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Soon to be king

Prince Road at center of Arizona's I-10 upgrade

I-10 not only serves cross-country traffic between California and Florida, it also is the only interstate connecting Arizona's two major metropolitan areas—Tucson and Phoenix.

Originally constructed 50 years ago, I-10 is undergoing major improvements to serve the current and future needs of Arizona's rapidly growing southwestern region.

The Arizona Department of Transportation (ADOT) has outlined a series of projects to update I-10 and keep increasing traffic volumes moving efficiently through the area. The largest project to date included a 5-mile widening of I-10 through the downtown Tucson area from Prince Road to 29th Street. The project was completed in 2009 at a cost of \$200 million. Currently, there are approximately a dozen various planning, design and construction projects under way to improve I-10 south of Phoenix. One of the major construction projects currently under way began in fall 2011

and spans from Prince Road to Ruthrauff Road in the city of Tucson. From the beginning, the project team has faced some very special challenges tackling this enormous reconstruction project.

Flying over trains

ADOT faced a number of challenges in designing the Ruthrauff Road to Prince Road project. Prince Road currently passes under I-10 and motorists experience heavy congestion during peak hours caused by an at-grade crossing of the Union Pacific Railroad (UPRR) tracks located immediately east of the highway. In addition, there are many local and cross-country utility lines located at the I-10/Prince Road interchange, including the majority of the city of Tucson's wastewater system and high-pressure gas and petroleum lines, which needed to be relocated prior to construction.

With forecasted increases in the frequency of trains passing through the area to accommodate motorists, the designers' solution was to build a new interchange and bridge that would take Prince Road traffic over I-10 and the UPRR

tracks and lower the elevation of I-10. The elevation changes of both the Prince Road crossing and the I-10 mainline make the project especially complex.

"This is not one of our easiest projects, but the challenges we are facing now will ultimately provide some much needed improvements," stated Tucson District Engineer Todd Emery.

Additional improvements include widening I-10 from three to four lanes in each direction to increase mobility in the region; updating the entrance and exit ramps to provide better connections and improved access for motorists; and providing new landscaping along the project area.

The improvements will allow traffic, including emergency-service vehicles, to pass over the railroad tracks without having to wait for the 40 to 60 trains that pass daily through the area and cause vehicles to back up onto I-10 during peak hours. Since the UPRR has doubled the tracks at this location, the project serves to address significantly increased future congestion and delays at Prince Road and the railroad tracks.

In order to keep an average of 157,000 vehicles moving through the work zone each day, the project has been separated into two major phases to achieve the project goals without causing significant impacts to motorists. Phase one began in spring 2012 and is anticipated to last until early 2013. Phase two is anticipated to begin in early 2013 and end by late 2013. The federally funded \$76,438,547 project, which was awarded to Pulice Construction Inc., began last fall and is expected to be completed by late 2013.

Sorting traffic

ADOT has successfully completed nine months of the two-year construction project. The majority of the utility work has been completed. "The level of collaboration regarding utility work is key to the project's success, and less than a year into the project we have accomplished much," said Emery.

To achieve the substantial and complex relocation and upgrades to the numerous utilities located in the construction zone, ADOT is working closely with 16 major utility organizations,

including Pima County Regional Wastewater Reclamation Department; Kinder Morgan; Tucson Water; Tucson Electric Power; Southwest Gas; Century Link; Flowing Wells Irrigation; and UPRR utilities.

As construction continues, I-10 remains open with three lanes in each direction and emergency-access lanes, with only minimal short-term lane closures planned in the project area when necessary. As part of the project, the I-10 Prince Road underpass and entrance and exit ramps have been closed until late 2013; however, Prince Road east of I-10 will remain open throughout the duration of the project. Access to all businesses and properties in the project area is being maintained during construction.

The project is currently in the first phase of the two-phase construction, which has westbound I-10 motorists traveling on lanes that have recently been shifted onto the westbound frontage road and eastbound I-10 motorists traveling on lanes that have been shifted onto the existing westbound interstate. During the second phase, traffic will be shifted onto the newly constructed eastbound interstate and westbound traffic will be directed back onto the existing interstate until the completion of construction.

Covering a lot of material

When complete, the Prince Road overpass will be 30 ft above ground level and will slope down on the east side of I-10 to reach current ground level near Runway Drive, where many businesses are located. On the west side, the overpass will slope down and be realigned with a roadway called Business Center Drive, another area filled with commercial development.

Excavation is under way to remove 184,000 cu yd of interstate waste material in the project area to lower the interstate by 20 ft from its current location.

The material is being hauled to a location underneath the I-10/I-19 traffic interchange several miles away, where it will be used for future projects. Almost 13,000 covered truckloads will haul the material over a 22-month period. The recovered material is being stockpiled, watered for compaction, covered with straw for dust control, seeded and bermed. "Stockpiling this material for future use will save an enormous amount of funding, freeing dollars for the many state road projects needed in our growing community," Emery explained.

Protecting the past

The project area is located along the Santa Cruz River, a river bed that is now dry but once flowed year-round. The



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area is recognized as a rich archaeological site. The river allowed people to learn how to cultivate and prepare maize, a key component of their diet. This development gradually transformed these people from a way of life centered on hunting and gathering to a more settled existence based on farming. More is known about these past inhabitants than before, thanks to archaeological excavations that were conducted as a part of the project. When archaeological investigations took place in the project area prior to construction, evidence was unearthed indicating that there were canals, various pit structures including storage pits and agricultural tools—all signs that suggest the area was an early farming community.

Geotechnical testing further revealed that the soil beneath I-10 between Prince and Ruthrauff roads is not suited to support a new, widened freeway. The option of removing the soil and recompacting it would have meant disturbing large sections of archaeological sites in the area—a process that would have required the state to recover the affected archaeological materials, which would have added up to a hefty price tag. Designers of the widened freeway came up with an alternative plan to install a geogrid, an open lattice or grid-like structure that stabilizes the

soils beneath a constructed road while reducing the stress on materials under the grid. Studies have shown that the use of geogrids in other projects across the country help protect subsurface archaeological deposits and preserve them for possible future exploration.

Partnering with the people

While construction continues on the project, ADOT also has been focusing on working with the community's businesses and employees to lessen the impacts of construction.

"We've been working steadily with business in the project area beginning at least two years before the construction project began last fall. We wanted to prepare the businesses, because we know from experience that the more information they have, the more successful they can remain throughout the construction," said Emery.

The ongoing outreach efforts include a project website featuring up-to-date information and resources; frequent traffic alerts; informational meetings; a quarterly newsletter; and e-mail updates to the community at large.

From informational business meetings held during the design phase of the project, ADOT gained feedback that the closure of Prince Road beneath I-10 would mean that those who work

on the west side of the freeway and use the local transit bus service to get to work would need to walk miles around the closure to get to their employment locations. As a result of discovering this potential hardship prior to construction, ADOT contracted a private transit provider to offer a free shuttle during construction that provides transportation to area employees around the construction zone during peak-use hours on weekdays and Saturdays. The shuttle is an example of the level of assistance that ADOT provides for affected businesses during construction projects. ADOT also provides area businesses with tips on how to best market a business during construction. In addition, public safety is emphasized regularly by providing fliers for businesses and their employees on how to stay safe in the construction zone.

"We feel confident that when this project is complete, the community will greatly appreciate the improvements. All our efforts addressing the project's challenging aspects will be well worth it," stated Emery. **R&B**

Ritter is a senior community relations officer for the Arizona DOT, Tucson.

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