

MEMORANDUM

To: Lesli Ellis

From: Bill Fox, PE

Date: September 12, 2016

Project: CU South Site Suitability Analysis - Transportation

Subject: **Multi-modal Access Opportunities and Constraints - DRAFT**

Multi-modal accessibility is an important consideration when evaluating future land uses on the CU South parcel as part of the Boulder Valley Comprehensive Plan Update process. The ability to efficiently access the 316-acre parcel at the southeastern edge of the City of Boulder will help determine appropriate land use type, intensity and location within the property. Figure 1 includes an aerial view of the entire CU South site.

In this context, the Fox Tuttle Hernandez Transportation Group has completed an initial review of multi-modal access potential for the CU South property. In making this review we have:

- Reviewed the site and surrounding land uses;
- Conducted a site inspection of existing roadways, bikeways, and pathways that currently access the site;
- Identified potential for additional roadway, bikeway, and pathway access around the perimeter of the site;
- Reviewed the multi-modal facility plans contained in the City of Boulder's Transportation Master Plan, with a focus on the CU South property;
- Reviewed the US 36 Environmental Impact Statement, with a focus on the Table Mesa Drive/US 36 interchange alternatives that, when implemented, will affect access to the CU parcel;
- Met with City of Boulder Transportation Division staff to review site access issues; and
- Prepared a set of transportation opportunity and constraint sketches on aerial photo base maps.

The results of this multi-modal access evaluation are summarized by topic as follows:

Existing and Potential Roadway Access:

S. Loop Drive

Currently, the only paved roadway access to the CU South property is provided by S. Loop Drive. It accesses the site from the Table Mesa Drive/S. Loop Drive/US36 Eastbound Ramp intersection. This 5-leg signalized intersection is included on **Figure 3** and illustrated in the attached **Photos 1 and 2**. S. Loop Drive is a narrow 2-lane roadway that extends approximately 1/3 mile into the property before terminating at a gravel parking area and an old industrial building (**Photos 3 and 4**). The parking area serves as access to 12 tennis courts and a gravel trail that loops through the property.

In the future, S. Loop Drive should continue as the primary vehicular access to the CU South property. As the area develops, the roadway should be reconstructed as a “complete street” with multi-modal facilities to accommodate bus, bicycle, pedestrian, and automobile traffic. It is recommended that the northern end of S. Loop Drive be incorporated into a “mobility hub” that connects all modes of travel and provides efficient circulation for RTD and CU buses, with bus, pedestrian and bicycle connectivity to the transit station along US 36 (see discussion below related to the potential US 36 interchange reconfiguration that was identified in the US 36 EIS). The future configuration of the Table Mesa Drive/Loop Drive/US 36 Ramp intersection and adjacent interchange will need to be carefully considered so as to provide safe and efficient access to CU South.

The extent of future storm water detention upstream of US 36 that is implemented will also have a significant impact on the land uses and access roadways in this northwest end of the CU South site. See the discussion below on this topic.

Tantra Drive

Tantra Drive is a 50-foot wide 2-lane street with on-street parking that extends from Table Mesa Drive south and then east to the western edge of the CU property (**see Figure 3, and Photos 5 and 6**). It currently carries less than 4,000 vehicle trips per day just south of Table Mesa Drive. It provides access to the commercial area south of Table Mesa Drive, abuts the Summit Middle School property where there is a pick-up and drop-off zone, and then provides access to multi-family residential housing. The eastern terminus of Tantra Drive was constructed as if it were intended extend east into the CU site.

The easterly extension of Tantra Drive into the CU property would make a logical secondary roadway access to CU South. Tantra Drive has a cross-section that can comfortably accommodate additional automobile traffic, and it connects to Table Mesa Drive at a signalized intersection.

However, speed mitigation through the school access area will be important, and the adjacent residents along Tantra Drive will likely object to the additional traffic.

Moorhead Circle

At the eastern end of Tantra Drive there is a 90 degree “T” intersection with Moorhead Circle, which extends south along the western edge of the CU property (see **Figures 3 and 4**). There is multi-family housing along the west edge of Moorhead Circle, and a raised, vegetated berm on the CU property along the east edge of the roadway (see **Photo 8**). Moorhead Circle is 32 feet wide with on-street parking along both sides.

While it would be physically possible to construct a roadway connection from the CU site directly onto Moorhead Circle, the narrow width and residential character on this area would make any new roadway connection undesirable.

Marshall Road

Marshall Road is a narrow paved 2-lane road in Boulder County that parallels CO 93 south of the CU property (see **Figure 5**). The northern terminus of Marshall Road is located at the southwest corner of the CU site, where it reaches the Boulder city limits (see **Photo 11**). There is a short connection (approximately 140 feet) between Marshall Road and CO 93, located approximately 700 feet south of the northern end of Marshall Road (see **Photo 12**).

While Marshall Road does nearly connect to the CU property, it is not recommended as a future extension into the site as the property develops due to the narrow width, the adjacent residential properties in Boulder County, and the substandard spacing between Marshall Road and CO 93.

Southwestern Access Onto CO 93 (Broadway)

The only other existing vehicular access to the CU property is located at the extreme southwestern corner of the site where there is a dirt roadway that extends east from the northern terminus of Marshall Road and runs along the south edge of the property (see **Photo 10**). It is not clear if this dirt roadway is on or off of the CU site, but eventually it does connect to the looping gravel roadway (cross-country course) within the CU property.

In the future, there is the potential to extend a new roadway access from the CU property and connect directly onto CO 93 (Broadway) as illustrated on **Figure 5**. CDOT has classified CO 93 as a non-rural arterial (NR-A), and the State Highway Access Code defines the geometric access requirements based on access category. A new roadway connection to CO 93 in this location would require a State Highway Access Permit, and it would also likely require a number of variances from Access Code geometric requirements related to intersection spacing and the design of auxiliary turn lanes, etc. A new access in this location would also need to be designed to overcome the existing topography that slopes downward to the east of the highway.

The amount of traffic that would utilize this new roadway connection will depend on the magnitude and placement of new land uses within CU South. The amount of future traffic using this access will determine the necessary intersection configuration and traffic control (stop sign or signal for example). That said, it is recommended that any internal roadway connection or connections between this new access at the south end of the property, and the Loop Drive access at the north end of the property, be constructed in a circuitous or non-direct alignment to discourage any outside traffic from cutting through the CU South property to avoid the Table Mesa Drive/Broadway connection.

Existing and Potential Bikeway and Pathway Access:

There are a number of gravel or dirt pathways that exist on, around, and through the CU South parcel as illustrated on **Figure 1**. A number of “social path” connections have been created between the CU site and the adjacent residential neighborhoods to the west (**see Photos 7 and 9**). The site also fronts on the US 36 Bikeway to the north, the Broadway path to the southwest (**see Photo 11**), and nearly reaches the South Boulder Creek Trail to the east.

In this context the CU property has excellent pathway and trail access, but there is room for improvement. **Figure 2** is a portion of the City’s Bicycle System Plan from the Transportation Plan, and it illustrates a number of pathway connections that have been identified. **Figures 3 – 5** provide a more detailed look at trail connections that could be enhanced to become multi-use paths, and a number of new connections to adjacent neighborhoods and pathways as the site is developed. These connections will help support bicycle and pedestrian access to and through the site, and also provide access to the transit network as it evolves.

Existing and Potential Transit Access:

Existing local and regional RTD buses pass through the adjacent bus stops along Table Mesa Drive and US 36 in close proximity to CU South, including the 206, 209, DASH, AB, and Flatiron Flyer routes. Eventually, as the property develops, there will likely be CU bus service to the site. The challenge will be coordinating the design of the CU site in the Mobility Hub area as it develops, in concert with future modifications to the adjacent US 36 interchange and its ramps, to accommodate the circulation of buses and the connectivity between bus routes to maximize bus transit service to the CU South parcel.

It is anticipated that the design of the internal multi-modal grid within the CU property will facilitate CU and/or local RTD bus circulation as appropriate given land uses and development intensity.

Potential Future Reconfiguration of the Adjacent US 36 Interchange:

The US 36 Environmental Impact Statement (EIS) considered alternatives for reconstructing the US 36/Table Mesa Drive/Foothills Parkway interchange. The Combined Alternative Package (Preferred Alternative) of the EIS describes two interchange reconfiguration “options” that provided distinctly different access to the CU South parcel (**see Figure 6**). The “Local Streets Option” would close the intersection of Table Mesa Drive and Loop Drive, and access to CU South would be provided by an extension of Tantra Drive into the CU site. The other option would maintain the intersection of Loop Drive onto Table Mesa Drive. These two options would have distinctly different impacts on the accessibility of the CU site and on the adjacent neighborhood as well.

Ultimately, *Section Four, Interchange Design Concepts, Impacts, and Mitigation* of the EIS references a subsequent agreement that was made between CDOT, the University of Colorado, the City of Boulder, and Boulder County that the preferred interchange design at this location will retain the existing intersection of Loop Drive and Table Mesa Drive to provide access to the CU South parcel. That said, the Preferred Alternative would still impact the configuration of the interchange ramps in the area and the relationship between the US 36 ramps, the transit stops along US 36 in this area, and the routes that buses would need to take to access the transit stations.

Figure 6 illustrates the Preferred Alternative interchange layout. It can be seen that buses on Table Mesa Drive would need to circulate on Loop Drive to access the eastbound US 36 transit stop, but would then be routed onto eastbound US 36. This calls out the need to better define local and regional bus access in this area, and supports the concept of making this northwest corner of the CU South parcel a mobility hub that includes efficient connectivity between local and regional RTD bus routes, future CU bus routes, etc.

Impacts of the South Boulder Creek Flood Mitigation Project:

The Final South Boulder Creek Major Drainageway Plan – Alternatives Analysis Report, August 2015, contains a number of alternatives related to storm water detention upstream of US 36 in the CU South parcel. The preferred Alternative D, accepted by council in August 2015, will entail construction of a berm along US 36, excavation of 81 acres in the northeast portion of the CU South property to create a detention pond, and fill of approximately 31 acres of the northwestern portion of the CU South property to 5370 feet a.s.l. (See attached Figure 9-5 Option D from Drainageway Plan). Of the seven alternatives considered, Alternative D minimized impacts to sensitive species from nearby Open Space Mountain Parks (OSMP) properties and minimized impacts to sensitive environmental resources.

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Ultimately, the South Boulder Creek flood mitigation will influence the configuration of multi-modal transportation access facilities on the site. In this context, it is recommended that the “mobility hub”, referenced above, be located as far north as possible within the CU South parcel to make multimodal travel and connections between modes and to off-site facilities as efficient as possible.

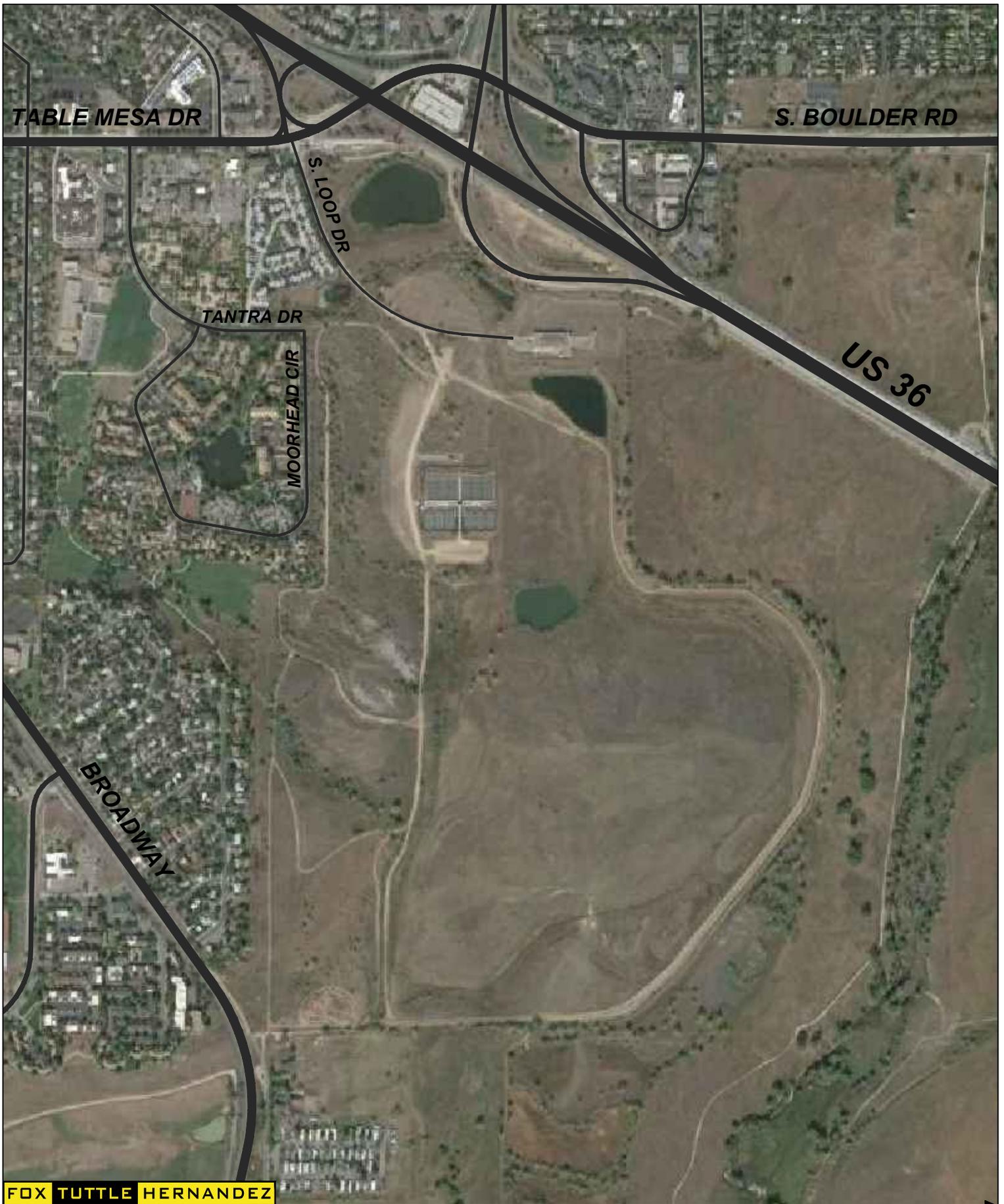
I hope this review of existing and potential multi-modal access to the CU South property is helpful. Please let me know if you have any questions.

In the next phase of this project, as future land use plans are developed for the site, we can assist with quantifying the amount and type of multi-modal transportation demand that may be expected on the various facilities that access the site.

/BF

Attachments:

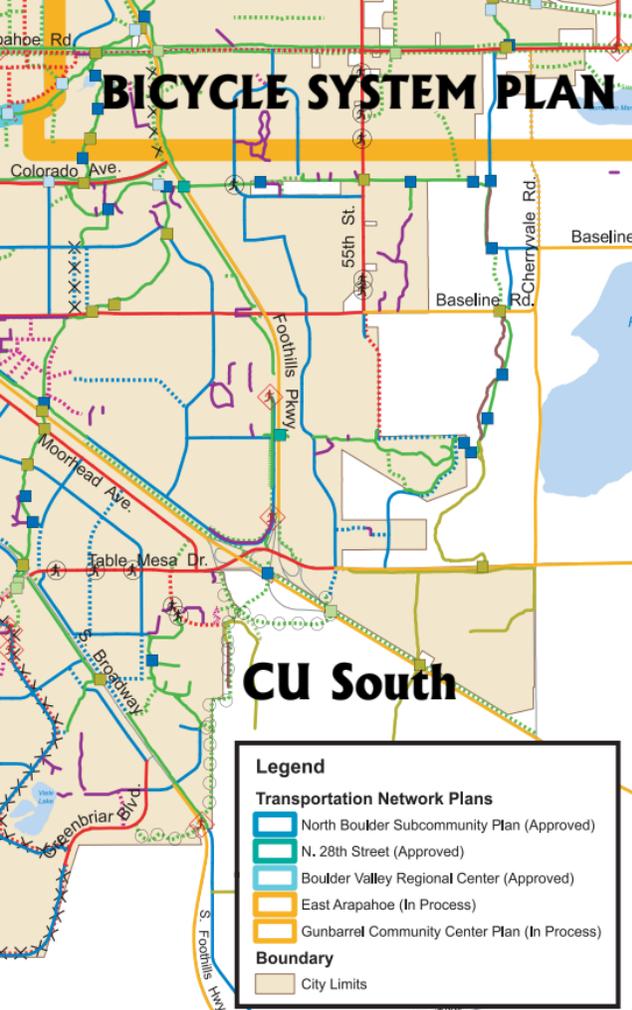
- Figure 1 Study Area Aerial Photo
- Figure 2 Boulder Transportation Master Plan - Bicycle Facility Plan (portion)
- Figure 3 – 5 Potential Multi-modal Access Improvements
- US 36 Interchange Sketch
- Site Photos 1 - 12
- Storm Water Detention Upstream of US 36, Options D



FOX TUTTLE HERNANDEZ
TRANSPORTATION GROUP

CU BOULDER SOUTH PARCEL ACCESS STUDY
STUDY AREA

Project #	16029	Original Scale	NTS	Date	7/27/16	Drawn by	CRS	Figure #	1
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BICYCLE SYSTEM PLAN

CU South

Legend

Transportation Network Plans

- North Boulder Subcommunity Plan (Approved)
- N. 28th Street (Approved)
- Boulder Valley Regional Center (Approved)
- East Arapahoe (In Process)
- Gunbarrel Community Center Plan (In Process)

Boundary

- City Limits

Existing Features

- ENHANCED PED CROSSING EXISTING
- BRIDGE EXISTING
- OVERPASS EXISTING
- UNDERPASS EXISTING

Proposed Features

- ENHANCED PED CROSSING PROPOSED
- EXISTING PED CROSSING UPGRADE
- BRIDGE PROPOSED
- EXISTING BRIDGE UPGRADE
- OVERPASS PROPOSED
- UNDERPASS PROPOSED
- PROPOSED UNDERPASS (Road Bridge)

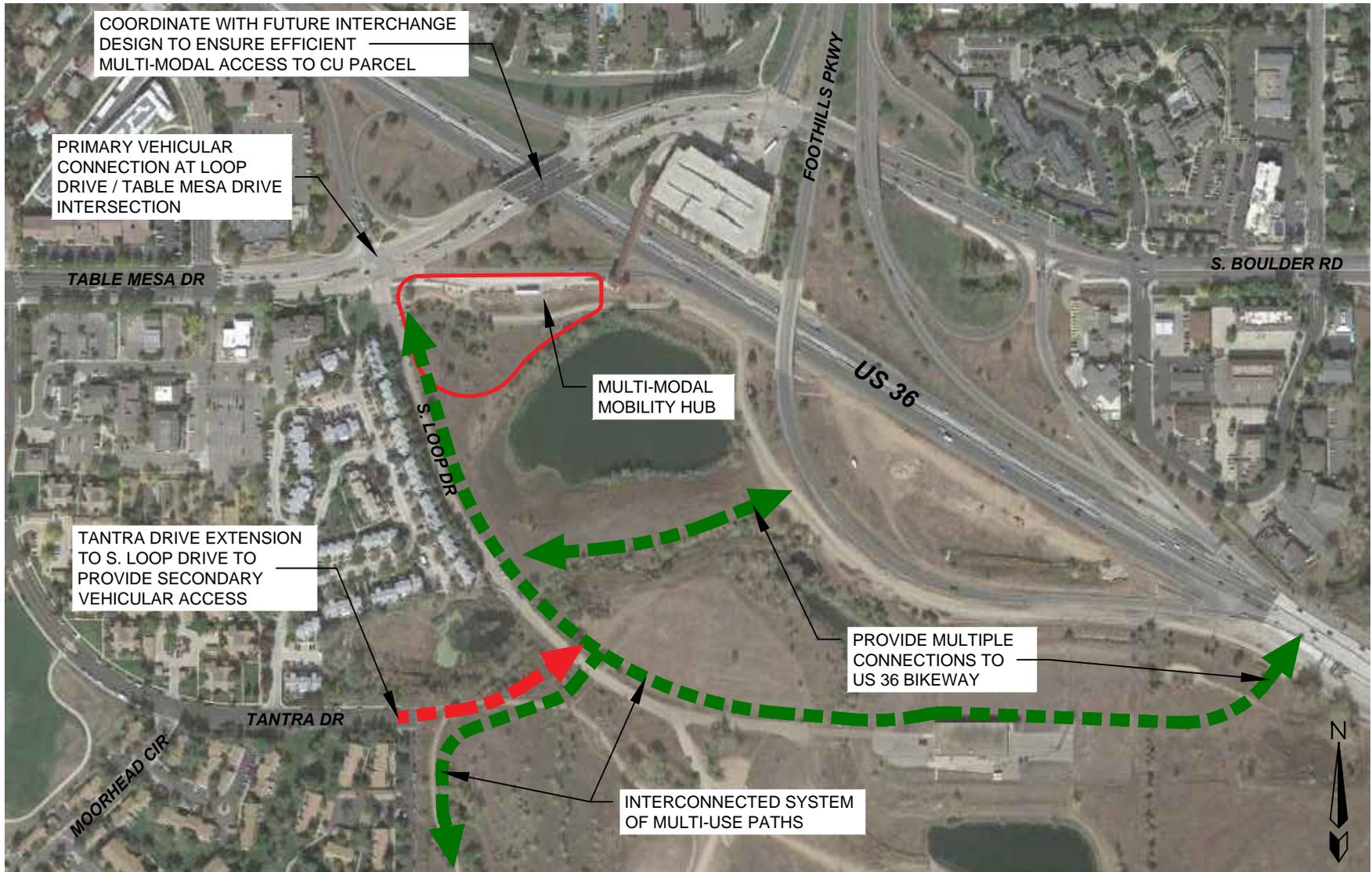
Existing Bike System

- CONTRA FLOW BIKE LANE EXISTING
- DESIGNATED BIKE ROUTE EXISTING
- MULTI-USE PATH EXISTING
- ON-STREET BIKE LANE EXISTING
- PAVED SHOULDER EXISTING
- SIDEWALK CONNECTION EXISTING
- SOFT SURFACE MULTI-USE PATH EXISTING
- SOFT SURFACE PEDESTRIAN PATH EXISTING
- STREET WITH SINGLE BIKE LANE EXISTING

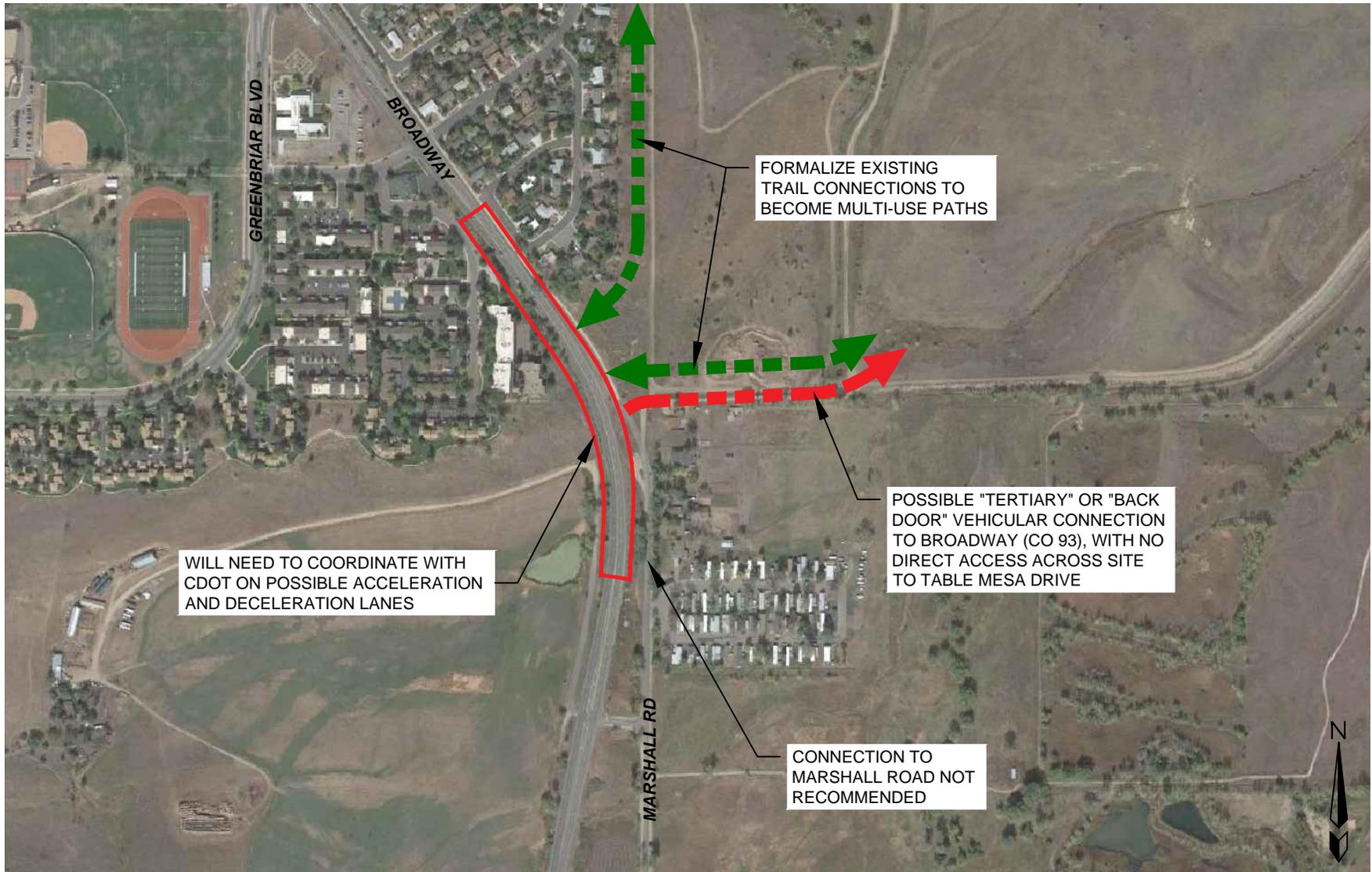
Proposed or Upgraded Road

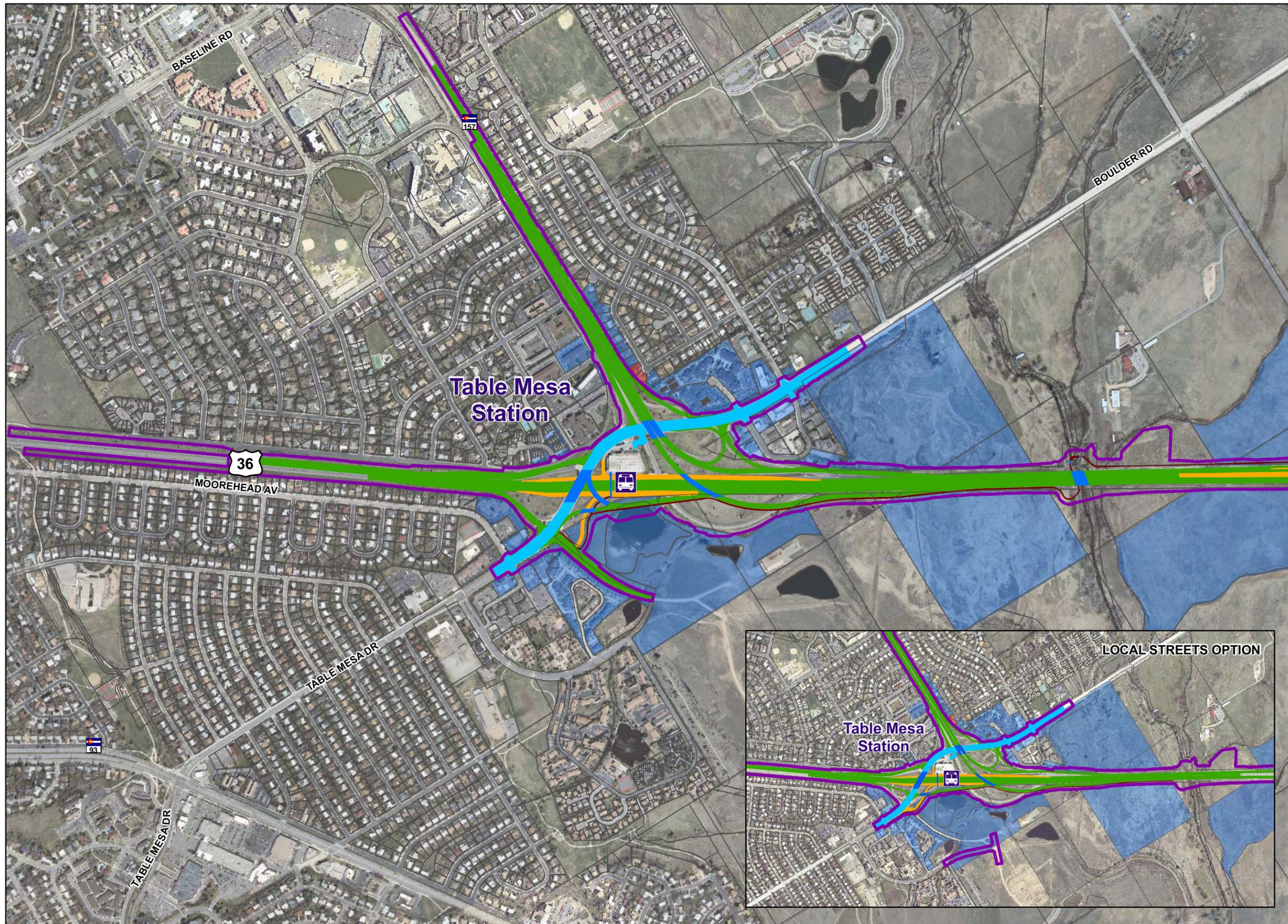
- BUS/BIKE LANE PROPOSED
- CONTRA FLOW BIKE LANE PROPOSED
- DESIGNATED BIKE ROUTE PROPOSED
- MULTI-USE PATH PROPOSED
- MULTI-USE PATH EXISTING UPGRADE
- UPGRADE TO MULTI-USE PATH
- ON-STREET BIKE LANE PROPOSED
- ON-STREET BIKE LANE EXISTING UPGRADE
- PAVED SHOULDER PROPOSED
- SIDEWALK CONNECTION PROPOSED
- SIDEWALK CONNECTION EXISTING UPGRADE
- SOFT SURFACE MULTI-USE PATH PROPOSED
- SOFT SURFACE MULTI-USE PATH EXISTING UPGRADE
- Conceptual Alignment (2019)
- Remove from 1996 TMAP

FIGURE 2

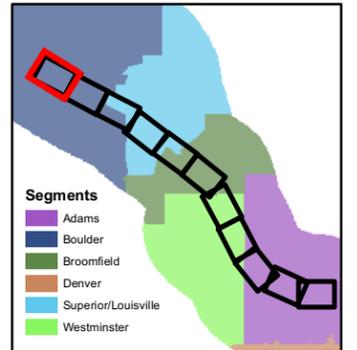






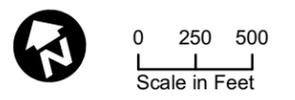


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Legend
Appendix A -
Corridor Reference Maps
Combined Alternative Package
(Preferred Alternative)

- US 36 Combined Alternative Package Footprint
- Arterial Improvements
- Bridges
- Bikeways
- Managed Lanes and Transit Stations
- General-purpose Lanes
- Work by Others
- Partial Property Acquisition
- Full Property Acquisition
- Parcel Boundary
- BRT/Rail Station
- BRT Station



US 36 CORRIDOR
 Environmental Impact Statement



Figure 6

Photo 1 Eastbound Table Mesa Drive at Loop Drive



Photo 2 Northbound Loop Drive at Table Mesa Drive



Photo 3 Southbound Loop Drive south of Table Mesa Dr.



Photo 4 Loop Drive within CU South



Photo 5 Westbound Tantra Drive just west of CU South



Photo 6 Eastbound Tantra Drive approaching CU South



Photo 7 Trail from Tantra Drive into CU South



Photo 8 Southbound on Moorhead Circle



Photo 9 Trail from Moorhead Circle into CU South



Photo 10 South property line looking west toward Broadway



Photo 11 North end of Marshall Road along CO 93 (Broadway)



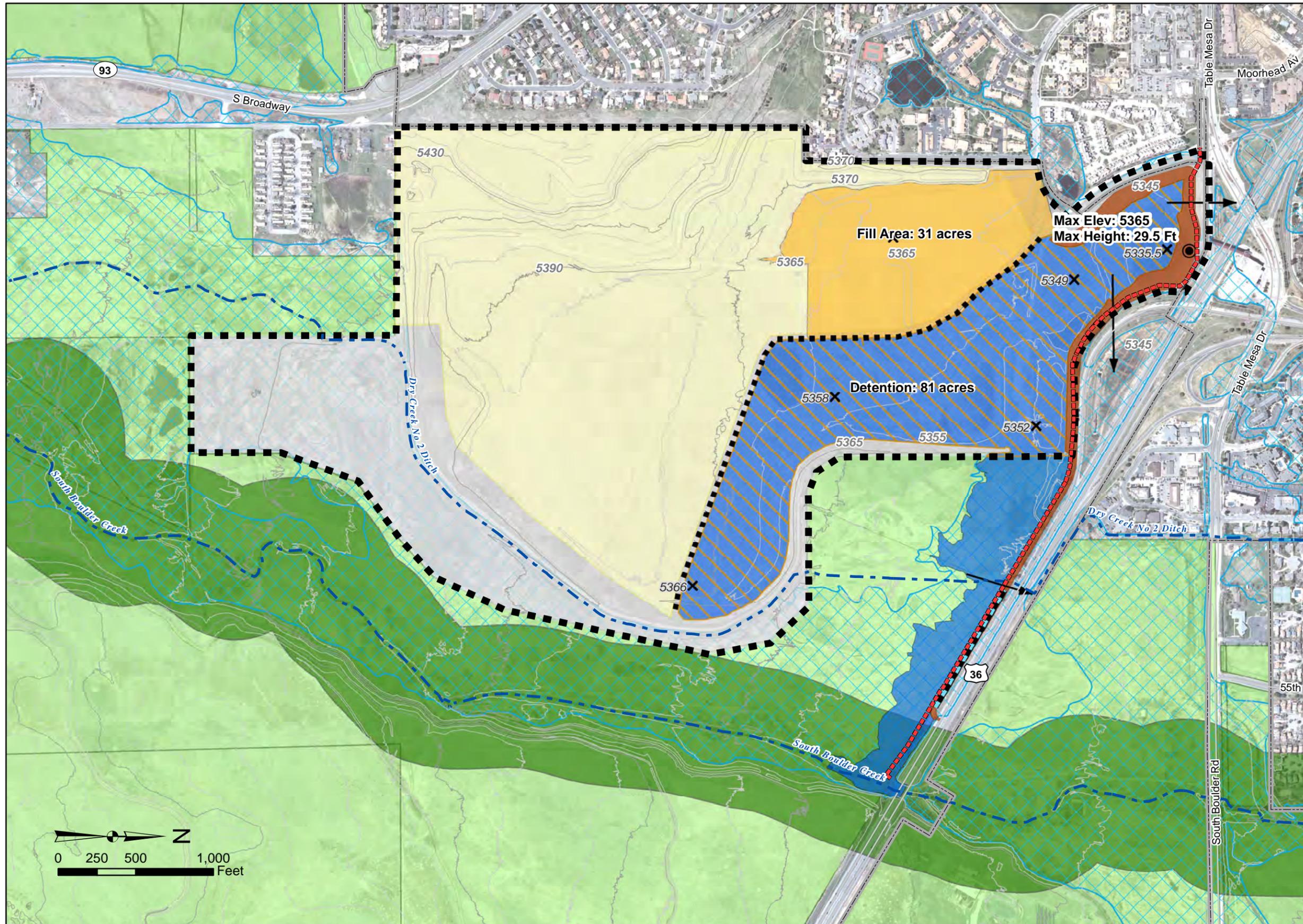
Photo 12 Marshall Road Connection to CO 93



Stormwater Detention Upstream of US36

South Boulder Creek Flood Mitigation Project

Figure 9-5
Option D



Single Berm
With excavation
With fill
On CU and OSMP property
In CDOT Existing ROW
Max Berm Height 29.5ft

Description	Acres
Total CU Property	302
CU Property Impacted	78
CU Building Potential Impacted	30
OSMP Property Impacted	19

Proposed Conditions

- New Berm
- Pool Contained By Fill or Cut Slope
- Limits of Excavation
- Detention Pond Area
- Fill Area
- Out of 100yr Inundation
- X Spot Elevation
- Max Berm Elevation
- Discharge Location
- Spillway

Existing Conditions

- Boulder City Limits
- CDOT Existing ROW
- CU Site Boundary
- OSMP Property
- Prebles Critical Habitat Area
- Effective 100 Year Floodplain
- 5 Foot Contours
- 10 Foot Contours

