



## Florida Department of Transportation

JEB BUSH  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

DENVER J. STUTLER, JR.  
SECRETARY

December 21, 2006

Mr. David Gibbs  
Division Administrator  
Federal Highway Administration  
Florida Division  
545 John Knox Road, Suite 200  
Tallahassee, FL 32303

Subject: Construction Management at Risk, (CM @ Risk), Special Experimental Program NO. 14 (SEP-14), Final Report for 213442-1-52-01, Madison County Rest Areas on I-10.

Dear Mr. Gibbs,

As per our commitment to use Special Experimental Program No. 14, (SEP-14) in our construction of the I-10 Madison County Rest Area in Madison County, Florida, the Department submits this final report. The intent of this report is to provide you with a summary of the life cycle and events of this pilot project, provide results for performance measures, and provide comments on the overall evaluation of this project citing the successes and the areas of concern.

The work consisted of roadway, site and building renovations and improvements to the East bound and West bound rest areas on I-10 in Madison County, Florida. Additional family rest rooms, a concession area, a security facility and covered canopies in the courtyard were added to each site. The existing truck parking was expanded to allow for additional truck storage. All sidewalks and picnic shelters were improved. The Wastewater treatment plant was replaced to meet the current and future needs. The Water treatment plant was also upgraded. Associated site work included high mast lighting, grading, drainage, base construction, paving signage, pavement markings, and other incidental construction on the existing site.

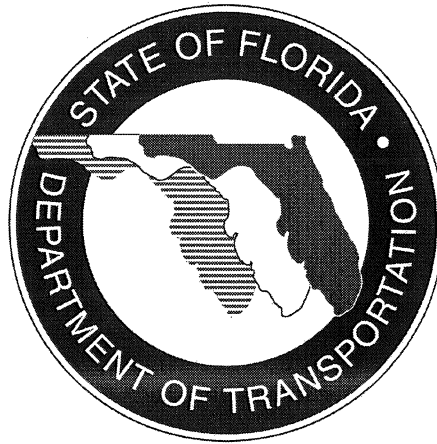
Although this CM@Risk delivery method had challenges it was a great learning experience and resulted in a quality product. I recommend this process be used for future projects with similar scope using the lessons learned.

If you have any questions on this project, please feel free to contact me at 850-414-4792 or [ken.leuderalbert@dot.state.fl.us](mailto:ken.leuderalbert@dot.state.fl.us) or the Project Manager, Tom Crossman at (386) 961-7037 or email [tom.crossman@dot.state.fl.us](mailto:tom.crossman@dot.state.fl.us)

Sincerely,

C. Ken Leuderalbert  
Manager, Project Management Office

C M @ Risk  
Final Report  
Project 213442-1-52-01  
Madison County Rest Areas on I-10



Tom Crossman, P.E.  
Sr. Project Engineer  
Lake City Construction, FDOT

## COST COMPARISON

(Supplemental Agreements / Work orders / Field SA's were not applicable).

This contract used:

Contract Modifications – used to modify the contract language or value.

Change Orders (CO) – used to modify the contract time, add scope.

Owner's Contingency funds – used by owner to add additional work not specified in the contract.

CM Contingency funds – used by CM firm for changes to items within the scope of the contract (changes in subcontractor's bids, market price changes, etc.).

Original Guaranteed Maximum Price (GMP) amount (includes contingencies) = \$ 6,966,982

Final contract amount = \$ 6,919,424

Initial Contingency funds with in GMP (CM and Owners) = \$275,547 or 4.0 % of contract value

Contingency funds used (CM and Owners) = \$220,980 or 3.2 % of contract value

Unused contingency funds returned to FDOT = \$ 47,557 or .7% of contract value

CM Shared Savings = \$ 7,010 or .1 % of contract value

Number of Contract Modifications = 2

Number of change orders = 2

Number of Owner contingency authorizations = 53 (involves 53 issues)

Number of CM contingency authorizations = 37 (involves 37 issues)

Number of Requests for Information (RFI's) = 136

Number of Claims = 0

Cost per SF of buildings = \$ 107 / SF for the metal pre-fabricated buildings.

= \$ 200 / SF Avg. for vending areas, bathrooms, guard building.

Additional Post construction design services costs were \$257,468 or 28% of total design cost.

Many of these design changes could have been avoided by bringing the CM on board earlier.

Additional inspection costs for Threshold inspections by Universal Engineering = \$60,268.

This was an open book contract whereby the owner had full access to all records pertaining to all bid costs and any added costs for extra work.

**This project was constructed under budget by \$47,557 or .7%.**

In a comparison with similar facilities constructed in District 2 from 1995 through 2002 the range of money overruns was from 8% to 86%, with an average overrun of 22%. If this project is compared to the average performance on the previous eleven (11) projects of this type work, the Department would have expected to see an increase in price of \$1,472,116.

## SCHEDULE COMPARISON

The advertisement for selection of CM firm was issued on September 15, 2003.  
Notice to Proceed into the pre-construction phase was issued on February 27, 2004.  
Notice to Proceed into the construction phase was issued on November 15, 2004.

Substantial Completion was scheduled for September 23, 2005.  
Substantial Completion was achieved on September 21, 2005.

Final completion date was scheduled for November 7, 2005.  
Final completion was achieved July 18, 2006.

Scheduled contract time = 351 days (from NTP into Construction phase to Final Acceptance)  
+ 7 days granted for redesign after GMP  
Revised contract time = 358 days

Actual construction time frame from the beginning date on site construction activities started until Substantial Completion was 291 days. This is the time frame that the traveling public incurred impacts during construction. There was 15 days at the beginning of the project for subcontractor acquisition/mobilization, and 45 days after construction for contract close out.

The CM firm met the Substantial Completion date. At Substantial Completion the owner was occupying the building, and the site was being used for its intended purpose. However, the CM firm did not meet the scheduled Final Completion date of November 7, 2005. The CM firm was working on punchlist items between Substantial Completion and Final Completion. All of the punchlist items were completed by the Final Completion date with the exception of two items consisting of pond surveys and video taping/desilting the drainage system. Completing the final two items consumed an exceedingly long time frame after Substantial Completion not anticipated by the CM firm. A more detailed discussion of these items will follow in the "Lessons Learned" section.

**Substantial Completion was achieved 2 days early.**

**Final Completion was not achieved on time.**

In a comparison with similar facilities constructed in District 2 from 1995 through 2002 the range of time overruns was from 12% to 122%, with an average overrun of 50%. If this project is compared to the average performance on the previous eleven (11) projects of this type work, the Department would have expected to see an increase in time of 176 days or approximately six months.

## **QUALITY COMPARISON**

This project is comparable with or exceeds the quality of any commercially constructed facility throughout the state. The Construction Manager was allowed to self-perform 4.9% of the work with their own forces on this project due to the limited subcontractor base in this remote area and low participation of subcontractors during the bidding process. They managed the project and hired subcontractors to perform the different trades including electricians, masons, glaziers, plumbers, etc. Many of these trades are licensed by the state. The building was constructed in a similar method to any school, hospital, etc. However, the roadway portion was constructed per FDOT Specifications which are generally stricter than in the private sector.

Our specification package consisted of two distinct sections. The 2004 FDOT Specifications governed all of the work outside the footprint of the building and Technical Specifications from the Architect governed all of the work inside the footprint of the building.

The following systems were used to monitor the operations of the work:

- Laboratory Management Information System, (LIMS)
- Contractor Quality Control, (CQC)
- Contractor Past Performance Report, (CPPR) grading system, Final Grade = 90%
- Maintenance of Traffic (MOT) reports
- Storm Water Pollution Prevention Plan (SWPPP) reports
- Disposition of Defective Materials, (DDM's)
- Hummingbird archiving system
- Density Log books
- Threshold and Verification inspection by Universal Engineering
- Materials Certifications
- Inspections by Madison County building inspector
- Inspections by Fire Marshall
- Civil Inspections by Cal Tech Engineering

## **DEGREE OF INNOVATION**

This pilot project was a unique process that had many advantages over conventional Design Bid Build, (DBB) projects. During the preconstruction phase the (Project Team) consisting of Construction, Maintenance, Design, Federal Highway Administration (FHWA), Infrastructure Corp of America, (ICA), the Construction Manager and numerous other agencies worked together and performed an extensive plans review that resulted in finding numerous areas of concern with the plans that had the potential to create problems during construction. We found approximately 50 items, some small and some substantial. All had the potential to cost the Department time and money due to delays if they had made it to the construction phase.

The Department's initial estimate was 6.25 million. The Construction Manager (CM) provided the Department with a preliminary budget estimate of 7.2 million. The high budget was partly due to the remote rural location and limited subcontractor availability. Steel and concrete shortages also affected the CM initial estimate. The Department's budget estimate did not

include Construction Management costs. This resulted in a modified value engineering phase in which the project team looked at the existing plans and reviewed items that could be changed to reduce the overall cost, yet not affect the initial intent or design of the structure. During this process the project team identified many items that allowed the team to reduce the CM budget estimate by approximately 3%, bringing the construction estimate down to 6.9 million. The project was bid out and received initial bids of 6.9 million. This allowed the funding to be acceptable and the project moved forward into the construction phase.

The plans review phase was the single greatest advantage of this process. During the above mentioned phases it truly was a team effort by all involved to pursue all items in the best interest of the owner.

### **ANALYSIS OF INDUSTRIES REACTION**

Statewide input was solicited for the Construction Manager at Risk (CM@Risk) concept. The CM@Risk delivery method has been discussed with the Florida Transportation Builder's Association (FTBA) representative. FTBA is in favor of the process for vertical construction projects by FDOT but not for horizontal construction. The concept has been discussed at the FDOT's Statewide Alternative Contracting Task Team Meeting to solicit input from construction and consultant firms. Many of these firms offer both Construction Management services in addition to CM@Risk services. Most of the discussion was positive for the delivery method. One concern raised is the limitation that might be placed on a firm's ability to self-perform portions of the work. The team is forming a subcommittee to make recommendations for continued implementation of this delivery method.

### **LESSONS LEARNED**

This pilot project was a great learning process for all involved. It was a challenge to mesh two completely different construction delivery methods together and achieve such a fine facility. The Construction Manager was not familiar with FDOT Specifications, testing and documenting procedures. Likewise, FDOT was not familiar with Architectural specifications and their format. Merging these two systems together was a challenge but through true cooperation and working together as a team we were able to make it work.

For this project the Construction Manager was acquired at 90% plans and specs. They should have been brought on board at 30% plans or earlier to:

- 1) Shorten the preconstruction phase
- 2) Be involved earlier to be in a position to provide an earlier budget estimate to the owner
- 3) Save design costs and provide needed input to the project concerning constructability and provide potential cost savings proposals (Value Engineering) during the design phase.

Scanning of project documents into Hummingbird was a troublesome process. The CM firm was not familiar with this system. With this as a pilot project there was an estimated 5-10 times the volume of documents generated than a "normal" project. The CM firm experienced connectivity

problems to our system due to their own security systems. Improvements to this area will need to be made in future projects. Clear guidelines on what documents will be scanned and by whom will need to be addressed on future projects.

For this project the scheduled time frame from Substantial Completion to Final Acceptance was scheduled to be 45 days. During these 45 days, the Construction Manager was to complete the items on the punchlist, demobilize from the site, close out all subcontracts, complete as-built plans, and complete all final documents to close out the contract. In our case all went well within the allowed time frame with the exception of two items: surveying the on site ponds, and dewatering/videotaping of the drainage system piping. Completing the two items took an exceedingly long time frame after Substantial Completion. All of the punchlist items were completed by Final Acceptance with the exception of these two items. The pond surveys were submitted to the EOR multiple times due to incomplete survey data. The drainage pipes were also dewatered/videotaped several times by the subcontractor prior to providing satisfactory tapes of all the piping. Some minor repairs were required to be made as a result of the pond surveys and pipe video taping. We held retainage during this time frame but it proved to be an inadequate incentive to have the work completed in a timely manner. I have discussed this at length with the Construction Manager and there are numerous avenues to pursue to avoid this in the future. This same problem existed on both of the pilot projects. The following might need to be considered in the future:

- 1) Write into the subcontracts a required completion time frame identifying these two items be completed prior to substantial completion.
- 2) Extend Liquidated Damages through to Final Acceptance rather than through Substantial Completion.
- 3) Keep the Construction Manager mobilized on site until Final Completion until all items are completed.
- 4) Be more proactive in replacing subcontractors that perform poorly.
- 5) Extend the time frame between Substantial Completion and Final Completion to 90 days rather than 45 days.

Although neither of the above items interfered with the facilities operation or had any impacts to the traveling public they were two items that lingered and kept the Department from Final Accepting.

More post design services time and money should be budgeted up front in the process. More post design services were required as compared to DBB to handle the plans review process and the VE revision phase. There were some delays in plans revisions due to monies not being available during the preconstruction phase. This expenditure would most likely be less if the CM is brought on at 30% plans.

The Department did not include the additional cost of Construction Management fees in their initial estimate. This cost needs to be considered when monies are encumbered for the project.

FDOT roadway designers are typically allowed 45 days for shop drawing turn around. Due to the accelerated construction schedule the CM expects a 10 day turn around. Although we were able to work through these issues without any major problems, on future projects the Engineer of Record (EOR) needs to be aware of the quick turn around that is required.

In future projects we may consider having someone similar to an FDOT Project Administrator /Contract Support Specialist as a member of the Construction Manager's staff. This person would assist the CM with the FDOT paper work process with items such as Hummingbird, asphalt reports, compliance, MOT, SWPPP, quality assessment review, density log books, daily work reports, etc. It would streamline this area and make it more efficient if this person was on site assisting. On future projects we should also clarify the reporting/inspection requirements for the FDOT Specifications a little more, whereby the CM can address them early on in the project.

The Department may want to consider having a portion of the Owner's Contingency funds outside of the GMP estimate. Any remaining unused CM Contingency funds are split between the Owner and the CM. If the contractor is allowed to bid out the work prior to submission of a GMP this split savings may need to be reduced or eliminated due to the fact that the risk for the CM was substantially reduced by bidding out the job prior to GMP.

During this project we had weekly progress meetings and monthly Executive meetings. This was a valuable tool for keeping the team informed of all issues.

The initial design of the project was pay item. We changed it to lump sum during the pre-construction phase. This had favorable results. We allowed for asphalt composite pay factors adjustments only. No other adjustments were allowed for fuel, steel, etc. On future projects we may need to consider only having asphalt composite pay factors or no adjustments at all. Pricing adjustments could be absorbed by the CM contingency funds. These types of market adjustments are generally anticipated and built into the subcontractor's bids.

For this project the subcontractor that performed the civil portion of the work signed the subcontract only a week or two prior to the start of the scheduled work. The CM did not anticipate or allow enough time for the Quality Control Plan, Erosion Control Plan, and MOT Plan approval prior to construction. On future projects the civil subcontractor should be brought on board earlier.

During this project teleconferencing was used extensively. Arrangements should be made early to acquire a consistent teleconference line for 8-10 persons. We used the FDOT Maintenance's system. However, this depended on the availability of their resources. A designated project specific line would have been more consistent to schedule.

The selection process we used to choose the Construction Manager was very similar to the selection process for a consultant. This worked well and should remain the same in the future.



In using the CPPR grading system, we graded the CM from the Notice to Proceed into the construction phase through Substantial Completion. We might want to extend the grading period through to Final Acceptance to aid in encouraging the contractor to close out the project between Substantial Completion and Final Completion.

There was some confusion concerning the time suspensions that are given in the specs for Christmas, New Years, Thanksgiving, Labor Day etc. The CM initially did not understand that these time suspensions applied to the roadway work as well as the building work. We used sound judgment and were able to prevail without impacting the schedule. This clarification needs to be addressed in the scheduling phase on future projects so the CM can allow for any required shut downs.

The "Let Date" for a project is tied to many aspects of the FDOT contract language. This was not a major problem. However, flexibility and common sense needs to be exercised in this area to fit this style of contract.

The primary personnel involved in this project on a daily basis are as follows:

Construction Manager: Andrew Wellman, Peter R. Brown Construction Co., Inc.

Architect: Javier Salman, C3TS

Engineer of Record: Erik VanZanden, Arcadis GNM

Project Management: Tom Crossman, Lake City Construction, FDOT