

Northwest Corridor PPI – Review of VE Summary Table

At the request of the Department, GTP has reviewed the VE table (Attachment A) that was provided them from the December 7-11, 2009 VE study conducted by the Department for the Northwest Corridor PPI Project (NWC). Due to the termination for convenience of the GTP contract by the Department (effective December 31, 2009), GTP will be unable to participate with the Department in their review and assessment of the VE Final Report, which will likely be issued after December 31. The Office of Innovative Program Delivery requested GTP to review the attached table to aid the Department in their future endeavors. This review is performed without the ability of any design documents, sketches, analysis, alignments, profiles, cost estimates etc. GTP did not have the ability to discuss with the VE Team and understand their perspective or techniques. A few overall observations are included in the General section, followed by review comments to the individual items.

Specifically, the Office of Innovative Program Delivery requested GTP to offer the background and history of the design evolution and offer comments to the table as possible. GTP was not to perform design or estimating services to investigate the recommendations.

General

GDOT and GTP agreed to study the west side and median (of I-75) options to preserve the east side corridor for possible future expansion of the managed lane system or for the possibility of a transit corridor. Alignments to the east side were not investigated, but observations are provided as noted.

As mentioned above, GTP has evaluated the VE summary recommendations, but without the benefit of reviewing the VE team's sketches, geometric revisions, bridge sections, cost estimates and other critical data necessary to fully evaluate these proposals. Many of the recommendations by the VE team appear to require design exceptions and it was GTP's and GDOT's goal to limit exceptions where feasibly possible, except those coordinated in advance with the Department. GTP received no breakout of cost to review. Generally, the cost savings seem on the high side. GTP puts a lot of emphasis on constructability, staging costs, traffic management, schedule effects, worksite access, etc. It is not possible to determine how these were considered. The Department is reminded to look at all cost elements when doing their eventual review. In addition, the Department needs to consider revenue as well as costs in their eventual evaluation. When considering changes to ramps, interchanges, etc., the Department should consider the traffic effects. Also, it is noted that EIS issues must be thoroughly considered, as the impact to schedule could be significant.

Subject to the above remarks, the following thoughts are offered on GTP's studies to date and observations from the VE table.

B-2 Extend the bridge on Gresham Road and place managed lanes at grade and eliminate part of Bridge No. 19

This recommendation is reasonable and was already under consideration when the termination notice for convenience was received. Additional structural analysis of the existing bridge will be required to determine suitability. Traffic management, staging, schedule and local impacts were among the issues to be considered before any recommendation was to be made to the Department.

B-3 Increase the span lengths by using spliced girders for Bridge no. 13

The use of longer spans would eliminate 2-3 intermediate bents. The removal of these intermediate bents and foundations would not offset the cost for more expensive girders that would be more difficult to construct. GTP believes the layout as proposed would be more cost effective when all the cost elements are reviewed.

B-5 Straighten managed lanes alignment at South Marietta Parkway and place them at grade so they go under the South Marietta Parkway Bridge. Use braided bridges for the ramps to go over the managed lanes.

The recommendation to braid the ramps at South Marietta Parkway may have some merit but the necessary geometry for the managed lanes to attain 55 mph appears to result in a deficiency. The ramp braids in the Atlanta area are generally ramps braided with Collector-Distributor roadways where speed design is 45 mph thus allowing tighter geometry. It is also not clear without additional study that a managed lane profile that would braid over the entrance/exit ramps which would be able to go under the South Marietta Parkway Bridge. The other complication not fully explored is the grade change on the general purpose entrance/exit ramps which would be very difficult to build and stage construct. The benefit of the managed lanes on the outside of the general purpose lanes is that they can be constructed with minimal impact and disruption to I-75 with higher productivity and shorter schedule.

B-6 Run the managed lanes under the Windy Ridge Parkway Bridge and delete Bridge No. 4

The recommendation to lower the managed lanes and place under the end span of the Windy Ridge Parkway Bridge has some merit, and has been under review by GTP. There are several factors that complicate this proposal. First, the location of the Colonial Pipeline high pressure gas crossing limit the profile that would approach the end span limiting the proposed profile. Secondly, the Boy Scouts of America on Windy Ridge Parkway has a significant modular block fill wall adjacent to the I-75 existing R/W. To fit the managed lanes under the bridge this wall would have to be undercut. The construction required to both undercut and secure the fill wall would be extensive and it is unclear if that was factored into the preliminary cost savings projections of the VE team. Also the profile required to proceed under the Windy Ridge Parkway bridge and then over the I-75 to I-285 ramps would require those ramps to be lowered. This grade change for system to system ramps would be disruptive to traffic and would cause time and staging delays that would have to be factored into the cost savings for this item.

B-13 Eliminate Bridge No. 16 on I-75 by mitigating the wetland area and extending box culverts

Bridge 16 was proposed to minimize impacts into the floodplain of Rottenwood and Hope Creeks. The existing quad 10 ft X 10 ft culvert at Rottenwood Creek is not designed for the proposed fills that would be required if the culvert was extended. Therefore a portion of the existing culvert under I-75 would have to be removed and rebuilt to handle larger fill amounts. This removal would require shoring and closing the outside shoulder of I-75 southbound. The extension of this culvert would negatively impact the confluence of Rottenwood Creek and Hope Creek. The confluence would have to be relocated farther west due to the culvert extension and backwater effects would have to be modeled.

Also, Bridge 16 spans the floodplain of both Rottenwood and Hope Creek. Eliminating the bridge and placing walls in the floodplain would create a rise in the creeks. As currently proposed the mitigation at Rottenwood and Hope Creeks would be for shading. Placing permanent fill in the wetlands is a greater impact and would require additional and more costly wetland credits to be acquired. If pursued, this item would require immediate coordination with the EIS team.

B-15 At Hickory Grove Road and I-75 use mechanically stabilized embankment wall and abutments in lieu of bridge end spans

The removal of the end spans while a valid value engineering suggestion would remove the flexibility the presence of the end spans creates. In the future if any expansion of I-75 were proposed the Hickory Grove Road Bridge would have to be replaced. Leaving the end spans open allows for future expansion. Generally, short end spans cost about the same as MSE abutments. When the design and costs are better established, this would appear to be a trade-off of flexibility versus potential cost savings.

B-17 Use a larger radius for Bridge No. 7 and shorten the bridge by cutting across the interchange farther north

The alignment and radius of Bridge No. 7 have been located at the present location for several reasons. The current radius on the bridge creates a crossing of I-75 that is close to perpendicular thus minimizing the span. As a result, a center bridge bent is not required in the median of I-75. This location of I-75 is already pinched by existing bridges. The addition of a bridge bent in the median would further reduce shoulders that are minimal. Another reason to avoid a median bridge bent is the extended lanes closures in a highly congested area that would be required to construct. The additional disruption to traffic would cause time and staging delays that would have to be factored into any apparent cost savings for this item.

This alignment has also been coordinated with the Revive I-285 project. The alternates proposed as part of Revive I-285 have several flyover ramps proposed for both I-285 and I-75. This alignment and profile ensure that the ramp will be utilized in future alternatives and is not a "throw away" solution.

B-18 Shorten Bridge No. 2B and move the curved bridge alignment north

The alignment and radius of Bridge No. 2B have been located at the present location for several reasons. The current radius on the bridge creates a crossing of I-75 that is close to perpendicular thus minimizing the span. As a result, a center bridge bent is not required in the median of I-75. This location of I-75 is already pinched by existing bridges. The addition of a bridge bent in the median would further reduce shoulders that are minimal. Another reason to avoid a median bridge bent is the extended lanes closures in a highly congested area that would be required to construct. The additional disruption to traffic would cause time and staging delays that would have to be factored into any apparent cost savings for this item.

This alignment has also been coordinated with the Revive I-285 project. The alternates proposed as part of Revive I-285 have several flyover ramps proposed for both I-285 and I-75. This alignment and profile ensure that the ramp will be utilized in future alternatives and is not a “throw away” solution.

G-4 North of North Marietta Parkway cross the two managed lanes from the west side of I-75 to the east side of I-75 and provide bridges to connect the lanes to the medians of I-75 and I-575 north of the interchange

Through discussions with GDOT the alignment of the reversible managed lanes was maintained on the west side of I-75 for the future possibility for a mirror image future expansion of the system, on the east. Also, the east side was left available for the potential of future transit. GTP studied median and west side alignments only.

At this time the drawings used by the VE team are not available. Therefore the basis for the cost savings are based on assumptions that the VE team was trying to minimize bridge structure and R/W. The current alignment crosses I-75 southbound limiting the span to one side of I-75. The VE team’s recommendations to cross I-75 southbound and northbound will at least double the current cost of crossing I-75. The geometry required to maintain 55 mph speed design would require a bridge with multiple straddle bents. The construction and traffic interruption to build the necessary straddle bents would increase the cost of this structure significantly.

Once the alignment is shifted to the east the profile grade would slope downward to match existing I-75 but only for a short while, approximately 500 ft. The managed lanes would have to climb to go over Sope Creek and Allgood Rd due to the insufficient width to fit the managed lanes under the bridge. Also the profile of Allgood Rd slopes downward to the east limiting the vertical clearance. At this point the west side alignment is significantly less expensive because it is at grade whereas the eastern alignment would be still mostly on bridge structure. The required R/W in this section appears to be equivalent except that the eastern alignment may displace 2 residences on Bankston Circle.

To the north of Allgood Rd, the western alignment has to climb over the Elizabeth Branch culvert and the Georgia Northeast Railroad siding. On the east side once the managed lanes fly over Allgood Rd it could slope downward but would still need to stay on structure until it cleared the Elizabeth Branch Creek. The

eastern alignment appears to save 1,000 ft of structure until it had to climb over Georgia NE Railroad, Canton Rd and the Canton Connector ramps etc.

North of Canton Connector the western alignment is on wall until Dickson Rd. This section on the eastern alignment would have to be on bridge structure due to the close proximity of Dickson Rd. As the eastern alignment proceeded north it would have to remain on structure for the same reasons the western alignment is on structure, height of slopes.

The western alignment proceeds into the median north of Bells Ferry Rd with a two lane flyover bridge over I-75 southbound. Then the managed lanes split and a one lane flyover to I-575. The eastern alignment would require a two lane flyover bridge for the I-75 northbound exit to I-575 and the I-575 southbound exit to I-75. Another flyover bridge would be required to merge the reversible managed lane in the median of I-75 north of I-575 interchange.

Without the specifics of the VE team's cost estimate the cost comparison cannot be made. Based on the complications to cross the managed lanes over I-75 and several other issues the eastern alignment at least appears to be equivalent if not more costly than the western alignment. In any event, if the Department no longer feels the east side should be preserved for future infrastructure, a detailed review of the east and west should be made, much like GTP did for the west and median concepts. If pursued, this item would require immediate coordination with the EIS team.

G-5 North of North Marietta Parkway cross the two managed lanes from the west side to I-75 to the east side of I-75 and provide bridges to connect the lanes to the medians of I-75 and I-575 north of the interchange and add access lanes at Bells Ferry Rd

See the above response for item G-4. The addition of a managed lane interchange at Bells Ferry Rd would have to be studied to see if its addition was financially feasible. The complication of adding an interchange at this location appears to be that it would require the closure of Bells Ferry Lane. Bells Ferry Lane serves four businesses and their access would be removed. The ramps would also impact Shady Grove Church and another business on the north side of Bells Ferry Rd.

G-6 From the merge point of Ramp C and the two managed lanes on Bridge No. 2A to where the Ramp H merges in start with two lanes at the Ramp C merge and reduce to a one lane section before the Ramp H merge and increase to two lanes at the Ramp H merge

This recommendation has merit and would be a cost savings. Additional signing, marking and gates would be required which would affect the net savings.

W-1 At Big Shanty Road and I-75 move the entry and exit ramps into the median to avoid the walls along I-75

This may be a viable option for further study. To achieve this, the ramp alignment would have to be shifted to the west 55 ft to obtain a 2:1 slope. A barrier would still be required along the outside of the reversible ramp. A quick layout indicates that there would not be enough room for a ditch along the east side of the ramp without requiring guardrail along the inside of the southbound GP lanes. Additional barrier (or even a shorter wall) would also be required north of the bridge, between the SB GP lanes and the ramp if the ramp alignment were to be shifted to the west. Therefore, this option would require further guardrail and/or barrier than currently shown. Another concern is that moving the ramp alignment to the west may have an impact on the bridge over Noonday Creek, as it may require additional widening than that shown in the original design. This option may improve or rectify any sight distance issues caused by the widened bridge abutment (I-75 over Big Shanty Road) in the original option for traffic exiting on the ramp. Another obstacle would be shortening the left turn on Big Shanty Rd. Moving the exit would result in an apparent deficient left turn storage from Big Shanty Rd to Barrett Lake Blvd and only minimal left turn storage could be provided for Big Shanty Rd to the northbound managed lanes.

W-2 Adjust the reversible lanes profile between South Marietta Parkway and Banberry Road to reduce the extent of the retaining walls

Without the specific details of the recommended profile changes it is hard to speculate on the validity. The profile was originally designed for 65 mph and then the criterion was revised to 55 mph. At the time the cost to revise the profile for the lower speed design was analyzed and found to be insignificant.

W-3 Adjust the reversible lanes profile between Sta. 406+00 and Sta. 419+00 to reduce the extent of the retaining walls

Without the specific details of the recommended profile changes it is hard to speculate on the validity. The profile was originally designed for 65 mph and then the criterion was revised to 55 mph. At the time the cost to revise the profile for the lower speed design was analyzed and found to be insignificant. The area in question is between Rottenwood Creek and Hope Creek. The profile for the creeks is set based on appropriate freeboard over flood elevations. It may not be possible to modify this profile based on the requirements at both Rottenwood Creek and Hope Creek. This would likely be reviewed later, in more detailed stages of design.

575-1 Move slip ramp at Hawkins Store Road bridge to the north and reduce the bridge width

This option would affect the usability of the managed lane. This "set" of slip ramps includes a SB entrance ramp and a NB exit ramp. The NB exit was laid out to provide enough distance between this

exit and the I-575 GP exit onto SR 92. Any additional shift to the north of this alignment would not allow anyone to exit from the managed lane and then exit onto SR 92. The SB entrance ramp is dependent on the placement of the NB ramp. Therefore it cannot be shifted to the north without affecting the exit movement.

Other options are to reduce any ramp lengths or taper rates for either or both of the movements in this “set” or shifting the SB ramp even further south so that it ends south of the Hawkins Store Road Bridge. The latter option is viable as it would allow the SB entrance slip ramp to end north of the bridge over Bells Ferry. However, it would then be 3200’ less length for SB traffic to utilize. Also, the existing piers of Shallowford Road are an obstacle that would damper any reduction in length of the northbound exit, suggested in the first option.

Finally, any potential ramp cost savings at any location should also consider impacts to the traffic and revenue. The net savings should be what needs to be considered.

575-2 End the project on I-575 just south of the Little River Bridge

This option is possible; however, it would shorten the usable length of the project by 0.4 miles. The NB managed lane could be merged into the GP lanes prior to the Little River bridge by beginning to taper out the shoulders and barrier at approximate Sta. 1542+95 over a distance of 605 ft, construct a parallel weave/merge lane for 1500 ft and utilize a 660 ft taper to the beginning of the existing bridge over Little River. However, with the additional traffic entering and merging from the proposed Old Rope Mill interchange this could possibly cause operational problems due to merges occurring from both the left and right sides of the mainline. Moving the end of the project to just south of the Little River Bridge would require a shift of the SB managed lane entrance ramp (am movement) of approximately 4100 ft, to approximately 500 ft south of the proposed Old Rope Mill interchange. The SB shift to the south is required for two reasons. First, there is insufficient space to construct the required cross section, including the barriers. A further shift to the south is then required due to the horizontal restriction at the Old Rope Mill bridge median bent and to provide for the advance signing and visibility requirements of the diverge for the managed lane entrance ramp. A VISSIM analysis would need to be performed to determine if operational problems occur. In that case the NB managed lane merge and taper would have to be shifted further to the south of the Old Rope Mill interchange.

P-1 On the two-lane managed lanes section of I-75 use 11 ft wide lanes adjacent to the 10 ft wide shoulders

This is a policy decision GDOT will have to make. This would require a design exception. Discussions during project development with the Department did not show any interest in this concept.

P-3 Use soil cement base in lieu of the asphalt base for the concrete pavement

The asphaltic concrete layer in the pavement cross section is not a base layer. It is an interlayer between the concrete pavement and the graded aggregate base, and its purpose is to prevent the adhesion of newly placed concrete to the underlying base material. The asphalt interlayer also helps in construction staging. This layer is recommended in the GDOT pavement design manual.

GDOT does not recommend soil-cement base in Cobb County or in other adjacent counties. Soil-cement base is recommended only in some Southern Georgia counties. Also, soil-cement is used as a base layer directly above the soil sub-grade; it is not used as an interlayer. Therefore, use of soil-cement in lieu of asphalt is not applicable in this case. The GDOT Office of Materials and Research may be consulted to evaluate the validity of this recommendation.

P-4 Delete the asphalt base for the concrete pavement

As stated in the response to Item P-3, the asphaltic concrete layer in the pavement cross section is not a base layer. It is an interlayer between the concrete pavement and the graded aggregate base, and its purpose is to prevent the adhesion of newly placed concrete to the underlying base material. The asphalt interlayer also helps in construction staging. This layer is recommended in the GDOT pavement design manual. The GDOT Office of Materials and Research may be consulted to evaluate the validity of this recommendation.

ATTACHMENT A



Draft SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: I-75 / I-575 REVERSIBLE LANES <i>Cobb and Cherokee Counties</i>		PRESENT WORTH OF COST SAVINGS				
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
GENERAL						
G-2	Where possible provide a 4-ft-wide shoulder and a 12-ft-wide shoulder in lieu of two, 10-ft-wide shoulders				DESIGN SUGGESTION	
G-3	From the merge point of Ramp C and the two managed lanes on Bridge No. 2A to where the Ramp H merges in provide a three-lane section that reduces to two lanes				DESIGN SUGGESTION	
G-4	North of North Marietta Parkway cross the two managed lanes from the west side of I-75 to the east side of I-75 and provide bridges to connect the lanes to the medians of I-75 and I-575 north of the interchange	\$209,254,000	\$103,041,000	\$106,213,000		\$106,213,000
G-5	North of North Marietta Parkway cross the two managed lanes from the west side of I-75 to the east side of I-75 and provide bridges to connect the lanes to the medians of I-75 and I-575 north of the interchange and add access lanes at Bells Ferry Road	\$209,254,000	\$104,041,000	\$105,213,000		\$105,213,000
G-6	From the merge point of Ramp C and the two managed lanes on Bridge No. 2A to where the Ramp H merges in start with two lanes at the Ramp C merge and reduce to a one-lane section before the Ramp H merge and increase to two lanes at the Ramp H merge	\$6,604,000	\$0	\$6,604,000		\$6,604,000



Draft SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: I-75 / I-575 REVERSIBLE LANES <i>Cobb and Cherokee Counties</i>		PRESENT WORTH OF COST SAVINGS				
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
WALLS						
W-1	At Big Shanty Road and I-75 move the entry and exit ramps into the median to avoid the walls along I-75	\$6,053,000	\$1,117,000	\$4,936,000		\$4,936,000
W-2	Adjust the reversible lanes profile between South Marietta Parkway and Banberry Road to reduce the extent of the retaining walls	\$2,298,000	\$0	\$2,298,000		\$2,298,000
W-3	Adjust the reversible lanes profile on between Sta. 406+00 and Sta. 419+00 to reduce the extent of the retaining walls	\$3,276,000	\$0	\$3,276,000		\$3,276,000
I-575						
575-1	Move slip ramp at Hawkins Store Road bridge to the north and reduce the bridge width	\$567,000	\$0	\$567,000		\$567,000
575-2	End the project on I-575 just south of the Little River bridge	\$3,642,000	\$0	\$3,642,000		\$3,642,000
PAVEMENT						
P-1	On the two-lane managed lanes section of I-75 use 11-ft-wide lanes adjacent to the 10-ft-wide shoulders	\$9,953,000	\$0	\$9,953,000		\$9,953,000
P-3	Use soil cement base in lieu of the asphalt base for the concrete pavement	\$10,192,000	\$1,625,000	\$8,567,000		\$8,567,000
P-4	Delete the asphalt base for the concrete pavement	\$10,192,000	\$0	\$10,192,000		\$10,192,000