

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**OFFICE OF DESIGN POLICY & SUPPORT  
INTERDEPARTMENTAL CORRESPONDENCE**

**FILE** P.I. # 0007161  
CSBRG-0007-00(161)  
Brantley County  
GDOT District 5 - Jesup  
SR 32 Bridge Replacement @ Little  
Satilla River Overflow

**OFFICE** Design Policy & Support

**DATE** November 6, 2012

**FROM**  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:**

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  
Jeff Baker, State Utilities Engineer  
Ken Thompson, Statewide Location Bureau Chief  
Andy Casey, State Roadway Design Engineer  
Attn: Dennis Odom, District Design Engineer  
Karon Ivery, District Engineer  
Brad Saxon, District Preconstruction Engineer  
Stephen Thomas, District Utilities Engineer  
Steve Price, District Environmentalist  
Cassius Edwards, Project Manager  
BOARD MEMBER - 1st Congressional District

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

Project Type:	<u>Bridge Replacement</u>	P.I. Number:	<u>0007161</u>
GDOT District:	<u>5 - Jesup</u>	County:	<u>Brantley</u>
Federal Route Number:	<u>N/A</u>	State Route Number:	<u>32</u>

Little Satilla River over flow bridge replacement on SR 32.

**Submitted for approval:**

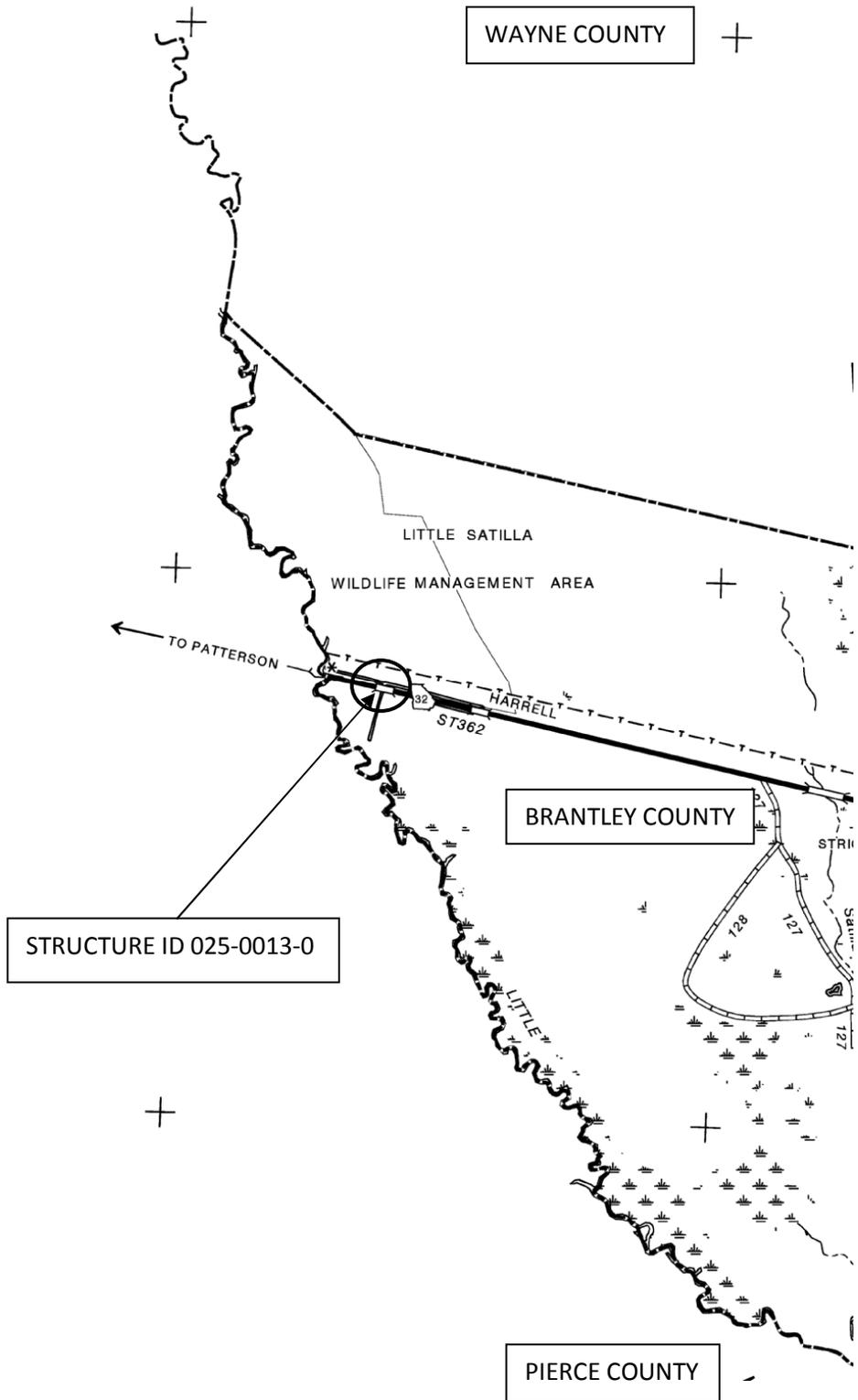
<u><i>Aaron L. Henry</i></u>	<u>8/9/12</u>
District Engineer	DATE
<u><i>Benett Lee - Split</i></u>	<u>8/23/2012</u>
State Program Delivery Engineer	DATE
<u><i>Cassim O. Edwards</i></u>	<u>8/13/12</u>
GDOT Project Manager	DATE

**Recommendation for approval:**

Program Control Administrator	<u><i>GLENN BOWMAN*/EKP</i></u>	DATE	<u>9/6/12</u>
State Environmental Administrator	<u><i>KATHY ZAHUL*/EKP</i></u>	DATE	<u>9/5/12</u>
State Traffic Engineer	<u><i>LISA MYERS*/EKP</i></u>	DATE	<u>8/29/12</u>
Project Review Engineer	<u><i>PATRICK ALLEN*/EKP</i></u>	DATE	<u>9/12/12</u>
<sup>SOP</sup> State Utilities Engineer	<u><i>BEN RABUN*/EKP</i></u>	DATE	<u>9/6/12</u>
State Bridge Design Engineer		DATE	
State Transportation Financial Management Administrator		DATE	
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).			
State Transportation Planning Administrator	<u><i>CINDY VAN DYKE*/EKP</i></u>	DATE	<u>8/29/12</u>

*\* - RECOMMENDATION ON FILE*

### PROJECT LOCATION



## PLANNING & BACKGROUND DATA

**Project Justification Statement:** This bridge (Structure ID 025-0013-0; SR 32 over Little Satilla River Overflow) was built in 1967. The bridge consists of five spans of Reinforced Concrete Deck Girders on concrete caps and concrete piles. This bridge is designed using truck configurations that weigh less than the current legal state truck weights. This bridge is posted. The overall condition of this bridge would be classified as fair; with the deck and superstructure members exhibiting cracking and/or minor spalling. No rehabilitation work performed on the structure components would improve this bridge in so far as the posting of the structure is concerned. Therefore, due to the structural integrity based on the design, replacement of this bridge is recommended.

**Description of the proposed project:** This project is approximately 0.25 miles in length and is located on SR 32 in Brantley County, 6.0 miles NW of Patterson, Georgia. This section of SR 32 is classified as Rural Minor Arterial. The 2010 Average Daily Traffic (ADT) is 1450 vehicles per day. The projected 2018 ADT is 1700 vehicles per day and 2500 vehicles per day in the design year of 2038. Truck traffic is 35% of the traffic volume. No accidents were reported at the bridge from 1/1/2009 to 12/31/2011. The proposed roadway and bridge improvements will provide for an acceptable Level of Service B in 2038 design year.

The overflow bridge (Structure ID 025-0013-0) has a sufficiency rating of 52.55. The structure is located at road inventory milepost 0.27. The bridge deck is 26 feet wide and 150 feet in length.

The logic for establishing the termini is due to replacing the bridge and reworking the shoulders and slope to accommodate guardrail. The structure has substandard load capacity. The new bridge will be constructed on the same alignment as the existing bridge. Traffic will be maintained by using an off-site 37.8 mile detour on State/Federal roads. The concept proposes to satisfy the Project Justification Statement by replacing the bridge to alleviate substandard load capacity and deck geometry while upgrading the shoulders and guardrail.

**Federal Oversight:**  Full Oversight  Exempt  State Funded  Other

**MPO:**  N/A  MPO  
MPO Project TIP #

**Regional Commission:**  N/A  RC – Southern Georgia RC  
RC Project ID #

**Congressional District(s):** 1

**Projected Traffic ADT:**

Current Year (2010): 1450      Open Year (2018): 1700      Design Year (2038): 2500

**Functional Classification (Mainline):** Rural Minor Arterial

**Is this project on a designated bike route?**  No  YES

**Is this project located on a pedestrian plan?**  No  YES

**Is this project located on or part of a transit network?**  No  YES

## CONTEXT SENSITIVE SOLUTIONS

**Issues of Concern:** There are no potential impacts that have been identified that would require context sensitive solutions.

**Context Sensitive Solutions:** N/A

## DESIGN AND STRUCTURAL DATA

**Mainline Design Features:** SR 32

Feature	Existing	Standard*	Proposed
<b>Typical Section</b>			
- Number of Lanes	2	2	2
- Lane Width(s)	11 ft	11-12 ft	11ft.
- Median Width & Type	N/A	N/A	N/A
- Outside Shoulder Width & Type	6' grass	8 (2' paved)	8'(2' paved)
- Outside Shoulder Slope	¾" per ft	6%	6%
- Inside Shoulder Width & Type	N/A	N/A	N/A
- Sidewalks	N/A	N/A	N/A
- Auxiliary Lanes	N/A	N/A	N/A
- Bike Lanes	N/A	N/A	N/A
Posted Speed	55 mph		55 mph
Design Speed	55 mph	45-75mph	55mph
Min Horizontal Curve Radius	N/A	N/A	N/A
Superelevation Rate	N/A	6%	N/A
Grade	N/A	N/A	N/A
Access Control	N/A	N/A	N/A
Right-of-Way Width	200 ft	100 ft	200 ft
Maximum Grade – Crossroad	N/A	N/A	N/A
Design Vehicle	SU	SU	SU

\*According to current GDOT design policy if applicable

**Major Structures:** Bridge ID: 025-0013-0

Structure	Existing	Proposed
Bridge ID: 025-0013-0 Milepost: 0.27	Two 11 ft. lanes with 2 ft. shoulders. Bridge deck is 150' long X 26' wide. Sufficiency rating of 52.55.	Two 11 ft. lanes with 8 ft. shoulders Bridge deck is 180' long X 38' wide.

**Major Interchanges/Intersections:** N/A

**Utility Involvements:** Power: Okefenokee REMC; Communications: Brantley Telephone

**Public Interest Determination Policy and Procedure recommended (Utilities)?**  YES  NO

**SUE Required:**  Yes  No

**Railroad Involvement:** N/A

**Right-of-Way:**

Required Right-of-Way anticipated:  YES  NO  Undetermined

**Location and Design approval:**  Not Required  Required

**Off-site Detours Anticipated:**  No  Yes  Undetermined

The detour route was selected as shortest available that met state route standards. Detour meeting was held July 10,2012, with only a positive comments.

**Transportation Management Plan Anticipated:**  YES  NO

**Design Exceptions to FHWA/AASHTO controlling criteria anticipated:**

FHWA/AASHTO Controlling Criteria	YES	Appvl Date (if applicable)	NO	Undetermined
1. Design Speed	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Lane Width	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Shoulder Width	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Bridge Width	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Horizontal Alignment	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Superelevation	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Vertical Alignment	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Grade	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Stopping Sight Distance	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Cross Slope	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Vertical Clearance	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Lateral Offset to Obstruction	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Bridge Structural Capacity	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Design Variances to GDOT standard criteria anticipated:**

GDOT Standard Criteria	Reviewing Office	YES	Appvl Date (if applicable)	NO	Undetermined
1. Access Control	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Median Usage & Width	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Intersection Skew Angle	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Lateral Offset to Obstruction	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Intersection Sight Distance	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. GDOT Drainage Manual	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Georgia Standard Drawings	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. GDOT Bridge & Structural Manual	Bridge Design	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Roundabout Illumination	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Rumble Strips/Safety Edge	DP&S	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>

**VE Study anticipated:**  No  Yes  Completed

## ENVIRONMENTAL DATA

### Anticipated Environmental Document:

GEPA:  NEPA:  Categorical Exclusion  EA/FONSI  EIS

### 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

### Environmental Permits/Variations/Commitments/Coordination anticipated:

Permit/ Variance/ Commitment/ Coordination Anticipated	YES	NO	Remarks
1. U.S. Coast Guard Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Forest Service/Corps Land	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. CWA Section 404 Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Tennessee Valley Authority Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. Buffer Variance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Coastal Zone Management Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. NPDES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. FEMA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9. Cemetery Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10. Other Permits	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11. Other Commitments	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
12. Other Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Is a PAR required?  No  Yes  Completed

**NEPA/GEPA:** Categorical Exclusion.

**Ecology:** Ecology survey and report will determine if any protected species or property will be encountered.

**History:** History survey and report will determine if there are any effects to potential historical artifacts.

**Archeology:** Archeology survey and report will determine if there are any cemeteries.

**Air & Noise:** Air and noise assessment and reports will determine if mitigation measures are needed.

**Public Involvement:** A Public Information Open House Detour Meeting was held July 10, 2012. A synopsis of the meeting is attached.

**Major stakeholders:** Traveling public.

## CONSTRUCTION

**Issues potentially affecting constructability/construction schedule:** The detour may or may not affect the schedule.

**Early Completion Incentives recommended for consideration:**  No  Yes

## PROJECT RESPONSIBILITIES

### Project Activities:

Project Activity	Party Responsible for Performing Task(s)
Concept Development	GDOT/D5
Design	GDOT/D5
Right-of-Way Acquisition	GDOT
Utility Relocation	Utility Companies
Letting to Contract	GDOT
Construction Supervision	GDOT
Providing Material Pits	Contractor
Providing Detours	GDOT
Environmental Studies, Documents, and Permits	GDOT
Environmental Mitigation	GDOT
Construction Inspection & Materials Testing	GDOT

**Lighting required:**  No  Yes

**Initial Concept Meeting:** N/A

**Concept Meeting:** The concept meeting minutes from March 29, 2012, are attached.

**Other projects in the area:** M004228, milling, resurfacing, and shoulder rebuilding on SR 32 from Brantley Co. line to Bacon Co. line in Pierce Co. and is expected to be complete by 2/6/12

**Other coordination to date:** None.

### Project Cost Estimate and Funding Responsibilities:

	Breakdown of PE	ROW	Utility	CST*	Environmental Mitigation	Total Cost
By Whom	GDOT	GDOT	GDOT	GDOT	GDOT	
\$ Amount	\$223,923	0	0	\$1,170,541	\$76,800	\$1,471,264
Date of Estimate	8/6/2007	2/6/2012	2/3/12	10/3/2012	2/8/12	

\*CST Cost includes: Construction, Engineering and Inspection, and Liquid AC Cost Adjustment.

## ALTERNATIVES DISCUSSION

**Alternative selection:**

<b>Preferred Alternative:</b> Replace bridge in place with off-site detour to maintain traffic during construction.			
<b>Estimated Property Impacts:</b>	None.	<b>Estimated Total Cost:</b>	\$1,471,264
<b>Estimated ROW Cost:</b>	0	<b>Estimated CST Time:</b>	6 months
<b>Rationale:</b> This appears to be the most logical alternative from expense and time constraints.			

<b>No-Build Alternative:</b> Continue to maintain and repair bridge as needed.			
<b>Estimated Property Impacts:</b>	None.	<b>Estimated Total Cost:</b>	0
<b>Estimated ROW Cost:</b>	0	<b>Estimated CST Time:</b>	0
<b>Rationale:</b> Not replacing the bridge would create maintenance and operational cost concerns.			

<b>Alternative 1:</b> Build bridge on the same alignment with a temporary on-site detour bridge to maintain traffic during construction.			
<b>Estimated Property Impacts:</b>	0	<b>Estimated Total Cost:</b>	\$3,020,226
<b>Estimated ROW Cost:</b>	0	<b>Estimated CST Time:</b>	11 months
<b>Rationale:</b> Traffic using an on-site detour bridge would be unsafe due to the proximity of the next bridge crossing the Little Satilla River. There is only 840 feet between existing overflow and river bridges. Drivers would experience a drastic speed reduction, sharp curves, and be out of alignment to safely cross over the bridges especially at night when visibility would be impaired due to construction lighting. These factors would also create an unsafe environment for construction personnel. Also, the environmental impact, ecology impact, and cost.			

<b>Alternative 2:</b> Build bridge on new alignment south of existing bridge with traffic maintained on existing bridge during construction.			
<b>Estimated Property Impacts:</b>	0	<b>Estimated Total Cost:</b>	\$4,313,429
<b>Estimated ROW Cost:</b>	0	<b>Estimated CST Time:</b>	18 months
<b>Rationale:</b> New alignment of this over flow bridge would create drastic alignment problems with the existing bridge over the Little Satilla River, which is not due to be replaced and would create an extra expense. Also, the environmental impact, ecology impact, and cost.			

**Comments:** None.

**Attachments:**

1. Typical sections
2. Traffic Volume
3. Project Layout
4. Detailed Cost Estimates:
  - a. Construction including Engineering and Inspection
  - b. Completed Fuel & Asphalt Price Adjustment forms
  - c. Utilities
  - d. Environmental Mitigation (EPD, etc)
5. Bridge inventory
6. Detour Map
7. PIOH Synopsis
8. Minutes of Concept meetings

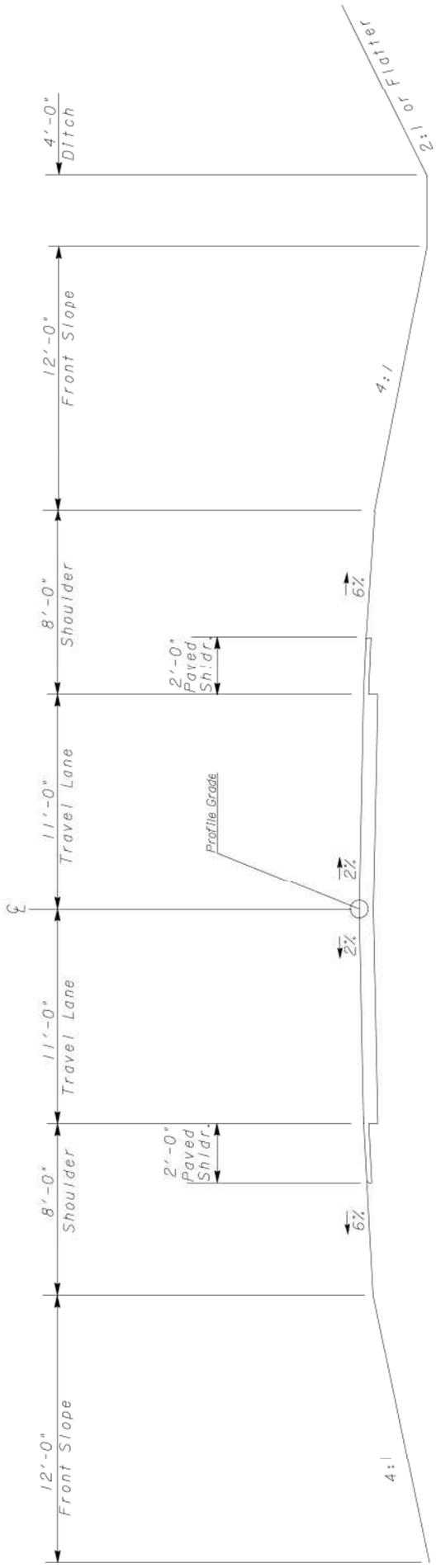
**APPROVALS**

Concur:   
Director of Engineering

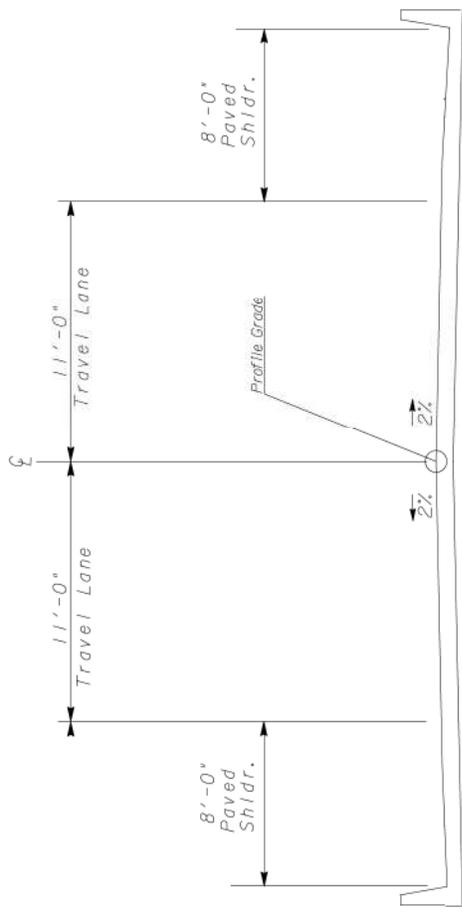
Approve:   
Chief Engineer

11/6/2012  
Date

PROPOSED ROADWAY TYPICAL SECTION



PROPOSED BRIDGE TYPICAL SECTION



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: ROADWAY DESIGN

TYPICAL SECTIONS

STATE ROAD 32

DRAWING NO.  
5-

# Department of Transportation State of Georgia

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## INTERDEPARTMENT CORRESPONDENCE

**FILE** CSBRG-0007-00(161), Brantley County      **OFFICE** Planning  
P.I. # 0007161  
**DATE** December 20, 2011

**FROM** Cindy VanDyke, State Transportation Planning Administrator

**TO** Bobby Hilliard, P.E., State Program Delivery Engineer  
**Attention:** Cassius O. Edward

**SUBJECT** Traffic Link Volume for S.R. 32 @ Little River Overflow.

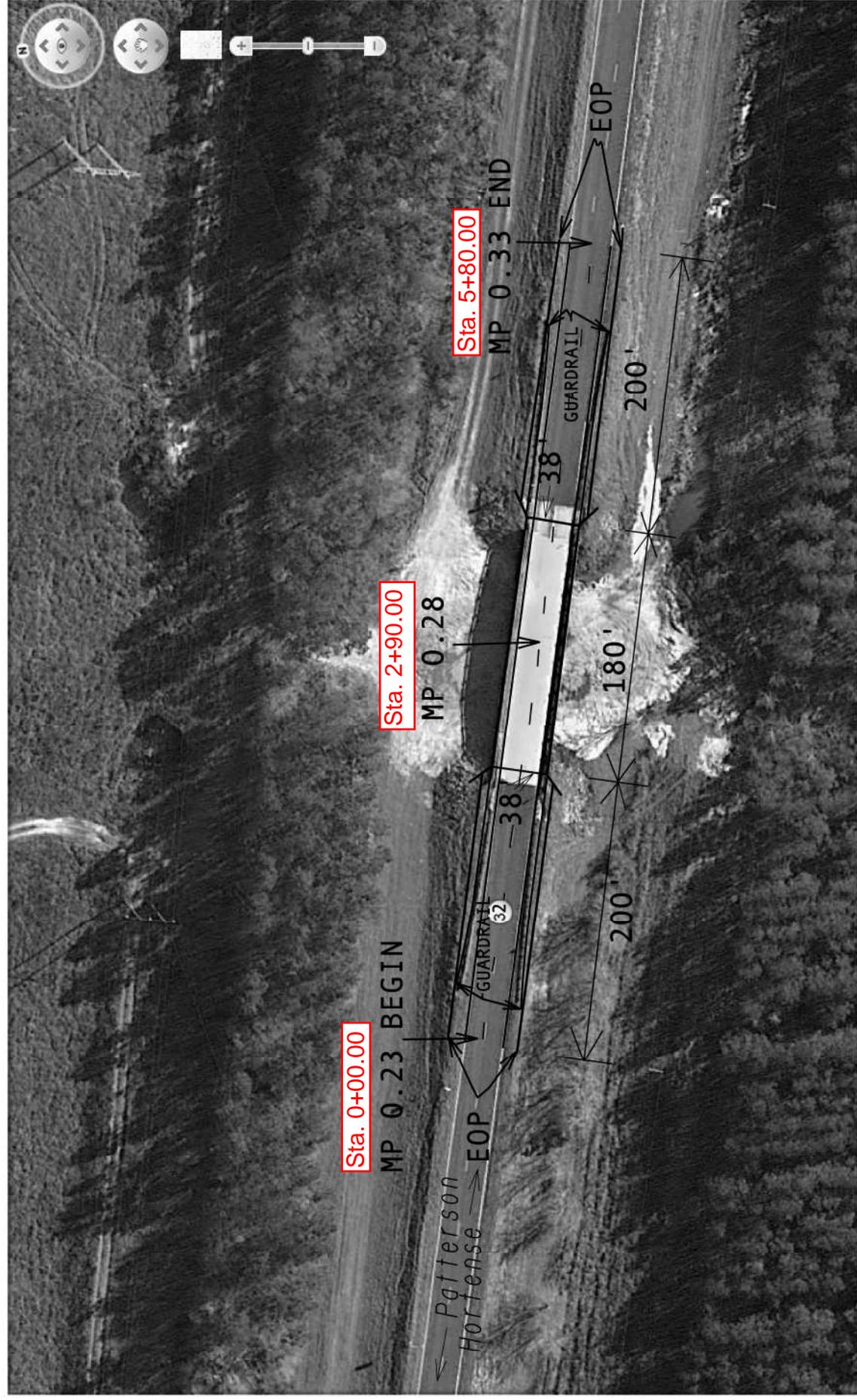
Traffic Link Volume for the above project is attached below:

**Traffic Count # 129**  
**BUILD = NO BUILD**

2010 ADT = 1450  
2018 ADT = 1700  
2038 ADT = 2500  
2010 DHV = 145  
2018 DHV = 170  
2038 DHV = 250  
D = 60%  
K = 10%  
T = 25%  
S.U. = 15%  
COMB. = 10%  
24 HR. T. = 35%  
S.U. = 19%  
COMB. = 16%

If you have any questions concerning this information please contact Abby Ebodaghe at (404) 631-1923.

PI 0007161 LITTLE SATILLA OVERFLOW SR 32 BRANTLEY COUNTY  
NOT TO SCALE \*\*\*\*\* 11' LANES - 8' SHOULDERS ON BRIDGE  
2' PAVED SHOULDERS/ROADWAY - PAVED UNDER GUARDRAIL



# DETAILED COST ESTIMATE



**Job: 0007161**

**JOB NUMBER:** 0007161

**FED/STATE PROJECT NUMBER** CSBRG-0007-00(161)

**SPEC YEAR:** 01

**DESCRIPTION:** SR 32 @ LITTLE SATILLA RIVER OVERFLOW  
PARAMETRIC EST OF BRIDGE REPLACEMENT

**ITEMS FOR JOB 0007161**

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0075	310-5080	800.000	SY	\$16.27427	GR AGGR BS CRS 8IN INCL MATL	\$13,019.42
0030	402-1812	100.000	TN	\$76.72070	RECYL AC LEVELING,INC BM&HL	\$7,672.07
0010	402-3103	350.000	TN	\$85.53277	REC AC 9.5 MM SP,TPII,GP2, INCL BM & H L	\$29,936.47
0070	402-3121	220.000	TN	\$70.55238	RECYL AC 25MM SP,GP1/2,BM&HL	\$15,521.52
0055	402-3190	140.000	TN	\$113.25187	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	\$15,855.26
0035	413-1000	195.000	GL	\$3.79794	BITUM TACK COAT	\$740.60
0085	433-1000	254.000	SY	\$153.85889	REINF CONC APPROACH SLAB 2*38**30'	\$39,080.16
0080	456-2015	1.000	GLM	\$3,745.92478	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	\$3,745.92
0045	540-1102	1.000	LS	\$175,500.00000	REM OF EX BR, BR NO - BRIDGE 150**26**45	\$175,500.00
0040	543-9000	1.000	LS	\$615,600.00000	CONSTR OF BRIDGE COMPLETE - BRIDGE 180**38**\$90	\$615,600.00
<b>SUBTOTAL FOR :</b>						<b>\$916,671.42</b>

**COST GROUP FOR JOB 0007161**

LINE NUMBER	UNIT	CALCULATION RULE	QUANTITY	PRICE	COST GROUP ID	DESCRIPTION	AMOUNT
00000004	SY	NORM	33350.000	\$1.01	EROC	EROSION CONTROL (SY)	\$33,676.83
00000008	LF	NORM	750.000	\$40.19	GDRL	GUARDRAIL/BARRIER (LF)	\$30,142.73
00000011	SY	NORM	300.000	\$4.00	MILL	MILLING (SY)	\$1,200.00
00000014	LS	NORM	1.000	\$105,000.00	TRFT	TRAFFIC CONTROL-TEMPORARY (LS)	\$105,000.00
00000016	LS	PCTO	1845.236	\$5.54	ERTHPCTO	EARTHWORK (PERCENT OF JOB)	\$10,222.61
00000017	EA	NORM	6.000	\$131.91	SSGN	SMALL ROADSIDE SIGNS	\$791.45
00000018	LM	NORM	2.000	\$1,744.99	SRTS	STATE ROUTE TRAFFIC STRIPE	\$3,489.98
<b>SUBTOTAL:</b>							<b>\$184,523.60</b>

**TOTALS FOR JOB 0007161**

<b>ITEMS COST:</b>	<b>\$916,671.42</b>
<b>COST GROUP COST:</b>	<b>\$184,523.60</b>
<b>ESTIMATED COST:</b>	<b>\$1,101,195.02</b>
<b>CONTINGENCY PERCENT:</b>	<b>0.00</b>
<b>ENGINEERING AND INSPECTION:</b>	<b>0.05</b>
<b>ESTIMATED COST WITH CONTINGENCY AND E&amp;I:</b>	<b>\$1,156,254.77</b>

**PROJ. NO.:** 0  
**P.I. NO.** 0007161  
**DATE:** 10/3/2012

<b>Base Construction Cost</b>		\$	1,101,195.02
E & I	5%	\$	55,059.75
Construction Contingency	0	\$	-
<b>Subtotal Construction Cost</b>		\$	1,156,254.77
Liquid AC Adjustment (50 % cap)		\$	14,286.26
<b>Total Construction Cost</b>		\$	1,170,541.03

PROJ. NO.

[Redacted]

CALL NO.

P.I. NO.

0007161

DATE

10/3/2012

INDEX (TYPE)	DATE	INDEX
REG. UNLEADED	Sep-12	\$ 3.836
DIESEL		\$ 4.068
LIQUID AC		\$ 576.00

Link to Fuel and AC Index:

<http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx>

**LIQUID AC ADJUSTMENTS**

$PA = \left( \frac{APM - APL}{APL} \right) \times TMT \times APL$

**Asphalt**

Price Adjustment (PA)				<b>13996.8</b>	\$	<b>13,996.80</b>
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	921.60		
Monthly Asphalt Cement Price month project let (APL)			\$	576.00		
Total Monthly Tonnage of asphalt cement (TMT)				40.5		

ASPHALT	Tons	%AC	AC ton
Leveling	100	5.0%	5
12.5 OGFC		5.0%	0
12.5 mm		5.0%	0
9.5 mm SP	350	5.0%	17.5
25 mm SP	220	5.0%	11
19 mm SP	140	5.0%	7
	<b>810</b>		<b>40.5</b>

**BITUMINOUS TACK COAT**

Price Adjustment (PA)			\$	<b>289.46</b>	\$	<b>289.46</b>
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	921.60		
Monthly Asphalt Cement Price month project let (APL)			\$	576.00		
Total Monthly Tonnage of asphalt cement (TMT)				0.83754468		

Bitum Tack			
Gals	gals/ton	tons	
195	232.8234	0.83754468	

PROJ. NO.

[Redacted]

CALL NO.

P.I. NO.

0007161

DATE

10/3/2012

**BITUMINOUS TACK COAT (surface treatment)**

Price Adjustment (PA)						<b>0</b>	\$	-
Monthly Asphalt Cement Price month placed (APM)		Max. Cap	60%	\$	921.60			
Monthly Asphalt Cement Price month project let (APL)				\$	576.00			
Total Monthly Tonnage of asphalt cement (TMT)					0			

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

<b>TOTAL LIQUID AC ADJUSTMENT</b>							\$	<b>14,286.26</b>
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**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**INTERDEPARTMENT CORRESPONDENCE**

**FILE** CSBRG-0007-00(161)  
**P.I. #** 0007161

**OFFICE** Jesup  
**DATE** February 03, 2012

**FROM** John Royal, D5 Utility Ofc.

**TO** James Sapp, D5 Design

**SUBJECT** PRELIMINARY UTILITY COST (ESTIMATE)

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

<b>Facility Owner</b>	<b>Non-Reimbursable</b>	<b>Reimbursable</b>	<b>Comments</b>
Okefenokee REMC	\$12,000		
Brantley Telephone	\$5,000		
<b>Totals</b>	\$17,000	\$0.00	
<b>Total Reimbursement</b>	\$0.00	\$0.00	

**CC: Angie Robinson, Office of Financial Management;**  
**Terry Brigman, Assistant State Utilities Engineer**  
**District Office File**  
**Utilities Office File**

## Sapp, James

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**From:** Westberry, Lisa  
**Sent:** Wednesday, February 08, 2012 3:32 PM  
**To:** Sapp, James  
**Cc:** Odom, Dennis; Edwards, Cassius Octavius; Moseley, Brent  
**Subject:** FW: 0007161 Environmental Mitigation?  
**Attachments:** PCR 0007161 - New Format2011.docx; PI 0007161.pdf

James,

I apologize for it taking so long to get back to you on this. The project is located on SR 32 over the Little Satilla River overflow bridge in Brantley County. I reviewed the National Wetland Inventory Maps and based on the project description, wetlands would be impacted by this project and mitigation would be required. Using 200 feet of existing ROW, the project would require approximately 48 wetland credits. The estimated costs for these credits is \$76,800.

DISCLAIMER: This information is based on a desk top review of the information available and only after a field reconnaissance will it be known for certain what the project impacts are and how many credits will be required for mitigation.

If you have any questions, please don't hesitate to ask.

Thank you,  
Lisa Westberry  
Georgia Department of Transportation  
600 West Peachtree Street, NW, Atlanta, GA 30308  
404-631-1772

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**From:** Sapp, James  
**Sent:** Tuesday, January 31, 2012 2:56 PM  
**To:** Westberry, Lisa  
**Cc:** Odom, Dennis; Edwards, Cassius Octavius; Moseley, Brent  
**Subject:** 0007161 Environmental Mitigation?

Ms. Westberry,

I know you are a very busy lady and I am sorry if I seemed impatient.

I know I asked for information about Environmental Mitigation on 0007161, but 0007163 is also on approximately the same schedule. I've attached maps to the bridges and screen shots of the bridges being replaced (with arrows above them).

Also, I'm attaching what I have completed of the concepts. I was completing the "Project Cost Estimate and Funding Responsibilities" table and asked Cassius Edwards to review it for me. He told me to get in touch with you regarding the mitigation. Will I need environmental mitigation and what will it cost? These are the questions that I have, and thank you for the hard work you do.

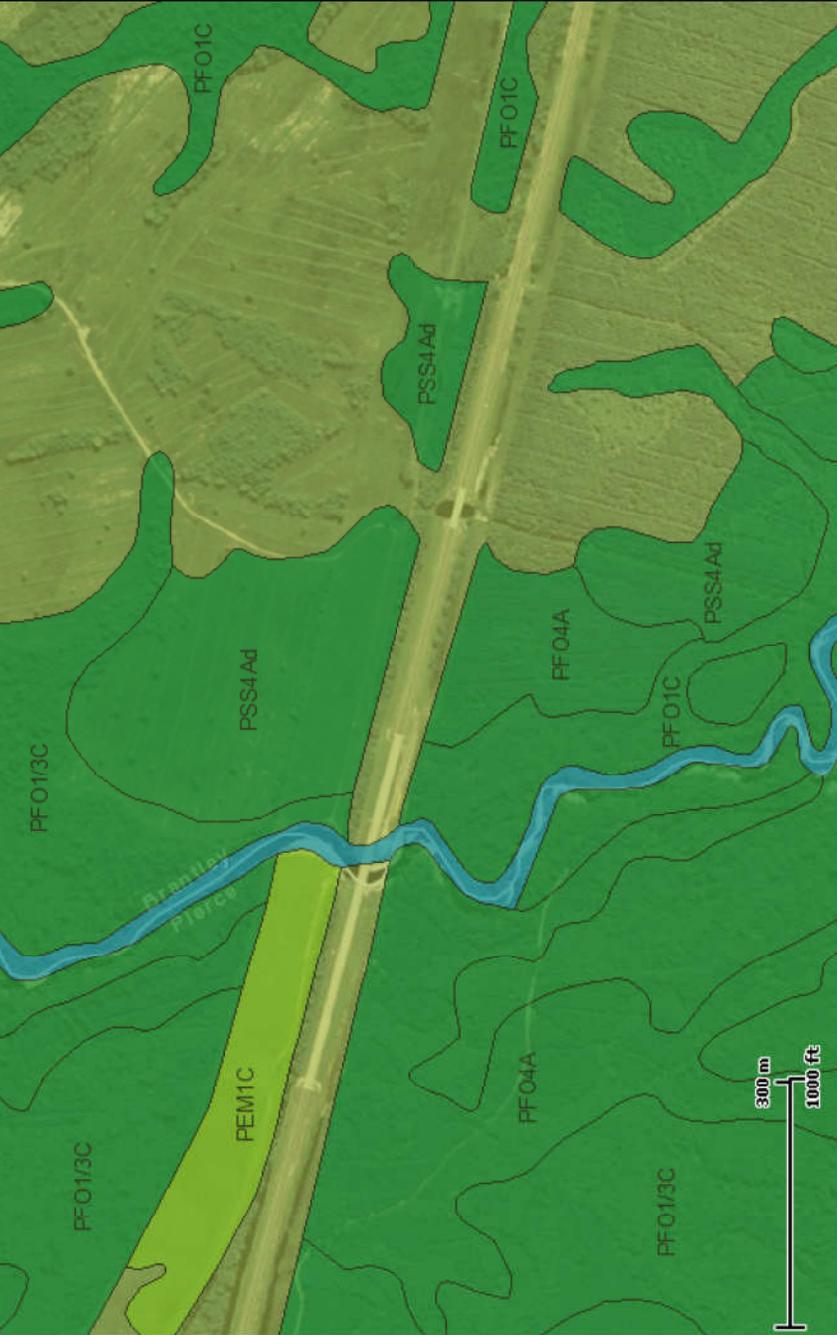
0007161



U.S. Fish and Wildlife Service

# National Wetlands Inventory

Feb 8, 2012



## Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

## Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:



# Bridge Inventory Data Listing

Parameters: Bridge Serial Num

Structure ID: 025-0013-0

Brantley

SUFF. RATING: 52.55

**Location & Geography**

Structure ID: 025-0013-0  
 200 Bridge Information: 06  
 \*5A Feature Int: LITTLE SATILLA RIVER O/F  
 \*5B Critical Bridge: 0  
 \*7A Route No Carried: SR00032  
 \*7B Facility Carried: HARRELL HIGHWAY  
 8 Location: 6 MI NW OF PATTERSON  
 2 Dot District: 5

**Signs & Attachments**

\*104 Highway System: 0  
 \*26 Functional Classification: 06  
 \*204 Federal Route Type: F No: 00362  
 105 Federal Lands Highway: 0  
 \*110 Truck Route: 0  
 2006 School Bus Route: 1  
 217 Benchmark Elevation: 0064.29  
 218 Datum: 1  
 \*19 Bypass Length: 16  
 \*20 Toll: 3  
 \*21 Maintenance: 01  
 \*22 Owner: 01  
 \*31 Design Load: 2  
 37 Historical Significance: 5  
 205 Congressional District: 01  
 27 Year Constructed: 1967  
 106 Year Reconstructed: 0000  
 33 Bridge Median: 0  
 34 Skew: 00  
 35 Structure Flared: 0  
 38 Navigation Control: 0  
 213 Special Steel Design: 0  
 267 Type of Paint: 0  
 \*42 Type of Service On: 1  
 Type of Service Under: 9  
 214 Movable Bridge: 0  
 203 Type Bridge: D  
 259 Pile Encasement: 3  
 \*43 Structure Type Main: 1 04  
 45 No Spans Main: 005  
 44 Structure Type Appr: 0 00  
 46 No Spans Appr: 0000  
 226 Bridge Curve Horz: 0 Vert: 0  
 111 pier Protection: 0  
 107 Deck Structure Type: 1  
 108 Wearing Structure Type: 1  
 Membrane Type: 8  
 Deck Protection: 8

225 Expansion Joint Type: 02  
 242 Deck Drains: 1  
 243 Parapet Location: 0  
 Height: 0  
 Width: 0  
 238 Curb Height: 1  
 Curb Material: 1  
 239 Handrail: 11  
 \*240 Medium Barrier Rail: 0  
 241 Bridge Median Height: 0  
 \* Bridge Median Width: 0  
 230 Guardrail Loc. Dir. Rear: 3  
 Fwd: 3  
 Oppo. Dir. Rear: 0  
 Oppo. Fwd: 0  
 244 Approach Slab: 3  
 224 Retaining Wall: 0  
 233 Posted Speed Limit: 55  
 236 Warning Sign: 0.00  
 234 Delineator: 1.00  
 235 Hazard Boards: 1  
 237 Utilities Gas: 00  
 Water: 00  
 Electric: 00  
 Telephone: 00  
 Sewer: 00  
 247 Lighting Street: 0  
 Navigation: 0  
 Aerial: 0  
 \*248 County Continuity No.: 00

\*16 Latitude: 31 21.067 HMMS Prefix: SR  
 \*17 Longitude: 82 -01.7338 HMMS Suffix: 00 MP: 0.19  
 58 Border Bridge: 00%-Shared: 00  
 99 ID Number: 0000000000000000  
 \*100 STRAHNET: 0  
 12 Base Highway Network: 1  
 13A LRS Inventory Route: 251003200  
 13B Sub Inventory Route: 0  
 101 parallel Structure: N  
 \*102 Direction of Traffic: 2  
 \*264 Road Inventory Mile Post: 000.28  
 \*208 Inspection Area: 5  
 Engineer's Initials: exp  
 \* Location ID No: 025-00032D-000.19E



# Bridge Inventory Data Listing

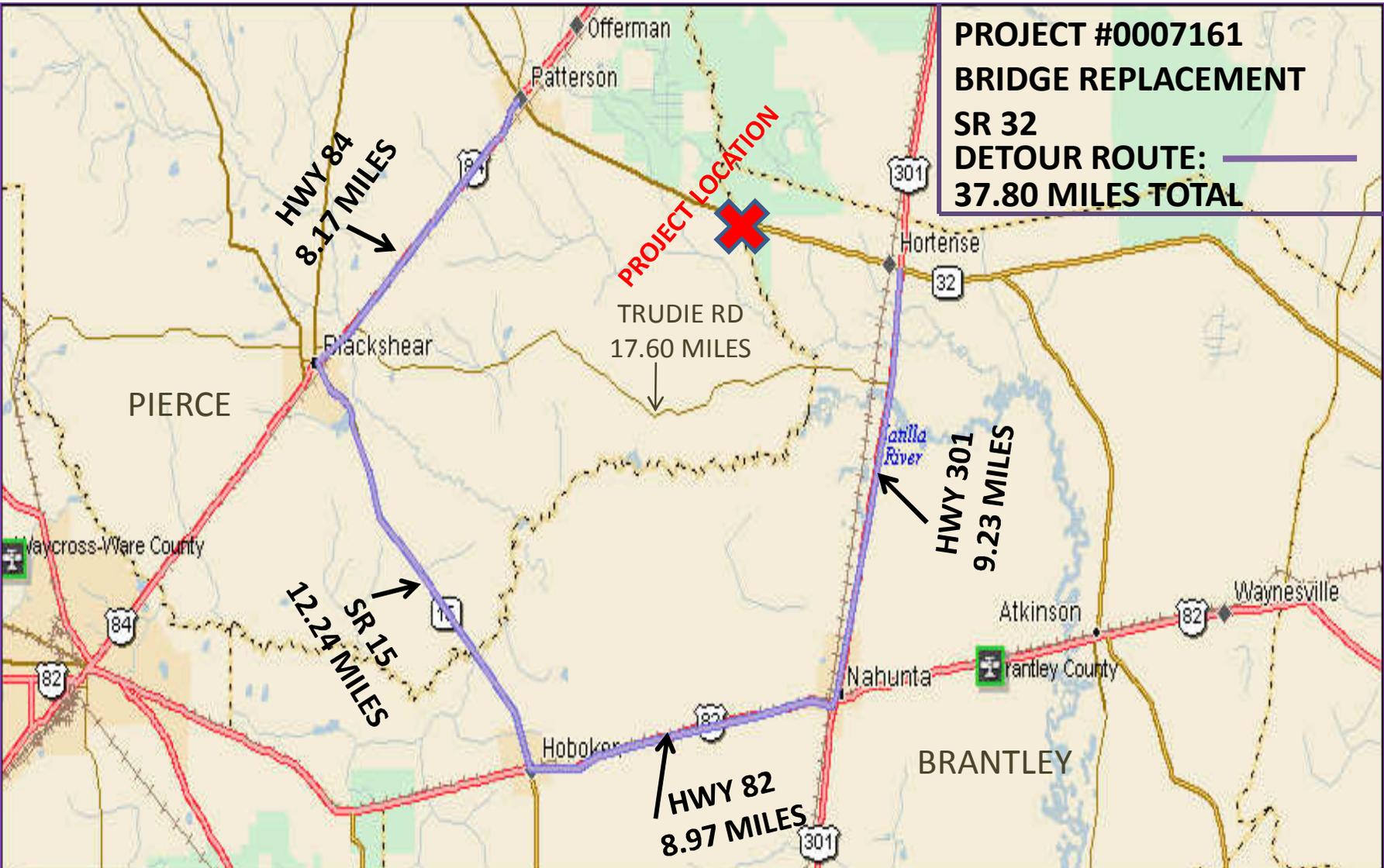
Processed Date: 9/14/2012

Parameters: Bridge Serial Num

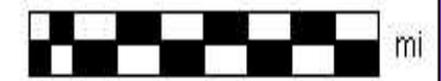
Structure ID: 025-0013-0

<p><b>Programming Data</b></p> <p>200 Project No: S-0609 (8)</p> <p>201 Plans Available: 4</p> <p>249 Prop Proj No: CSBRC-0007-00(161)</p> <p>250 Approval Status: 0000</p> <p>251 PI Number: 0007161</p> <p>252 Contract Date: 02/01/1301</p> <p>260 Seismic No: 00000</p> <p>75 Type Work: 34 1</p> <p>94 Bridge Imp. Cost: \$114</p> <p>95 Roadway Imp. Cost: 46</p> <p>96 Total Imp Cost: 226</p> <p>76 Imp Length: 000361</p> <p>97 Imp Year: 1990</p> <p>114 Future ADT: 002160 Year: 2030</p>	<p><b>Measurements:</b></p> <p>*29 ADT: 001440 Year: 2010</p> <p>109% Trucks: 35</p> <p>*28 Lanes Or: 02 Under: 00</p> <p>210 No. Tracks On: 00 Under: 00</p> <p>*48 Max. Span Length: 0033</p> <p>*49 Structure Length: 150</p> <p>51 Br. Rwdy. Width: 26.00</p> <p>52 Deck Width: 32.10</p> <p>*47 Tot. Horiz. Ct: 26</p> <p>50 Curb / Sidewalk Width: 2.00 / 2.00</p> <p>32 Approach Rdwy. Width: 025</p> <p>*229 Shoulder Width: 6.00 Type: 8 Rt: 6.00</p> <p>Rear Lt: 6.00 Type: 8 Rt: 6.00</p> <p>Fwd. Lt:</p> <p>Permanent Width:</p> <p>Rear: 24.90 Type: 8</p> <p>24.70 Type: 2</p> <p>Intersection Rear: 0 Fwd: 0</p> <p>36 Safety Features Br. Rail: 2</p> <p>Transition: 2</p> <p>App. G. Rail: 1</p> <p>App. Rail End: 2</p> <p>53 Minimum Cl. Over: 99' 99" *</p> <p>Under:</p> <p>*228 Minimum Vertical Cl</p> <p>Act. Odm Dir: 99' 99"</p> <p>Oppo. Dir: 99' 99"</p> <p>Posted Odm Dir: 00' 00"</p> <p>Oppo. Dir: 00' 00"</p> <p>55 Lateral Undercl. Rt: N 0 0</p> <p>56 Lateral Undercl. Lt: 0 00</p> <p>*10 Max Min Vert Ct: 99' 99" Dir: 0</p> <p>39 Nav Vert Cl: 000 Horiz: 0000</p> <p>116 Nav Vert Cl Closed: 000</p> <p>245 Deck Thickness Main Deck Thick Approach: 6.00</p> <p>246 Overlay Thickness: 0.00</p> <p>212 Year Last Painted: Sup: 0000 Sub: 0000</p>
<p><b>Hydraulic Data</b></p> <p>215 Waterway Data:</p> <p>High Water Elev: 0000.0 Year: 1900</p> <p>Flood Elev: 0000.0 Freq: 00</p> <p>Avg Streambed Elev: 0000.0</p> <p>Drainage Area: 00000</p> <p>Area of Opening: 000000</p> <p>113 Scour Critical: U</p> <p>216 Water Depth: 10.3 B: Height: 17.7</p> <p>222 Slope Protection: 1</p> <p>221 Slope Protection: 0 Fwd: 3</p> <p>219 Fender System: 0</p> <p>220 Dolphin: 0</p> <p>223 Current Cover: 000</p> <p>Type: 0</p> <p>No. Barrels: 0</p> <p>* Width: 0.00 Height: 0.00</p> <p>* Length: 0 Apion: 0</p> <p>266 L/W Insp. Area: 2 Divis: RMO</p> <p>Location ID No: 025-00013D-000.19E</p>	<p>65 Inventory Rating Method: 1</p> <p>63 Operating Rating Method: 1</p> <p>66 Inventory Type: 2 Rating: 20</p> <p>64 Operating Type: 2 Rating: 20</p> <p>231 Calculated Loads:</p> <p>H-Modified: 21 1</p> <p>HS-Modific: 26 0</p> <p>Type 3: 31 1</p> <p>Type 3s2: 30 0</p> <p>Timber: 37 1</p> <p>Piggyback: 40 0</p> <p>261 H Inventory Rating: 15</p> <p>262 H Operating Rating: 25</p> <p>67 Structural Evaluation: 5</p> <p>58 Deck Condition: 7</p> <p>59 Superstructure Condition: 7</p> <p>* 227 Collision Damage: 0</p> <p>60A Substructure Condition: 5</p> <p>60B Scour Condition: 5</p> <p>60C Underwater Condition: 6</p> <p>71 Waterway Adequacy: 8</p> <p>61 Channel Protection Cond.: 5</p> <p>68 Deck Geometry: 4</p> <p>69 UnderCir. Horiz/Vert: N</p> <p>72 Appr. Alignment: 8</p> <p>62 Culvert: N</p> <p><b>Posting Data</b></p> <p>70 Bridge Posting Required: 4</p> <p>41 Struct Open, Posted, CL: P</p> <p>* 103 Temporary Structure: 0</p> <p>232 Posted Loads</p> <p>H-Modified: 21</p> <p>HS-Modific: 00</p> <p>Type 3: 31</p> <p>Type 3s2: 00</p> <p>Timber: 37</p> <p>Piggyback: 00</p> <p>253 Notification Date: 02/01/1901</p> <p>258 Fed Notify Date: 2/1/1901 12:00:00AA</p>

**PROJECT #0007161**  
**BRIDGE REPLACEMENT**  
**SR 32**  
**DETOUR ROUTE: **  
**37.80 MILES TOTAL**



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www.delorme.com



0 1 2 3 4 5 6 7 8 mi  
Data Zoom 9-0

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**INTERDEPARTMENT CORRESPONDENCE**

FILE: P. I. No. 0007161 OFFICE: Environmental Services  
DATE: July 12, 2012

FROM <sup>GBK</sup> Glenn Bowman, P.E., State Environmental Administrator

TO Distribution Below

SUBJECT PUBLIC INFORMATION (DETOUR) OPEN HOUSE SYNOPSIS

PROJECT No. & COUNTY: CSBRG-0007-00(161), Brantley

PROJECT DESCRIPTION: Project CSBRG-0007-00(161), P.I. No. 0007161, Brantley County, would replace the existing structurally deficient (i.e., substandard load capacity) bridge on State Route 32 over the Little Satilla River Overflow. This project is approximately 0.25 mile in length and located approximately 6.0 miles northwest of Patterson, Georgia. The existing bridge over the Little Satilla River Overflow was built in 1967 and is classified as being in fair condition with the deck and superstructure members exhibiting cracking and/or minor spalling. No rehabilitation work performed on the structure components would improve this bridge in so far as the posting of the structure is concerned. Therefore, due to the structural integrity based on the design, replacement of this bridge is recommended. The existing bridge is 150 feet long and 26 feet wide with two 11 foot travel lanes and 2 foot shoulders. The new bridge will be constructed at 180 feet in length, 38 feet wide with two 11 foot travel lanes and 8 foot shoulders. It will be constructed on the same alignment as the existing bridge and the roadway will be closed to through traffic during construction. Traffic will utilize an off-site detour during construction.

DATE: July 10, 2012

NUMBER IN ATTENDANCE: 6

FOR: 1

CONDITIONAL: 0

UNCOMMITTED: 0

AGAINST: 0

OFFICIALS IN ATTENDANCE: Mr. Chris Harris, Brantley County Commissioner.

ADDITIONAL COMMENTS: Those who did not provide written comments expressed

positive favor of the project and detour through conversations with myself and with the other GDOT project representatives.

PREPARED BY: Steve Price, GDOT District 5 Environmentalist

TELEPHONE No.: (912) 427-5756

cc: Jay Shaw, DOT Board Member  
Gerald M. Ross, P.E., Chief Engineer  
Russell McMurry, P.E., Director of Engineering  
Keisha Jackson, OES Public Involvement Manager  
Cindy Van Dyke, State Planning Administrator  
Brad Saxon, P.E., District Preconstruction Engineer  
Karlene Barron, Director of Communications  
Karon Ivory, District Engineer  
Jennifer Giersch, FHWA

# DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

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## INTERDEPARTMENT CORRESPONDENCE

**S.R. 32 @ Little Satilla River Overflow, 6 Miles NW of Patterson  
CSBRG-0007-00(161), Brantley County  
P. I. No.: 0007161**

**March 29, 2012 @ 9:00 AM  
Location: District 5 Assembly Room**

**Final Concept Meeting Minutes  
April 18, 2012**

**Revised Final Concept Meeting Minutes  
April 26, 2012**

### Attendance

Cassius O. Edwards	GDOT/OPD	912-427-5865	<a href="mailto:cedwards@dot.ga.gov">cedwards@dot.ga.gov</a>
Dennis Odom	GDOT/D5 Design	912-427-5716	<a href="mailto:dodem@dot.ga.gov">dodem@dot.ga.gov</a>
Keith Stewart	GDOT/D5 Design	912-427-5863	<a href="mailto:kstewart@dot.ga.gov">kstewart@dot.ga.gov</a>
John Royal	GDOT/D5 Utility	912-366-1090	<a href="mailto:jroyal@dot.ga.gov">jroyal@dot.ga.gov</a>
Jeffery Young	GDOT/D5 Location	912-370-2711	<a href="mailto:jyoung@dot.ga.gov">jyoung@dot.ga.gov</a>
Malcolm C. Coleman	GDOT/D5 ROW	912-427-1975	<a href="mailto:malcoleman@dot.ga.gov">malcoleman@dot.ga.gov</a>
Brent Moseley	GDOT/OPD	912-427-5749	<a href="mailto:bmosley@dot.ga.gov">bmosley@dot.ga.gov</a>
Steve Price	GDOT/D5 Environmentalist	912-427-5756	<a href="mailto:stprice@dot.ga.gov">stprice@dot.ga.gov</a>
James Sapp	GDOT/Design	912-427-5770	<a href="mailto:jsapp@dot.ga.gov">jsapp@dot.ga.gov</a>
Brad Saxon	GDOT/Pre-Construction	912-427-5715	<a href="mailto:bsaxon@dot.ga.gov">bsaxon@dot.ga.gov</a>
Cynthia Phillips	GDOT/Traffic Operations	912-427-5767	<a href="mailto:cyphillips@dot.ga.gov">cyphillips@dot.ga.gov</a>
Jack G. Walker	GDOT/A2 Waycross	912-285-6009	<a href="mailto:jacwalker@dot.ga.gov">jacwalker@dot.ga.gov</a>
Johnny Barber	GDOT/A2 Waycross	912-424-9253	<a href="mailto:jbarber@dot.ga.gov">jbarber@dot.ga.gov</a>
Lee Sheffield	GDOT/D5 Estimator	912-424-9409	<a href="mailto:lesheffield@dot.ga.gov">lesheffield@dot.ga.gov</a>
Teresa Scott	GDOT/D5 Utility	912-427-5780/5788	<a href="mailto:tscott@dot.ga.gov">tscott@dot.ga.gov</a>
Cory Knox	GDOT/D5 Construction	912-427-5733	<a href="mailto:cknox@dot.ga.gov">cknox@dot.ga.gov</a>
Jill Nagel	GDOT/ D5 Communications	912-427-5743	<a href="mailto:jnagel@dot.ga.gov">jnagel@dot.ga.gov</a>

The **Project Justification Statement** was read. This bridge (Structure ID 025-0013-0; SR 32 over Little Satilla River Overflow) was built in 1967. The bridge consists of five spans of Reinforced Concrete Deck Girders on concrete caps and concrete piles. This bridge is designed using truck configurations that weigh less than the current legal state truck weights. This bridge is posted. The overall condition of this

bridge would be classified as fair; with the deck and superstructure members exhibiting cracking and/or minor spalling. No rehabilitation work performed on the structure components would improve this bridge in so far as the posting of the structure is concerned. Therefore, due to the structural integrity based on the design, replacement of this bridge is recommended.

The **Description of the Proposed** project was read. This project is approximately 0.25 miles in length and is located on SR 32 in Brantley County, 6.0 miles NW of Patterson, Georgia. This section of SR 32 is classified as Rural Minor Arterial. The 2010 Average Daily Traffic (ADT) is 1450 vehicles per day. The projected 2018 ADT is 1700 vehicles per day and 2500 vehicles per day in the design year of 2038. Truck traffic is 35% of the traffic volume. No accidents were reported at the bridge from 1/1/2009 to 12/31/2011. The proposed roadway and bridge improvements will provide for an acceptable Level of Service B in 2038 design year.

The overflow bridge (Structure ID 025-0013-0) has a sufficiency rating of 52.55. The structure is located at road inventory milepost 0.27. The bridge deck is 26 feet wide and 150 feet in length.

The logic for establishing the termini is due to replacing the bridge and reworking the shoulders and slope to accommodate guardrail. The structure has substandard load capacity. The new bridge will be constructed on the same alignment as the existing bridge. Traffic will be maintained by using an off-site 49.5 mile detour on State/Federal roads. The concept proposes to satisfy the Project Justification Statement by replacing substandard load capacity and deck geometry bridges with upgraded shoulders and guardrail.

Brad Saxon stated that the bridge sufficiency rating in the concept report and bridge inventory report are different. He also stated that there is a shorter detour route south of the bridge from SR 23/US 301 to SR 520/US 82 on the Nahunta side. Plus, the off-site detour miles were calculated incorrectly and did not need to be calculated from bridge end to bridge end. The detour needed to be calculated from where the road the bridge is on intersects other state routes.

Brad recommends the proposed lane width in the concept report be reduced to 11' lanes. The existing lane width is 11' and needs to be put back in kind and **Brad's comment was continuing with 11' lanes was not a problem since the bridge was already receiving 8' shoulders.**

Under the **Major Structures** section on page 4 of the concept report, Brad stated that the roadway references need to be removed from the existing & proposed sections. The existing and proposed roadway dimensions are already listed under the **Mainline Design Features**. Also, the bridge deck width needs to be changed to 38 feet.

No VE Study is anticipated.

The Environmental Document is expected to Categorical Exclusion.

The Public Involvement statement on page 6 needs to be changed to only list one meeting Detour/PIOH meeting.

Under the Construction section of the concept report, it was asked was there any potential issues that would affect constructability or construction schedule. Johnny Barber stated that he found a Barn Swallow nest under the bridge. The Barn Swallow is listed as an endangered species. **If the project is let during the nesting period April 1-August 31, then netting could not be installed and any demolition work would have to wait until after Aug 1 to begin.**

**Netting can only be installed prior to the nesting period and has to be installed by March 31. Demolition of existing structures can only be done outside of the nesting period, unless netting has been installed prior to March 1.**

If the project is LET in March, April, May, June, or July then the contractor would have to wait until August 31 to start any demolition work on existing structures

Ideally the project would be let from July-Dec and NTP issued with time enough to install netting (prior to March 10 or just after nesting period ends (August 31) so that demolition could occur.

The Alternates given in the concept report, Brent Moseley asked if the rationale given in the report was sufficient enough explanation given as to why that alternate was not chosen. Brad stated that we would look at the rationale statements and give a more detailed explanation.

The Typical Sections for the roadway and the bridge need to be revised in the concept.