

Alternatives to Avoid Section 4(f) Resources

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This memorandum supplements avoidance alternatives discussed in the May 7, 2008 memorandum titled, "Frontage Road Option" and the *Determination of Effects to Historic Properties* report prepared in late 2008. These documents detailed alternatives that could avoid some but not all Section 4(f) resources and, therefore, are not considered true avoidance alternatives. The purpose of this memorandum is to provide additional details about the three avoidance alternatives discussed in the Section 4(f) chapter of the US 6/Wadsworth EA: Folded Diamond Interchange, Close the Frontage Road, and Improve Kipling and/or Sheridan Interchanges.

Folded Diamond Interchange

A folded diamond interchange avoids one (or two) quadrant of an interchange by placing two directions of exits on one off-ramp. In this case, westbound US 6 traffic would exit on the same loop for both northbound and southbound Wadsworth. It was considered for the US 6/Wadsworth project as an alternative that could avoid the NE quadrant where the four directly affected historic properties are located.

Diagram of Folded Diamond Interchange Option



In order for this alternative to meet capacity demands, the off-ramp would need to be expanded to at least two lanes (one for northbound and one for southbound) and the

deceleration lane along US 6 would have to be extended approximately 1/2-mile to the east to avoid queuing on US 6 that would affect mainline traffic. Both expanding the loop and lengthening (and potentially widening) the deceleration lane have significant consequences that make this option not prudent:

- There are significant operational issues with separating turning movements on a two-lane off-ramp and keeping queues from impacting the WB to SB free flow movement. Separating northbound and southbound traffic on the off-ramp is difficult to do with signing and creates operational inefficiencies as drivers have to make additional decisions about which lane they need to be in. Signage would not meet driver expectations and may confuse drivers; drivers going south would exit in the innermost lane, and drivers going north would exit in the outermost lane. **The operational issues with exiting and signing would not meet the project purpose and need because operational efficiency needs of the interchange would not be achieved, and capacity on US 6 would be reduced as queues would affect the mainline.**
- The operational issues associated with the off-ramp exits is compounded by the need to add a signal to the northbound exit to allow drivers to turn left across Wadsworth traffic to head northbound. Northbound traffic would queue on the ramp, affecting the free-flow movement to the south; maintaining WB to SB as free-flow was one of the primary considerations for selecting a loop in this location. To add a signal and create a two-lane off-ramp defeats the purpose of selecting a loop and compromises the purpose and need so significantly that reconstruction of the interchange would no longer be a good option. Additionally, adding another signal to Wadsworth would reduce the capacity of through traffic on Wadsworth and not meet the purpose and need of increasing capacity on Wadsworth. **The combined loop would not meet purpose and need for capacity improvements to the interchange or Wadsworth or operational efficiencies of the interchange.**
- Expanding the size of the loop would create additional property impacts in the NW quadrant, would increase impacts to waters of the U.S. at the confluence of McIntyre and Lakewood gulches, and create additional encroachments into the floodplains of these gulches. Depending on the interaction of the frontage roads, expanding the loop could also require use of another historic property in the NW quadrant (5JF4563). The US 6 bridge over Wadsworth would need to be widened, adding additional construction and maintenance costs. **These additional impacts and costs contribute to making this option not prudent. If use of 5JF4563 was required, this option would not avoid Section 4(f) use.**
- Extending the deceleration lane to the east would affect the four historic properties that this alternative sought to avoid. By widening US 6, the deceleration lane would have a similar effect as the off-ramp in this location, encroaching on properties (JF4536, 4JF4542, 5JF3549, and 5JF3548) and other properties within the Green Acres Historic District. **Without the extended deceleration lane, this option cannot meet the project purpose and need because capacity and operational needs of the interchange would not be addressed and queuing associated with the exit lane would adversely affect US 6 mainline traffic, increasing congestion. With the deceleration lane, the folded diamond would affect the historic properties and not be an avoidance alternative.** (Shifting US 6 to the south to avoid impacts to the historic properties also would not be

prudent because impacts would extend east and west for at least ½ mile or more on both the north and south sides of the roadway, causing other Section 4(f) properties to be used [Meadowlark Hills Historic District, 5JF4563] Additionally, this option would be very costly, at least doubling the cost of the proposed project.)

Close the Frontage Road

An option to close the frontage road was considered to reduce the footprint of the off-ramp/frontage road in front of the affected historic properties (JF4536, 4JF4542, 5JF3549, and 5JF3548). Without maintaining the required width of the frontage road, this option might allow the off-ramp to be reconfigured by using the space of the frontage road and not encroaching on the historic properties. **This alternative is not feasible because access to the historic properties is only from the frontage road so a roadway needs to be maintained in some form (cul-de-sac, frontage road) in front of the properties. Without access, these properties would need to be acquired, and there would be no avoidance of Section 4(f) use.**

Improve Kipling and/or Sheridan Street Interchanges

An option to improve surrounding interchanges without constructing improvements to the US /Wadsworth interchange was considered to avoid impacting Section 4(f) properties. This option was not prudent because:

- **It would not meet the safety needs of the project** because weave conditions, short acceleration and deceleration lengths, and other design deficiencies that contribute to unsafe conditions for vehicles would remain, independent of whether volumes could be reduced by improving adjacent interchanges.
- The project's **multi-modal needs would not be met** without improvements to the interchange and to Wadsworth.
- **It would not meet the travel demands** for regional and local access to Wadsworth and, therefore, would not meet the project's needs to accommodate traffic demands. The *Traffic Study Report* found that there is already latent demand on Wadsworth that, because of the inefficiencies and congestion of the existing US 6/Wadsworth interchange and Wadsworth between 4th and 14th Avenues, is being met by Kipling and Sheridan. The latent demand supports that Wadsworth is a primary destination and that the surrounding roadways cannot meet the access demands of Wadsworth. Wadsworth is the only continuous north-south roadway on the west side of the Denver metropolitan area and serves an unique and important role in regional travel. Major governmental and retail centers, such as City Commons and two Wal-Marts, are served primarily from the US 6/Wadsworth interchange.