

## I-85 Reconstruction and Widening MM 77 to 98



Main Contractor: Blythe Zachry Joint Venture



CPM Scheduling Consultant: HSE Contractors Inc.

TIA Narrative Report Based on **June 2021** Update  
I-85 Reconstruction and Widening MM 77 to 98

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## 1. Executive Summary

A two-part analysis of the project schedule, using the June 2021 schedule update, was conducted in response to significant changes requested by South Carolina Department of Transportation (SCDOT) during the summer of 2021. These changes focused on revising approved MOT plans for approximately 65% of the remaining project, primarily driven by safety improvement goals. Specifically, SCDOT requested the discontinuation of "Split-traffic" conditions, which were previously allowed and approved as part of the Traffic flow or Maintenance of Traffic (MOT) plans.

Throughout the summer of 2021, BZJV collaborated closely with SCDOT to develop strategies for swiftly relocating existing traffic from "Split Condition" and preventing future traffic from entering such conditions. These strategies were formally documented in a Memorandum of Understanding (MoU). Concurrently, SCDOT granted approval for an extension of 876 days out of a total delay of 1206 days as indicated in the June 2021 schedule.

At the request of SCDOT, facilitated through their claim's consultant, BZJV prepared a schedule demonstrating that the project would meet its approved contract completion date with the 876-day time extension. For this analysis, BZJV used the November 2021 schedule update, which conveniently aligned with the resolution of delays and damages related to CSX and Wet Utilities on the project.

Subsequently, SCDOT requested that we illustrate the time mitigation on the project without incorporating the changes specified in the Memorandum of Understanding (MoU). In compliance with this request, we reverted to the June 2021 schedule, as it represented the schedule state prior to the integration of any MoU-related modifications. Furthermore, the June 2021 schedule encompassed the schedule updates in which the CSX and Wet Utility delays had been conclusively determined.

In the first part of the Time Impact Analysis, utilizing the June 2021 update, we meticulously documented the measures undertaken by BZJV, or those that would have been reasonably taken in seven discrete steps. This detailed documentation serves two main purposes: firstly, to isolate the numerous changes that occurred in the schedule and BZJV's plans during the Summer of 2021, and secondly, to provide a comprehensive account of BZJV's proactive efforts to rectify negative float and alleviate the lingering 329-day delay within the project schedule without the changes mentioned in the MoU.

In the second part of the Time Impact analysis, utilizing the June 2021 update, we introduced two additional steps after the initial seven. One step pertains to the inclusion of the MoU sections related to exiting the "Split condition," and the other step refers to the sequence and method of construction for avoiding future "Split conditions."

In conclusion, through our analysis, we have documented that BZJV would have successfully mitigated the 329-day delay that remained in the June 2021 schedule after SCDOT granted an 876-day extension for prior delays. Additionally, we have documented in this analysis that the Traffic Flow changes directed by SCDOT during the summer of 2021 resulted in a 303-calendar day delay, for which BZJV has already requested 282 calendar days.

## 2. Scope Of Work

### **I-85 Widening Project**

SCDOT, and its two contractors, a Joint Venture of Blythe Construction, Inc. and Zachry Construction Corp. (BZJV) have begun widening and rehabilitation of the existing Interstate 85 between mile marker 77 and 98.

This project utilizes the design-build contract method, which required BZJV to design, obtain permits, acquire right-of-way, coordinate utility relocation, and construct the 21 miles of interstate, all under the oversight of the SCDOT and the Federal Highway Administration.

BZJV continues to rehabilitate and widen from mile marker 77 to mile marker 80 in Spartanburg County and reconstruct and widen the existing four-lane interstate to six lanes between mile marker 80 and mile marker 98 in Cherokee County. the BZJV's scope involves adding a travel lane in both directions and interchange reconstruction for exits at mile markers 83, 87, 95, and 96. In addition, the contractor provides rehabilitation of the existing ramps for exits at mile markers 78, 80, 90, and 92. Additionally, a new CSX railroad bridge crossing the interstate near mile maker 81 was constructed under this Contract. the BZJV began construction in June of 2017.

The work being performed on these roads and bridges will help alleviate traffic congestion throughout this entire corridor. This project will improve safety for the traveling public, provide a financial boost to the local economy and increase the capacity of this section of the interstate system so it may function more efficiently for many years to come. The contract awarded to BZJV was the second largest infrastructure improvement contract ever awarded in South Carolina, trailing only the contract awarded to replace the Cooper River Bridges.

This project will make a positive difference to all who travel the Upstate.

### 3. Chronology of Events

#### Analysis based on June 1, 2021 Schedule update

This What-if analysis was built on the June 1, 2021 schedule, as this data date is concurrent with the timing SCOT first issued instructions to BZJV to look for options to get traffic out of the split conditions. It also coincides with the cut-off update for the CSX and Wet Utility delay that was negotiated between SCDOT and BZJV. This analysis demonstrates the actions taken or would have been reasonably taken by BZJV, and how those actions would result in recovering the negative float on project completion had it not been for the split conditions. This analysis also highlights the impact of the MoU changes to the recovered schedule that eventually resulted in pushing the project completion date beyond the contractual finish date.

The subsequent steps (1-7) underscore the efforts taken or would have been taken by BZJV to address the persistent -329 days of delay after accommodating the additional 876-day time extension related to the CSX and Wet Utilities claim. These efforts yielded the following steps, as outlined below:

**Step 1:** The first step in this analysis was to reflect a phased construction strategy, focusing on smaller segments of 5 miles at a time instead of the original 10-mile sections. By prioritizing critical areas such as segment 3 Area 1 and segment 2 Areas 1 & 2, the schedule improves the substantial completion date from 10/23/2024 to 9/23/2024 and a reduction in total float from -329 CD's to -299 CD's.

This step was reflected in the contemporaneous schedule updates as the project progressed.

**Step 2:** The second step in this analysis involved immediately transitioning to stage 2 construction spanning miles 86.5 to 91.5 without waiting for the demolition of the bridge at Exit 87 to be completed. This was done by utilizing temporary pavement installed by BZJV in Stage 1B to allow for a traffic switch to Stage 2 without waiting for the Exit 87 Bridge to be demolished. This approach mitigated the delay on substantial completion from 9/23/2024 to 6/30/2024 and a reduction of total float from -299 CD days to -214 CD's.

This step was reflected in the contemporaneous updates as the project progressed.

**Step 3:** The third step in this analysis was to address the Wet Utilities work. During the project multiple Wet Utility crews were brought on to try to recover schedule and the crews were moved around to best meet the needs of the project. In this analysis an additional crew brought to Lines 640 and 352 resulted in the completion date changing from 6/30/2024 to 5/15/2024 with a reduction in total float from -214 CDs to -168 CDs.

**Step 4:** The fourth step in this analysis addresses some out-of-sequence logic that was maintained in the June 1, 2021 schedule update. This logic showed work that was completed still delaying incomplete retaining wall work. So, this step of the analysis removes the out of sequence logic and then proceeds to reflect the acceleration of Wall 14 Retaining wall with an additional crew to reduce overall duration for this wall. By streamlining the workflow and eliminating any out-of-sequence logic, the schedule shows an earlier completion date from 5/15/2024 to 4/24/2024 and a reduction in total float from -168 CD's to -147 CD's.

This improvement in Wall 14 duration was reflected contemporaneously in the March 1, 2022 schedule update submitted by BZJV as a re-baseline schedule.

**Step 5:** In the fifth step of this analysis, additional concrete crews within segment 3 & segment 4 resulted in schedule improvement. In this analysis the additional crews facilitated an earlier substantial completion date from 4/24/2024 to 4/7/2024 and a reduction in total float from -147 CDs to -130 CDs.

This step in the analysis was not reflected in contemporaneous schedule update due to the change to asphalt paving in Section 4 reducing the amount of concrete paving.

**Step 6:** In the sixth step of this analysis tasks such as pouring paved ditches, topsoiling ditches, seeding and mulch operations, guardrail installation, and permanent signing were moved to after completing the traffic shift, rather than delaying the traffic shift until all activities were complete. This step in the analysis improved the substantial completion date from 4/7/2024 to 2/29/2024 and reduced total float from -130 CDs to -92 CDs.

This step in the analysis has generally been done in the contemporaneous schedule updates but not as a proactive change in logic but as each traffic shift occur. The BZJV team has proceeded with the traffic shift as soon as possible leaving many of these items to be completed later, in order to accelerate the project as much as possible.

**Step 7:** The seventh step of this analysis was the addition of crews for Earthwork in Segment 4 Stage 3A(B). This step resulted in an earlier substantial completion date from 2/29/2024 to 11/22/2024 and a reduction in total float from -92 CDs to +7 CD's.

The steps and changes listed above in this what-if analysis were not part of the MoU changes and have resulted in BZJV mitigating all the delays that remained after an 876-day time extension was granted. In the following two steps the impacts of the MoU on this what-if recovery schedule are being analyzed.

**Step 8:** The eighth step in this analysis is to reflect the challenges that BZJV encountered in getting the traffic out of the "Split-conditions". This request required BZJV to divert forces and focus efforts to get work completed within Segments 2 and 3 to get southbound traffic out of the Split condition that they were in as part of the Stage 2 construction process. This step has tried to reflect this request by delaying work in Segment 4 until southbound traffic is no longer in this Split condition. This step resulted in a later substantial completion date from 11/22/2024 to 4/23/2024 and an increase in total float from +7 CDs to -145 CD's.

This step was reflected in contemporaneous schedule update as this delay did affect the project completion date.

**Step 9:** The last step in this analysis is to reflect the final design and construction process that was required to change the concrete paving to asphalt paving so that a "Split-condition" was not used for Mainline Traffic for the remainder of the project This required extensive changes to the schedule, such as the adjustment of height differences between sections, full-depth reconstructions, and the construction of widened shoulders. This step would have resulted in a later substantial completion date from 4/23/2024 to 9/27/24 and an increase in total float from -145 CDs to -303 CDs.

This step was reflected in contemporaneous schedule updates as this delay did affect the

project completion date and can be seen in its entirety as part of the March 1, 2022 schedule update that the BZJV submitted as a re-baseline schedule.

Please see the below spreadsheet to see a summary of this analysis and the affects each step would make to the June 1, 2021 schedule update:

Step Of Analysis	Major Changes Made in Schedule	Substantial Completion	Total Float
June1,2021 Update		10/23/2024	-329
Step 1	<ul style="list-style-type: none"> <li>Adjust Constrains on project liability insurance expiration date.</li> <li>Adjust <i>Must Finish on or Before</i> constraint on Substantial Completion to 24NOV24 to reflect the granting of 846-day time extension.</li> <li>Add logic for 5-mile switch into stage 3A</li> <li>Work on 5 miles at a time instead of 10 miles; Segment 3 Area 1 to Segment 2 Areas 1&amp;2 ties were deleted.</li> <li>Temporary Asphalt installed below the Exit 87 bridges - this had already been completed at this time but the schedule improvement was not reflected in the June 1, 2021 schedule update</li> </ul>	9/23/2024	-299
Step 2	<ul style="list-style-type: none"> <li>Start 2<sup>nd</sup> 5 miles without waiting for demo of bridge 87.</li> <li>Demo Exit 87 Bridge after switching traffic to stage 2 from 86.5 to 91.5</li> </ul>	6/30/2024	-214
Step 3	<ul style="list-style-type: none"> <li>Wet Utilities working with 2 crews to 3 crews with additional cost</li> <li>Multiple Crew on line 640 and line 352 by Wet utility subcontractor</li> </ul>	5/15/2024	-168
Step 4	<ul style="list-style-type: none"> <li>Remove Retaining walls out of sequence logic on (RW16) (RW12)</li> <li>2 crews On Wall 14 decreasing duration from 94 to 60</li> </ul>	4/24/2024	-147
Step 5	<ul style="list-style-type: none"> <li>Additional concrete crews</li> <li>Concrete activities segment 3 &amp; segment 4 with additional crews</li> </ul>	4/7/2024	-130
Step 6	<ul style="list-style-type: none"> <li>Adjust Schedule logic for Pour paved ditches, topsoil ditches, seeding and mulch, install guardrail, and permanent signing to substantial complete / section completion rather than the traffic switches for that area / stage.</li> </ul>	2/29/2024	-92
Step 7	<ul style="list-style-type: none"> <li>Earthwork additional Crews (Stage 3A(B))</li> </ul>	11/22/2024	+7
Step 8	<ul style="list-style-type: none"> <li>Reflect the elimination of split traffic Delay in schedule</li> <li>Segment 4 can't start until December 2021 because of waiting for segments 2 &amp; 3 southbound completion</li> </ul>	4/23/2024	-146

Step 9	<ul style="list-style-type: none"> <li>March 2022 Update – Re-baseline schedule submitted by the BZJV with Asphalt design changes incorporated</li> </ul>	9/27/2024	-303
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## 4. Conclusion

This schedule analysis represents a comprehensive overview of potential actions that would have been taken by BZJV to address delays and recover from negative float on the I-85 Widening Project. The report explores the efforts either made or could have been made by BZJV to advance the substantial completion date. It then addresses the challenges that were faced in order to address the requests made by the SCDOT as part of the Memorandum of Understanding. This report acknowledges setbacks and challenges that did impact the project timeline. These include the complexities introduced by the MOU, variable wedging for height difference, overcoming initial challenges, full-depth reconstructions, and the construction of widened shoulders

In conclusion, this analysis of the Time Impact Analysis Report serves as a valuable resource for understanding the potential progress, setbacks, and recovery efforts of the I-85 Widening Project. It highlights the dedication and adaptability of the project team in navigating challenges and working towards successful project completion within the revised timeframe.

## 5. Disclaimer

This what-if analysis was carried out using contemporaneous events and conversation with the Project Teams. Due to the nature of CPM scheduling isolating events result in a different result than those that may have been represented in the contemporaneous updates submitted to SCDOT. The intent of this analysis is show whether BZJV could have recovered the time beyond the completion date of 11/29/2024 without the incorporation of items in the MoU.

## 6. Appendices

June1,2021 Update Schedule (-329) Vs Step 1 Schedule (-299)
Step 1 Schedule (-299) Vs Step 2 Schedule (-214)
Step 2 Schedule (-214) Vs Step 3 Schedule (-168)
Step 3 Schedule (-168) Vs Step 4 Schedule (-147)
Step 4 Schedule (-147) Vs Step 5 Schedule (-130)
Step 5 Schedule (-130) Vs Step 6 Schedule (-92)
Step 6 Schedule (-92) Vs Step 7 Schedule (+7)
Step 7 Schedule (+7) Vs Step 8 Schedule (-146)
Step 8 Schedule (-146) Vs Step 9 Schedule (-303)