

DISPUTE REVIEW BOARD RECOMMENDATION

JANUARY 6, 2020

PROJECT

**SR 54 RECONSTRUCTION
PASCO COUNTY, FLORIDA
FPID 416561-2-52-01, ET., AL
FDOT CONTRACT NO. T7388**

INTRODUCTION:

D.A.B. Constructor, Inc. (D.A.B.) is the prime contractor for the Florida Department of Transportation's (Department) SR 54 road widening project from Curley Road to Morris Bridge Road in Pasco County, Florida (Project). American Consulting Engineers of Florida, LLC is the Florida Department of Transportation's (Department) design engineer and the Project's Engineer of Record (EOR).

On October 31, 2019, the Dispute Review Board (DRB) for the Project received a written request from D.A.B. for a DRB Hearing and recommendation regarding entitlement for additional compensation for Extra Work and Delay due to the design error(s) associated with the design geometry of the temporary pavement located approximately between Sta. 1708+00 to Sta. 1740+00.

Subsequently, on December 4, 2019, D.A.B. and the Department agreed that the issue statement for which the DRB was requested to provide a recommendation would be:

- (1) Is there a design error(s) associated with the geometry of the temporary pavement located approximately between Sta. 1708+00 and Sta. 1740+00?
- (2) If there is found to be an error(s) associated with the geometry of the temporary pavement located approximately between Sta. 1708+00 and Sta. 1740+00, is D.A.B. entitled to compensation for extra work and delay due to the design error(s)?

The Department and D.A.B. agreed that the DRB Hearing and DRB recommendation for the issue was related only to entitlement and not to quantum.

The DRB Hearing was held on December 16, 2019, at the Department's Maintenance Facility's Training Building, 16411 Spring Hill Dr., Brooksville, Florida. Representatives of D.A.B. and the Department that attended the DRB Hearing were:

D.A.B.:

- Foster Bachschmidt, D.A.B. Vice President
- William Gelner, D.A.B. Senior Project Manager
- Michael Lemke, D.A.B Project Manager
- Lysle Tower, D.A.B. Project Manager

Department:

- Conrad Campbell, P.E., FDOT District 7 Construction Engineer
- Joshua Ebner, P.E., FDOT Operations Engineer
- Richard Frank, FDOT Construction Manager
- Zachary Stringer, FDOT Construction Project Manager
- Domenic DeSimone, CSS
- Tony Foti, Keystone Senior Inspector
- Ryan Forrestel, American Consulting Engineers of Florida (Roadway and PM/EOR during design)
- Gayle Grady, American Consulting Engineers of Florida (Design-Build Director)
- Danielle Intriago, P.E., American Consulting Engineers of Florida (Roadway and PM/EOR post design)
- Bill Adams, P.E., American Consulting Engineers of Florida (Roadway, former D7 in-house design engineer and District Pavement Design Engineer)
- Brad Green, American Consulting Engineers of Florida (Lead MOT designer)
- Adam Perez, P.E., American Consulting Engineers of Florida (Roadway, former D7 in-house design engineer and District Pavement Design Engineer)

ISSUE OVERVIEW:

The Contract Documents specified the construction of a Phase 1A temporary roadway parallel to and on the South side of SR 54 in an area East of Foxwood Boulevard between Sta. 1707+18 and Sta. 1740+01. The Contract Documents also specified the geometry for the temporary roadway pavement, i.e. the location and cross slope of the temporary pavement. The Contract Documents also indicate the groundwater elevations observed in the vicinity of the temporary roadway during the years 2010 and 2011.

D.A.B. was responsible for the selection of materials and construction methods of the temporary roadway. D.A.B. utilized a pavement design of 8 inches of reclaimed asphalt pavement (RAP) base and 1.5 inches of SP TL-C asphalt. The temporary pavement design by D.A.B. was not required to be approved or reviewed by the Department.

During the initial construction of the temporary roadway, discovery was made that the Contract Plans did not provide the minimum required clearance (1-foot) between the designed top of the concrete pipe at Cross Drain CD-7 and the temporary roadway. The Department subsequently modified the planned cross slope of the temporary pavement to 1% in order to provide adequate clearance.

D.A.B. testified it constructed the remainder of the temporary roadway with a cross slope of 2.2% in lieu of matching the cross slope of the existing roadway and a 250-foot length of temporary pavement at a 2% cross slope at the intersection of SR 54 and Foxwood Boulevard as specified by the Contract Plans. D.A.B. testified the majority of the existing roadway cross slope ranged from less than 2% to over 5%.

The Department testified that it based its design on a cross slope of 2.0% and indicated a 2.2% cross slope would be acceptable if based on the control point indicated by the Contract Plans, which the Department contends was the outside edge of the existing roadway travel lane. D.A.B., however, used the edge of the existing roadway shoulder as the control point for cross slope rather than the edge of the existing roadway travel lane as the control point. D.A.B. contends the edge of the existing roadway shoulder was the control point specified by the Contract Plans.

After the initial construction of the temporary roadway, the pavement yielded and fractured. D.A.B. contends the temporary roadway was also subjected to flooding. D.A.B. contends the pavement failure and flooding were the result of Contract Plan error(s), an inadequate Base Water Clearance Elevation, i.e. the close proximity of the temporary roadway pavement elevation to the elevation of the groundwater. The Department contends the pavement problems were a result of an inadequate pavement design by D.A.B. and flooding of the pavement was the result of D.A.B.'s failure to adequately maintain the temporary drainage provided for by the Contract Plans.

After the temporary roadway pavement yielded and fractured, D.A.B., with approval by the Department, subsequently reconstructed the temporary roadway at a higher elevation than specified by the Contract Plans. D.A.B. again utilized RAP base. To date, the reconstructed temporary roadway has not experienced pavement yielding or fracturing.

POSITIONS OF THE PARTIES:

D.A.B.'S POSITIONS AND REBUTTAL

- There is a plan error in the vicinity of cross drain CD-7.
- Contract Documents governing the construction of the temporary pavement from Sta. 1707+18 to Sta. 1740+01 failed to provide adequate Base Water Clearance Elevation (BWCE).
- The ground water in the vicinity of temporary pavement from Sta. 1708+00 to Sta. 1740+00 is at or near the proposed elevation of the finished grade for the temporary pavement which leads to flooding of the temporary pavement during rain events and severe instability of the pavement at all times.
- The Department's Plans Preparation Manual ("PPM") Section 10.3.1.1(9) requires the Engineer of Record ("EOR") to address the "location and geometry for transitions, detours, and diversions" in the Temporary Traffic Control Plan ("TTCP"). PPM Section 10.3.1.1(4) also requires the EOR to address Temporary Drainage Design as applicable in the TTCP. The PPM requires the EOR to provide a temporary pavement design that is free from water and hydroplaning risk, in addition to adequate Base Water Clearance Elevation as required by Table 2.6.3 on Page 2-41 of the PPM, Volume 1.

- Under PPM Section 10.12.9, the EOR must provide adequate Base Water Clearance Elevation for temporary pavements.
- A fundamental element of the structural capacity of the detour pavement includes its proximity to groundwater. After projecting the temporary pavement design onto the Roadway Cross Sections in the area under concern, the geometry of the temporary pavement design provides no clearance from the groundwater elevation shown in those same cross sections.
- The temporary pavement geometry, as designed, fails to provide adequate minimum cover for the 30-inch reinforced concrete pipe associated with CD-7. Appendix C of the FDOT Drainage Manual requires a minimum of 12 inches of cover for Round and Elliptical Reinforced Concrete Pipe. The temporary pavement geometry provided in the Contract TTCP fails to meet this requirement, as the proposed temporary pavement elevation offers less than 8 inches of cover between the finished surface elevation and top of pipe elevation.
- The collection of design errors resulted in a temporary pavement that yielded under loading and fractured. Furthermore, the proximity of the pavement to groundwater led to overtopping in minor rain events.
- The EOR failed to conduct a hydroplaning risk analysis, as required by the PPM. Such an analysis would have revealed significant hydroplaning risk during rain events had traffic been placed on the temporary pavement as designed.
- A third-party utility in place along the edge of the temporary pavement prevented the construction of a swale sufficient to store runoff created by the additional impervious cover. The ditches to the Southside of the roadway cannot be excavated further due to conflicts with a communication line owned by Frontier. The relocation of this utility for a second time would expose the Project to undue further delays.
- The EOR failed to provide temporary drainage that would keep water from overtopping the roadway.
- The Department stated that D.A.B. should have anticipated the installation of multiple pumps to keep water off of the roadway, but no reasonable bidder would have contemplated such a requirement.
- The EOR could have efficiently designed the temporary pavement and temporary drainage to provide adequate Base Water Clearance Elevation and sufficient storage capacity adjacent to the southern edge of pavement to alleviate overtopping and mitigate the impacts of the third-party utility (Frontier) that was in conflict in the original design and prevented the creation of additional capacity.
- No reasonable bidder could have anticipated the problem encountered.
- No amount of asphalt base would function sufficiently in this application due to the proposed pavement elevation's proximity to groundwater.

- A pumping system to remove water from the roadway is extreme at best and would require around-the-clock attendance to ensure the traveling public is not exposed to a hydroplaning risk.
- The linear ditches have no additional capacity as the groundwater is at the elevation of the temporary pavement.
- The plans do not follow any of the applicable guidelines for vertical separation from groundwater due to the EOR's failure to calculate the temporary pavement elevations that would result from the application of the Typical Section shown on Sheet 530 of the Roadway Plans.
- The TTCP failed to provide cross sections for the temporary pavement areas, rendering the issue one incapable of "being caught" by D.A.B.
- The Department and EOR failed to follow applicable design requirements, which resulted in inadequate clearance from groundwater for the temporary pavement from Station 1707+18 to 1740+01.
- The Department and EOR refused to acknowledge the error, and forced D.A.B. to make design-oriented decisions that are not within its scope of work or its purview as the Contractor.
- D.A.B. is entitled to compensation for the significant additional cost and delay due to the plan error associated with the design geometry of the temporary pavement.
- Two (2) feet of Base Water Clearance was not maintained as required by the Plans Preparation Manual. Therefore, a plan error exists.
- The cross-sections in the entire area show groundwater at the proposed pavement elevation in some areas.
- D.A.B. has no way of knowing the Department's design for the temporary pavement violated its design standards.
- D.A.B. cannot be held responsible for whatever might be necessary to make the non-standard and defective design functional.
- Standard Specification 102-6.3 is not intended as a catch-all that places all responsibility upon the contractor for the design of the detour facility.
- D.A.B. has utilized the pavement design of 8 inches of RAP with 1.5 inches of SP12.5 asphalt successfully in the areas of the Project where the pavement does have adequate Base Water Clearance.
- The design geometry for the temporary pavement led to overtopping of the roadway during rain events that left standing water on the roadway for long periods. The flooding is commensurate with the roadway borings which show groundwater at the same elevation of the temporary pavement's surface in some areas.
- The design geometry of detours and diversions is the responsibility of the EOR per Plans Preparation Manual, Section 10.3.1.1 (1), Page 10-7.

- The design geometry fails to provide adequate base water clearance as required by the Plans Preparation Manual, Page 2-41, Table 2.6.3.
- The roadway plans failed to consider the necessary structural capacity of the detour pavement as required by the Plans Preparation Manual, Section 10.12.9, Page 10-69.
- The roadway plans failed to provide adequate drainage for the temporary pavement as evidenced by countless photos documenting a continually flooded condition as the result of recurring rain events.
- D.A.B. is entitled to additional compensation for additional work and delay in addressing the plan error associated with the design geometry of the temporary pavement from Station 1707+81 to 1740+01.

DEPARTMENT'S POSITIONS, AND REBUTTAL

- No design error existed at the area in question.
- The TTCP provides for temporary drainage with adequate cover height via CD7.
- An acceptable temporary pavement at the proposed geometry is constructible by means and methods which are used every day across the industry.
- Any pavement failure was the direct result of the selective methods and materials used in constructing the temporary pavement.
- The drainage pipe initially installed at CD-7 was installed 6 inches higher than shown on the plans. D.A.B. subsequently relayed the pipe at the proper elevation and achieved the necessary cover height by transitioning the cross slope per the EOR's recommendations. The Department considered the cover height portion of NOI #5 resolved.
- The Department finds D.A.B.'s claim that CD-7 has nowhere to drain to be baseless.
- The Department finds D.A.B.'s claim that after a rain event the entire temporary alignment becomes flooded to be baseless.
- The design of the CD-7 cross drain related to the temporary traffic shift exceeds the requirements since it is designed to meet the permanent condition 50-year design event criteria. Therefore, flood protection for the roadway is provided by the design.
- The results of a performed Falling Weight Deflectometer evaluation of the temporary pavement in the claim area as well as a control section of temporary pavement to the west of the claim area showed similar deflection in the deeper layers such as embankment, but indicated a weaker base in the claim area. The results of the test suggest that a problem exists within the base itself, separately from any water table issue in deeper layers.

- The selection of construction methods and materials are the cause of any failures in the temporary pavement.
- Clearance could be met. American Consultant Professionals analyzed a potential pavement design utilizing 3 inches of structural asphalt and 7 inches of black base for a total of 10 inches of asphalt which would meet the requirements of the Flexible Pavement Design Manual and still achieve clearance of 4 inches.
- The cover height issues were exacerbated by installing the 30 inch pipe higher than per plan. The pipe was then placed correctly and the cover issue was resolved by flattening the roadway prior to encountering any extra work or delay. The alleged elevation busts were never specified nor provided to the Department.
- Temporary drainage is provided in the plans via connection of CD-7 to the existing cross drains and headwall which drains to a sump on the north side of SR 54, stages and then flows to the adjacent lowlands. The proposed temporary pavement edge of travel elevation is at the same elevation of the 5-year design high water elevation.
- It is the Contractor's responsibility to select materials and construction methods which will stand up to any weather condition. The EOR demonstrated that a pavement design consisting of 7" of black base and 3 inches of structural asphalt would meet the Department's design criteria for a permanent roadway and clear the water table encountered.
- On May 16, 2019, the EOR provided the Department an additional detail for transitioning the temporary pavement cross over the cross drains which was discussed with D.A.B. and implemented in the field when the pipe was re-laid on June 13, 2019, and re-compacted with adequate cover on July 18, 2019. D.A.B. acknowledged the discussed approach of flattening the roadway over CD-7 was implemented during the July 30, 2019, DRB meeting and in RFM 1.
- The accepted September schedule shows an unrelated section of the temporary pavement to the east of the area in question (1816+00 to 1740+00) was actually critical at the time of notice and has not started to date.
- D.A.B.'s originally constructed temporary pavement was constructed to elevation 93.00 which is 0.7 feet lower than what is designed in the plans. The contract plans design the temporary pavement to have an edge of travel lane elevation of 93.70. If the temporary pavement was constructed correctly, the roadway would not be flooded. The adjacent land is relatively flat with an elevation range of roughly 92.5 to 94 feet.
- The location and geometry of the temporary pavement is provided in the contract plans pages 530, 539, and 544.
- The temporary drainage was provided in the contract plans pages 540 and 542.
- PPM, Chapter 2, Section 2.0 states "The design criteria presented in this manual are intended as the principal source of criteria for the design of new construction or major reconstruction projects on the Florida State Highway System." Temporary pavement does not fall within the parameters of new construction or major reconstruction. Therefore, Table 2.6.3 does not apply.

- PPM Section 10.12.9 does not specify that the EOR is to provide adequate Base Water Clearance Elevation for temporary pavements (Special Detours or a diversion).
- Figure 3 in D.A.B.'s position paper incorrectly shows the temporary pavement being constructed on the outside edge of paved shoulder. Phase I Typical Section 1 on Temporary Traffic Control Plan (3) shows overbuilding the existing shoulder. Temporary Traffic Control Plan (14) shows the temporary pavement sloped at 2%. D.A.B.'s Position papers, Appendix C, also applies the incorrect construction of the temporary pavement. D.A.B. shows the temporary edge of pavement elevation is 93.23 at CD-7. This is incorrect. The edge of travel lane at CD-7 should be 93.7 per the contract plans, which is 0.28 feet lower.
- The CD-7 pipe cover was addressed in this isolated area. Pipe cover in this isolated area is unrelated to the base failure in this segment.
- The temporary pavement constructed by D.A.B. was not constructed per plan. A drainage analysis has been completed to prove that overtopping is not an issue when the pavement is constructed in accordance with the contract documents. The ICPR analysis was performed that identified the maximum stage should not have exceeded 92.68. If positive drainage was maintained there is no reason why flooding should have occurred for the rain event on October 19th, 2019. (See Appendix R5 – Drainage Map and ICPR Evaluation)
- PPM Section 2.1.5.1 requires a hydroplaning analysis be conducted for permanent conditions that vary from standard cross slope configurations. Hydroplaning is not a risk for this 45-mph design speed special detour. We did not have a condition that required a hydroplaning analysis.
- The calculated hydroplaning speed exceeds the posted speed. Hydroplaning is not predicted. It is incumbent that the contractor maintains positive drainage in accordance with specifications 102-5.2. (See Appendix R6 – Hydroplaning Analysis)
- D.A.B. asserts a utility line was in conflict with a ditch. When notified of D.A.B.'s intent to add a ditch to fulfill their obligation to maintain positive drainage, FDOT coordinated with the third-party utility (Frontier) and acquired a commitment to relocate the utility to avoid the conflict. In fact, the as-builts were reviewed and a ditch could be graded to CD-7 without impacting the communication line.
- The EOR did not fail to provide drainage that would keep water from overtopping the roadway. The overtopping asserted by D.A.B. is on a temporary pavement that is not constructed per plan. Our drainage calculations prove that overtopping will not occur during a 50-year storm event. The temporary drainage design utilizes the permanent cross drain designed for a 50-year storm event, therefore, in the temporary condition it accommodates a 50-year storm event. The design in the contract plans exceeds the minimum design criteria for temporary drainage. (See Appendix R5 and Department's Rebuttal to DAB's Position). The cross drain serves to equalize the water levels on either side of the roadway as well as provide conveyance of storm runoff. Flow from the cross drain would be to wetland area lying north and south of the cross drain as shown on the drainage map. The design of the cross drain related to this temporary traffic shift exceeds the requirements since it is designed to meet the permanent condition 50-year design event criteria.

- The seasonal high-water elevation is shown in the profile sheets and the groundwater encountered elevations are shown in the cross-section sheets. The field measured groundwater elevations provided by D.A.B. in the email dated October 8, 2019, prove the field conditions are in line with the information provided in the plans.
- D.A.B.'s statement that no amount of asphalt base would function sufficiently in this application due to the proposed pavement elevation's proximity to groundwater is made without any factual basis being presented.
- D.A.B. elected again to utilize a pavement design of RAP base and 1.5 inches of SP TL-C. Article 283-1 of the Standard Specifications limits using RAP material as a base course only on non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications.
- D.A.B.'s claim of the temporary pavement design not being constructible is not D.A.B.'s prior assertion – their assertion is that a design error exists.
- In December of 2014, the FDOT issued estimates bulletin 14-06 (Appendix R4) that initiated a change how Special Detours (Temporary Pavements) were paid for. This memo also refers to the specification change where 'payment for the work of construction, maintaining, and removing special detour facilities...will be paid for as a Special Detour.' It goes on to say, 'the pavement design, construction and maintenance of the Special Detour components will be up to the contractor, subject to the geometry (location and cross slope) shown in the plans.' What the EOR has provided in the plans meets this requirement as well as the specification language in 102-6.3 and 102-11.3.
- The selection of construction methods and materials are the cause of any failures in the temporary pavement. (See Appendix D – FWD Evaluation of SR 54 Temporary Road pages 5 and 6 in FDOT's Position Paper). It's the contractor's responsibility to select the appropriate materials for the special detour.
- Plans Preparation Manual, Volume 1, Section 10.12.9 is silent on base clearance requirements for temporary pavement. Section 10.3.1.1 does not require temporary cross sections for Temporary Traffic Control Plans. The contract plans clearly depict the seasonal high-water elevation in close proximity to CD-7 on Roadway Profile (6). The information provided allows the contractor to select and construct appropriate materials for the existing field conditions.
- D.A.B. originally constructed the temporary pavement at the wrong elevation. They have since attempted to construct a viable special detour. Survey confirms the elevation of the low point now conforms to the contract plans. The survey information showed the low point along the edge of pavement is 93.74. The design in the contract plans has an edge of pavement low point at 93.62. D.A.B.'s design raised the low point 0.08 feet.
- DAB has not correctly established that any information is missing from the plans or that the plans are in error. All information that DAB needed to construct the special detour was provided in the contract and accurate.
- It is the contractor's responsibility to maintain positive drainage and select the appropriate materials.

DRB ANALYSIS:

D.A.B. contends there was a design error(s) associated with the geometry of the temporary pavement located approximately between Sta. 1708+00 and Sta. 1740+00 which resulted in:

- (1) Inadequate minimum coverage requirement between the top of the concrete pipe at Cross Drain CD-7 and the temporary roadway
- (2) Flooding of the initial temporary roadway
- (3) Yielding and fracture of the initial temporary roadway

Coverage at Cross Drain CD-7

D.A.B. acknowledged that the pipe for Cross Drain CD-7 was initially installed at an incorrect elevation higher than specified by the Contract Plans and was subsequently re-installed at the elevation specified by the Contract Plans.

The Department acknowledged the Contract Plans did not provide for a 12-inch minimum coverage requirement between the top of the concrete pipe at the Contract Plan elevation of Cross Drain CD-7 and the temporary roadway based on the Department's design geometry of the temporary pavement located approximately between Sta. 1708+00 to Sta. 1740+00. The Department subsequently modified the Contract Plan to achieve the coverage requirement by flattening the pavement cross slope to 1.0% over the pipe with a 100-foot cross slope transition length. D.A.B. proceeded to construct the temporary roadway accordingly and the minutes of the DRB meeting held July 30, 2019, state that D.A.B. indicated there was no longer an issue with the coverage.

D.A.B. has not specified whether or not it incurred any additional work and/or a delay as a direct result of the Department's modification of the temporary pavement cross slope in the vicinity of Cross Drain CD-7 to achieve adequate coverage above the pipe.

Flooding of the Initial Temporary Roadway

Standing water was observed on the initially constructed temporary roadway. D.A.B. stated the water was a result of the Contract Plans' failure to provide adequate Base Water Clearance Elevation (BWCE) for the temporary roadway. The Department contends the water was a result of D.A.B.'s failure to provide adequate temporary drainage for the water.

The Department stated the observed standing water was only on the shoulder pavement of the temporary roadway and not on the travel lane pavement of the temporary roadway and that the Department's design requirements allow for standing water on the shoulder pavement.

The Department stated the Department's Plans Preparation Manual (PPM) does require the EOR to provide a temporary roadway design that is free from water encroaching on the travel lane. The Department stated that was achieved by having water drain to CD-7 which has a flow line elevation of 89.89' at the headwall on the north side of SR 54 and a 50-year design high-water elevation of 93.71', and right-of-way pop-offs at an elevation of 92.6' to the south and 92.25' to the north.

The Department further stated that the observed standing water was a result of D.A.B.'s failure to provide adequate temporary drainage conditions for the water to drain to Cross Drain CD-7. The Department further stated there was adequate clearance from buried utilities for D.A.B. to construct a ditch and/or grade the ground to channel the water to Cross Drain CD-7.

There was no evidence presented that indicated that the observed water on the temporary roadway was in the travel lane.

The evidence provided does indicate that the observed water on the temporary roadway could be the result of D.A.B.'s failure to adequately provide temporary drainage conditions for the water to drain to Cross Drain CD-7, i.e. failure to construct a ditch and/or grade the ground to channel the water to Cross Drain CD-7. D.A.B. acknowledged that it had the responsibility of providing temporary drainage conditions for the water to drain to Cross Drain CD-7.

Yielding and Fracture of the Initial Temporary Roadway

D.A.B. acknowledged that it was responsible for the design of the temporary roadway base and asphalt pavement. The Contract Plans, however, specified the geometry of the temporary pavement, i.e. the temporary roadway location and cross slope.

The Contract Plans (Plan Sheet 530) shows the temporary pavement to be constructed with a cross slope matching the adjacent roadway cross slope. The exception is a 125-foot section adjacent to both sides of Foxwood Boulevard that was to have a cross slope of 2% according to Contract Plan Sheet 541.

The Department testified it based its design of the temporary roadway on a 2% cross slope of the temporary pavement rather than the Contract Plan No. 530 specified actual cross slope of the existing roadway. The Department also testified that its designed cross slope of 2% was based on the "control point" being the outside edge of the existing roadway travel lane.

Contract Plan Sheet No. 530 shows the temporary pavement varied in width and was to be constructed outward from the outside edge of a temporary 4'-2" asphalt overlay of the existing roadway shoulder (the "control point"), not the existing travel lane as stated by the Department. The 4'-2" temporary shoulder overlay was to accommodate a temporary low profile barrier per Index 412. Plan Sheet No. 530 does not specify the slope of the temporary shoulder extension asphalt. Index 412 does not specify the depth or slope of the additional shoulder asphalt except that it should have a 1:10 slope or flatter for a minimum distance of 9" outward from the outside edge of the temporary low profile barrier. (D.A.B. testified that in a subsequent agreement with the Department, the temporary low profile barrier was not to be utilized. Therefore, temporary shoulder asphalt for the temporary barrier, as indicated by the Contract Documents, was not necessary.)

Thus, the basis of the Department's design did not coincide with the geometry of the temporary pavement indicated by the Contract Plans, i.e. the "control point" or the slope.

D.A.B. stated it designed the roadway pavement utilizing 8 inches of reclaimed asphalt pavement (RAP) base and 1.5 inches of SP TL-C asphalt, and constructed the temporary roadway with the width, length, and cross slope beginning at the outside edge of the existing roadway shoulder as was specified by the Contract Plans, however, with a cross slope of 2.2% rather than the actual cross slope of the existing roadway as specified by Contract Plan No. 530.

D.A.B. provided existing roadway cross slope tabulation that showed the actual cross slope of the existing roadway ranged from less than 2% to greater than 5% with the average cross slope being 3.47%. 8.24% of the existing roadway has a cross slope of less than 2%; 22.35% of the existing roadway has a cross slope between 2% and 3%; 40% of the existing roadway has a cross slope between 3% and 4%; 21.18% of the existing roadway has a cross slope of 4% to 5%; and 8.24% of the existing roadway has a cross slope of greater than 5%.

If the temporary roadway had been constructed to match the cross slope of the existing roadway, approximately 70% of the length of the temporary roadway would have had lower elevations than the elevations of the Department's design bases of 2.0% cross slope or the actually constructed elevations with 2.2% cross slope and therefore an even lesser actual base clearance water elevation.

Neither the Department's design temporary pavement cross slope nor D.A.B.'s constructed temporary pavement cross slope complied fully with the Contract Plans geometry of the temporary pavement.

According to the Department, if the initial temporary roadway were to have been constructed outward from the outside edge of the existing roadway shoulder with a 2% cross slope, the outside edge of the outside temporary roadway shoulder would be at elevation 93.34' and the outside edge of the travel lane would be at elevation 93.42', based on the assumption that the outside temporary roadway shoulder was also at a 2% cross slope.

The Department stated the seasonal high-water elevation in the area is 93.3' and a design 50 -year high-water elevation of 93.71'.

D.A.B. stated the Department's Plans Preparation Manual (PPM) Volume 1, Table 2.6.3 specifies a minimum distance of 1-foot of the roadway base course above the water elevation. Based on the groundwater elevations indicated by the Contract Documents and the bottom elevation of the temporary roadway base, either by D.A.B.'s contended cross slope control point or the Department's basis of design geometry of the temporary pavement, there is not a minimum distance of 1-foot of the roadway base course above the water elevation.

The Department acknowledged that the basis of its design for the temporary roadway did not provide at least a 1-foot continued clearance for the roadway base above the base clearance water elevation.

The Department stated the Department's Plans Preparation Manual (PPM) Volume 1, Table 2.6.3 does not apply to the temporary roadway since PPM Chapter 2, Section 2.0 states the design criteria presented in the manual are intended as the principal source of criteria for the design of new construction or major reconstruction projects on the Florida State Highway System.

The Project is major reconstruction of SR 54 from a two lane roadway to a divided highway. PPM Chapter 2, Section 2.0 does not address or differentiate between “permanent” construction and “temporary” construction, nor state that the PPM is solely for permanent new construction and not also for newly constructed temporary roadways of major reconstruction projects.

The Department did not provide evidence nor explain why a minimum distance of 1-foot of the roadway base course above the water elevation would be required for permanent newly constructed roadway with traffic and not be necessary for a newly constructed temporary roadway with traffic that would be in service for an extended period of time.

The Department provided an exhibit of a year 2016 Department approved flexible pavement design package for a Design-Build project, (SR 694) in Pinellas County, Florida, which indicated the proposed use of asphalt base in areas where the base clearance was below 2-feet on rural typical sections and below 1-foot on urban curbed typical sections and also indicated that notes and station ranges would be included in the plans alerting the contractor of possible base clearance issues and that dewatering operations may be required to achieve compaction. Although the Contract Plans for the SR 54 project did provide groundwater elevations, the Contract Plans for SR 54 did not include notes alerting the contractor of possible base clearance issues for the temporary roadway.

The Department stated its EOR analyzed a potential temporary roadway pavement design utilizing 3 inches of structural asphalt and 7 inches of black base for a total of 10 inches of asphalt which would meet the requirements of the Flexible Pavement Design Manual and still achieve water clearances of 4 inches. However, the Department did not state, or provide engineering evidence, that the EOR’s proposed pavement design would not have yielded or fractured under the actual conditions presented, i.e. less than 1-foot of base water clearance.

The Department noted that Standard Specification Section 283-1 limits the use of RAP material as base course for non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications. However, it is not uncommon in the industry for RAP material to be utilized as base course of temporary roadways on Department projects. In fact, D.A.B. stated the reconstructed temporary roadway was constructed utilizing RAP material as base course. Other temporary roadways on the Project, where there was initially adequate Base Water Clearance, were constructed utilizing RAP base course material. Neither the reconstructed temporary roadway between Sta. 1708+00 and Sta. 1740+00 nor the other temporary roadways on the Project have yielded or fractured. (D.A.B. testified the temporary roadway between Sta. 1708+00 and Sta. 1740+00 was subsequently reconstructed at higher elevation than the initial temporary roadway in order to obtain at least a 1-foot Base Water Clearance and that the Department agreed to that modification from the geometry provided by the Contract Plans.)

D.A.B. did not provide evidence that a design with an asphalt base course, rather than RAP material, would have yielded and fractured under the actual conditions presented, i.e. less than 1-foot of base water clearance.

The Department conducted a Falling Weight Deflectometer (FWD) test to determine the structural integrity of the yielded and fractured temporary pavement roadway. The report of the FWD test stated that a section temporary roadway, approximately 0.5 mile away, and consisting of 2 inches of asphalt and 8 inches of RAP based, was used as a control section. The report of the test stated that the results of the test concluded: (1) the deflections in the asphalt layer were significantly higher in the claim areas than the control section, (2) the embankment deflections were similar across all sections, and (3) overall, the deflection pattern indicated structurally weaker asphalt sections in the claim area.

However, the test FWD report does not specify if the indicated structurally weaker asphalt sections in the claim area was a result of the clearance of the roadway base course above water elevation, or the base or asphalt materials utilized, or some other condition or situation.

DRB RECOMMENDATION:

This DRB recommendation is based upon the information presented to the DRB by D.A.B. and the Department in their position and rebuttal papers, by their testimony at the DRB Hearing, and the DRB's analysis of that information. This DRB recommendation is a unanimous recommendation of the DRB members: Matthew L. Michalak, DRB Chairman; Allan Adderley, P.E., DRB Member; and David "Mick" Jameson, DRB Member.

Coverage at Cross Drain CD-7

Although D.A.B. did state in the July 30, 2019, DRB meeting that the Cross Drain DC-7 clearance did not appear to be an issue, the NOI had not been rescinded. D.A.B. has not specified whether or not it incurred any additional work and/or a delay as a direct result of the Department's modification of the temporary pavement cross slope in the vicinity of Cross Drain CD-7. However, if D.A.B. did incur additional work and/or delay, it would be entitled to compensation for such if the additional work and/or delay was the direct result of the Department's modification of the temporary pavement slope at Cross Drain CD-7 and if the requirements of the Contract Specifications were met for such compensation and delay.

Flooding of the Temporary Roadway

The evidence provided does not indicate the standing water observed encroached on the travel lane of the temporary roadway. The evidence presented does not indicate the standing water observed on the temporary roadway shoulder was a Contract Plan error.

Yielding and Fracture of the Initial Temporary Roadway

The evidence provided does indicate and the Department acknowledged that the Department's basis for design did not provide for a minimum 1-foot distance of the roadway base course above the water elevation.

The evidence provided does indicate that on other projects, the Department has approved flexible pavement designs with less than a 1-foot distance of the roadway base course above the water elevation than the minimum 1-foot distance as specified in Volume 1, Table 2.6.3.

The evidence provided does not substantiate the Department's contention that the observed yielding and fracturing of the temporary roadway was the direct result of D.A.B.'s utilization of RAP base course material or D.A.B.'s pavement design.

The evidence provided does not substantiate D.A.B.'s contention that the observed yielding and fracturing of the temporary roadway was the direct result of Base Water Clearance, although the geometry of the temporary pavement, as specified by the Contract Plans, does not provide the minimum 1-foot distance of the roadway base course above the water elevation which is a provision of the Department's PPM Volume 1, Table 2.6.3.

The evidence provided failed to substantiate the actual cause of the observed yielding and fracturing of the temporary roadway, be it Base Water Clearance, D.A.B.'s utilization of RAP base course material, or some other condition or situation.

The evidence provided to the DRB failed to substantiate D.A.B.'s contention that the Department's basis for design of the geometry of the temporary roadway was the cause of the yielding and fracture of the initially constructed temporary roadway.

Submitted by and for the DRB

A handwritten signature in cursive script that reads "Matthew L. Michalak".

Matthew L. Michalak, DRB Chairman