the three year period 83 crashes occurred on US 441 Barron Farm Road to Pinehill Road. The proposed widening and intersection improvements will help reduce the crashes and the crash rate.