

Summary Report

All Electronic Tolling (AET) Phase 6B
Veterans Expressway (SR 589) from Gunn Hwy to Dale Mabry Hwy
FPN's 406151-4-52-01 and 406151-6-52-01
Contract E8M77

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Project Scope of Work

The project consisted of the conversion of the existing conventional SunPass/cash toll collection system to an All Electronic Tolling (AET) system at five (5) locations: The Mainline (Sugarwood) Toll Plaza, and the entrance and exit ramp toll plazas at Gunn Highway and Hutchison Road. The project includes the construction of eleven drilled shaft foundations, Toll Gantry erection, Toll Plaza equipment buildings, demolition of the old toll plazas, reconstruction of the mainline at the Sugarwood site to the highway's ultimate 8-lane configuration, milling and resurfacing/widening of the ramps, lighting, drainage, utilities, and landscaping.

Contract Time

Original Contract Time:	645 days
Time Extensions for Weather Impacts:	25 days
Time Extensions for Holidays	23 days
Time Extensions for Special Events:	0 days
Other Time Extensions (S.A. 27):	84 days
Total Time Extensions:	132 days
Total Allowable Contract Time:	777 days

First Contract Day: 07/08/2013

Final Acceptance: 07/07/2015

Project completed on Contract Day 730, 47 days (6.0%) ahead of Allowable Contract Time.

Percentage of contract time added = 20.5%

Percentage of contract time added, excluding weather and holidays = 13.0% (<20%)

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Contract Amount

Original Contract Amount: \$11,249,740.28

Supplemental Agreements (SA's)

SA 23 Supplemental Contingency Fund \$112,000.00

SA 27 Time Extension for AET Implementation \$103,253.68

SA 37 Credits and Costs Related to Plan Revisions 8 & 9 \$ (385.63)

SA 40 Sound-Attenuated Generator Enclosure \$17,288.64

Total SA's \$232,156.69

Final Contract Amount: \$11,481,896.97

Total Amount Paid to Contractor: \$ 10,925,662.29, **2.9% under Original Contract Amount (<10%)**
(4.8% under Final Contract Amount)

Lessons Learned

1) Temporary Traffic Loops

Issue Summary

The Plans only provided for permanent traffic signal loops at the project's signalized intersection (Gunn Highway/SB Off-Ramp). However, there were three (3) separate construction phases through this intersection. The first shift took traffic off of the lanes containing the existing loops. This resulted in cars sitting in the queue for an unacceptably long time while waiting for traffic on the other side of the intersection to trigger the loops.

Resolution

This was temporarily remedied by setting the signals to operate on recall. This required coordination with the Maintaining Agency (Hillsborough County Traffic). However, this too was found to be objectionable for many drivers. Ultimately, a temporary traffic signal loop was installed in the temporary lane until the new permanent pavement was complete. This additional work was paid through a Work Order.

Lesson Learned

When phasing work at or near signalized intersections, a plan note in the TCP should state that the Contractor is to maintain the signalized intersection with the cost for the temporary signal items (including temporary detection) to be included in the lump sum MOT pay item. Means and methods to maintain actuation is determined by the contractor and approved by the Engineer. Alternatively, the EOR can add pay items 102 104, Temporary Signalization and Maintenance – per intersection per day and/or 102 107 Temporary Traffic Detection and Maintenance – per intersection per day.

2) Pavement Elevations Beneath Toll Gantry

Issue Summary

FTE's reviewer for the mainline gantry shop drawing returned the drawing to the contractor as "Revise and Resubmit" with several comments that required addressing before the drawing could be approved. One of the comments was "Field verify the final maximum and minimum pavement elevations below the gantry to determine the correct truss height and column lengths." However, since fabrication and erection of the gantry must be done during an earlier phase than the paving of the roadway, it was not possible to field verify the final pavement elevations at the time that the shop drawing needed to be submitted.

It was determined that elevations taken from the Plans would be sufficient to determine that the shop drawings gave the correct truss height and column lengths. This solution, however, presented an additional problem: the plans do not give the pavement elevations at the station where the gantry was to be constructed. The gantry is to be erected at STA 595+60, and the plan cross sections provide profile grade elevations at STA 595+50 and 596+00. Because the gantry location falls in the middle of a transition out of a superelevated curve, the pavement cross slopes between at STA 595+50 and 596+00 are in a constant state of change. To add to the complexity, the rate of change of the cross slope is different for different lanes. For example, the profile sheet states that the middle lanes transition from -4.9% at STA 594+00, to -2% at 595+90. While the outside lane transitions from -5.5% at STA 593+65, to -2% at 595+90. The inside lane and the outside shoulder are to match existing cross slopes.

Resolution

Using the information from the profile sheet, and his experience as a professional land surveyor, the Project Administrator was able to calculate profile grade elevations at the gantry location, as well as the cross slopes for each lane at this same station. From this, he was able to determine the high point and the low point of the final pavement elevation for both the northbound and southbound lanes. This information was provided to the Contractor, who then incorporated it into the re-submitted shop drawing for the gantry.

Lesson Learned

It is recommended that the Designer include in the plans a specific cross section at the location of each gantry. Such a cross section should give the profile grade elevation, as well as the high point and low point of the final pavement elevation in each direction of travel. For widening and retrofit projects, the EOR should field verify the existing pavement elevations prior to letting when designing the final elevations of these cross sections. – **update to GTR?**

3) Noise Attenuating Enclosure for Generator

Issue Summary

The original contract plans did not require the generator enclosures to be noise attenuating. For most locations along the corridor this was not an issue; however, at the Gunn Hwy exit ramp, there is a residential home within 40 feet of the new Gantry Equipment Building (GEB) site. Decibel readings at the property line were significantly above an acceptable threshold. At the request of the adjacent property owner, initial modifications included changing the start time of the generator test from 9:00am to 2:00pm.

Resolution

The Department requested that the contractor remove the enclosure that was originally installed and replace it with a noise attenuating enclosure. The new enclosure was paid through a Supplemental Agreement.

Lesson Learned

The EOR should review the locations of the GEBs (and associated equipment). In urban areas, with residential properties in close proximity, consider noise abatement measures for equipment. The Department should also consider the times of the weekly tests for equipment that produce excessive noise to minimally impact the adjacent properties. – **update to GTR?**

4) Separate Electrical Transformers for Toll and ITS

Issue Summary

The original contract plans for the electrical service show one electrical transformer at each Gantry Equipment Building (GEB) site. At the NB Gunn and NB Hutchison on-ramps, the contract plans identified two separate electrical service meters, one installed at the GEB and one installed for the ITS system. The GEB sites were constructed as designed with a single transformer at each GEB. FTE's Electrical Engineer (Jeff Kipfinger) referenced the FTE General Tolling Requirements (GTR) and advised that the GEB and the ITS systems at the NB Gunn and NB Hutchison sites must be fed from separate electrical transformers.

Resolution

A plan revision was issued to add an additional transformer at the NB Gunn and NB Hutchison sites. These additional transformers were installed by TECO, and tied into the ITS service meters by the contractor. TECO's costs to provide the two new transformers were paid through FTE's reimbursable Utilities

Contract. The contractor's cost to disconnect from the initial transformer and re-connect to the new transformer and service meter was paid through a Contingency Work Order.

Lesson Learned

The EOR should ensure that the plans incorporate all current GTR requirements in the original design. Related to this specific issue, the plans need to indicate separate electrical transformers for the Tolling Systems and for ITS components, as required by the GTR.

5) Primary Toll Equipment Building

Issue Summary

After construction began, it was revealed to the CEI and Contractor that the Sugarwood Gantry Equipment Building (GEB) was to be the Server site (or Primary) for the four GEB's at the Hutchison and Gunn ramps, as well as for the adjacent project's GEB sites (Wilsky Ramps). If GEB sites that are dependent on the Primary are constructed prior to the Primary, they cannot be put into operation until after the Primary site is operational and interconnected. (Toll locations do not operate independently). This meant that the Sugarwood GEB needed to be turned over to the Toll Equipment Contractor (TEC) before any of the other GEBs. This caused a scheduling delay because the Wilsky and Hutchison GEBs were scheduled to be completed and turned over to the TEC prior to the Sugarwood GEB. The construction of the Wilsky and Hutchison GEBs were already well underway at the time this information about the Sugarwood GEB was revealed. The problem was compounded by the fact that the completion and turnover of the GEBs was the most critical activity on the CPM schedule. This caused a delay to the overall contract completion date.

Resolution

The contractor revised his schedule to make the completion and turnover of the Sugarwood GEB the most critical activity and dedicated resources appropriately. The mandatory AET Implementation date was amended to account for this delay.

Lesson Learned

If there are more than one new tolling sites included in a construction project, prior to the start of construction it is critical that the EOR identifies the Primary Server site, and the sites that are subordinate to it. This information, with sequence of construction, must be denoted clearly on the Plans. This is especially important if a corridor is to be divided up into several construction projects. The Turnpike Tolls office should be involved in this process to be sure that the work sequence and work effort required by the roadway contractor is clearly identified and performed to allow for the TEC operations to be completed in an effective sequence.

During the Initial CPM Schedule Review, it should be verified that the contractor has sequenced the construction of the primary site first. The Initial CPM Schedule must provide a clear sequence of the work leading up to turnover of the Primary GEB to the TEC. The Contractor must also account for the construction/installation of all other infrastructure elements that must be in place for the primary site to be put into operation.

Per Session 2, Tolls indicated that this issue was caused due to the change in the TEC from Raytheon to Transcore. The plans were developed for the Raytheon system, which would not have required the primary site. – **add requirement in GTR to include construction sequencing?**

6) Leave Temporary Drilled Shaft Casings in Place

Issue Summary

The Plans called for temporary full depth casings at all drilled shaft foundations. At the Drilled Shaft Pre-Activity Meeting, the CEI inquired if the contractor would prefer that the steel casings permanently remain in place in lieu of vibrating and removing the steel casing, due to the vibration experienced in placing/removing the full depth casings (at NB Hutchison Ramp) and difficulties experienced on other projects (Sections 1 and 2) along the Veterans Expressway. This method should reduce shaft failure, collapse and sloughing, as well as eliminating the possibility of the rebar cage settling during casing removal.

Resolution

The Contractor made a formal request to FTE to leave the temporary steel casings in place. With the concurrence of both the EOR and the District Geotechnical Engineer, FTE granted this request.

Lesson Learned

If the plans call for temporary casings in the drilled shafts, a Plan Note should be added allowing the Contractor the option (at no additional cost to the Department) to leave the steel casing in place, in lieu of removal. Furthermore, the Contractor's Specialty Engineer should provide an analysis demonstrating that the skin friction of the cased shaft will be sufficient to withstand the projected loads. The EOR will review the contractor's submittal for concurrence.

7) MOT Phasing Items (Major Structure Assembly and Demolition of Existing Toll Plazas)

Issue Summary

While major components of the mainline (Sugarwood) gantry structure were to be fabricated at the supplier's factory, it was necessary to transport sections of the gantry to the project site and complete the structure's splicing of the components there. Due to the final weight and length of the assembled structure, it was necessary to complete the assembly of the structure in the median, at the location where it was to be flown into final position. However, there was no Traffic Control Plan (TCP) Phase identified to stage this assembly work.

Resolution

The EOR was contacted and the location of the construction staging area was discussed. Field measurements and ultimate positions of crane locations were identified for lifting and setting the Gantry Structure. Additional TCP plan sheets 100A and 100B were provided with Revision 7 to provide a work zone in the median for assembly and erection. Because this situation was identified early, and because the AET implementation date had already been postponed due to other issues, the revision to the TCP caused no additional delays to the implementation of AET.

Lesson Learned

Perform early Constructability Reviews and implement additional reviews for each TCP/Phasing Change. Include TCP Phases to stage, construct/assemble, lift, and set large structures.

8) Review MOT phasing notes to be sure work can be completed within time restraints

Issue Summary

The scope of work includes the complete demolition and reconstruction of the pavement on sections of four ramps. For three of the ramps, the Traffic Control Plan (TCP) required that the demolition of the old pavement and placement of Type-B stabilization, limerock base, and new asphalt pavement be done over the course of a weekend. This was to be done over the full two-lane width of the ramp (reference TCP Plan Sheets 95 and 96 – Phase IV, Stages I and II). The contractor demonstrated that they could not perform all the work required at a given ramp with the weekend time restriction.

Resolution

The contractor requested a modification to the TCP which would allow them to perform the demolition and reconstruction of one lane at a time. This would allow them to keep traffic active on one lane while they worked on the other, and would give them the time they needed to complete the work. It was determined that such a plan would not have a detrimental impact upon traffic. The traffic control plan was modified to allow for the reconstruction of the ramps to be done one lane at a time, with the active travel lane being separated from the work zone with pinned temporary barrier wall.

Lesson Learned

Prior to construction, the phasing of the Traffic Control Plan (TCP) should be carefully reviewed to ensure that the work is constructible within the time constraints imposed by the TCP, and the time constraints are reasonable for the work effort required. During construction, the CEI should review the contractor's CPM schedule to be sure that work efforts and durations coincide with the TCP provided in the plans.

9) Procurement of Telecommunications for Tolling Projects

Issue Summary

The original contract plans for the tolling system (Plan Sheet 126) required the contractor to provide telecommunications connectivity from each toll equipment building to the Department's data center at Turkey Lake. Since the procurement of the telecommunications lines must follow the state's procurement process, the contractor should not be responsible for this work.

Resolution

The requirement for the contractor to provide the telecommunications lines was removed from the contract after letting. Tolls Operations coordinated with the State Procurement Office to establish the telecommunications installation.

Lesson Learned

Procurement of the telecommunications lines should not be included in construction contracts since the procurement must follow the state procurement process. This appears to have been updated in the 2015 GTR (Section 12).

Discussion Topics for Consideration

10) For Veterans Expressway, Schedule Fly-In of Major Overhead Structures on a Friday Night

Issue Summary

Lane closure restrictions prohibit detouring traffic off the mainline on Friday or Saturday nights. This restriction would require the contractor to schedule the fly-in of the mainline gantry on a weeknight. If some unforeseen circumstance were to cause the fly-in to get behind schedule, it could result in the traffic being detoured during morning rush-hour traffic. The morning rush-hour traffic on the Veterans Expressway gets backed up even during the best of circumstances, so drivers would likely experience extreme gridlock if a detour was added to the mix.

Resolution

The contractor requested and was granted approval to close down the mainline on a Friday night. This avoided the possibility of impacting the weekday morning rush-hour. Scheduling on a Friday also provided the opportunity of having Saturday night as a back-up date in case the work on Friday was cancelled due to weather or mechanical breakdowns. Otherwise, if the work needed to be postponed for a week, the Contractor would incur enormous crane rental fees for the week.

Lesson Learned

On highways that experience very heavy weekday morning traffic, when scheduling the flying-in of a mainline gantry (or any major overhead structure), we recommend FTE consider performing the operation on a Friday night. The scheduling of such an operation would have to take into consideration any Special Events occurring in the area that might impact traffic on the highway.

11) Identify and maintain existing irrigation system at the Sugarwood Administration Building

Issue Summary

When it was determined that the Sugarwood Administration building was not going to be demolished, as shown in the original contract plans, the EOR did not consider the irrigation system that was existing. There are several planters and sod around the building and additional landscaping was installed as part of the construction project. The contractor was not aware of the irrigation system and much of it was damaged during construction activities. According to maintenance, the irrigation will need to be replaced.

Resolution

Maintenance funds will need to be secured and a contract let to re-install the irrigation system.

Lesson Learned

If changes to existing demolition plans occurs, request input from the maintenance office related to items that may not be considered.

12) Grouping of Landscape and Construction Contracts

Issue Summary

The AET Phase 6B conversion project was grouped with a \$300,000 landscaping project that was intended to visually enhance the areas where the new AET systems were constructed. The landscaping was designed prior to the letting of two adjacent D-B widening projects (Veterans segments 4 and 5). The two widening projects overlap the project limits of the AET Phase 6B project. If the Phase 6B landscaping had been

installed as designed, the construction activities of the two adjacent widening projects would have required the destruction of most (if not all) of the newly installed landscaping.

Also, in the original bid plans, the Sugarwood Administration Building was shown to be demolished. During the course of the AET Phase 6B Project, a major change was implemented which eliminated demolition of the building. This change required the landscaping in the area of the building to be re-designed.

Resolution

The EOR issued Plan revisions which moved all of the landscaping that had originally been located around the new AET Tolling facilities. Most of these plants were relocated to the side slopes of a ramp at the north end of the project limits that is unaffected by the adjacent widening project. The Plan revisions also added landscaping around the Sugarwood Administration Building.

Lesson Learned

Since it cannot be known what elements of the work will be altered during the course of a project, it is recommended that landscaping be let as separate contracts once all roadway and other construction activities have been completed.

13) Loop Sealant Compatibility with Asphalt Pavement

Issue Summary

It appears that the Veterans Corridor projects were some of the first projects to utilize asphalt beneath the Toll Gantry Structures. Although the sealant for the Gantry Loops was most likely suitable for concrete structures, it has not been found to be compatible with asphalt surfaces in the gantry loop area. Within months after the sealant was placed it became obvious the sealant would not endure over time, and has required resealing.

Resolution

In areas where the sealant failed, the Tolls Department set up a nighttime lane closure under the gantries and overlaid the sealant with a different sealant.

Lesson Learned

The TEC should provide the Department with specific performance criteria testing results for the sealant being used prior to installing loops on construction projects.