Indian River Inlet Bridge
Questions and Answers

October 24, 2007

Updated November 9, 2007

What are the next steps?

On October 29, 2007 we advertised the request for qualifications (RFQ) from design-build teams. These will be reviewed with interested teams in December, followed by advertisement of the Request for Proposals (RFP). We hope to award a contract for this project by spring 2008, with construction expected to be complete by 2011.

What are the concerns with the approaches as built now?

A longer bridge length is needed because of continuing problems encountered with the approaches for the new bridge. Due to the types of subsurface soils in this area, consolidation was required in advance to prevent settlement from occurring after the roadway is constructed. Projects with such geotechnical issues require extensive engineering analysis based upon soil samples from the site. The consolidation of the subsurface soils has proven to be a very difficult situation even with the involvement of geotechnical specialists. As of this summer, approximately 60 percent of the consolidation of subsurface soils had been achieved. However, it could take an additional seven years to achieve the desired 95 percent consolidation if the embankments are left as is. As a result, we have the following issues:

The embankments have settled beyond the original predictions. This means they are now below the elevations needed to tie into the new bridge.

Roadway embankments are shifting and leaning toward the west, and it has been difficult to estimate the magnitude of this problem.

As result of the weight of the embankments and their unexpected westerly shifting, nearby roads have been impacted, requiring Route 1 pavement repairs and Road 50a reconstruction.

The new bridge construction would be delayed until the problems with the settlement are resolved.

What is the new plan?

After careful consideration of all the issues and reviewing our options, it became clear that regardless of the path forward we chose, there would be increased costs involved. What became the prominent issue then was the timely completion of the new bridge. Rebuilding the approaches, or waiting for the subsurface soils to properly consolidate, would have taken longer and was less predictable than building a longer structure. These options would also delay the design/build contractor from accessing the site to start building the new bridge. These options would have left more to chance than is acceptable for this project.

What had been proposed for the actual length of the bridge before this change? What is the expected length now?

The actual length of the bridge previously was approximately 1,400 feet. The new design is proposed to have a bridge that is 2,600 feet long, including 900 feet for the actual clear span over the inlet (to accommodate the possible future widening of inlet to 800 feet) and 1,700 feet that would be part of the bridge over land. While the new bridge would be larger, the actual construction will not take any longer because the contractor could work on the main span simultaneously while working on the sections over land.

What other options were considered and what were their drawbacks?

We had considered rebuilding the approaches with lightweight fill material to reduce the need for greater amount of consolidation. This option would require additional time to determine the appropriate embankment design and would also interfere with the bridge contractor's access to the inlet area. Additional consolidation is likely after the roadway is opened to traffic and the cost of this special fill material is significantly higher than traditional embankment soils.

We considered adding a greater amount of fill material in anticipation of accelerating the settlement rate and reducing the seven-year estimate. As previously stated, secondary impacts are occurring as the current embankment is shifting. These concerns would remain as well as the risk of relying on the uncertainties of the rate of soil compaction.

The costs of the above options are estimated to be similar to building a longer bridge due to the various issues associated with each. In addition, the construction of a longer bridge will reduce uncertainties with the approaches and enable the bridge construction to begin sooner.

What will happen to the approaches now?

Before the end of the year, we expect to begin removing the majority of the dirt approaches -- approximately 600 feet on each side. We will be exploring economical ways of disposing of this material either for use on other roadway projects or other public works initiatives. The proposed 600 feet of removal will minimize the remaining fill heights while keeping the new longer structure above the design flood elevation. We also expect to be able to utilize some of the fill material for other DelDOT projects statewide. This will result in cost savings for other projects. The material contained in the embankments comes from borrow pits and other sources, which when utilized again for other purposes could be tested after removal. None of the fill used is topsoil.

What will DelDOT do with embankments that will remain?

We expect some of the additional surcharge fill material can be placed on the remaining embankment to accelerate the consolidation. Actual surcharge heights and fill amounts still need to be designed in detail, but are expected to be reasonable and much more manageable than the taller embankment heights. Partial replacement of the remaining fill with lightweight materials offers another solution. The lightweight fill approach has been used successfully on other projects including the new Woodrow Wilson Bridge near Washington D.C.

Was the original design flawed? Is someone at fault?

DelDOT has made a commitment to investigate how we got to this point. We are working closely with our legal counsel, the Federal Highway Administration (FHWA), and others to ensure we proceed in the proper manner. The appropriate first step was to hire an outside design and construction investigative service consultant to review the information and data related to the design and construction of the earthen embankments. O'Connell & Lawrence began work the week of February 25, 2008. The criteria for selection included

demonstrated knowledge and experience in handling similar projects; adequate staffing to meet an aggressive schedule; and immediate availability. This review will not happen overnight, but we will take deliberate steps to conduct a thorough review of the process, design and construction details, and overall decisions that have brought us to this point. DelDOT will continue to follow the policies in place that serve to protect the state from errors and omissions while recognizing the complexities of developing engineering solutions for difficult problems. It should not be assumed what the final outcome of the investigation will be.

In general, Payment/Performance Bonds are required for all construction projects. However, for design and engineering work, these bonds are not required. DelDOT standard consultant contracts instead, require all design and engineering consultants to maintain professional liability insurance and to indemnify the Department against any damages relating to negligence in professional practice. The same requirements are passed along to subconsultants working under the umbrella of a DelDOT contract. The first line of recourse for the department in this case will be considered under the Errors and Omissions Policy required in our consultant contracts.

Can you give a timeline for how DelDOT got to this point?

February 2006: MSE (Mechanically Stabilized Earth) wall and embankment construction begin on both the north and south sides of the inlet. Installation of monitoring equipment (settlement plates, piezometers and inclinometers) is done as the embankment placement is performed. Monitoring of that equipment is performed on a weekly basis starting at the beginning of the construction. This information is provided to the designer on a regular basis.

Additional monitoring tools not originally included in the contract include a 3-D laser scan of the MSE wall faces (performed when the wall is 1/3 its planned height, 2/3 planned height and finished height---measures vertical alignment), vertical string line measurements.

February – September, 2006: MSE wall and embankment construction and monitoring continue on both the north and south sides of the inlet.

End of September 2006: Survey monitoring reveals some wall movements that need further review. Also begin to see some cracking in the existing Route 1 pavement. DelDOT contacts designer to discuss issues. Designer makes recommendation to stop work on south side while they analyze data. Work continues on north embankments. Monitoring continues on weekly basis.

October -- December, 2006: DelDOT continues to monitor embankment movements and provided to the designer for review and analysis. Embankment construction proceeds as per their recommendations (i.e. in some instances we embanked every other week, instead of weekly). Meetings with University of Delaware, Federal Highway Administration (FHWA), and designers are held as issues arise.

December 2006: MSE wall and embankment construction is completed on north side of inlet. Construction of MSE wall and embankment continues on the south

side at the rate recommended by the designer. Analysis of vertical settlement and horizontal movement data continues on both north and south sides.

• **February 2007**: MSE wall and embankment construction is completed on south side of inlet. Monitoring continues for both north and south side embankments. Analysis of vertical settlement and horizontal movement data continues on both north and south sides.

• **March 2007**: MSE wall and embankment monitoring continues to show movements that are greater than what is expected. Based on input from University of Delaware and FHWA, DelDOT decides to hire independent geotechnical consultant to review data and provide analysis.

• **May -- August 2007**: Monitoring continues. Independent review firm (Geocomp) takes soil borings to determine current soil conditions, performs analysis of soils and monitoring data and provides a determination about amount and duration of settlement.

• **August -- September 2007**: Discussions between DelDOT and FHWA are held to assess the latest geotechnical report and determine what the path forward for the proposed bridge and existing embankments should be. A final decision regarding how to proceed is required in order to issue the Request for Qualifications (RFQ) for the new bridge (had to include requirements of new bridge length in the RFQ).

• **October 2007**: Final determination to lengthen the bridge with FHWA concurrence is made and public announcement on decision is made. RFQ for new bridge is issued.

• **November 2007:** The department announces it will hire an outside firm to review the information and data related to the geotechnical work, based on following the policies in place that serve to protect the state from errors and omissions.

Is there a bridge in Delaware that is an example of how this new design – with the extended bridge over land -- might look?

The William V. Roth Jr. Bridge (formerly Chesapeake & Delaware Canal Bridge). The Roth Bridge also has long sections over land, is 4,650 feet long and features a 750-foot deck surface that crosses the canal.

How else is the design different than what was previously announced?

The capacity and function of the bridge will not change. The minimum vertical clearance will remain at 45 feet over the navigational portion of the inlet. The bridge width will remain the same (two 12-foot lanes, a four-foot interior shoulder, a 10-foot exterior shoulder in each direction, and one 12-foot wide sidewalk accessed from the east side of the bridge). The reduced embankment limits will result in the elimination of the massive wall surface areas and will provide a more open view between the bay side and the ocean side.

Why can't we use an existing design like the Penobscot Narrows Bridge in Maine and just adapt to our situation?

While similarities might be carried from one bridge design to the next, comprehensive detailed designs are required for all highway bridges to ensure the final design is appropriate for the specific project parameters and site conditions.

Will this alter how contractors bid on the project? By removing the embankments, a risk is removed from the contractors because there would be a concern regarding whether the embankments would continue to move as they tried to connect the bridge to it. Additionally, the movement and settling of the approaches could restrict contractors' access in the approach area. Eliminating these uncertainties and the associated risks to the contractor reduces the potential for bids to be inflated, and allows for a more timely completion of the bridge.

What is different about the procurement process approach as compared to the last time DelDOT bid the bridge project?

Price is being weighed more than in the previous process but is still not based on the lowest bid. Technical qualifications remain a significant part in the final decision. The previous ambiguity of the design-build authorization legislation and epilogue was addressed during the last legislative session.

What do you anticipate the response from the contracting community to be given two other attempts to award have been put off?

We are cautiously optimistic that we will continue to have interest in this project. We have heard from various sources that contractors and design firms are already teaming up waiting for advertisement of the project. Although some teams may be put off due to the number of procurements we've done so far, we are doing everything we can to minimize risk for the design-build teams, making it attractive for them to participate. It is the ideal contract for the teams as it consists mainly of bridgework.

Why can't DelDOT dictate that local or union workers construct the bridge?

Delaware's procurement laws do not require state contractors to be either unionized or non-unionized. As a department, we do not track, maintain, nor require that contractors identify whether they are union shop firms or not. There is no law that requires this. Additionally, since this is a federally participating project, we are not permitted to specify laborers to be used on the project; if we do so, the federal government will not fund the project. However, the "prevailing" wage rates we are required to use are basically union-scale for bridge projects such as this one.

How much does DelDOT anticipate the new bridge construction to cost?

Our estimates indicate that the design-build of the new bridge structure will cost approximately $150 million. The previous estimate in the last procurement process was $130 million. The increased cost is due to inflation and the longer bridge length.

Does DelDOT have all the funding needed to proceed with this path forward?

The needed federal funds could come from a mixture of federal reallocations, additional earmark/discretionary funds (we have recently requested this), and some releasing of

unused funds in projects completed or almost complete. Given the high priority of this project, we will work diligently to seek opportunities for additional bridge funds by 2011.

How will this impact access to the park now? and later? Access to the park is intended to proceed as originally designed. Proceeding with the bridge project as currently planned will actually allow the project to be completed sooner than if we had to allow time for the settlement. Currently, the park access is restricted by allowing no vehicle access under the bridge. Access to the south campground is only available from south bound Route 1 and the south bath house beach area is only accessible from north bound Route 1. U-turns are permitted on Route 1 away from the project site. After the new bridge is constructed, vehicle access will be permitted to both south side locations from either northbound or southbound Route 1, as the access roads will loop under the bridge. The access to all north side locations will not change from what is there today. We will continue to coordinate issues with the state Department of Natural Resources and Environmental Control (DNREC) and determine if there are any additional measures we can take to reduce the impacts on access.

Is the bridge safe now?

Yes. The need for replacing the bridge is due to the severe scouring in the Inlet adjacent to the bridge substructure that has taken place over the decades. The velocity of current in the inlet is very high and unique. However, the existing bridge is in no immediate danger of failing, and in fact it is the most monitored bridge in the state.

The bridge deck is made up of five spans of steel girder beams, each approximately 250 feet long. This is considered a redundant system (not fracture-critical), meaning that if one span failed, other spans would be able to carry the load allowing the bridge to remain standing. In the department’s most recent bridge inspection (August 2007), the deck and superstructure are rated in fair and satisfactory condition. More significantly, our yearly (most recently took place September 2007) dive inspection of piers under the water show the piers are stable, that the rip-rap placed in 1989 is intact.

To ensure the existing bridge remains stable while a new bridge is built, the regular inspections will continue, the U.S. Army Corps of Engineers has continued to provide DelDOT with their periodic bathymetric survey and land survey equipment is used to monitor the existing bridge on a monthly basis. Most recently, DelDOT worked with the University of Delaware to install tilt sensors on the piers of the bridge. This latest effort will further enhance the Department's current bridge monitoring program. We have been reviewing different ways to have the sensors report information on a "real time" basis, but there have been many complications regarding security issues related to being on the state's computer systems. We have other options to investigate with the University of Delaware that we hope to implement. Regardless, this extra reporting measure is still useful and will allow us to promptly respond even if information is currently not available in "real time" form.

The public can be assured that if a natural disaster or other event were to occur, we would immediately inspect the bridge to ensure it is stable. If it were a danger to travelers, we would not hesitate to close it.

Future changes in conditions are dependent on many variables that cannot be fully predicted, including future storm events. While we do not envision these conditions resulting in a sudden collapse of the structure, they could affect its future serviceability. When exactly that might occur, cannot be answered.

What about this widely publicized report of a bridge failure by 2008-2012?

This document was prepared in 2005, based on U.S. Army Corps of Engineers inlet depth data from 1938 to 1999. In general, many factors come into play in trying to predict how the scour will propagate, including frequency and severity of storm events, which may cause actual results to vary. At the time this document was developed, this simplistic approach was provided to gauge an approximate service life for the existing bridge and how it compared with the completion date of the bridge. We do not believe this information is an accurate compilation of what is now occurring in the inlet, and, more importantly, since 1999, we have undertaken a variety of measures to monitor the bridge. Previous estimates were based on past trends and were not intended to predict the future. More recently, the department has procured additional structural expertise to review the current situation and to further evaluate the slope stability of the existing streambed and riprap protection.

What is the history of bridges over the inlet?

The current 860-foot bridge was built in 1965, and was widened in 1976.

Until 1928, the Inlet functioned as a natural inlet, shifting up and down the coast over a 2-mile range. Between 1928 and 1937 the Inlet was kept open by dredging, and in 1938, the U.S. Army Corps of Engineers constructed the jetties. The first bridge over the Inlet was a timber bridge constructed in 1934, followed by a concrete and steel movable swing bridge built in 1938. This lasted until 1948 when it was destroyed by ice flow and extreme tides. Another concrete and steel swing bridge built in 1952 lasted until the current bridge was built in 1965.

When can the public expect to hear from DelDOT again on this project?

We will continue to be visible on this project and will regularly update the public as we move forward. We will also discuss the re-establishment of regular meetings of the Construction Working Group, but will continue to notify the group via e-mail and mail of items of interest as they are available. The latest updates will also be posted on the IRIB Web site at www.irib.deldot.gov.

For more information, contact Darrel Cole or Jason Gleockler in DelDOT Public Relations at dot-public-relations@state.de.us, or 800 Bay Road, Dover, DE, 19903, or call 302-760-2080 or 800-652-5600.