
SOUTH END TRANSITION STRUCTURE

As stated before, maintenance of traffic is of great importance to the Alaskan Way Viaduct and Seawall Replacement Program and the balance between this and efficient construction will benefit the public the most. A temporary roadway is needed to connect the south end bridge that spans S Atlantic Street to the existing Viaduct structure while the tunnel is being constructed. The project team looked at various alternatives for a bridge or roadway to serve this purpose and concluded that a bridge structure that tied into the west side of the existing Viaduct would be the best overall option. This roadway/bridge is referred to as the Transition Structure. This section will discuss two of the alternatives that were considered and the preferred alternative. Refer to Trend SS0019 for additional information relating to how the preferred alternative was chosen.

However, this preferred alternative couldn't be designed to the full standards and the design speed currently set in the corridor analysis. This section will document design elements on the south end transition bridge structure that are deviated from Urban Managed Access 1 (UMA-1) with a design speed of 50 mph. It will show that all of the design elements meet 40 mph which coincides with the recommendations set forth in this construction corridor analysis to reduce the posted speed limit to 40 mph through this area. Figures 3 through 10 are used to help reference these deviations and show the plan and profiles of this structure. No alternative can be designed to full standards because the existing conditions on the viaduct have non-standard vertical clearance and non-standard shoulders (both right and left). Keep in mind bridge structure is expected to be in operation for 4 to 5 years.

Alternative 1

An alternative that was design to full standards, except when connecting to the existing Viaduct, was a bridge structure that connected the south end bridge spanning S Atlantic Street with an inline approach that tied into where the end of the existing Viaduct ends at Bent 127. Refer to Figure 3 for the layout of this alternative.

This alternative provided some advantages and disadvantages when compared to the preferred alternative. Some advantages include a higher design speed (45 to 50 mph), little structural modifications on the existing Viaduct, larger shoulders, and better channelization of three lanes at the tie in location. Disadvantages include a **full closure of SR 99 for 6 months**, expected LOS of E or F for 1st Ave S., and significant impacts to businesses on 1st Ave.

Ultimately it was decided by WSDOT that the full closure of SR 99 for 6 months was not acceptable even though it would ultimately provide better geometric and roadway elements when compared to the preferred alternative. A preliminary cost estimate for this alternative is around \$35 Million.

Figure 3

Alternative 2

Five alternatives besides the Alternative 1 and the preferred alternative were looked at. Only one of these will be talked about in this document. Most of these alternatives had a construction detour that traveled through an adjacent property acquired by WSDOT called the WOSCA property. After the detour was operational a roadway would be built that was similar to Alternative 1 or the preferred alternative. Any option that had a detour through the WOSCA property would cause a delay to any projects for the Tunnel. This could also create constructability issues causing higher bids and possible delays while in construction.

The alternative displayed has a detour that uses the Railroad Ave ramps and ties into the south end bridge spanning over S Atlantic Street. Refer to Figure 4 for a layout of this option. Then a configuration similar to Alternative 1 would be built to facilitate traffic through this area during construction of the tunnel. Advantages include no long duration full closures, standard roadway criteria and geometrics, and limited impacts to city streets compared to Alternative 1. Disadvantages include additional construction costs, constructability issues in coordination of South Portal and Tunnel construction, a detour of 25 mph for around 1 year, and delay of any tunnel projects.

The impacts to the program schedule and pushing back the milestone of full opening of the tunnel to traffic by the end of 2015 are considered unacceptable. This option could also create constructability issues for the program which would increase costs and risk. For the reasons state above, this option along with any other options that implemented detour through the WOSCA property were not considered anymore.

Figure 4

Preferred Alternative

The preferred alternative includes a roadway that connects the south end bridge to the west side of the Viaduct near S Dearborn Street. This option would be constructed next to viaduct without any impacts or full closures except for the final tie into Viaduct with limited structural modifications. Refer to figure 5 for the layout of this alternative.

This alternative balances the needs of maintenance of traffic and roadway design standards. As stated above, no long duration full closures will be required but the overall design and construction is lower compared to the Alternative 1. This alternative has advantages and disadvantages when compared to Alternative 1. Some advantages include no long duration full closures, reduced impacts to 1st Ave S., and less overall impacts to businesses and industries in the area. Disadvantages include a lower design and posted speed, structural modifications to the existing viaduct, and further non-standard roadway elements.

The preferred alternative is recommended because of the following reasons: it doesn't require a full 6 month closure or any long duration detours, it allows for an accelerated schedule to allow tunnel construction to take place on schedule so that the program can meet the 2015 milestone of opening to traffic, adequate construction staging area is allowed for South Portal and Tunnel construction which will eliminate risk of increase construction costs and schedule delays, and the construction cost is the equal or less than the other alternatives. The estimated cost for this alternative is around \$35 million. However, as stated before, this alternative has non-standard roadway and geometric design for UMA-1 designation with a 50 mph design speed.

Figure 5

Deviated Design Elements for the Preferred Alternative

The following table and figures 6 through 11 are used to document non-standard design characteristics associated with the preferred alternative. The matrix used to analyze this alternative is Matrix 3-7 and 4-6 under urban mobility projects. The designation for SR 99 that is used for this analysis is UMA-1 with a 50 mph design speed set under the corridor analysis. The ramps have a design speed of 30 mph to match city streets.

Table XX is used to tabulate each design element that doesn't meet design standards or a 50 mph design speed. Note that these all meet a 40 mph design speed. The table presents the existing condition (if present), the 50 mph standard, the 40 mph standard, and the proposed condition.

Figures 6 through 11 show the geometric plan and profile information for the transition structure and design elements that correspond to Table XX.

Justifications

1. Lack of right of way is limited in this highly congested area. The combination of the Transition Structure (SR 99 SB and NB), the Detour Alaskan Way South, the existing Alaskan Way Viaduct, the SIG Tail Track (railroads), designated pedestrian paths committed to the city, and Port of Seattle property create very little space to create full standard roadway elements. Eliminating or reducing any of the above would have adverse economic or maintenance of traffic (SR 99 or City of Seattle) effects.
2. The existing Viaduct's dimensions and structural integrity limit the amount of structural modifications that can be performed without infringing public safety and/or construction risk. The goal of this alternative is to limit the amount of retrofitting on the existing Viaduct so that risk, safety, and full closure is held to a minimum. Existing dimensions and roadway criteria limit what roadway design can be connected to it.
3. The program has agreed that the bored tunnel and portal operations are of upmost importance and right of way for heavy construction is already limited. In order to make the operations of future projects in this project, adequate construction staging area is needed. The WOSCA site, purchased right of way, will be needed for bored tunnel operations so that the program can meet an aggressive schedule on within the set budget.
4. Using maintenance of traffic strategies provided with different alternatives would create negative impacts to local businesses and industries in the near vicinity. Shifting traffic to the city streets for full closures would cause severe congestion which would ultimately increase level of service creating unwanted conditions for the City of Seattle.

Figures 6 -11