

# VALUE ENGINEERING REPORT

I-75 at 7 Locations from the Florida State Line to SR 122

NHS-0007-00(386), PI No 0007386

NHS-0000-00-(762), PI No. 0000762

Lowndes County

August 31, 2007

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OWNER AND DESIGN TEAM:

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**I-75 at 7 Locations from the Florida State Line to SR 122  
Value Engineering Study**

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## **EXECUTIVE SUMMARY**

# Executive Summary

## VALUE ENGINEERING STUDY

### I-75 at 7 Locations from the Florida State Line to SR 122

August 14-17, 2007

#### Introduction

The State of Georgia has previously widened I-75, from four to six lanes, from the Florida State Line to SR 122. The widening of I-75 resulted in substandard outside shoulders and reduced clear zones remaining at several interchange locations. The proposed project would eliminate these substandard outside shoulders / clear zones and also reconstruct the seven overpass locations to allow for I-75 to be widened to eight / ten lanes in the future. The seven locations involved in this VE Study are:

- I-75 at CR 274 (Lake Park Road / Bellville Road) This site involves the reconstruction of the Interchange to increase cross road capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the new ramp intersections.
- I-75 at SR 376 (Lakes Boulevard) This site involves the reconstruction of the interchange to increase capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the new ramp intersections and adjacent crossroad intersections.
- I-75 at Loch Laurel Road Overpass This site involves constructing a new longer grade crossing bridge north of the existing bridge and improving the cross road sight distance.
- I-75 at SR 31 (Madison Highway) This site involves the reconstruction of the interchange to increase capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the ramp intersections.
- I-75 at SR 133 St. Augustine Road) This site involves the reconstruction / reconfiguration of the Interchange to increase capacity. It proposes to construct a new wider and longer bridge, widen and improve the ramps, extend access control, improve alignment in the ramp intersections, and signalize the ramp intersections.
- I-75 at SR 7 (Shiloh Road) This site involves the reconstruction of the existing Interchange with a partial cloverleaf interchange with a loop ramp in the southwest quadrant. It proposes to construct a new wider and longer bridge, improve the ramps, and extend access control.
- I-75 at SR 122 (Main Street) This site involves the reconstruction of the existing interchange with a tight diamond interchange. It proposes to construct a new wider and longer bridge, improve the ramps, and extend access control.

The principal reasons for reconstructing the various interchanges is to eliminate the Interstate substandard shoulder / clear zones and widen the cross road bridges to accommodate the future widening of I-75 to eight lanes plus two “managed” lanes. The proposed project also makes significant changes in the access control at all 6 Interchanges. All of the Interchange sites except for the SR 122 site propose to construct 4-span bridges with short end spans and 2:1 end slopes. Major project items include bridge construction, asphalt and concrete pavement, roadway

embankment, traffic control, retaining walls, traffic signals, associated drainage facilities, and concrete shoulders.

### **Considerations**

The projects being evaluated under this VE study have a total estimated construction cost of \$97,539,000 (including E&C, and inflation). The project's right-of-way (ROW) costs are estimated at \$112,632,000. Right-of-way and bridge construction are the highest cost project items. Construction is scheduled for the SR 7 and SR 122 Interchanges in 2009. The Interchange Modification Reports for these projects have been approved. Some public hearings have been held and preparation of the Categorical Exclusion Reports is underway.

### **Results Obtained**

The VE team focused their efforts on the high cost items of the project. The study generated 50 ideas with 24 being identified for additional evaluation as possible recommendations or design suggestions. The VE team developed eight independent recommendations that if implemented have the potential to reduce the project cost by approximately \$8,000,000. The VE team also developed eleven design suggestions for further consideration by the State and its design consultant. A detailed write-up of each recommendation and design suggestion is contained in the center portion of this report. A summary of the recommendations and design suggestions follows.

## **Recommendation Highlights**

### **Idea A-2 (1), To reduce the CR 274 Bridge width by removing one left-turn lane and changing the 10-foot rural shoulder design to an urban shoulder design.**

The proposed CR 274 Bridge design shows a typical bridge section that carries 2 through lanes, 2 left turn lanes, and two 10-foot shoulders across the new bridge.

It is recommended that one 12-foot left turn lane be removed from the bridge and that the rural 10-foot shoulder concept is changed to an urban section concept with 6-foot sidewalks, 2-foot curb and gutters, and side parapets. The traffic study report indicates the left turn volumes at this location require approximately 150 feet of storage. The ramp intersections are sufficiently far apart to allow for a consolidated single left turn lane that would accommodate the projected left turns without the need for a second left turn lane. Converting the rural flush shoulder section to an urban sidewalk and parapet section is consistent with the typical sections used on the bridges at SR 376, SR 31, and SR 133. This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

**The total potential savings if this recommendation is accepted is \$496,000.**

### **Idea A-2 (4), To reduce the SR 31 Bridge width by removing one left-turn lane from the bridge typical section.**

The proposed SR 31 Bridge design shows a typical bridge section that carries 4 through lanes and 3 left turn lanes across the new bridge.

It is recommended that one of the dual I-75 southbound 12-foot left turn lanes be removed from the bridge typical section. The traffic study report indicates the left turn volumes at this location do not require storage lengths requiring 3 separate left turn lanes across the bridge. The traffic report indicates that approximately 150 feet of storage is necessary for eastbound traffic and a double 150-foot left storage area for westbound traffic. The ramp intersections are sufficiently far apart to allow for a consolidated left turn lane plus a second left turn lane for westbound traffic. Removing this lane will reduce the bridge width and make the bridge easier to construct. This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

**The total potential savings if this recommendation is accepted is \$455,000.**

### **Idea A-2 (5), To reduce the SR 133 Bridge width by removing one left-turn lane and one eastbound through lane from the bridge typical section.**

The proposed SR 133 Bridge design shows a typical bridge section that carries 5 through lanes and 3 left turn lanes across the new bridge.

It is recommended that one of the dual I-75 southbound 12-foot left turn lanes and one of the eastbound through lanes be removed from the bridge typical section. The traffic study report indicates the left turn volumes at this location do not require storage lengths requiring three separate left turn lanes across the bridge. The traffic report indicates that approximately 150 feet of storage is necessary for eastbound traffic and a double 250-foot left storage area for westbound traffic. The ramp intersections are sufficiently far apart to allow for a consolidated left turn lane plus a second left turn lane for westbound traffic. It is not necessary to carry a third eastbound through lane across the bridge since only two eastbound lanes exist on the west side of the structure. Removing these lanes will reduce the bridge width and make the bridge easier to construct and reduce the negative impacts of a wider roadway section within the commercial area on the east side of I-75. This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

**The total potential savings if this recommendation is accepted is \$1,086,000.**

**Idea A-2, B-2, To reduce SR 122 from a proposed four / five lane roadway section to a three-lane section and to reduce the SR 122 Bridge width by the same amount.**

The proposed design shows SR 122 being widened to a four / five-lane section through the community and a SR 122 Bridge typical section of 2 through lanes, 2 left turn lanes, and two 10-foot shoulders.

It is recommended that consideration be given to widening SR 122 to only three-lanes and to reduce the SR 122 Bridge to the same typical section. The traffic study report indicates less than 5,000 ADT on SR 122 in the design year which does not warrant an expansion to five lanes. In addition, future traffic is so light that traffic signals are not warranted at the ramp intersections. The ramp intersections are sufficiently spaced to allow for a consolidated left turn lane across the bridge. Removing these lanes will reduce the cross road and bridge typical section. This concept has the potential to save significant project cost, improve constructability, reduce construction time, and lessen the project's impact on the community.

**The total potential savings if this recommendation is accepted is \$1,535,000**

**Idea A-4, To reduce the overall lengths of the CR 274, SR 376, Loch Laurel Road, SR 31, and SR 133 bridges by changing them from four span structures with 2:1 end slopes to two span structures using MSE walls with pile end bents.**

The proposed design for the 5 Interchange cross road bridges (CR 274, SR 376, Loch Laurel Road, SR 31 and SR 133) shows four-span structures with short end spans and 2:1 end slopes.

It is recommended that the end spans of the bridges be removed and replaced with vertical abutments comprised of MSE retaining walls with pile end bents. The use of MSE walls with piles and bents at the abutments would improve constructability, reduce construction time, and result in significant cost savings to the project.

**The total potential savings if this recommendation is accepted is \$1,873,000.**

**Idea A-4 (6), To reduce the overall length of the SR 122 bridge by changing it from a four-span structure with 2:1 end slopes to a two span structure using MSE walls with end bents.**

The proposed SR 7 Bridge design indicates a four-span structure with two main spans crossing I-75, one long end span over the future Loop Ramp location for the relocated southbound off-ramp (includes end span and 2:1 end slopes), and one short end spans and 2:1 end slopes on the northbound side.

It is recommended that the end spans of the bridge be removed and replaced with vertical abutments comprised of MSE retaining walls with pile end bents. Since the ultimate location of the southbound Loop Ramp will be under the west side end span, the common pier between the main and end spans should be constructed as designed. The west side MSE walls should be built outside the common pier so they can easily be removed in the future when I-75 is widened and the southbound Loop Ramp is shifted out. The I-75 capacity analysis indicates the through movements will operate at a level of service 'C' in the design year (2032). Therefore, the ultimate I-75 widening to eight / ten lanes (and the southbound Loop Ramp shift) will most likely occur more than 20 years after completion of this project. The use of MSE walls with piles and bents at the abutments would improve constructability, reduce construction time, and result in significant cost savings to the project.

**Idea B-2, To reduce the shoulder width on relocated Morven Road and Union Road from ten feet to six feet.**

The proposed typical section for relocated Morven Road and Union Road in the I-75 / SR-122 Interchange complex (Site 7) includes 10-foot shoulders. The paved portion of the 10-foot shoulder is 6 feet 6 inches.

It is recommended that the shoulder width be reduced to 6 feet (2-foot paved). The reduced shoulder width complies with the GDOT Design Manual for local roads being designed for speeds of less than 50 mph. The reduced shoulder width would be adequate for these roads due to the extremely light projected traffic and low design speeds of these roads. Reducing the shoulder width would result in a potential cost savings to the project. It could also reduce the time needed to construct these roads.

**The total potential savings if this recommendation is accepted is \$196,000**

**Idea B-5, To eliminate the Interchange entrance and exit ramp tie-ins for the proposed future forth lane on I-75 at CR 274, SR 376, SR 31 and SR 133.**

The current design proposes to extend exit and entrance ramp tapers to accommodate possible future widening of I-75 from 6 to 8 lanes for the Interchange ramps at CR 274, SR 376, SR 31, and SR 133. Additional asphalt pavement is provided to tie into a future 4<sup>th</sup> lane in each

direction. Additional striping is added to align the current ramp tapers to tie into the existing outside travel lane.

It is recommended that the entrance and exit ramp tapers be redesigned to tie into the existing 6-lane section and eliminate the additional pavement for possible future widening of the ramps at CR 274, SR 376, SR 31, and SR 133. The capacity analysis of I-75 indicates that the through movement on the interstate will operate at a level of service 'C' in the design year (2032), which is acceptable for projects in rural areas. It is anticipated that the future widening of I-75 to 8 lanes will not occur for more than 20 years after the completion of construction for these projects. If the additional pavement is constructed during the current project, it is likely that it will need to be reconstructed before the construction of the future widening to 8 lanes. Reducing the ramp tapers would result in a potential cost savings to the project and could also reduce construction time.

**The total potential savings if this recommendation is accepted is \$1,095,000.**

## **Design Suggestions**

The VE team also developed various Design Suggestions for consideration during the final design of the project. The Design Suggestions are:

- It is suggested that a single ultimate typical roadway section be developed for I-75 and that this typical section be provided to all design consultants to ensure designs are based on the same criteria. The ultimate typical roadway section should include all desirable features / conditions, such as, future 4<sup>th</sup> lane location, potential “managed lane” location, bridge pier offsets, clear zone dimensions, inside shoulder width, uniform median width, and vertical / horizontal clearances.
- It is suggested that consideration be given to constructing a Single Point Interchange at the I-75 / SR 376 Interchange in order to reduce the amount of new ROW required for the facility.
- It is suggested that consideration be given to various bridge design options that could be used to reduce the beam depth for the SR-133 (St Augustine Road) structure. Consideration should be given to, Precast, Prestressed beams (single span), Precast, Prestressed beams with post tension ducts (single span), Precast, Prestressed beams with post tension ducts spliced with continuity, two-span steel plate girders, and Prestressed beams “touched shored” till made continuous.
- It is suggested that the proposed horizontal alignments for the cross roads at SR 376 and DR 31 be shifted slightly to the north to move part / all of the new bridges away from the existing bridges in order to improve the constructability of the new bridges.
- It is suggested that the Jewell Futch Road reconstruction in the southwest quadrant of the SR 376 Interchange on be eliminated.
- It is suggested that consideration be given to jacking the existing bridges during reconstruction to minimize the difference in roadway elevations to improve constructability and shoring issues.
- It is suggested that consideration be given to alternately closing the crossroads at SR 276 and Loch Laurel Road and detouring local traffic around the site during construction.
- It is suggested that contra-flow lane (2 lanes in each direction) alignments be considered to accommodate traffic on I-75 during construction in this corridor. Using conventional lane reductions / shifts at each of the interchange sites along the corridor would result in continuous lane changing configurations on I-75 that would likely confuse motorists and create safety concerns. Additionally, using this approach will provide a safer and more efficient work zone.

- It is suggested that a new access drive / road be created on SR 31 at the Hinton Oil property directly across from the new access drive at the Cowart & Sons property shown on the original concept.
- It is suggested that the ramp location on the west side of the I-75 / CR 274 Interchange be shifted 110 feet to the east to reduce the spacing between the ramp intersections from 770 feet to 660 feet. It is further suggested to reduce the length of the limited access control line in the northwest and southwest quadrants from 480 feet to 320 feet.
- It is suggested that the new cross street intersections at the I-75 / CR 274 and I-75 / SR 31 Interchanges be reviewed to see if they meet warrants for the installation of traffic signals. The proposed design has shifted the ramp intersection away from I-75 and the addition of access control outside these intersections has forced all traffic to enter the various truck stops through the new cross street intersections.

**I-75 at 7 Locations from the Florida State Line to SR 122  
SUMMARY OF POTENTIAL COST SAVINGS**

<b>ITEM No.</b>	<b>CREATIVE IDEA DESCRIPTION</b>	<b>ORIGINAL INITIAL COST</b>	<b>PROPOSED INITIAL COST</b>	<b>INITIAL COST SAVINGS</b>	<b>FUTURE SAVINGS</b>	<b>TOTAL LIFE CYCLE SAVINGS</b>	<b>SAVINGS POTENTIAL (%)</b>
	<b>Recommendations</b>						
<b>A-2</b>	To reduce the bridge width (change to urban section & combine left turn lanes) @ CR 274	\$1,913,000	\$1,417,500	\$496,000	Small	\$496,000	100
<b>A-2</b>	To reduce the bridge width (combine the number of left turn lanes) @ SR 31	\$4,191,000	\$3,736,000	\$455,000	Small	\$455,000	100
<b>A-2</b>	To reduce the bridge width (eliminate one eastbound lane & combine left turn lanes) @ SR 133	\$5,538,000	\$4,452,000	\$1,086,000	Small	\$1,086,000	100
<b>A-2, B-2</b>	To reduce roadway /bridge typical section (eliminate 2 through lanes, keep center left turn lane) @ SR 122	\$1,535,000	\$0	\$1,535,000	Small	\$1,535,000	100
<b>A-4</b>	To use 2-Span Bridges with MSE Walls at the Abutments @ CR 274, SR 376, Loch Laurel Road, SR 31, & SR 133	\$3,832,000	\$1,759,000	\$1,873,000	Small	\$1,873,000	100
<b>A-4</b>	To use 2-Span Bridges with MSE Walls at the Abutments @ SR 7	\$4,230,000	\$2,948,000	\$1,282,000	Small	\$1,282,000	100
<b>B-2</b>	To reduce shoulder widths on relocated Union Rd and Morven Rd @ SR 122	\$196,000	\$0	\$196,000	Small	\$196,000	100

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<b>B-5</b>	To eliminate the 4 <sup>th</sup> Lane Ramp Tapers	\$1,095,000	\$0	\$1,095,000	Small	\$1,095,000	100
		<b>Recommendation Subtotal:</b>				<b>\$8,018,000</b>	
	<b>Design Suggestions</b>						
<b>A-5</b>	To identify / define the ultimate typical section for I-75 throughout the corridor.	N/A	N/A	N/A	N/A	N/A	
<b>A-11</b>	To consider using a Single Point Interchange @ SR 376	N/A	N/A	N/A	N/A	N/A	
<b>A-13</b>	To consider strategies to reduce the bridge depth @ SR 133	N/A	N/A	N/A	N/A	N/A	
<b>A-15</b>	To offset (to the north) the location of the New Bridge to simplify construction under traffic @ SR 376 & SR 31	N/A	N/A	N/A	N/A	N/A	
<b>B-2</b>	To eliminate the reconstruction of a section of Jewell Futch Road at the Georgia Winnebago property @ SR 376	N/A	N/A	N/A	N/A	N/A	
<b>C-2</b>	To specify jacking bridges as necessary to maintain uniform roadway elevations during bridge reconstruction.	N/A	N/A	N/A	N/A	N/A	

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<b>C-3</b>	To investigate possible detour routes that would allow the closing of local roads during construction @ SR 376 & Loch Laurel Rd.	N/A	N/A	N/A	N/A	N/A	
<b>C-4</b>	To use contra-flow traffic lanes on I-75 to aid construction	N/A	N/A	N/A	N/A	N/A	
<b>G-1</b>	To accommodate additional access on the cross road @ SSR 31	N/A	N/A	N/A	N/A	N/A	
<b>L-1</b>	To hold the east side ramps at their proposed location while shifting the west side ramps inward (maintain a 660-foot separation) @ CR 274	N/A	N/A	N/A	N/A	N/A	
<b>L-4</b>	To investigate whether signals could be installed at the realigned truck stop entrances at CR 274 & SR 31	N/A	N/A	N/A	N/A	N/A	
<b>Note:</b> Savings Potential represents how much of an individual item, exclusive of any overlapping dependent items, can be implemented.							

## **STUDY IDENTIFICATION**

## Study Identification

<b>Project: I-75 at 7 Locations from the Florida State Line to SR 122</b>	<b>Date: August 14-17, 2007</b>
<b>Location: Lowndes County</b>	

### VE Team Members

Name:	Title:	Organization:	Telephone:
Keith Borkenhagen	VE Team Facilitator	MACTEC	623-556-1875
George Obaranec	Transportation Engineer	MACTEC	770-421-3346
Steven Gains	Transportation Engineer	Wolverton & Associates	707-447-8999
Clint Parker	Construction Engineer	SL King & Associates, Inc.	404-832-4834
Greg Grant	Structural Engineer	Wolverton & Associates	707-447-8999

### Project Description

The State has previously widened I-75, from four to six lanes, from the Florida State Line to SR 122. The widening of I-75 resulted in substandard outside shoulders / clear zones remaining at several Interchange locations. The proposed project would eliminate the substandard outside shoulders / clear zones and also reconstruct the seven Overpass locations to allow for I-75 to be widened to eight / ten lanes in the future. The seven locations involved in this reconstruction project are:

- I-75 at CR 274 (Lake Park Road / Bellville Road) This site involves the reconstruction of the Interchange to increase cross road capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the new ramp intersections.
- I-75 at SR 376 (Lakes Boulevard) This site involves the reconstruction of the Interchange to increase capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the new ramp intersections and adjacent crossroad intersections.
- I-75 at Loch Laurel Road Overpass This site involves constructing a new longer grade crossing bridge north of the existing bridge and improving the cross road sight distance.
- I-75 at SR 31 (Madison Highway) This site involves the reconstruction of the Interchange to increase capacity. It proposes to construct a new wider and longer bridge, shift and improve the ramps, extend access control, and signalize the ramp intersections.
- I-75 at SR 133 St. Augustine Road) This site involves the reconstruction / reconfiguration of the Interchange to increase capacity. It proposes to construct a new wider and longer bridge, widen and improve the ramps, extend access control, improve alignment in the ramp intersections, and signalize the ramp intersections.

- I-75 at SR 7 (Shiloh Road) This site involves the reconstruction of the existing Interchange with a partial cloverleaf Interchange with a loop ramp in the southwest quadrant. It proposes to construct a new wider and longer bridge, improve the ramps, and extend access control.
- I-75 at SR 122 (Main Street) This site involves the reconstruction of the existing Interchange with a tight Diamond Interchange. It proposes to construct a new wider and longer bridge, improve the ramps, and extend access control.

The principal reasons for reconstructing the various Interchanges is to eliminate the Interstate substandard shoulder / clear zones and widen the cross road bridges to accommodate the future widening of I-75 to eight lanes plus two “managed” lanes. The proposed project also makes significant changes in the access control at all 6 Interchanges. All of the Interchange sites except for the SR 122 site propose to construct 4-span bridges with short end spans and 2:1 end slopes. Major contract items include bridge construction, asphalt and concrete pavement, roadway embankment, traffic control, retaining walls, traffic signals, associated drainage facilities, and concrete shoulders. This project has an estimated construction cost of \$97,539,000 (including E&C and Inflation). The project’s ROW costs are estimated at \$112,632,000.

## **Project Constraints**

Several project constraints were discussed during the design presentation. Constraints mentioned include the following:

- No changes should be made to the project (SR 122) that impact the two-lane bridge crossing Franks Creek on the west side of the Interchange.
- It is critical to maintain access to the various commercial properties throughout the project.
- Construction staging will be critical due to its probable impact to I-75 traffic.

## **Project Briefing**

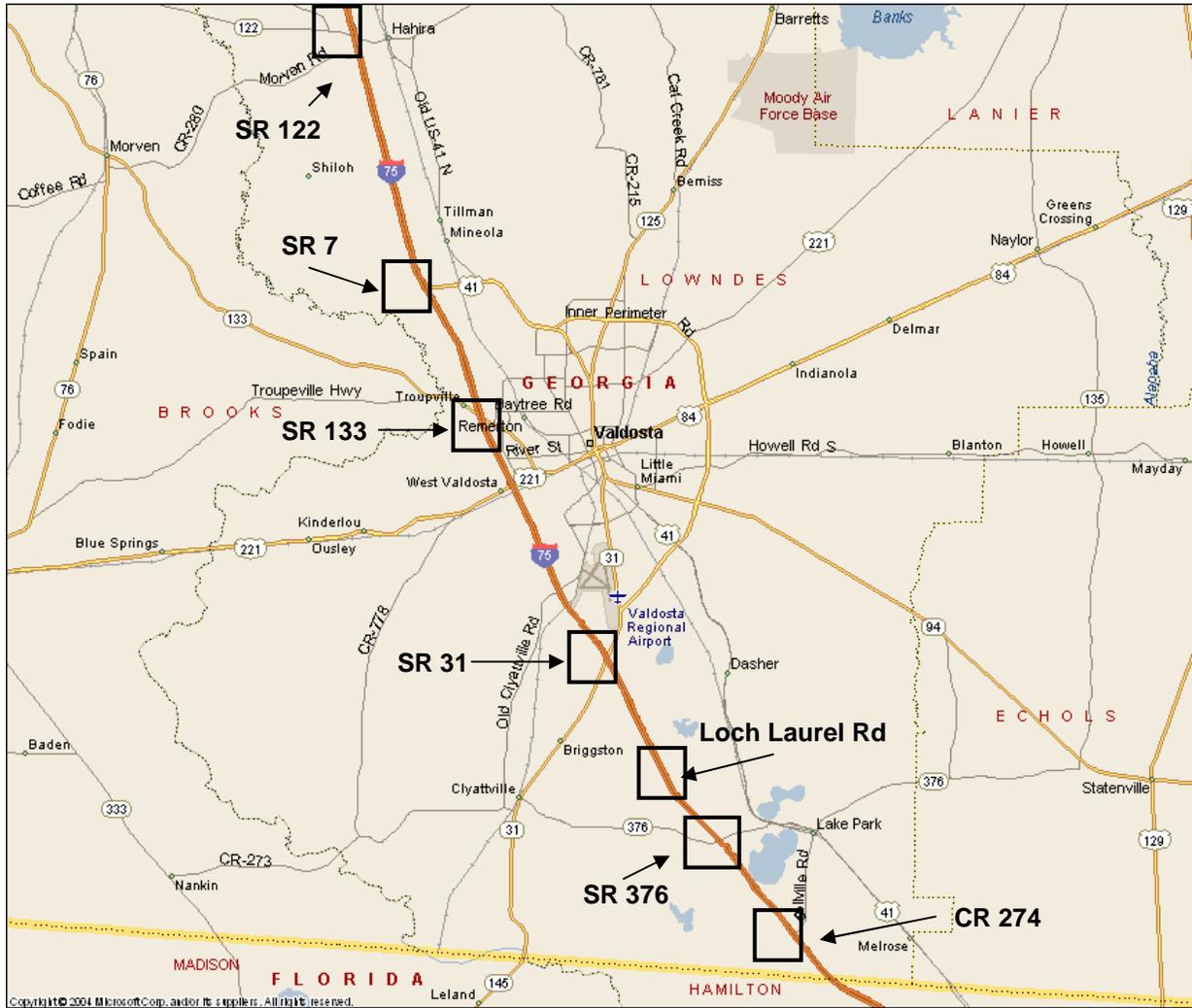
Prior to beginning work, the VE team was briefed on the current status of the project. Mr. Jeff VanDyke, P.E., project manager for Carter Burgess and Mr. Alan Rainer, P.E., project manager for The LPA Group Incorporated briefed the team on the CR 274, SR 376, Loch Laurel Road, SR 31 and SR 133 sites. Mr. Ralph Ramspell with Moreland Altobelli and Associates briefed the team on the SR 7 and SR 122 sites. The following items were discussed:

- Public hearings for the proposed revisions to the Interchanges at SR 7 and SR 122 were held in May 2007. The proposed revisions to the Interchanges have received Concept Stage Approval from the FHWA.
- The current rural roadway section for SR 7 / Shiloh Road will be changed to an urban section.
- There are sight distance problems on SR 7 / Shiloh Road on the east side of the Interchange and the grade needs to be raised approximately six feet.
- The SR 122 (Main Street) Interchange was redesign after the second public hearing to reduce its footprint and reduce its impact on the tax base of the city. Retaining walls were added to move the ramps closer to the main traffic lanes. The Interchange was changed to a compressed diamond to reduce its impact.

- The SR 122 Interchange has caused the relocation of two city streets.
- The relocation of Union Road in the SR 122 Interchange does impact Franks Creek, but does not require the creek to be relocated.
- No traffic signals will be installed (does not meet traffic signal warrants) at the ramp intersections for the SR 122 Interchange. The County is looking into placing school signals at the appropriate locations.
- The Interchange Modification Report for SR 7 and SR 122 has been approved. The project is being processed under a Categorical Exclusion.
- The SR 7 and SR 122 Interchanges are scheduled for construction in February 2009.
- It is anticipated that the CR 274, SR 376, Loch Laurel Road, SR 31 and SR 133 Interchanges will be processed under a Categorical Exclusion. These five locations will probably be let to construction under a single project.
- Project staging and maintaining access to the various commercial sites along the Interchanges is a major design concern.
- The reconstruction of the Interchanges provides an opportunity to obtain new access control along the cross roads. The designs attempt to provide approximately 600 feet of access control (Design Manual uses 1,000 feet) or access control to the nearest cross street.
- The structures at all Interchange locations are being design as 4-span bridges.
- The designs for the Interchanges will propose concrete pavement for the ramps and ramp intersections to minimize future maintenance costs.
- Traffic signals will be added or upgraded at all Interchanges.
- The new overpass structure at Loch Laurel Road will be shifted to the north to improve the sight distance for the cross road on the west side .
- The designer looked at placing a loop ramp in the SR 31 Interchange, however, while eliminating on lane on the bridge, it did not eliminate the need for the fourth diamond ramp.
- The bridge at SR 133 is being widening from five lanes to eight lanes with a sidewalk on one side.

# Project Sketch Map

## I-75 at 7 Locations from the Florida State Line to SR 122



## **RECOMMENDATIONS**

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-2 (1)	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> To Reduce Bridge Width (I-75 at CR 274)
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Comp By: G.G. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed CR 274 Bridge design shows a typical bridge section that carries two through lanes, two left turn lanes, and two 10-foot shoulders across the new bridge.

**Proposed Change:**

It is recommended that one 12-foot left turn lane be removed from the bridge and that the rural 10-foot shoulder concept is changed to an urban section concept with 6-foot sidewalks, 2-foot curb and gutters, and side parapets.

**Justification:**

The traffic study report indicates the left turn volumes at this location do not require storage lengths requiring separate left turn lanes across the bridge. The traffic report indicates that approximately 150 feet of storage is necessary. The ramp intersections are sufficiently far apart to allow for a consolidated single left turn lane that would accommodate the projected left turns without the need for a second left turn lane. Converting the rural flush shoulders concept to a sidewalk and parapet typical section is consistent with the typical sections used on the bridges at SR 376, SR 31, and SR 133.

This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

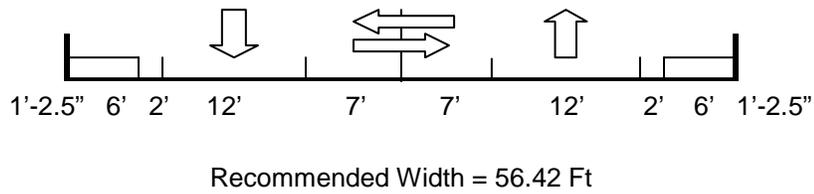
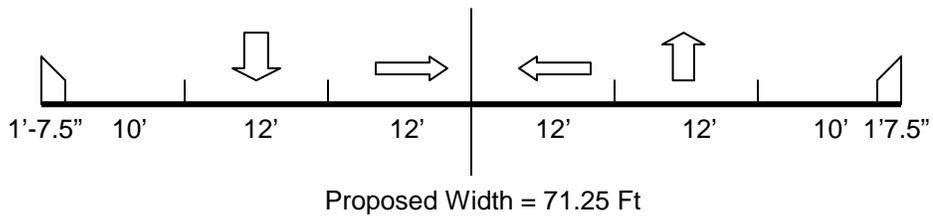
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	\$1,913,000		
<b>- Proposed</b>	\$1,417,000		
<b>- Savings</b>	\$496,000		\$496,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$496,000</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (1)  
CLIENT: GDOT  
Sheet: 2 of 4

## CR 274 (Bellville Road) Bridge over I-75





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (1)

CLIENT: GDOT

Sheet: 4 of 4

Square Footage of Proposed Bridge = 19,572 SF

Proposed Bridge Width = 71.25 feet

Proposed Bridge Length =  $19,572 / 71.25 = 274.7$  feet

Recommended Bridge Width = 56.42 feet

Change in Bridge Width =  $71.25 \text{ ft} - 56.42 \text{ ft} = 14.83 \text{ ft}$

Square Footage of Recommended Bridge

$19,572 \text{ SF} - (14.83 \times 274.7) = 15,498 \text{ SF}$

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-2 (4)	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> To Reduce Bridge Width (I-75 at SR 31)
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Comp By: G.G. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed SR 31 Bridge design shows a typical bridge section that carries 4 through lanes and 3 left turn lanes across the new bridge.

**Proposed Change:**

It is recommended that one of the dual I-75 southbound 12-foot left turn lanes be removed from the bridge Crosssection.

**Justification:**

The traffic study report indicates the left turn volumes at this location do not require storage lengths requiring 3 separate left turn lanes across the bridge. The traffic report indicates that approximately 150 feet of storage is necessary for eastbound traffic and a double 150-foot left storage area for westbound traffic. The ramp intersections are sufficiently far apart to allow for a consolidated left turn lane plus a second left turn lane for westbound traffic if deemed necessary.

Removing this lane will reduce the bridge width and make the bridge easier to construct. This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

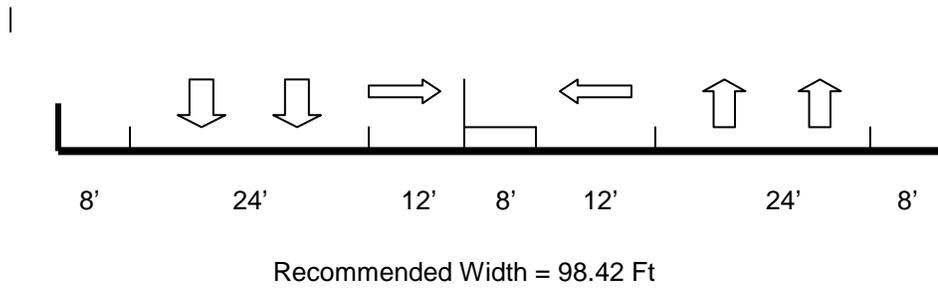
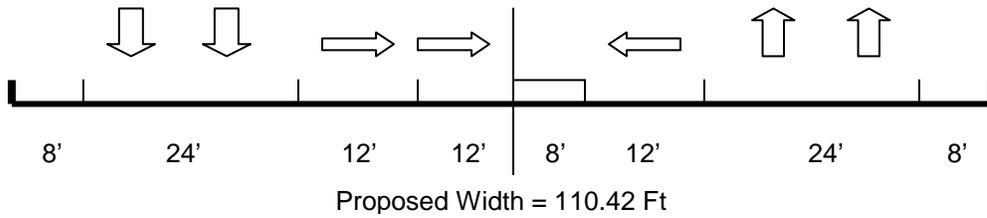
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	\$4,191,000		
<b>- Proposed</b>	\$3,736,000		
<b>- Savings</b>	\$455,000		\$455,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$455,000</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (4)  
CLIENT: GDOT  
Sheet: 2 of 4

## SR 41 (Madison Highway) Bridge over I-75





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (4)

CLIENT: GDOT

Sheet: 4 of 4

Square Footage of Proposed Bridge = 42,876 SF

Proposed Bridge Width = 110.42 feet

Proposed Bridge Length =  $42,876 / 110.42 = 388.30$  feet

Recommended Bridge Width

$110.42 \text{ ft} - 12 \text{ ft} = 98.42 \text{ ft}$

Square Footage of Recommended Bridge

$388.30 \text{ ft} \times 98.42 \text{ ft} = 38,216 \text{ SF}$

**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-2 (5)	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> To Reduce Bridge Width (I-75 at SR 133)
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Comp By: .G.G. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed SR 133 Bridge design shows a typical bridge section that carries five through lanes and three left turn lanes across the new bridge.

**Proposed Change:**

It is recommended that one of the dual I-75 southbound 12-foot left turn lanes and one of the eastbound through lanes be removed from the bridge typical section.

**Justification:**

The traffic study report indicates the left turn volumes at this location do not require storage lengths requiring three separate left turn lanes across the bridge. The traffic report indicates that approximately 150 feet of storage is necessary for eastbound traffic and a double 250-foot left storage area for westbound traffic. The ramp intersections are sufficiently far apart to allow for a consolidated left turn lane plus a second left turn lane for westbound traffic if deemed necessary. It also does not appear to be necessary to carry a third eastbound through lane across the bridge since only two eastbound lanes exist on the west side of the structure.

Removing these lanes will reduce the bridge width and make the bridge easier to construct. It will also reduce the negative impacts of a wider roadway section within the commercial area on the east side of I-75. This concept has the potential to save significant project cost, reduce construction time, improve constructability, reduce the amount of project ROW, and lessen the project's impact on the community.

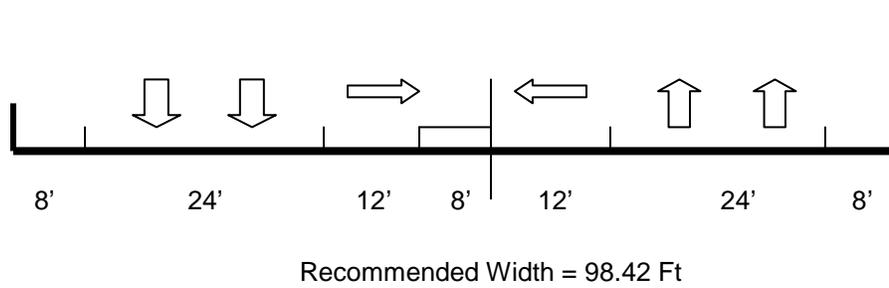
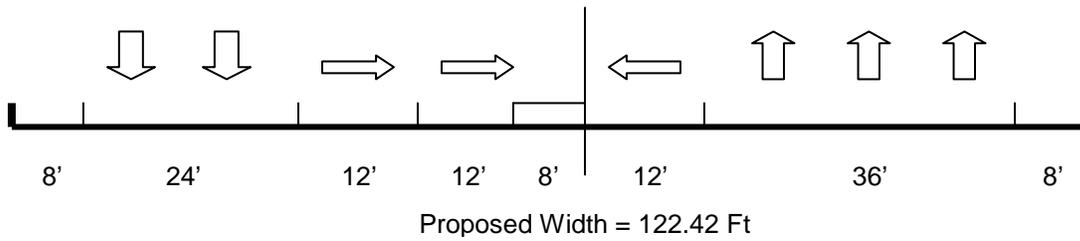
<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST - Original</b>	\$5,538,000		
<b>- Proposed</b>	\$4,452,000		
<b>- Savings</b>	\$1,086,000		\$1,086,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$1,086,000</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (5)  
CLIENT: GDOT  
Sheet: 2 of 4

## SR 133 (St Augustine Road) Bridge over I-75





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2 (5)

CLIENT: GDOT

Sheet: 4 of 4

Square Footage of Proposed Bridge = 56,652 SF

Proposed Bridge Width = 122.42 feet

Proposed Bridge Length =  $56,652 / 122.42 = 462.8$  feet

Recommended Bridge Width

$122.42 \text{ ft} - 24 \text{ ft} = 98.42 \text{ ft}$

Square Footage of Recommended Bridge

$462.8 \text{ ft} \times 98.42 \text{ ft} = 45,549 \text{ SF}$

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-2, B-2	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> To Reduce Bridge Width & Minimize Side Road Reconstruction at SR 122
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Comp By: G.O. Date: 8-16-07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed design shows SR 122 being widened to a four/five-lane section with the SR 122 Bridge over I-75 carrying two through lanes, two left turn lanes, and two 10-foot shoulders across the new bridge.

**Proposed Change:**

It is recommended that consideration be given to widening SR 122 to only a three-lane section and the SR 122 Bridge width be reduced to the same typical section. In addition, consideration should be given to buying the total amount of ROW necessary to construct SR 122 to the five-lane section at some time in the future.

**Justification:**

The traffic study report indicates that SR 122 will have less than 5,000 ADT in the design year build-out which does not warrant an expansion to five lanes. In addition, future traffic is so light that traffic signals are not warranted for the ramp intersections. The ramp intersections are sufficiently far apart to allow for a consolidated left turn lane (to accommodate 150 feet of storage in both directions).

Removing these lanes will reduce the cross road and bridge typical section. This concept has the potential to save significant project cost, improve constructability, reduce construction time, and lessen the project's impact on the community.

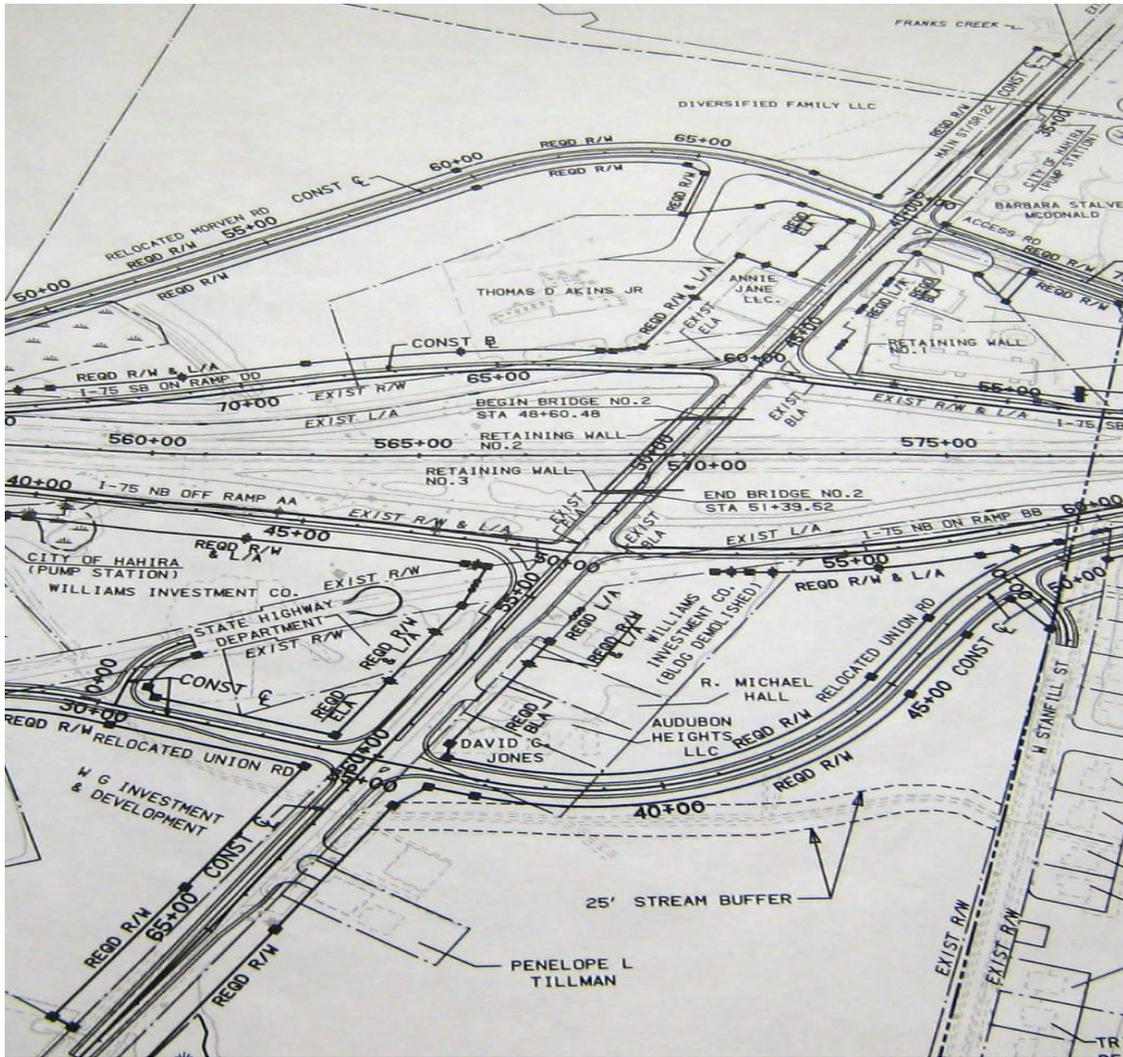
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST - Original</b>	\$1,535,000		
<b>- Proposed</b>	\$0		
<b>- Savings</b>	\$1,535,000		\$1,535,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$1,535,000</b>

# SKETCH

Project: I-75 at 7 Locations from Florida to SR 122

ITEM N<sup>o</sup>: A-2, B-2  
CLIENT: GDOT  
Sheet: 2 of 4

## SR 122 at I-75





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-2, B-2  
CLIENT: GDOT  
Sheet: 4 of 4

Reduction in SR 122 Bridge Deck Width:

$$260 \text{ ft} \times 2 \times 12 \text{ ft} = 6,240 \text{ SF}$$

Reduction in SR 122 Roadway Section:

$$\text{Station } 37+00 \text{ to Station } 65+00 = 2,800 \text{ feet}$$

$$2,800 \text{ ft} - 260 \text{ ft} = 2,540 \text{ ft}$$

Reduced Pavement Width:

$$2,540 \text{ ft} \times 24 \text{ ft} = 60,960 \text{ SF} = 6,773 \text{ SY} \quad \text{Use } 6,800 \text{ SY}$$

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-4	<b>Sheet No.:</b> 1 of 10	<b>CREATIVE IDEA:</b> To Use a 2-Span Bridge with MSE Walls at the Abutments (CR 274, SR 376, Loch Laurel Road, & SR 133)
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Comp By: G.G. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed design for the 5 Interchange cross road bridges (CR 274, SR 376, Loch Laurel Road, SR 31 and SR 133) crossing I-75 show four-span structures with short end spans and 2:1 end slopes.

**Proposed Change:**

It is recommended that the end spans of the bridges be removed and replaced with vertical abutments comprised of MSE retaining walls with pile end bents.

**Justification:**

The I-75 capacity analysis indicates the through movements will operate at a level of service 'C' in the design year (2032). The use of MSE walls with piles and bents at the abutments would improve constructability, reduce construction time, and result in significant cost savings to the project.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST - Original</b>	\$3,632,000		
<b>- Proposed</b>	\$1,759,000		
<b>- Savings</b>	\$1,873,000		\$1,873,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$1,873,000</b>

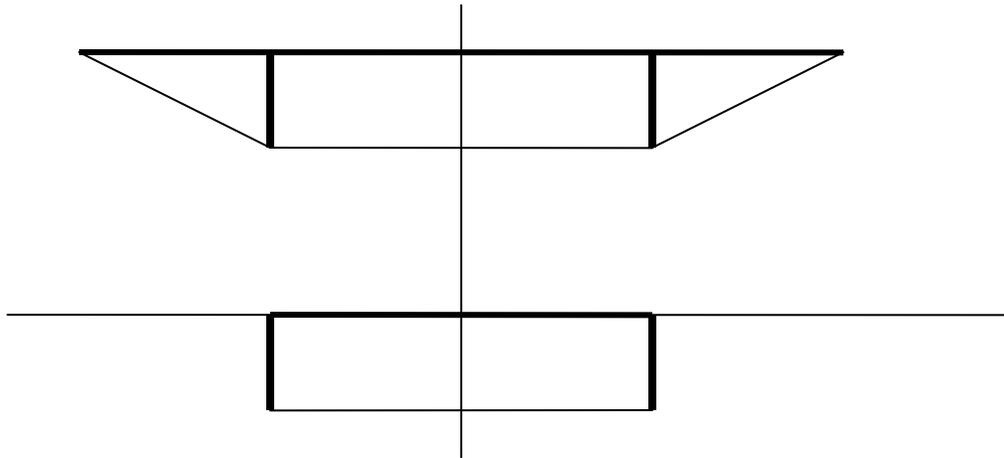
# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

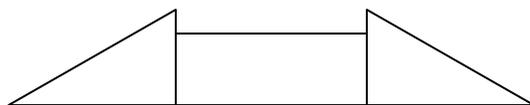
ITEM N<sup>o</sup>: A-4  
CLIENT: GDOT  
Sheet: 2 of 10

**CR 274, SR 376, Loch Laurel Rd, SR 31 & SR 133 Bridges over I-75**

Typical 4-Span Bridge with End Spans & 2:1 End Slopes



Typical 2-Span Bridge with MSE Walls with Pile End Bents



Typical MSE Wall Configuration  
For Area Calculations

## COST WORKSHEET

Project: I-75 at 7 Locations from Florida to SR 122					IDEA No.: A-4 CLIENT: GDOT Sheet: 3 of 10		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Site 1 (I-75 at Bellville Road)							
Reduced Bridge Size (BT-54)	SF	2,950.29	\$85.00	\$250,774.59	0		\$0
Slope Paving & Filter Fabric	SY	758.34	\$50.00	\$37,917.00	0		\$0
MSE Wall Area	SF	0		\$0	4,112.65	\$51.00	\$209,745.14
Site 2 (I-75 at SR 376)							
Reduced Bridge Size (BT-54)	SF	4,475.63	\$85.00	\$380,428.12	0		\$0
Slope Paving & Filter Fabric	SY	951.92	\$50.00	\$47,596.00	0		\$0
MSE Wall Area	SF	0		\$0	4,831.82	\$51.00	\$246,422.79
Site 3 (I-75 at Loch Laurel)							
Reduce Bridge Size (BT-74)	SF	2,508.50	\$105.00	\$263,392.50	0		\$0
Slope Paving & Filter Fabric	SY	399.76	\$50.00	\$19,988.00	0		\$0
MSE Wall Area	SF	0		\$0	5,088.18	\$51.00	\$259,497.35
Site 4 (I-75 at SR 31)							
Reduced Bridge Size (BT-74)	SF	7,121.88	\$105.00	\$747,796.88	0		\$0
Slope Paving & Filter Fabric	SY	1,350.08	\$50.00	\$67,504.00	0		\$0
MSE Wall Area	SF	0		\$0	6,976.39	\$51.00	\$355,795.72
Site 5 (I-75 at SR 133)							
Reduced Bridge Size (BT-84)	SF	10,038.17	\$125.00	\$1,254,770.83	0		\$0
Slope Paving & Filter Fabric	SY	1,761.5	\$50.00	\$88,075.00	0		\$0
MSE Wall Area	SF	0		\$0	8,984.20	\$51.00	\$458,186.34
<b>SUBTOTAL</b>				\$3,158,242.92			\$1,529,647.34
(10% E&C + 5% Inflation) <b>MARK-UP (15%)</b>				\$473,736.44			\$229,447.10
<b>TOTAL</b>				\$3,631,979.36			\$1,759,094.44
<b>TOTAL ROUNDED</b>				<b>\$3,632,000</b>			<b>\$1,759,000</b>

**COMPUTE BRIDGE WIDTHS**

SITE	DESCRIPTION	SIDE BARRIER			SHOULDER			TRAVEL LANES			TURN LANES		
		#	WIDTH	TOTAL	#	WIDTH	TOTAL	#	WIDTH	TOTAL	#	WIDTH	TOTAL
			FT	FT		FT	FT		FT	FT		FT	
1	BELLVILLE ROAD / CR 274	2	1.63	3.25	2	10.00	20.00	2	12.00	24.00	2	12.00	24.00
2	LAKES BLVD / SR 376	2	1.21	2.42	0	0.00	0.00	4	12.00	48.00	2	12.00	24.00
3	LOCH LAUREL / CR 783	2	1.63	3.25	2	8.00	16.00	2	12.00	24.00	0	12.00	0.00
4	MADISON HWY / SR 31	2	1.21	2.42	0	0.00	0.00	4	12.00	48.00	3	12.00	36.00
5	N. ST. AUGUSTINE RD / SR 133	2	1.21	2.42	0	0.00	0.00	5	12.00	60.00	3	12.00	36.00

SIDEWALK & GUTTER			MEDIAN			TOTAL WIDTH FT
#	WIDTH FT	TOTAL FT	#	WIDTH FT	TOTAL FT	
0	0.00	0.00	0	0.00	0.00	71.25
2	8.00	16.00	0	0.00	0.00	90.42
0	0.00	0.00	0	0.00	0.00	43.25
2	8.00	16.00	1	8.00	8.00	110.42
2	8.00	16.00	1	8.00	8.00	122.42

**Assumptions:** Adjustments made to correct errors in sidewalk widths and barrier widths presented in the consultant's plans (impact considered negligible)

**CALCULATE LENGTH OF SKEWED BENTS**

LENGTH ALONG END BENT WALLS

SITE	DESCRIPTION	SKEW ANGLES		
		GRAPHICALLY MEASURED DEGREES	BRIDGE WIDTH NORMAL	BRIDGE WIDTH SKEWED
			FT	FT
1	BELLVILLE ROAD / CR 274	85	71.25	71.52
2	LAKES BLVD / SR 376	72	90.42	95.07
3	LOCH LAUREL / CR 783	45	43.25	61.16
4	MADISON HWY / SR 31	50	110.42	144.14
5	N. ST. AUGUSTINE RD / SR 133	40	122.42	190.45

**LPA USED 102 FT WHICH INCLUDES 2 FT SLOPE IN FRONT OF PIER**

Length normal to I-75

FROM LPA DRAWING CL BENT TO FACE OF PIER =  
 ALLOWANCE FOR SIDE BARRIER  
 OFFSET FROM FACE OF MSE WALL TO BFPR

100 FT  
 1.75 FT  
 6 FT  


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 107.75 FT

SPAN LENGTH

**BEAM LENGTH ALONG SKEW**

SITE	DESCRIPTION	SKEW ANGLES		BRIDGE LENGTH NORMAL FT	BRIDGE LENGTH SKEWED FT	BEAM TYPE	BEAM DESIGNATION
		GRAPHICALLY MEASURED	DEGREES				
		1	BELLVILLE ROAD / CR 274				
2	LAKES BLVD / SR 376	72	107.75	113.30	PSC	BT-54	
3	LOCH LAUREL / CR 783	45	107.75	152.38	PSC	BT-74	
4	MADISON HWY / SR 31	50	107.75	140.66	PSC	BT-74	
5	N. ST. AUGUSTINE RD / SR 133	40	107.75	167.63	PSC	BT-84	

BRIDGE WIDTH	SLAB & COPING	STRUCTURE	STRUCTURE
DEPTH	DEPTH	DEPTH	DEPTH + 2FT
FT	FT	FT	FT
4.50	1.00	5.50	7.50
4.50	1.00	5.50	7.50
6.17	1.00	7.17	9.17
6.17	1.00	7.17	9.17
7.00	1.00	8.00	10.00

**COMPARISON OF SQUARE FOOT BRIDGE**

	CONSULTANT	VE TEAM	DIFF	Length
SITE	FT <sup>2</sup>	FT <sup>2</sup>	FT <sup>2</sup>	Diff (ft)
1	19,572	21,314	-1,742	-24.444
2	29,400	28,331	1,069	11.826
3	17,200	18,227	-1,027	-23.748
4	45,313	42,953	2,360	21.371
5	61,084	56,753	4,331	35.379

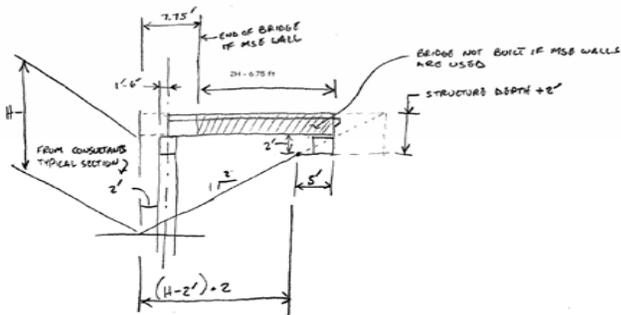
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**COMPARISON OF SQUARE FOOT BRIDGE**

	CONSULTANT	WIDTH	Length
SITE	FT <sup>2</sup>	FT <sup>2</sup>	FT <sup>2</sup>
1	19,572	71.25	275
2	29,400	90.42	325
3	17,200	43.25	398
4	45,313	110.42	410
5	61,084	122.42	499

1907

CALCULATE LENGTH OF SUB SPANS



ASSUMED

SITE	DESCRIPTION	H	2H - 6.75 FT	2H - 6.75 FT	Override	BRIDGE WIDTH	BRIDGE
		FT	FT	SKEWED	End spans	NORMAL	AREA SAVED
				FT	FT	FT	FT <sup>2</sup>
1	BELLVILLE ROAD / CR 274	24.00	41.25	41.41	41.41	71.25	2,950.29
2	LAKES BLVD / SR 376	24.00	41.25	43.37	49.50	90.42	4,475.63
3	LOCH LAUREL / CR 783	24.00	41.25	58.34	58.00	43.25	2,508.50
4	MADISON HWY / SR 31	24.00	41.25	53.85	64.50	110.42	7,121.88
5	N. ST. AUGUSTINE RD / SR 133	24.00	41.25	64.17	82.00	122.42	10,038.17

TO CALCULATE THE SQUARE FOOTAGE YOU USE THE SKEWED LENGTH X THE NORMAL WIDTH FOR THE AREA OF THE PARALLELOGRAM

**CALCULATE AREA OF WALL IF USING A 2 SPAN BRIDGE  
AREA UNDER BRIDGE**

SITE	DESCRIPTION	H	WALL EMBED	WALL H UNDER	BRIDGE WIDTH	WALL AREA
		FT	FT	BRIDGE	SKEWED	UNDER BRIDGE
				FT	FT	FT <sup>2</sup>
1	BELLVILLE ROAD / CR 274	24.00	2.00	26.00	71.52	1,859.58
2	LAKES BLVD / SR 376	24.00	2.00	26.00	95.07	2,471.81
3	LOCH LAUREL / CR 783	24.00	2.00	26.00	61.16	1,590.28
4	MADISON HWY / SR 31	24.00	2.00	26.00	144.14	3,747.61
5	N. ST. AUGUSTINE RD / SR 133	24.00	2.00	26.00	190.45	4,951.61

**AREA LEFT SIDE OF BRIDGE**

SITE	DESCRIPTION	STRUCTURE	WALL H UNDER	HEIGHT	RUN LENGTH	WALL AREA
		DEPTH + 2FT	BRIDGE	BESIDE BRIDGE	SKEWED	LT OF BRIDGE
		FT	FT	FT	FT	FT <sup>2</sup>
1	BELLVILLE ROAD / CR 274	7.50	26.00	33.50	67.26	1,126.54
2	LAKES BLVD / SR 376	7.50	26.00	33.50	70.45	1,180.00
3	LOCH LAUREL / CR 783	9.17	26.00	35.17	99.47	1,748.95
4	MADISON HWY / SR 31	9.17	26.00	35.17	91.81	1,614.39
5	N. ST. AUGUSTINE RD / SR 133	10.00	26.00	36.00	112.01	2,016.22

**AREA RIGHT SIDE OF BRIDGE**

SITE	DESCRIPTION	STRUCTURE	WALL H UNDER	HEIGHT	BRIDGE WIDTH	WALL AREA
		DEPTH + 2FT	BRIDGE	BESIDE BRIDGE	SKEWED	RT OF BRIDGE
		FT	FT	FT	FT	FT <sup>2</sup>
1	BELLVILLE ROAD / CR 274	7.50	26.00	33.50	67.26	1,126.54
2	LAKES BLVD / SR 376	7.50	26.00	33.50	70.45	1,180.00
3	LOCH LAUREL / CR 783	9.17	26.00	35.17	99.47	1,748.95
4	MADISON HWY / SR 31	9.17	26.00	35.17	91.81	1,614.39
5	N. ST. AUGUSTINE RD / SR 133	10.00	26.00	36.00	112.01	2,016.22

**TOTAL WALL AREA**

SITE	DESCRIPTION	WALL AREA	WALL AREA	WALL AREA	WALL AREA
		LT OF BRIDGE	UNDER BRIDGE	RT OF BRIDGE	RT OF BRIDGE
		FT <sup>2</sup>	FT <sup>2</sup>	FT <sup>2</sup>	FT <sup>2</sup>
1	BELLVILLE ROAD / CR 274	1,126.54	1,859.58	1,126.54	4,112.65
2	LAKES BLVD / SR 376	1,180.00	2,471.81	1,180.00	4,831.82
3	LOCH LAUREL / CR 783	1,748.95	1,590.28	1,748.95	5,088.18
4	MADISON HWY / SR 31	1,614.39	3,747.61	1,614.39	6,976.39
5	N. ST. AUGUSTINE RD / SR 133	2,016.22	4,951.61	2,016.22	8,984.05

**COST SAVINGS OF MSE WALLS VERSES END SPANS**

SITE	DESCRIPTION	WALL AREA	WALL COST	WALL COST
		FT <sup>2</sup>	\$ PER FT <sup>2</sup>	\$
1	BELLVILLE ROAD / CR 274	4,112.65	\$ 51.00	\$ 209,745.14
2	LAKES BLVD / SR 376	4,831.82	\$ 51.00	\$ 246,422.79
3	LOCH LAUREL / CR 783	5,088.18	\$ 51.00	\$ 259,497.35
4	MADISON HWY / SR 31	6,976.39	\$ 51.00	\$ 355,795.72
5	N. ST. AUGUSTINE RD / SR 133	8,984.05	\$ 51.00	\$ 458,186.34

SITE	DESCRIPTION	BRIDGE AREA	BRIDGE COST	BRIDGE COST
		FT <sup>2</sup>	\$ PER FT <sup>2</sup>	\$
1	BELLVILLE ROAD / CR 274	2,950.29	\$ 85.00	\$ 250,774.59
2	LAKES BLVD / SR 376	4,475.63	\$ 85.00	\$ 380,428.13
3	LOCH LAUREL / CR 783	2,508.50	\$ 105.00	\$ 263,392.50
4	MADISON HWY / SR 31	7,121.88	\$ 105.00	\$ 747,796.88
5	N. ST. AUGUSTINE RD / SR 133	10,038.17	\$ 125.00	\$ 1,254,770.83

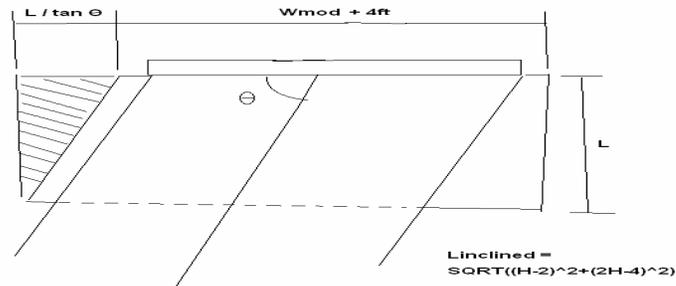
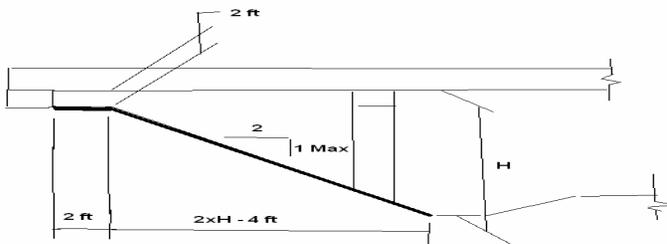
SITE	DESCRIPTION	BRIDGE COST	WALL COST	DIFFERENCE
		\$	\$	\$
1	BELLVILLE ROAD / CR 274	\$ 250,774.59	\$ 209,745.14	\$ 41,029.44
2	LAKES BLVD / SR 376	\$ 380,428.13	\$ 246,422.79	\$ 134,005.34
3	LOCH LAUREL / CR 783	\$ 263,392.50	\$ 259,497.35	\$ 3,895.15
4	MADISON HWY / SR 31	\$ 747,796.88	\$ 355,795.72	\$ 392,001.16
5	N. ST. AUGUSTINE RD / SR 133	\$ 1,254,770.83	\$ 458,186.34	\$ 796,584.50
<b>Savings of Wall vs. 2:1 End Slopes</b>				<b>\$1,367,515.58</b>

SITE	DESCRIPTION	main spans 2	end spans	total	Span Difference	Original Concept
		Length (ft)	length (ft)	Length (ft)	FT	Length (ft)
1	BELLVILLE ROAD / CR 274	216.32	82.82	299.14	24	274.69
2	LAKES BLVD / SR 376	226.59	99.00	325.59	0	325.16
3	LOCH LAUREL / CR 783	304.76	116.00	420.76	23	397.69
4	MADISON HWY / SR 31	281.32	129.00	410.32	0	410.38
5	N. ST. AUGUSTINE RD / SR 133	335.26	164.00	499.26	0	498.98

BRIDGE COSTS		
SITE	BEAM DESIGNATION	BEAM COST
1	BT-54	\$ 85.00
2	BT-54	\$ 85.00
3	BT-74	\$ 105.00
4	BT-74	\$ 105.00
5	BT-84	\$ 125.00

Calculation of Slope Paving & Filter Fabric

SITE	DESCRIPTION	H FT	SKEW ANGLES		L inclined (FT)	BRIDGE WIDTH	Slope Paving	Reduction		Total Slope Paving
			GRAPHICALLY MEASURED	SKEWED		Area	L/tan(Q)	L/tan(Q)	Area	
			DEGREES		FT	FT <sup>2</sup>	FT	FT <sup>2</sup>	FT <sup>2</sup>	
1	BELLVILLE ROAD / CR 274	24.00	85	49.19	71.52	3518.43	4.30	105.86	3412.56	
2	LAKES BLVD / SR 376	24.00	72	49.19	95.07	4676.81	15.98	393.15	4283.66	
3	LOCH LAUREL / CR 783	24.00	45	49.19	61.16	3008.91	49.19	1210.00	1798.91	
4	MADISON HWY / SR 31	24.00	50	49.19	144.14	7090.69	41.28	1015.31	6075.38	
5	N. ST. AUGUSTINE RD / SR 133	24.00	40	49.19	190.45	9368.73	58.63	1442.02	7926.71	
		<b>Total</b>		<b>Cost of</b>		<b>Total Cost</b>				
		<b>Slope Paving</b>		<b>Slope Paving</b>		<b>Slope Paving</b>				
		<b>Area (each side)</b>		<b>&amp; Filter Fabric</b>		<b>&amp; Filter Fabric</b>				← 2 sides
SITE	DESCRIPTION	YD <sup>2</sup>	\$/ YD <sup>2</sup>	\$						
1	BELLVILLE ROAD / CR 274	379.17	\$ 50.00	\$ 37,917.38						
2	LAKES BLVD / SR 376	475.96	\$ 50.00	\$ 47,596.21						
3	LOCH LAUREL / CR 783	199.88	\$ 50.00	\$ 19,987.86						
4	MADISON HWY / SR 31	675.04	\$ 50.00	\$ 67,504.19						
5	N. ST. AUGUSTINE RD / SR 133	880.75	\$ 50.00	\$ 88,074.54						
		<b>Total</b>		<b>\$ 261,080.17</b>						



## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-4 (6)	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> To Use a 2-Span Bridge with MSE Wall at the Abutments (I-75 at SR 7)
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Comp By: G.G. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed SR 7 Bridge design indicates a four-span structure with two main spans crossing I-75, one span over the future Loop Ramp location for the relocated southbound off-ramp (includes end span and 2:1 end slopes), and one short end spans and 2:1 end slopes on the northbound side.

**Proposed Change:**

It is recommended that the end spans of the bridge be removed and replaced with vertical abutments comprised of MSE retaining walls with piles and bents. Since the ultimate location of the southbound Loop Ramp will be under the west side end span, the common pier between the main and end spans should be constructed as designed. The west side MSE walls should be built outside the common pier so they can easily be removed in the future when I-75 is widened and the southbound Loop Ramp is shifted out.

**Justification:**

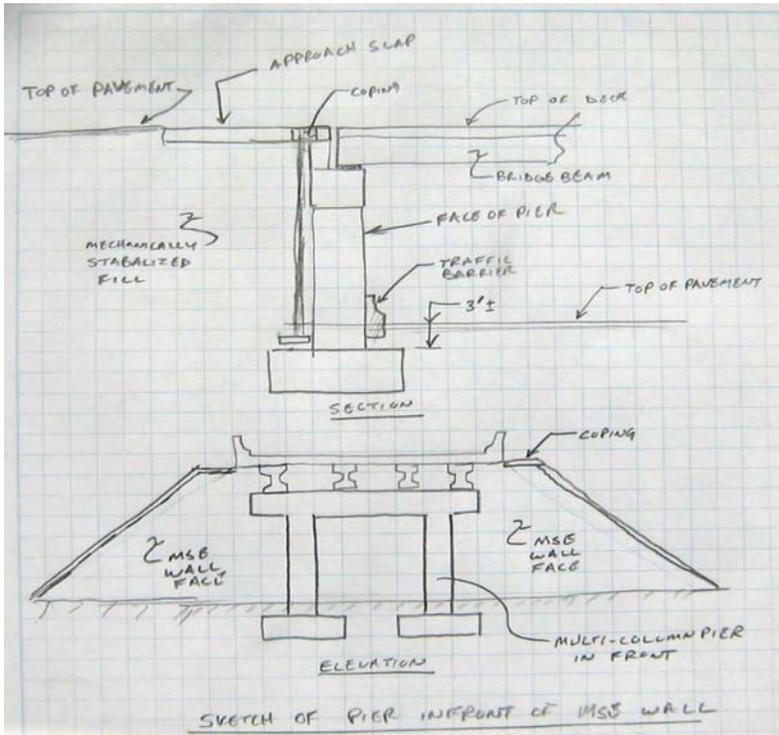
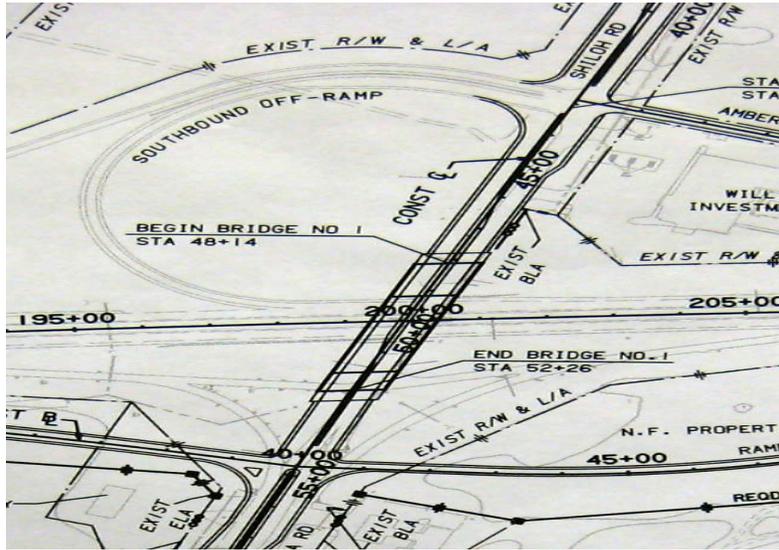
The I-75 capacity analysis indicates the through movements will operate at a level of service 'C' in the design year (2032). Therefore, the ultimate I-75 widening to eight / ten lanes (and the southbound Loop Ramp shift) will most likely occur more than 20 years after completion of this project. The use of MSE walls with piles and bents at the abutments would improve constructability, reduce construction time, and result in significant cost savings to the project.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST - Original</b>	\$4,230,000		
<b>- Proposed</b>	\$2,948,000		
<b>- Savings</b>	\$1,282,000		\$1,282,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$1,282,000</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-4 (6)  
 CLIENT: GDOT  
 Sheet: 2 of 4





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-4 (6)

CLIENT: GDOT

Sheet: 4 of 4

Proposed 4-Span SR 7 Bridge Size:

$$376.33 \text{ ft} \times 91.25 \text{ ft} = 34,340 \text{ SF}$$

Recommended 2-Span Bridge Size:

$$232 \text{ ft} \times 91.25 \text{ ft} = 21,170 \text{ SF}$$

MSE Wall Size:

$$(55 \text{ ft} \times 27.5 \text{ ft}) \times \frac{1}{2} + (20 \text{ ft} \times 91.25 \text{ ft}) + (55 \text{ ft} \times 27.5 \text{ ft}) \times \frac{1}{2} = 3,337.5 \text{ SF per side}$$

$$\text{MSE Walls Both Sides: } 3,337.5 \times 2 = 6,675 \text{ SF}$$

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> B-2	<b>Sheet No.:</b> 1 of 3	<b>CREATIVE IDEA:</b> Minimize Side Road Reconstruction
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The proposed typical section for relocated Morven Road and Union Road in the I-75 / SR-122 Interchange complex (Site 7) includes 10-foot shoulders. The paved portion of the 10-foot shoulder is 6 feet 6 inches.

**Proposed Change:**

It is recommended that the shoulder width be reduced to 6 feet (2-foot paved).

**Justification:**

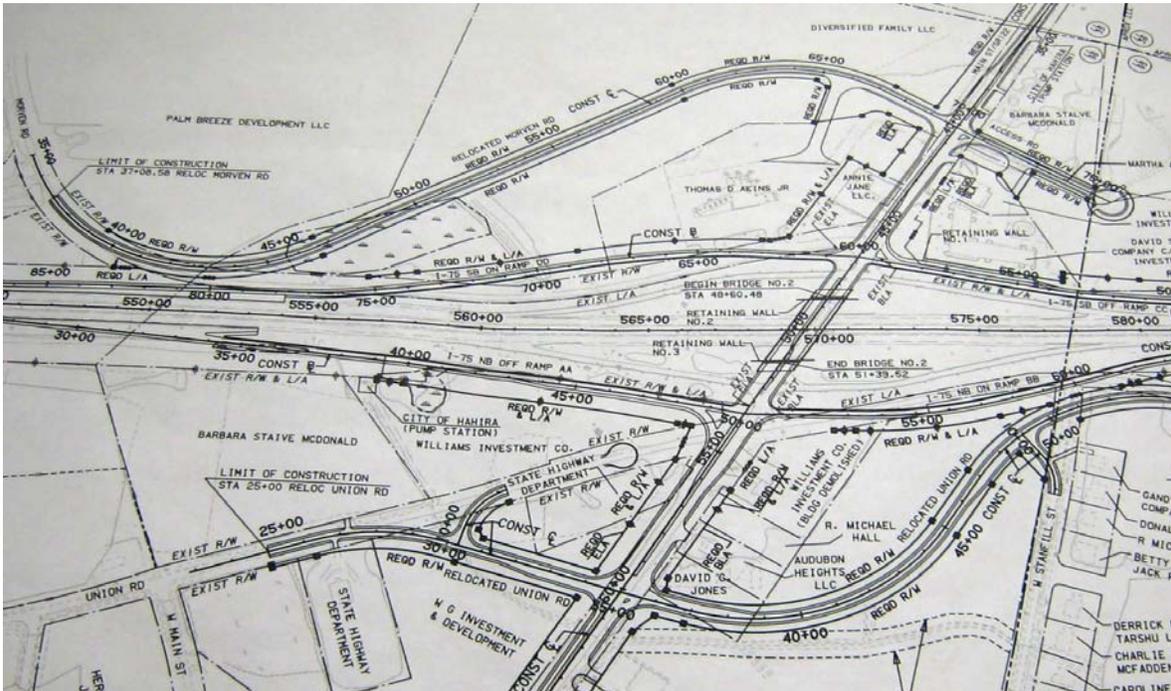
The recommended reduced shoulder width complies with the GDOT Design Manual when local roads are being designed for speeds of less than 50 mph. The reduced shoulder width would be adequate for these roads due to the extremely light projected traffic and low design speeds of these roads. Reducing the shoulder width would result in a potential cost savings to the project. It could also reduce the time needed to construct these roads.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST - Original</b>	\$196,000		
<b>- Proposed</b>	\$0		
<b>- Savings</b>	\$196,000		\$196,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$196,000</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: B-2  
CLIENT: GDOT  
Sheet: 2 of 3





## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> B-5	<b>Sheet No.:</b> 1 of 4	<b>CREATIVE IDEA:</b> Eliminate Additional Pavement in Ramp Tapers for Future 4 <sup>th</sup> Lane
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Comp By: S.W.G. Date: 8-16-07 Checked By: K.B. Date: 08-21-07

**Original Concept:**

The current design proposes to extend exit and entrance ramp tapers to accommodate possible future widening of I-75 from 6 to 8 lanes for the Interchange ramps at CR 274, SR 376, SR 31 and SR 133. Additional asphalt pavement is provided to tie into a future 4<sup>th</sup> lane in each direction. Additional striping is added to align the current ramp tapers to tie into the existing outside travel lane.

**Proposed Change:**

It is recommended that the entrance and exit ramp tapers be redesigned to tie into the existing 6-lane section and eliminate additional pavement for possible future widening of the Interchange ramps at CR 274, SR 376, SR 31 and SR 133. The ramp alignments will need to be adjusted to account for the shift in the ramp tapers.

**Justification:**

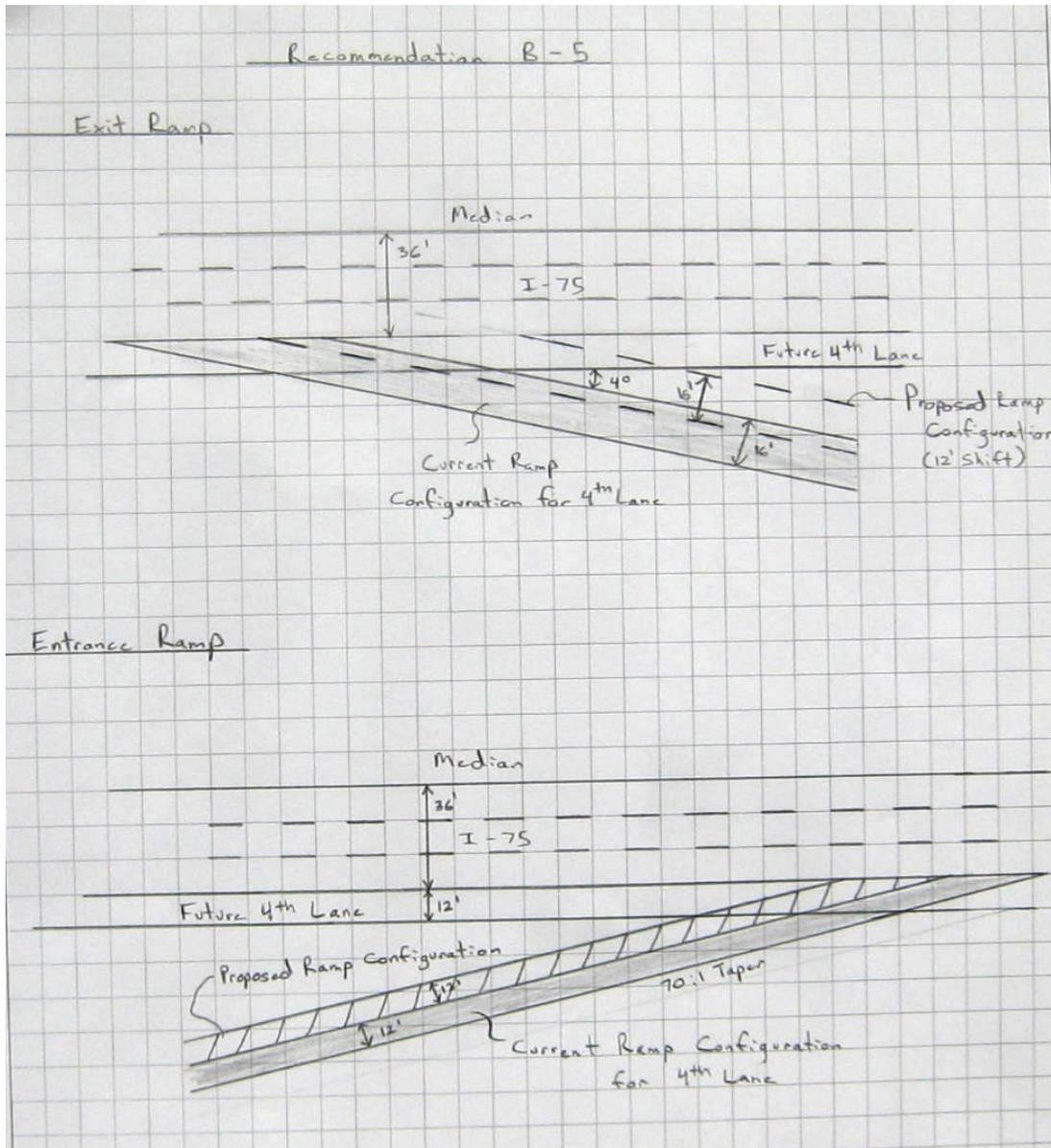
The capacity analysis of I-75 indicates that the through movement on the Interstate will operate at a level of service 'C' in the design year (2032), which is acceptable for projects in rural areas. It is anticipated that the future widening of I-75 to 8 lanes will not occur for more than 20 years after the completion of construction for these projects. If the additional pavement is constructed during the current project, it is likely that it will need to be reconstructed before the construction of the future widening to 8 lanes.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST - Original</b>	\$1,095,000		
<b>- Proposed</b>	\$0		
<b>- Savings</b>	\$1,095,000		\$1,095,000
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>\$1,095,000</b>

# SKETCH

Project: I-75 at 7 Locations from Florida to SR 122

ITEM N<sup>o</sup>: B-5  
CLIENT: GDOT  
Sheet 2 of 4





## CALCULATIONS

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: B-5  
CLIENT: GDOT  
Sheet 4 of 4

### Exit Ramp

Additional Pavement Area = 229 SY

### Entrance Ramp

Additional Pavement Area = 1,120 SY

Pavement Area for One Site =  $(2 \times 229) + (2 \times 1,120) = 2,698$  SY

Total Area for 4 Sites (1,2,4 & 5) =  $4 \times 2,698 = 10,792$  SY

### 12.5mm Superpave

Wt =  $(165\#/SY)(1TN/2000\#)(10,792 SY) = 890$  TN

### 19mm Superpave

Wt =  $(220\#/SY)(1TN/2000\#)(10,792 SY) = 1,187$  TN

### 25mm Superpave

Wt =  $(1100\#/SY)(1TN/2000\#)(10,792 SY) = 5,936$  TN

### G.A.B.

Wt =  $(1760\#/SY)(1TN/2000\#)(10,792 SY) = 9,497$  TN

### In-Place Embankment (Average Depth = 3FT)

Volume =  $(10,792 SY)(3FT)(1 YD/3 FT) = 10,792$  CY

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-5	<b>Sheet No.:</b> 1 of 2	<b>CREATIVE IDEA: Design Suggestion</b> To Identify / Define the Ultimate Typical Roadway Section for I-75
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Comp By: G.O. Date: 08/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The current design consultants are using various configurations for the ultimate build-out roadway typical section for I-75. These configurations have varying median widths, median shoulder widths, number of traffic lanes, and widths of outside clear areas.

**Proposed Change:**

It is suggested that a single ultimate typical roadway section be developed for I-75 and that this typical section be provided to all design consultants to ensure designs are based on the same criteria. The ultimate typical roadway section should include all desirable features / conditions, such as, future 4<sup>th</sup> lane location, potential “managed lane” location, bridge pier offsets, clear zone dimensions, inside shoulder width, uniform median width, and vertical / horizontal clearances.

**Justification:**

The bridges at Sites 1-5 are being designed for a different typical section than the bridges at Sites 6 & 7. Throughout the study, the team received information showing different standards for the ultimate roadway section for I-75. The various standards have led to different criteria being used to determine the new bridge lengths needed to cross I-75. The different standards (various median widths, number of lanes, and clear zone dimensions) have resulted in non-uniform bridge lengths at the 7 locations under design and also brings into question whether the 2 Interchanges that are not being redesigned in this corridor will provide adequate clearance for the ultimate I-75 section.

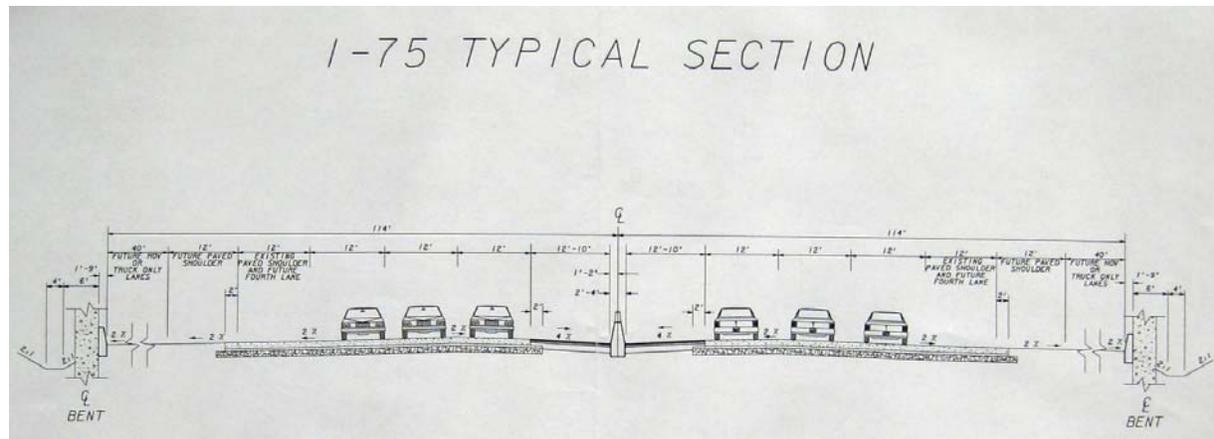
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DESIGN SUGGESTION CONTINUATION

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

ITEM N<sup>o</sup>: A-5  
 CLIENT: GDOT  
 Sheet: 2 of 2

Standardizing the typical roadway section for I-75 is critical for uniformity and to assure the 7 Interchanges being designed / upgraded will meet the ultimate I-75 configuration. The ultimate I-75 typical has significant cost and constructability implications to the proposed upgrading of the 7 Interchanges. Determining whether an eight-lane or ten-lane (includes “managed lanes”) typical section will be used significantly impacts the bridge lengths (crossing roadway at high skew angles) resulting in many adverse impacts including depth of structure, vertical alignment repercussions, ROW impacts, ramp alignments, clear zone accommodations and constructability. In some locations, the extreme lengths may preclude the use of prestress concrete beams.



**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-11	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> Consider Designing A Single Point Interchange at SR 376
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The proposed design includes reconstructing the existing Diamond Interchange at I-75 and SR 376 with a new, wider Diamond Interchange. Widening out the Interchange ramps will require significant new ROW.

**Proposed Change:**

It is suggested that consideration be given to constructing a Single Point Interchange at this location in order to reduce the amount of new ROW required for the facility.

**Justification:**

Constructing a Single Point Interchange would reduce the overall footprint of the Interchange by bringing the new ramps in toward the new bridge (most likely within the existing ramp locations). This shift would reduce the amount of new ROW required to construct the Interchange. ROW is the highest cost item on this project. Accepting this change would reduce the cost of the project and reduce its impact on the community.

Using a Single Point Interchange would result in a single signalized Intersection. Shifting the ramp Intersection point toward the bridge would also shift the starting point for access control and allow for the possibility of reducing (still maintaining 600 feet) its overall length and impact on the community.

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-13	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> Strategies to Reduce Bridge Depth at SR 133
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Comp By: G.G. Date: 8/16/08 Checked By: K.B. Date: 08-20-07

**Original Concept:** The main spans for the proposed bridge at SR 133 are approximately 168 feet long in order to clear the required width of I-75 at an approximate skew of 40 degrees. The proposed design uses an eight-lane typical section for I-75 which may need to be widened to a ten-lane section to meet the desired I-75 ultimate section.

**Proposed Change:** It is suggested that consideration be given to various options that could be used to reduce the beam depth for the SR-133 (St Augustine Road ) structure.

**Justification:**

The use of prestress concrete beams to span the 168-foot length needed to cross I-75 would likely require the beams to have an 84-inch depth. The resulting total bridge deck thickness would adversely impact the ramp tie-ins to Main Street and the Main Street grade profile east of the new bridge. Reducing the depth of these beams would also justify the use of vertical abutments (MSE walls) at the bridge ends in order to minimize the length of a less traditional and more expensive superstructure.

Consideration should be given to the following options for the main carrying member:

- Precast, Prestressed beams (single span)
- Precast, Prestressed beams with post tension ducts (single span)
- Precast, Prestressed beams with post tension ducts spliced with continuity
- 2-span steel plate girders
- Prestressed beams “touched shored” till made continuous

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> A-15	<b>Sheet No.:</b> 1 of 2	<b>CREATIVE IDEA: Design Suggestion</b> To Offset the Roadway Centerline at SR 376 & SR 31 to Simplify Construction Under Traffic
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Comp By: G.O. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The proposed design at SR 376 and SR 31 essentially maintains the centerline of existing cross roads for the centerline of the new up-graded Interchange cross roads. Holding the centerlines the same places the new bridge in the same location as the old bridge.

**Proposed Change:**

It is suggested that the proposed horizontal alignments for the cross roads at SR 376 and SR 31 be shifted slightly to the north to move part / all of the new bridges away from the existing bridges in order to improve the constructability of the new bridges.

**Justification:**

Reconstructing new bridges on the same location as the existing bridges poses considerable constructability and traffic control issues. While no construction staging plans have been developed, the staging schemes required will be expensive and problematic. Shifting the centerline alignments a small amount to the north will provide space to construct part / all of the new bridges away from the existing structures. At both locations there may be some additional ROW impacts associated with shifting the centerlines, however, planned whole ROW takes in the NE and NW quadrants (SR 376) and NW quadrant (SR 31) should minimize the impacts and provide room for the centerline shift. Shifting the centerlines would also allow for a reduction in the skew angle of the bridges resulting in shorter spans and improved constructability.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

# SKETCH

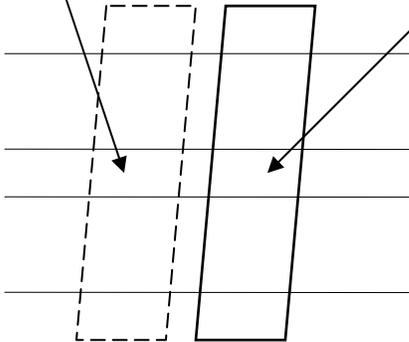
**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: A-15  
CLIENT: GDOT  
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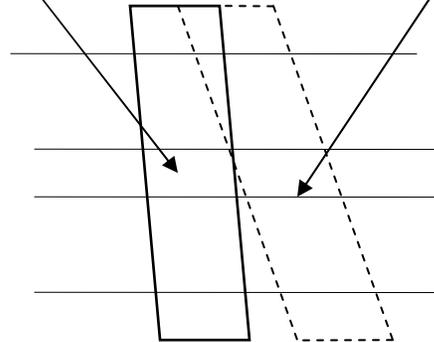
Recommended  
Centerline Shift

Existing & Proposed  
Bridge

Recommended  
Centerline Shift



Site 2



Site 4

**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> B-2	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> Side Road Reconstruction
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-22-07

**Original Concept:**

The SR-376 Interchange shows side road reconstruction at Jewell Futch Rd. at the Georgia Winnebago property and the East Coast Properties in the southwest quadrant.

**Proposed Change:**

Eliminate this side road reconstruction.

**Justification:**

The area of this reconstruction is off the Limit of Access and is 0.25 miles from the intersection of Jewell Futch Rd. @ SR 376/Lakes Blvd.

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> C-2	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> To Jack Bridges as Necessary to Maintain Uniform Roadway Elevations During Bridge Reconstruction
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The proposed design essentially maintains the centerline of existing cross roads for the centerline of the new up-graded Interchange cross roads. Holding the same crossroad centerlines requires the new bridges to be reconstructed on the same location as the existing bridges. This work will require the demolition of a portion of the old bridge and the construction a portion of the new bridge while maintaining traffic over the other portion of the old bridge that is left in place. The roadway on the new bridge will be higher than the roadway on the old bridge and due to their close proximity could cause constructability and construction shoring challenges.

**Proposed Change:**

It is suggested that consideration be given to jacking the existing bridges during reconstruction to minimize the difference in roadway elevations to improve constructability and shoring issues.

**Justification:**

Jacking the existing bridges will accommodate for longer span bridges where shoring is required for construction. Jacking the bridges will allow traffic to transition from one side to the other during bridge reconstruction. It will also allow for ramp tie-ins during stage reconstruction which will result in a construction time / cost savings.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> C-3	<b>Sheet No.:</b> 1 of 2	<b>CREATIVE IDEA: Design Suggestion</b> Consider Local Road Closures and Possible Detours for constructing the New Bridges at SR 376 & Loch Laurel Rd.
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Comp By: G.O. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:** The proposed project anticipates constructing the new Interchange bridges at SR 376 and Loch Laurel Road by staging local traffic through the construction area. This work will require the demolition of a portion of the old bridge and the construction a portion of the new bridge while maintaining traffic over the other portion of the old bridge that is left in place. The process would then be reversed to construct the second half of the bridge.

**Proposed Change:** It is suggested that consideration be given to alternately closing the crossroads at SR 376 and Loch Laurel Road and detouring local traffic around the site during construction.

**Justification:** A reasonable circular detour route exists between SR 376 and Loch Laurel Road that would allow for closing one local crossroad at a time to simplify and expedite construction at the closed site. The detour route would follow SR 376 east to US-41, north on US-41 to Twin Lakes Road, west on Twin Lakes Road to CR 783, South on CR 783 to SR 376, and east on SR 376.

Closing local traffic at an entire site would allow the contractor to occupy the entire site and perform the bridge demolition and new construction, (bridge replacement, ramp construction, local crossroad construction) in a much more streamlined and efficient manner. This concept would result in a much faster and safer construction project.

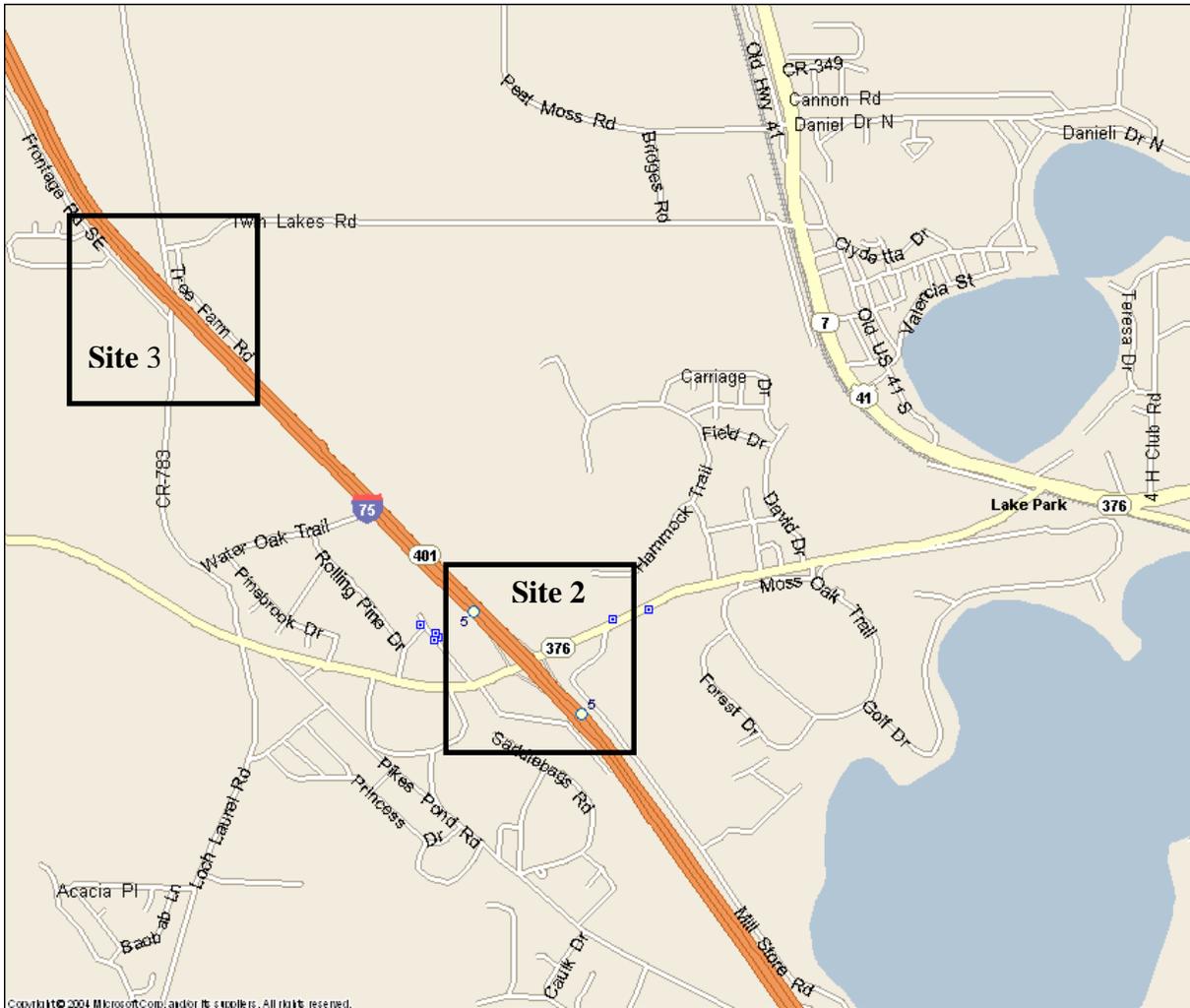
It will also be important to review the condition of the existing roads to be used for the detour and calculate the anticipated detoured traffic's impact on these roads.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

# SKETCH

**Project: I-75 at 7 Locations from Florida to SR 122**

ITEM N<sup>o</sup>: C-3  
CLIENT: GDOT  
Sheet: 2 of 2



**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> C-4	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> To Use Contra-Flow Lanes on I-75 to Aid Construction
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Comp By: G.O. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

It is assumed that conventional lane reductions / shifts will be used on both directions of I-75 to provide for the new bridge construction at these 7 locations.

**Proposed Change:**

It is suggested that contra-flow lane (2 lanes in each direction) alignments be considered to accommodate traffic on I-75 during construction in this corridor.

**Justification:**

Using conventional lane reductions / shifts at each of the 7 Interchange sites along the corridor would result in continuous changing lane configurations on I-75 that would likely confuse motorists and create safety concerns. Coordinating construction staging for the various sites (all sites involve different bridge designs and constructability issues) to provide uniform lane reductions / shifts is not practical.

Using contra-flow lanes would allow the contractor(s) to work in-site and construct half a bridge at a time, thereby shortening the construction duration and providing a safer work zone. This concept requires the traveling public to cross the I-75 median area, however, there is precedent for this concept in this area (the mapping for Site 5 shows an existing crossover alignment).

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> G-1	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> Right of Way / Access Control Adjustments at SR 31
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

In the proposed layout for SR 31, the Hinton Oil property is shown as a ROW take in the northwest quadrant because of new access control limits. The existing access drive to the Cowart & Sons property in the southwest quadrant is proposed to be relocated to the west.

**Proposed Change:**

It is suggested that a new access drive / road be created across from the new access drive at the Cowart & Sons property shown on the original concept.

**Justification:**

This proposed change would allow access to the Hinton Oil company via an access road (similar to what the original concept shows in the northeast corridor). The proposed changes would result in eliminating the need to acquire the Hinton Oil company which would be a cost saving for ROW.

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> L-1	<b>Sheet No.:</b> 1 of 2	<b>CREATIVE IDEA: Design Suggestion</b> To Check the Lengths Between Traffic Signals
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Comp By: C.V.P. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The proposed design shows a signal spacing of 770 feet between the new ramp intersections at CR 274. The proposed design also includes a 480-foot limited access control line in the northwest and southwest quadrants. This new access control line eliminates the existing car access entrance (in the southwest quadrant) to the CFJ Properties and also eliminates 14 parking spaces in their parking lot. Existing access to the Wallace/Hurst property and the Land Osun Management property in the northwest quadrant is also eliminated.

The elimination of access to these properties is mitigated by shifting the car access entrance to the existing truck access entrance to the CFJ Properties (500 feet south of the new ramp location). New access is also created via a new access drive / road in the northwest quadrant (across from the CFJ truck entrance) which combines access to the Wallace/Hurst property, the Land Osun Management property, and the Country Hospitality property.

**Proposed Change:**

It is suggested that the ramp location on the west side of I-75 be shifted 110 feet to the east to reduce the spacing between the ramp intersections from 770 feet to 660 feet. It is further suggested that the length of the limited access control line in the northwest and southwest quadrants to be reduced from 480 feet to 320 feet.

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

## DESIGN SUGGESTION CONTINUATION

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

ITEM N<sup>o</sup>: L-1  
CLIENT: GDOT  
Sheet: 2 of 2

**Justification:**

Accepting this shift in intersection spacing and reducing the length of access control would allow the existing car access entrance to the CFJ Properties to remain open and eliminate taking the 14 parking spaces. It would also allow the two existing access drives to the Wallace/Hurst property to remain open and allow widening of the Wallace/Hurst drive to accommodate trucks entering the Land Osun Management property. It would also eliminate the need for the new access drive / access road south of the Wallace/Hurst property.

The suggested changes will result in significant ROW cost savings for the access road shown in the concept, the cost to cure for eliminating parking spaces, and ROW costs are reduced by shifting the ramps in the northwest and southwest quadrants. Construction savings will be realized by eliminating the access road in the northwest quadrant. The proposed changes will not result in any new design variances and meet FHWA requirements.

**DEVELOPMENT AND RECOMMENDATION PHASE**

**Project: I-75 at 7 Locations from Florida State Line to SR 122**

<b>IDEA No.:</b> L-4	<b>Sheet No.:</b> 1 of 1	<b>CREATIVE IDEA: Design Suggestion</b> Investigate Possible Traffic Signal Installations at CR 274 and SR 31
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Comp By: G.O. Date: 8/16/07 Checked By: K.B. Date: 08-20-07

**Original Concept:**

The proposed design includes new traffic signals at the ramp intersections at CR 274 and SR 31. The design also includes the reconstruction of cross street intersections at the relocated truck stop entrances on the east side of I-75. These cross streets will experience heavy truck turning movements since they serve primarily as access points for several large truck stops

**Proposed Change:**

It is suggested that these new cross street intersections be reviewed to see if they meet warrants for the installation of traffic signals.

**Justification:**

The proposed design has shifted the ramp intersection away from I-75 and the addition of access control outside these intersections has forced all traffic to enter the various truck stops through the new cross street intersections. Since the proposed design requires all traffic to use the new cross street intersections, the heavy turning truck traffic at these intersections could present difficulties for proper operations. These cross street intersections should be reviewed to determine whether traffic signals are warranted. As these areas continue to develop and traffic gets heavier, traffic operations will be compromised.

<b>LIFE CYCLE COST SUMMARY</b>	<b>CAPITAL COST</b>	<b>FUTURE COST</b>	<b>TOTAL COST</b>
<b>INITIAL COST – Original</b>	<b>Design Suggestion</b>		
<b>- Proposed</b>			
<b>- Savings</b>			
<b>FUTURE COST – Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>Design Suggestion</b>

# APPENDIX

## Sources

### Approving/Authorizing Persons

Name:	Position:	Telephone:

### Personal Contacts

Name:	Telephone:	Notes:
Nabil Raad	635-8126	I-75 Typical Section
Vinesha Pegram	463-2988	I-75 Typical Section
Jeff Van Dyke	404-249-7550	Loop Ramp Traffic Data
Jeff Van Dyke	404-249-7550	I-75 Typical Section

### Documents/Abstracts

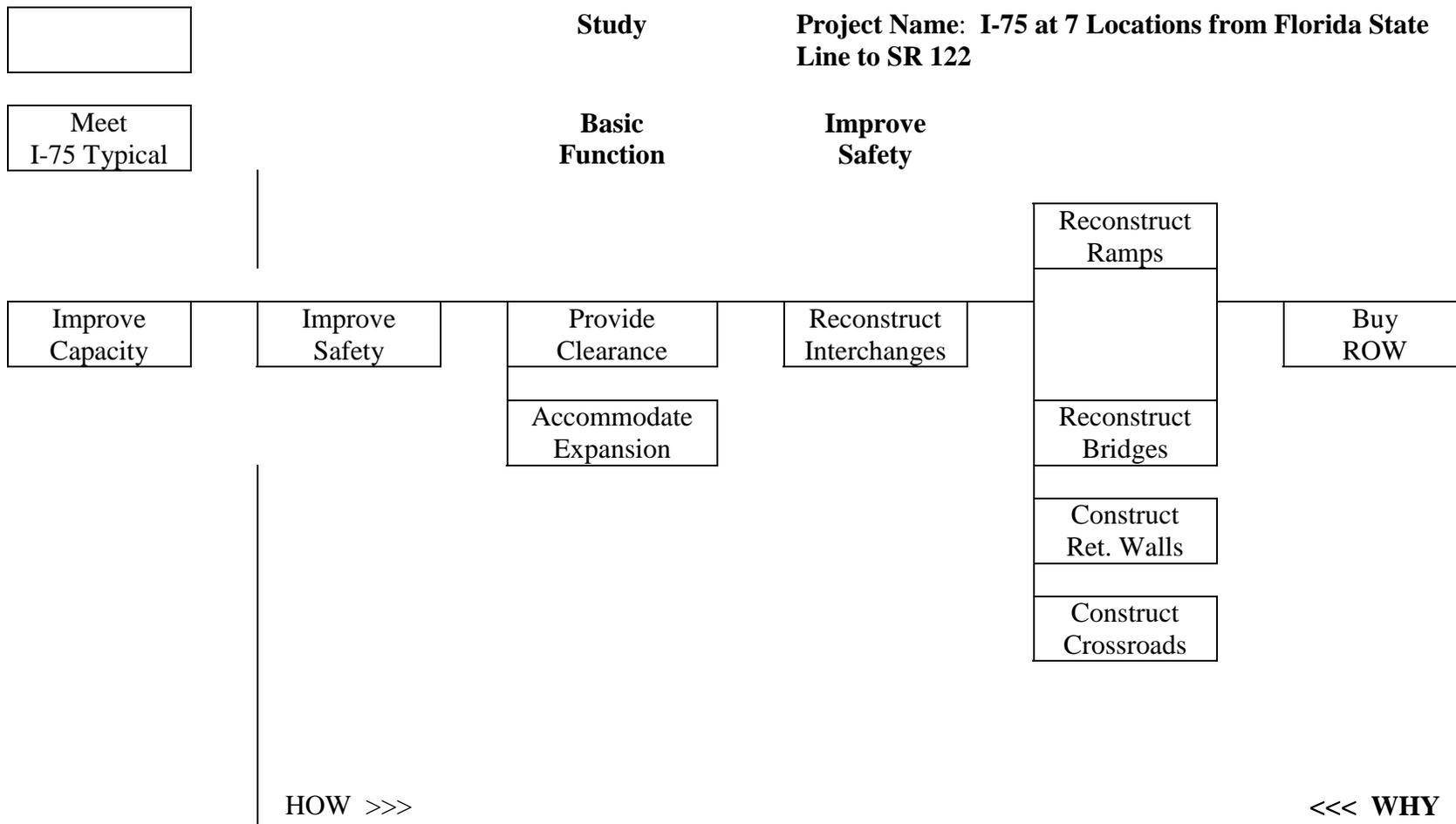
Reference:	Reference:
100 Scale Plan Layouts	
Project Concept Report	
Preliminary Cost Estimate	
Typical Sections for Bridges & Cross Roads	
Preliminary ROW Cost Estimate	
Preliminary Traffic Analysis	

# I-75 at 7 Locations from Florida to SR 122

## Cost Model / Distribution

Item	Description	\$ Amount	% of Total Project
A	Bridge	\$20,514,000	26.5%
B	Superpave Asphalt	\$10,259,000	13.2%
C	Traffic Control	\$7,584,000	9.8%
D	Embankment	\$5,626,000	7.3%
E	Concrete Pavement	\$5,534,000	7.1%
F	Clearing & Grubbing	\$4,920,000	6.4%
G	Miscellaneous	\$4,497,000	5.8%
H	Aggregate Base	\$4,015,000	5.2%
I	Retaining Walls	\$3,657,000	4.7%
J	Bridge Removal	\$2,000,000	2.6%
K	Signing & Markings	\$1,615,000	2.1%
L	Signals	\$1,500,000	1.9%
M	Temporary Barrier	\$1,490,000	1.9%
N	Erosion Control	\$1,489,000	1.9%
O	Drainage	\$991,000	1.3%
P	Concrete Shoulders	\$717,000	0.9%
Q	Guardrail	\$713,000	0.9%
R	Concrete Curb & Gutter	\$351,000	0.9%
	<b>Construction Subtotal:</b>	<b>\$77,472,000</b>	<b>100.0%</b>
	10% E&C	\$7,747,000	
	5% Inflation @ 4 Years	\$12,320,000	
	<b>Construction Total:</b>	<b>\$97,539,000</b>	

# FAST DIAGRAM



## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** I-75 at 7 Locations from Florida to SR 122

**Function:** Improve Safety

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
<b>A</b>	<b>Bridges</b>	Separate	Roadways	\$20,514,000	26.5%	Yes
		Provide	Storage			
		Provide	Access			
		Provide	Ped. Access			
		Provide	Clearance			
		Eliminate	Substandard Shoulders			
<b>B</b>	<b>Asphalt Pavement</b>	Construct	Side Streets	\$10,259,000	13.2%	Yes
		Construct	Accel. / Decel. Lanes			
		Construct	Ramp Tapers			
		Construct	Cross Streets			
<b>C</b>	<b>Traffic Control</b>	Allow	Construction	\$7,584,000	9.8%	
		Maintain	Traffic			
		Provide	Safety			
		Maintain	Access			
		Stage	Bridge Construction			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** I-75 at 7 Locations from Florida to SR 122

**Function:** Improve Safety

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
<b>D</b>	<b>Embankment</b>	Achieve	Grade	\$5,626,000	7.3%	Yes
		Construct	Ramps			
		Support	Roadway			
		Improve	Sight Distance			
		Relocate	Roads			
		Provide	Shoulders			
		Improve	Operations			
<b>E</b>	<b>Concrete Pavement</b>	Construct	Ramp Pav't	\$5,534,000	7.1%	Yes
		Support	Trucks			
		Reduce	Maintenance			
		Construct	Ramp Intersections			
		Extend	Truck Lanes			
<b>F</b>	<b>Clearing &amp; Grubbing</b>	Allow	Construction	\$4,920,000	6.4%	
		Remove	Old Roadways			
		Prepare	Site			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** I-75 at 7 Locations from Florida to SR 122

**Function:** Improve Safety

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
<b>G</b>	<b>Miscellaneous</b>	Extra	Items	\$4,497,000	5.8%	No
<b>H</b>	<b>Aggregate Base Course</b>	Support	Pavement	\$4,015,000	5.2%	No
		Drain	Pavement			
<b>I</b>	<b>Retaining Walls</b>	Hold	Ramps	\$3,657,000	4.7%	Yes
		Hold	Bridges			
		Save	ROW			
		Provide	Aesthetics			
		Shorten	Spans			
		Eliminate	Spans			
<b>J</b>	<b>Bridge Removal</b>	Allow	Construction	\$2,000,000	2.6%	Yes
		Stage	Construction			
<b>K</b>	<b>Signing &amp; Traffic Markings</b>	Improve	Safety	\$1,615,000	2.1%	No
		Control	Traffic			
		Improve	Operations			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** I-75 at 7 Locations from Florida to SR 122

**Function:** Improve Safety

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
<b>L</b>	<b>Signals</b>	Control	Traffic	\$1,500,000	1.9%	Yes
		Improve	Operations			
		Improve	Safety			
<b>M</b>	<b>Temporary Barrier</b>	Allow	Construction	\$1,490,000	1.9%	No
		Provide	Safety			
		Delineate	Traffic			
<b>N</b>	<b>Erosion Control</b>	Control	Erosion	\$1,489,000	1.9%	No
		Minimize	Fines			
<b>O</b>	<b>Drainage</b>	Remove	Water	\$991,000	1.3%	No
		Drain	Pavement			
<b>P</b>	<b>Concrete Shoulder</b>	Control	Drainage	\$717,000	0.9%	Yes
		Support	Trucks			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** I-75 at 7 Locations from Florida to SR 122

**Function:** Improve Safety

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
<b>Q</b>	<b>Guardrail</b>	Improve	Safety	\$713,000	0.9%	Yes
		Reduce	Embankment			
		Delineate	Traffic			
<b>R</b>	<b>Concrete Curb &amp; Gutter</b>	Control	Drainage	\$351,000	0.5%	Yes
		Minimize	ROW			
		Improve	Safety			

<b>CREATIVE PHASE Creative Idea Listing</b>		<b>JUDGMENT PHASE Idea Evaluation</b>	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
A	<b>Bridges</b>		
A-1	Shorten Spans	Reduce Cost, Accelerate Construction	✓
A-2	Narrow Structures	Reduce Cost, Accelerate Construction	✓
A-3	Keep Old Structures	Reduce Cost, Reduce Service Life, Safety	X
A-4	Make 2-Span Structures	Reduce Cost, Accelerate Construction	✓
A-5	Eliminate Spans	See A-4, Reduce Cost	✓
A-6	Use MSE Walls at Abutment Ends	See A-4, Reduce Cost, Accelerate Construction	✓
A-7	Don't Replace at some Locations / Interchanges	Reduce Cost, Accelerate Construction	X
A-8	Widen Existing Structures	Reduced Service Life	X
A-9	Use Single Sidewalk	Reduce Cost,	X
A-10	Reduce / Eliminate Left Turn Lanes (Site # 1, 4, 5)	Narrower Bridge, Reduce Cost	✓
A-11	Revise Interchange Type (Use Single Point)	Reduce ROW,	DS
A-12	Use Loop Ramps at some Locations (Site #1, 4)	Lessen Impact on ROW, Reduce Bridge Width	X
A-13	Trellis Bridges to make Shallower (Site # 5)	Reduce Cost	✓
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

<b>CREATIVE PHASE Creative Idea Listing</b>		<b>JUDGMENT PHASE Idea Evaluation</b>	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
A-14	Add 4 <sup>th</sup> Lane to I-75 by Widening to both Inside and Outside of Existing Facility (Reduce Bridge Lengths)	Reduce Bridge Lengths, Reduce Cost	✓
A-15	Shift Bridge Location (Site 2 & 4) to reduce / eliminate Building New Bridge on top of Existing Bridge	Improve Constructability	✓
A-16	Eliminate Specialty Lane @ Site 6 & 7 (48-ft width)	Reduce Costs, Shorten Bridge	✓
A-17	Use Shallower Beams	Reduce Crossing Grade	✓
<b>B</b>	<b>Asphalt Pavement</b>		
B-1	Replace with Concrete where Truck Traffic is Heavy	Reduce Maintenance	DS
B-2	Minimize Side Road Reconstruction	Reduce Cost	DS
B-3	Widen Out Ramps on Only One Sides of Interchange	Reduce Cost, Accelerate Construction	X
B-4	Keep Ramps in Existing Location, Widen Bridges for Double Left Turns	See B-3, Reduce ROW Needs	X
B-5	Eliminate Tapers for 4 <sup>th</sup> I-75 Lane	Reduce Cost	✓
B-6	Build only Interstate Acceleration / Deceleration Lanes and use Existing Ramps (Widen as Necessary)	See B-3, B-5, Save ROW	X
B-7	Retain Existing Pavement and Overlay	Reduce Cost	DS
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

<b>CREATIVE PHASE Creative Idea Listing</b>		<b>JUDGMENT PHASE Idea Evaluation</b>	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
<b>C</b>	<b>Traffic Control</b>		
C-1	Minimize Grade Difference in Bridges Being Replaced	Improve Safety	DS
C-2	Jack Bridges to Get Clearance during reconstruction	See C-1, Improve Safety	DS
C-3	Investigate Possibility of Using Detours	Improve Safety, Added Maintenance Cost	DS
C-4	Use Contra Flow Traffic on I-75	Accelerate Construction	DS
C-5	Simplify Staging to Reduce Amount of Temp Barrier	Reduce Cost	X
<b>D</b>	<b>Embankment</b>		
D-1	Maximize Use of Existing Ramp Locations	Reduce Cost, Accelerate Const., Save ROW	X
D-2	Use Shallower Beam Depths	See A-17, Reduce Cost, Accelerate Construction	X
D-3	Use More Curb & Gutter Sections	Reduce Embankment, Reduce Cost, Save ROW	X
D-4	Use More Retaining / MSE Walls	Save ROW	X
D-5	Use Loop Ramp in NE Quadrant (Site 1)	See A-12, Reduce ROW Impact	X
D-6	Construct Loop Ramp (Site 7) in Ultimate Location	See A-16	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

<b>CREATIVE PHASE Creative Idea Listing</b>		<b>JUDGMENT PHASE Idea Evaluation</b>	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
<b>E</b>	<b>Concrete Pavement</b>		
E-1	Eliminate Some by Retaining Existing Ramps	Reduce Cost, Accelerate Construction	X
E-2	Add to Heavy Truck Traffic Access Areas	See B-1, Reduce Maintenance Effort / Cost	X
E-3	Why use High Early Strength Concrete	High Cost, Accelerate Construction	X
<b>I</b>	<b>Retaining Walls</b>		
I-1	Use More Wall to Save ROW	Minimize ROW Impacts	DS
I-2	Revise Ramp Alignments to Reduce ROW Needs	See B-3, Minimize ROW Impacts	X
I-3	Use More Existing Ramp Locations	See B-3, Minimize ROW Impacts	X
I-4	Add MSE Walls at Bridge Abutments	See A-4, Shorten Beams, Reduce Cost,	X
I-5	Use MSE Walls in-lieu-of Cast-in-place Walls	Reduce Cost, Accelerate Construction	X
<b>J</b>	<b>Bridge Removals</b>		
J-1	Check to See if all Bridges Need to be Replaced	Reduce Cost, Accel. Construction, LC Impacts	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

<b>CREATIVE PHASE Creative Idea Listing</b>		<b>JUDGMENT PHASE Idea Evaluation</b>	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
<b>K</b>	<b>Signals</b>		
K-1	Check Lengths Between Signals	Require Design Exception, Safety Issues	DS
K-2	Signalize Existing Ramp Interchanges	Reduce Cost, Accelerate Construction	X
K-3	Use Single Point Interchange	See A-11, Pull In Ramps, Save ROW, Reduce Impacts	X
K-4	Add Signals to Sites 1, 4, 6, & 7	Add Cost, Improve Capacity	✓
<b>M</b>	<b>Temporary Barrier</b>		
M-1	Simplify Staging to Minimize Use	Reduce Cost	X
<b>P</b>	<b>Concrete Shoulder</b>		
P-1	Question Need for Concrete Shoulders on Ramps	Concrete ramps require concrete shoulders	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			