

CO 21 (Powers Boulevard) and Research Parkway Interchange



The Colorado Department of Transportation (CDOT) has initiated the design and development of the Powers Parkway Boulevard and Research Interchange. This project is part of a broader, ongoing CDOT plan that has been sequentially providing improvements to interchanges all along the Powers Boulevard Corridor due to growth in that area. The project is located in El Paso County on Colorado Highway 21 (CO 21)/(Powers Boulevard) between milepost 149 and 151 and Research Parkway between Scarborough Drive and Cross Creek Drive.

The conceptual design of this interchange was approved in 1997 as part of the Powers Boulevard Extension North, Woodmen Road to Interstate 25 Environmental Assessment (EA).

The EA defines a plan to address the needs within the Powers & Research interchange limits. CDOT is required to implement the Powers & Research grade separated interchange solution following reevaluation of any changes that have taken place within the area since. The planning and design process is in compliance with the National Environmental Policy Act (NEPA) during the re-evaluation.

The current configuration is an at-grade signalized intersection. Key issues at this intersection:

- excessive vehicle wait times
- inadequate left turn lanes
- multimodal movements are not currently well-accommodated
- excessive vehicular congestion

Recommended Improvements

CDOT has identified approximately \$40 million to design and reconstruct the improvements in phases.

The project is intended to produce the following improvements:

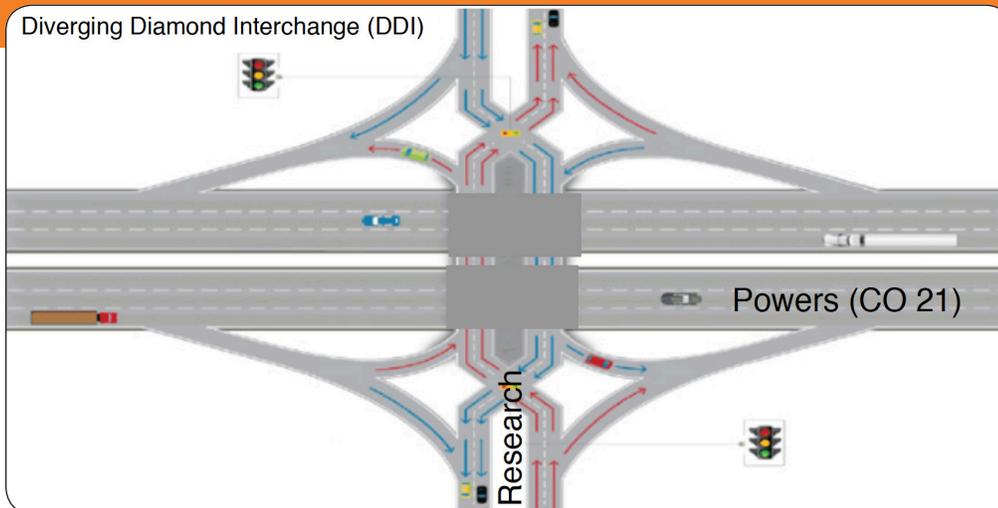
- Increased capacity – in and around the reconstructed intersection
- Improved safety
- Higher level of service
- Improved riding surface (smoother and stronger pavement)
- Bridge replacement
- Resurfacing, restoration, rehabilitation
- Reconstruction

Various alternative interchange types analyzed include:

- Single Point Urban Interchange (SPUI)
- Tight Urban Diamond Interchange (TUDI)
- Partial Cloverleaf
- Diverging Diamond Interchange
- Round-about/Dog Bone Configuration

Based upon the Valued Engineering study (completed in summer 2018) the design alternative selected for this intersection is a Diverging Diamond Interchange (DDI), (similar to the Fillmore/I-25 Interchange). This DDI will have more distance between the signalized intersections as compared to Fillmore/I-25 Interchange.

Diverging Diamond Interchange



Gray box on figure above represents new bridges on Powers Boulevard over the top of Research Parkway.

A Diverging Diamond Interchange (DDI) is a type of diamond interchange in which the two directions of traffic on the non-freeway road (Research Parkway) cross to the opposite side on both sides of the bridge at the freeway (Powers Boulevard). It is unusual in that it requires traffic on Research Parkway to briefly drive on the opposite side of the road from what is customary. The crossover “X” sections can either be traffic-light intersections or one-side overpasses to travel above the opposite lanes without stopping, to allow nonstop traffic flow when relatively sparse traffic.

Advantages

- Two-phase signals with short cycle lengths, significantly reducing delay.
- Reduced horizontal curvature reduces the risk of off-road crashes.
- Increases the capacity of turning movements to and from the ramps.
- Potentially reduces the number of lanes on the crossroad, minimizing space consumption.
- Reduces the number of conflict points; thus, theoretically improving safety.
- Increases the capacity of an existing overpass or underpass, by removing the need for turn lanes.
- Costs significantly less than a normal interchange.

Phase 1 PRELIMINARY DESIGN COMPLETED IN SUMMER 2018:

- Re-evaluation of 1997 Environmental Assessment
- Value Engineering study
- Approximately 30% design model showing the ultimate footprint
- Identification of design criteria
- Cost estimate for construction
- Update of traffic engineering and rights-of way, as needed
- Land survey

Phase 2 FINAL DESIGN:

- Final design of Diverging Diamond Interchange (DDI)
- Right-of way easement plans
- Geo tech borings
- Road surveying
- Stakeholder and property owner outreach
- Public meeting/open house spring 2019

Project Contacts

Andrew Stecklein
CDOT Project Manager
Ph: 719-227-3264
Andrew.stecklein@state.co.us

Steve Murray
Consultant Project Manager
Ph: 719-314-1800
Steve.murray@fhueng.com

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