July 14, 2011

Mr. Tom Niskala
Transportation Planning Director
Corpus Christi Metropolitan Planning Organization
5151 Flynn Parkway, Suite 404
Corpus Christi, Texas 78411

Dear Tom:

This letter is a follow-up to the PR 22 Corridor Study prepared by HDR Engineering, Inc. and submitted to the Corpus Christi Metropolitan Planning Organization (MPO) in April, 2011. The purpose of this letter is to provide a qualitative analysis of potential innovative solutions for the intersection of PR 22 and SH 361 in Corpus Christi, Texas. While the previous study recommended the implementation of a superstreet concept for this intersection, other options were considered and are discussed in detail below.

A myriad of factors were considered in developing alternatives for the intersection of PR 22 and SH 361 including existing and forecasted traffic volumes, traffic distribution and patterns, available right-of-way (ROW), median width, and preliminary costs. The Federal Highway Administration's (FHWA) Alternative Intersection Selection Tool was also used as a preliminary screening tool for alternative concepts and was used in conjunction with other qualitative factors in selecting a recommended alternative. A summary of each alternative is described below.

Traditional Improvements

Traditional improvements include capacity enhancements such as the addition of turn lanes and signal timing optimization. The existing intersection layout of PR 22 and SH 361 is mostly built out with dual left turn lanes on the southbound approach and a free right turn lane for the westbound approach, which are the heaviest movements at the intersection. Analyses of the forecasted 2035 traffic volumes for this intersection do not indicate a need for additional turn lanes on other approaches. The existing intersection will become more constrained as traffic volumes grow in the future. This is due to the protected left-turns for the northbound and southbound approaches which take away green time from the through movements on PR 22, which are also heavy at this intersection.

Continuous Flow Intersection (CFI)

The objective of CFI is to move the left-turn conflict out of the main intersection. In a typical CFI intersection, this is accomplished with a signalized left-turn bay placed several hundred feet before the intersection as shown in Figure 1. The left-turn leg feeds a special CFI leg, which in turn empties into the cross street near the main signalized intersection. The signals at the left-turn bay, CFI crossover, and main intersection are all operated by a single controller and coordinated to

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provide smooth continuous traffic flow. This configuration allows the left turns and through vehicles to travel through the intersection at the same time thereby eliminating the separate left turn phases. This is especially beneficial at intersections where left-turn traffic is heavy and left turns are protected, which takes valuable time away from the through movements.

Figure 1. Example CFI layout to be constructed in Austin, Texas.

A partial CFI for northbound and southbound PR 22 was considered for the intersection based on a review of the traffic volumes and output from the FHWA Alternative Intersections Selection Tool. Although the tool proved favorable results for a CFI, it does not consider existing geometry which is critical to the success of innovative concepts. While the heavy southbound left-turn movement on PR 22 would be accommodated with the CFI concept, due to the significant construction that will be required it is not desirable for conversion to a CFI. Based on a preliminary review of the intersection layout, additional ROW would be required on the east side of the north leg and the west side of the south leg of the intersection to accommodate the CFI lanes. In addition, access would be limited to properties on both the northeast and southwest corners where there are numerous existing driveways. Both of these factors would make a partial CFI costly to construct at this location.

Roundabout

Single and multi-lane roundabouts are gaining popularity in the United States. The FHWA's Alternative Intersections Selection Tool was initially used to evaluate whether 2035 traffic forecasts at the intersection could be accommodated using a single or multi-lane roundabout. Based on output from the FHWA tool, a roundabout will not adequately accommodate the traffic volumes at the intersection in 2035. The speed limit on PR 22 is 55 mph within the study area, which requires

a larger diameter roundabout than a traditional roundabout to allow higher speeds at entries, on the circulatory roadway and at the exits. In addition, geometric constraints at the intersection in terms of ROW availability and maintaining access to adjacent properties makes a roundabout not an ideal alternative for the intersection of PR 22 and SH 361.

Superstreet Concept

A superstreet intersection is a type of intersection that prohibits cross-street traffic on the minor street approach from making left turn or though movements. The minor cross street traffic must turn right and proceed to the downstream U-turn to continue in the motorist's desired direction as shown in Figure 2. Implementation of a superstreet intersection was evaluated for the intersection of PR 22 and SH 361. The initial assessment included preliminary evaluation using the FHWA's Alternative Intersections Selection Tool. In addition, a feasibility analysis was performed to determine if the superstreet footprint fit within the existing pavement footprint or with minor pavement additions. Due to the existing wide median on PR 22, the existing intersection layout provides a good footprint for the superstreet intersection. In addition, the existing traffic volumes and patterns (i.e., low cross-street left and through movements) make it compatible for the superstreet intersection. The highest turn movements at this intersection are the southbound left-turns and the westbound right-turns which operate efficiently with a superstreet concept. Since the superstreet concept will likely fit well within the existing footprint, conversion of the intersection to a superstreet concept will be cost-effective to construct.

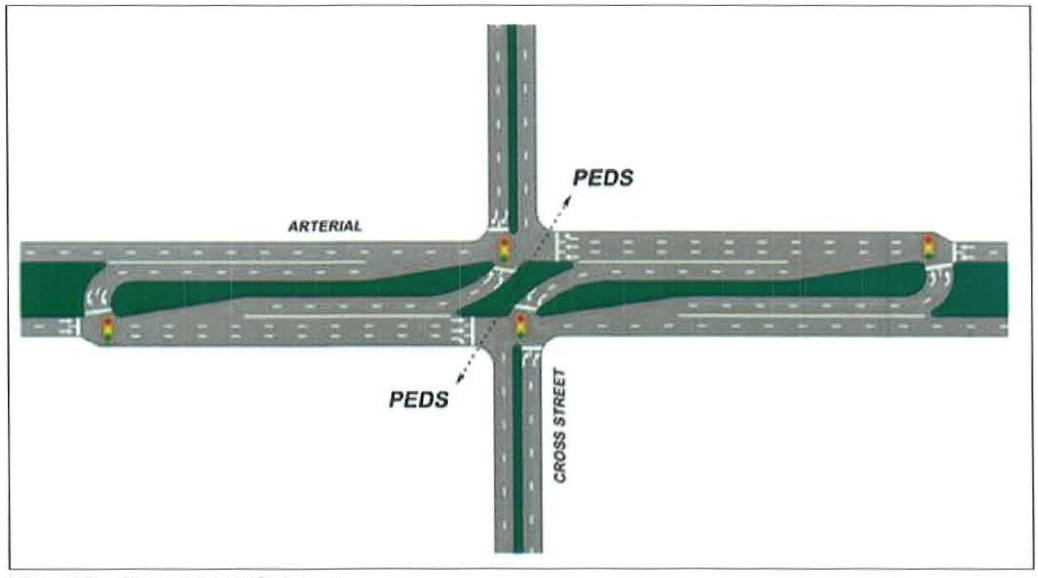

Figure 2. Superstreet Concept

Conclusion

A qualitative analysis of traditional and potential innovative solutions was performed for the intersection of PR 22 and SH 361 in Corpus Christi, Texas. A myriad of factors were considered in developing alternatives for the intersection of PR 22 and SH 361 including existing and forecasted traffic volumes, traffic distribution and patterns, available right-of-way, median width and preliminary costs. The Federal Highway Administration's (FHWA) Alternative Intersection Selection Tool was also used as a preliminary screening tool for alternative concepts and was used in conjunction with other qualitative factors in selecting a recommended alternative. Based on the factors described above, the superstreet concept is recommended for the intersection of PR 22 and SH 361 based on the ability to accommodate the heavy traffic volumes and directional split at the intersection and the ability to fit within the existing ROW due to the existing wide median. The performance measures of the superstreet concept compared to the existing intersection were detailed previously in the PR 22 Corridor Study report submitted to the Corpus Christi MPO in April of 2011.

Please feel free to contact me with any questions or if you need further information.

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