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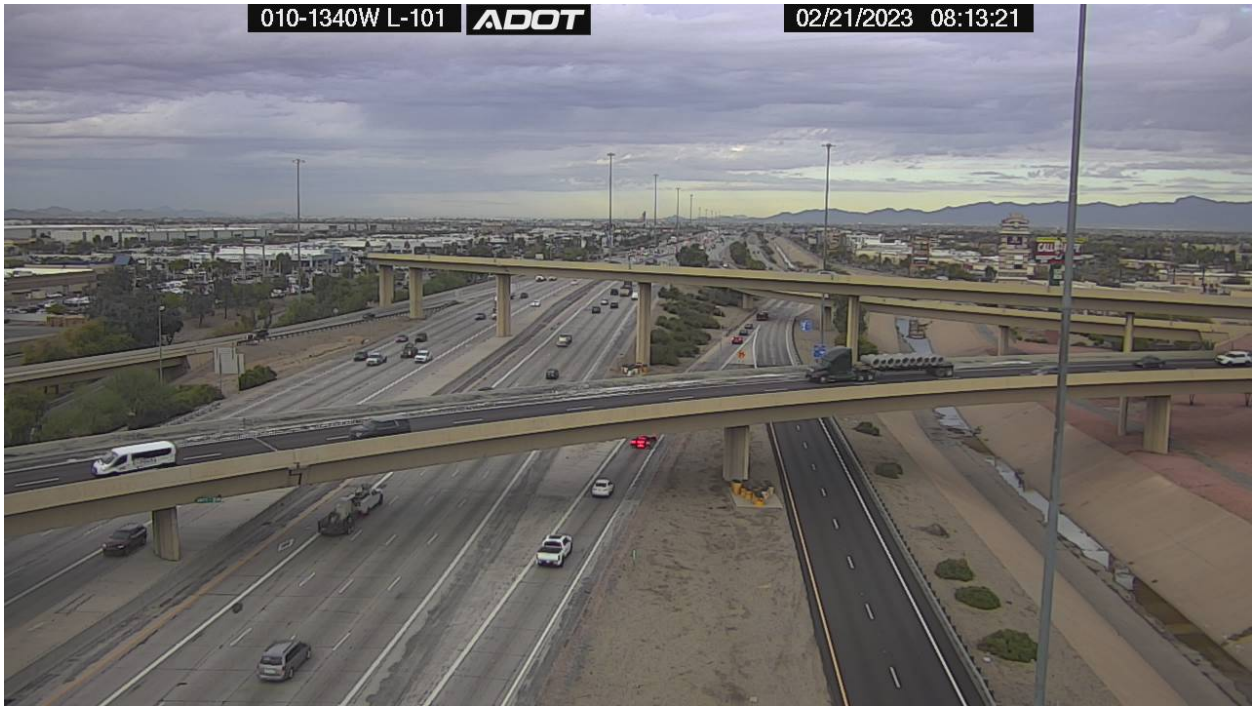

SR 101L / I-10 System Interchange Improvements

TRACS NO. F0475 01L

Contract No. 2022-005

ALTERNATIVE CONSTRUCTABILITY AND RECOMMENDATION REPORT

March 1, 2023

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The focus of this report is to evaluate the DHOV and 91st Avenue exit ramp alternatives presented by the project team for constructability, mitigate risk, and for those that are the most cost effective. This report will offer a recommendation for the preferred alternatives.

Constructability Comments Common to All Alternatives

This constructability pertains to all alternatives presented in the Initial DCR.

I-10 Widening

To reduce the impact to traffic and keep traffic moving, all the alternatives reconstruct only the eastbound I-10 side of the interstate. Not having traffic control on both side of I-10 during the widening will save on traffic control costs as well as the impact to the travelling public. Other than night and weekend closures, the only portion of I-10 that require a closure will be the westbound HOV lane to construct the I-10 DHOV median connection retaining walls and piers.

It is recommended that construction is sequenced working from the outside in (south to north), building the 91st Avenue improvements first while the bridge substructures are started. Constructing the new I-10 outside ramps and lanes will facilitate the sequencing of construction to rotate traffic. Building the area outside of traffic first so that traffic can be moved to the new area to build the inside lanes.

101L Widening

It is recommended that construction is sequenced working from the outside in. Widening the outside lanes first will allow for the traffic to be moved to the outside to construct the median DHOV bridge and lanes. Not doing a full reconstruct and only widening to the outside will save on construction cost and schedule duration.

Traffic will need to be phased to impact the medical center as little as possible. The use of temporary pavement will allow a two-phased approach to sequence the construction of the northbound Thomas exit ramp. This will allow this critical ramp to stay open for traffic going to the medical center.

McDowell Southbound Exit Ramp Bridge Over Thomas and Braided Bridge Over Thomas Southbound Entrance Ramp

Construction of the braided ramp bridge over the Thomas southbound entrance ramp will need to be phased to limit the impact to the entrance ramp traffic. The columns should be placed as far from the existing roadway as possible so that the bridge substructure can be built under the current traffic condition. The final design could be optimized to limit the number of straddle bents. Consideration should be made for the use of precast straddle bents to reduce impacts to the traveling public.

In order to construct the pier of the McDowell southbound exit ramp bridge over Thomas, one left hand turn lane in each direction will need to be closed.

S-E Ramp Construction Sequencing

The construction sequencing for S-E Ramp along I-10 will need to be phased. Most of the ramp east of the connection can be completed without impacting the existing ramp. For the tie-in, one recommendation is to close one lane of the S-E ramp and add temporary pavement. Then, construct one side of the tie-in, flip traffic, and complete the other side. If a lane closure is not possible, then a short-term closure of at least three days will be required to perform the tie-in. Even using high-early concrete, a weekend closure is not enough time for the preparation, construction, and concrete curing.

83rd Avenue Braided Ramps

Most of the new 83rd Avenue ramps and bridges can be built without much impact to traffic since a majority of both westbound and eastbound are outside of traffic. The eastbound bridge can be built in its entirety outside of traffic. The existing westbound ramp traffic will need to be placed on an inside pavement detour to construct the complete bridge, a portion of the retaining walls, and outside ramp lane. The traffic will then be rotated to the outside to complete the retaining walls and inside ramp lane.

Waterline

There is an existing waterline that crosses the 101L in between Thomas Road and McDowell Road. Extreme care should be taken during design and construction to protect this line in place. Further investigation may be necessary to determine if additional steel casing is needed.

DHOV Alternative B

Alternative B (Initial DCR Figure ES-2) would remove and reconstruct the existing eastbound I-10 to northbound SR 101L Ramp, which would provide room within the SR 101L median. The new I-10 to SR 101L Ramp would be moved toward the east and would continue to be the highest-level bridge in the interchange. The new DHOV ramp would be added within the medians of SR 101L and I-10 and would be at the same level as the existing south-to-east ramp. This alternative would require reconstruction of the south-to-west ramp and many of the existing bridges over McDowell Road would need to be widened.

Demolition of Existing E-N Ramp

The existing E-N Ramp is a post-tensioned box girder bridge. This will be demolition more difficult than that a precast girder bridge. Since it is post-tensioned box girder bridge, an entire frame will need to be removed at once. The middle two frames over I-10 and associated ramps will require a full closure of I-10 in both direction for safety reasons during the demolition. We recommend sequencing the removal of the bridge from the north abutment to the west abutment. Further investigation should be made for the proper frame demolition sequence.

Construction Sequencing

There are two bridges being constructed (New E-N ramp and DHOV). The DHOV ramp bridge in is being built in between two bridges at the 101L connection. The new E-N ramp bridge will have to be at the highest level, making it much more difficult to build since it is taller and must go over all the other fly-over bridges in the system. The new E-N bridge is assumed to be precast. Both the new E-N bridge and the DHOV bridge can be built at the same time while the northbound 101L widening takes place. The E-N bridge over McDowell will have to be constructed once traffic is relocated to the new E-N bridge. This will need to be constructed first to demolish the old one and build the DHOV 101L connection. The northbound 101L widening will have to be completed prior to switching traffic to the new E-N bridge. The southbound 101L widening can take place at any time but will most likely be sequenced at the same time as northbound.

E-N Ramp Bridge I-10 Tie-In

Both sides of the eastbound I-10 91st Avenue entrance and exit ramps should be relocated first to make room for the new E-N ramp and bridge construction. Install temporary pavement on the north side of the existing ramp and shift traffic to build the new retaining wall and south half of new tie-in. Traffic is then shifted to the new bridge to complete the north side of the tie-in.

DHOV Alternative F

Alternative F (Initial DCR Figure ES-3) would not require moving or reconstructing any of the existing SR 101L/I-10 ramps. The DHOV ramp would braid from the median over the I-10 westbound lanes and be located on the northeast side of the system interchange. The DHOV would then braid over the northbound 101L lanes to the median. The DHOV improvements would extend farther north on SR 101L due to the braided structure.

Bridge vs. Embankment at Sta 30+00

The Initial DCR shows a section of embankment at approximately Sta 30+00 of the new DHOV bridge. Investigation should be made on whether it makes more sense to continue the bridge through this portion as well. One consideration is construction access. If embankment material is required and the contractor is allowed to use McDowell Road to bring in material, then the embankment portion may make sense. If McDowell Road is not an option, then it might make sense to run the bridge through this portion.

Construction Sequencing

Westbound I-10 realignment and the outside widening of the 101L in both directions have to take place before the DHOV bridge takeoff and landing areas can be constructed.

91st Ave Connector Ramp Alternative 2

The SR 101L to 91st Avenue Alternative 2 (Initial DCR Figure ES-4) would provide a two-lane combined exit ramp from southbound SR 101L to McDowell Road and 91st Avenue. The exit would begin just north of the Thomas Road bridge, then braid over the Thomas Road southbound entrance ramp, and continue along the west side of SR 101L. One of the ramp lanes would exit to McDowell Road and the second lane would continue toward 91st Avenue and include a one-lane bridge that would fly over the system interchange and connect to the existing I-10 to 91st Avenue eastbound exit ramp. With Alternative 2, the McDowell Road southbound exit ramp is relocated farther north and combined with the 91st Avenue exit north of the Thomas Road bridge.

New Dedicated Fly Over Bridge

This option incorporates a long structure that goes over McDowell Road, the existing S-W ramp, the E-N ramp, both direction of I-10, and the 99th Ave eastbound entrance ramp. This construction will be difficult due to height of the columns, working over existing fly over bridges, and working over the existing I-10. The portion over I-10 will have to be phased as to not work over live traffic.

Construction Sequencing

The bridge over Thomas Road and the braided ramp bridge need to be constructed at the same time as the 101L widening in order to relocate the McDowell Road exit ramp. Once traffic is on the new McDowell Road exit ramp alignment, the 101L ramp tie-ins can be made.

The new 91st Avenue ramp bridge over I-10 can be constructed and tie-ins can be made with the sequencing of the I-10 improvements.

91st Ave Connector Ramp Alternative 3

The SR 101L to 91st Avenue Alternative 3 (Initial DCR Figure ES-5) would provide a one-lane exit ramp from southbound SR 101L to McDowell Road just north of the Thomas Road bridge, then would braid over the Thomas Road southbound entrance ramp, continue along the west side of SR 101L, and terminate at McDowell Road. From the end of the existing ramp from southbound SR 101L to eastbound I-10, a slip ramp would be added that would provide an exit that connects to the existing I-10 eastbound to 91st Avenue exit ramp.

Constructability

This alternative utilizes the existing S-E fly over ramp and splits into the 91st Avenue connector east of the existing S-E ramp bridge. Using a split ramp approach, the 91st Avenue exit needs to occur in the tangent section of the system ramp.

Construction Sequencing

The construction sequencing for the slip ramp follows the sequencing of the I-10 widening. The I-10 91st Avenue exit ramp needs to be relocated before the slip ramp along I-10 can be constructed. The slip ramp will follow the same phased approach as discussed in the S-E Ramp Construction Sequencing.

Recommendations

DHOV Alternative F is recommended. This alternative offers less of an impact to the traveling public, presents less risk, has a shorter construction duration, and carries a lower construction cost.

Benefits

- Reduces the number of impacts to the travelling public since most of the work will be built outside of the existing alignment. The I-10 mainline and system ramp closures are minimized.
- Reduces cost since the existing E-N Bridge will not have to be realigned and not removed.
- This alternative also has little impact to 99th Avenue and no modifications to the I-10 eastbound 99th Avenue exit and entrance ramps.
- There is less impact to McDowell Road since there is only one bridge being constructed above and that bridge is constructed to the outside.
- Reduces the duration of the construction schedule.

Drawbacks

- The E-N bridge would not be upgraded to two lanes.

91st Avenue Connector Alternative 3 is recommended. This alternative offers less of an impact to the traveling public, presents less risk, has a shorter construction duration, and carries a lower construction cost.

Benefits

- Reduces the number of impacts to the travelling public since most of the work will be built outside of the mainline I-10 alignment.
- Reduces cost since a new fly over bridge does not have to be constructed.
- Reduces the duration of the construction schedule.

Drawbacks

- Wouldn't get a new dedicated bridge for the 91st Avenue connection.
- Traffic for both S-E and 91st Avenue would be on the same ramp bridge.