



W 13th Ave Realignment Study

Feasibility Study | March 2017



13TH AVENUE REALIGNMENT FEASIBILITY STUDY

Prepared for:

City and County of Denver
Department of Public Works
201 W. Colfax Ave, Dept. 608
Denver, CO 80202

Prepared by

Felsburg Holt & Ullevig
6300 South Syracuse Way, Suite 600
Centennial, CO 80111
(303) 721-1440

Design Workshop
1390 Lawrence Street, #100
Denver, CO 80204
(303) 623-5186

Zoeller Consulting, LLC
1932 North Locust Street
Denver, CO 80220
(303) 929-3848

FHU Reference No. 112197-04

March 2017

Acknowledgments

Denver City Council

District 3 - Paul D. Lopez

Denver Project Management Team

Karen Good, Public Works

Steven Chester, Community Planning and Development

Sarah Anderson, Public Works

Justin Schmitz, Public Works

Brad Dodson, Finance

Rachael Bronson, Public Works

Jay Henke, Public Works

Ryan Billings, Public Works

SUV Valley ECO District

Chris Parr

Community Partners

Sun Valley residents and businesses

Sun Valley Youth Center

Mercy Housing

Sun Valley Kitchen

Rude Recreation Center

Fairview Elementary School

Earthlinks

Consultant Support

Felsburg Holt and Ullevig

Design Workshop

Livable Studios, Inc.

Zoeller Consulting, LLC



Table of Contents

- 1.0 INTRODUCTION 1**
 - 1.1 Project Goals and Objectives 1
 - 1.2 Previous Plans 1
 - 1.2.1 Decatur-Federal Station Area Plan 3
 - 1.2.2 Sun Valley Master Plan 3
 - 1.3 Project Area 3
 - 1.4 Study Process and Schedule 3
- 2.0 EXISTING CONDITIONS 6**
 - 2.1 Demographics 6
 - 2.2 Infrastructure 6
 - 2.2.1 Bike Routes 6
 - 2.2.2 Transit Routes 8
 - 2.2.3 Average Daily Traffic 8
 - 2.2.4 Level of Service 8
 - 2.2.5 Railroad Crossings 12
 - 2.2.6 Existing Cross Sections 12
 - 2.3 Environmental Considerations 12
- 3.0 PUBLIC OUTREACH 15**
 - 3.1 Introduction 15
 - 3.2 Project Website 15
 - 3.3 Outreach Activities and Events 15
 - 3.3.1 Outreach Activities and Events in 2014 15
 - 3.3.2 April 2016 Public Meeting 16
 - 3.3.3 June 2016 Stakeholder Workshop 16
 - 3.3.4 September 2016 Stakeholder Workshop 17
 - 3.3.5 Property Owner Meetings 18
 - 3.3.6 November 2016 Public Meeting 18
- 4.0 ALTERNATIVES DEVELOPMENT AND EVALUATION PROCESS 19**
 - 4.1 Introduction, Purpose 19
 - 4.2 Tier 1 20



4.2.1	Tier 1 Elements	20
4.2.2	Tier 1 Evaluation Criteria	32
4.2.3	Tier 1 Scoring	33
4.2.4	Tier 1 Outcome	33
4.3	Tier 2	36
4.3.1	Tier 2 Alternatives.....	36
4.3.2	Tier 2 Evaluation Criteria	37
4.3.3	Tier 2 Scoring	37
4.3.4	Mini Roundabout	46
4.3.5	Tier 2 Outcome	46
5.0	PREFERRED ALTERNATIVE	47
5.1	Alignment.....	47
5.2	Cross Section.....	47
5.3	Bike Facilities.....	47
5.4	Green Infrastructure	51
5.5	Future Traffic Operations.....	53
6.0	RECOMMENDED NEXT STEPS.....	56

Appendices

- Appendix A. Environmental Consideration
- Appendix B. June 2014 Public Meeting Questions and Answers
- Appendix C. April 2016 Public Meeting Materials and Summary
- Appendix D. June 2016 Stakeholder Workshop Materials and Summary
- Appendix E. Sun Valley Community Coalition Letter and Project Response
- Appendix F. September 2016 Stakeholder Workshop Materials and Summary
- Appendix G. November 2016 Public Meeting Materials and Summary



List of Figures

Figure 1.	Timeline of Previous Plans	2
Figure 2.	Project Area	4
Figure 3.	Schedule.....	5
Figure 4.	Bike Routes	7
Figure 5.	Transit Routes	9
Figure 6.	Average Daily Traffic	10
Figure 7.	Level of Service	11
Figure 8.	Railroad Crossings.....	13
Figure 9.	Existing Cross Sections	14
Figure 10.	Process Flowchart.....	19
Figure 11.	Design Speeds	21
Figure 12.	Transition West of S. Platte River with 13th Avenue Tie-in.....	23
Figure 13.	Transition West of S. Platte River with 13th Avenue Dead End	23
Figure 14.	Transition West of Decatur Street	24
Figure 15.	One-way Couplet	24
Figure 16.	Grid Network Completion.....	25
Figure 17.	Basic with Tree Lawn Cross Section.....	27
Figure 18.	Basic with Bike Lanes Cross Section.....	27
Figure 19.	Parking One Side Cross Section	28
Figure 20.	Sun Valley Master Plan Cross Section.....	28
Figure 21.	Realign West of Decatur	30
Figure 22.	Realign East of Decatur	30
Figure 23.	Full-size Roundabout	31
Figure 24.	Tier 1 Bike Network Alternatives	31
Figure 25.	Grid Completion Alternative.....	38
Figure 26.	Green Infrastructure Alternative	39
Figure 27.	Multimodal Enhancement Alternative	40
Figure 28.	Preferred Alternative Cross Sections.....	48
Figure 29.	View of 13 th Avenue.....	49
Figure 30.	View of Holden Place	50
Figure 31.	Stormwater Bumpout	52
Figure 32.	2040 Traffic Volumes	54
Figure 33.	Preferred Alternative Design	55



List of Tables

Table 1.	Evaluation Criteria	32
Table 2.	Evaluation Matrix.....	34
Table 3.	Tier 2 Alternative Summary	37
Table 4.	Results.....	41



1.0 Introduction

13th Avenue is envisioned as a transformative infrastructure project to better connect Sun Valley, the Decatur-Federal Station, adjacent neighborhoods, and downtown. The City hired Felsburg Holt & Ullevig (with subconsultants Design Workshop and Zoeller Consulting) to conduct a feasibility study for the 13th Avenue and Holden Place corridors. The purpose of the study was to evaluate the technical feasibility of realigning 13th Avenue and to determine the preferred alignment.

1.1 Project Goals and Objectives

The study was guided by the following goals:

- ▶ Study the technical feasibility of realignment alternatives for 13th Avenue
- ▶ Understand and communicate the trade-offs with different alignment alternatives
- ▶ Develop conceptual design and cost estimates for the Preferred Alternative to help find funding for the project

The project team and stakeholders agreed that the study would determine a feasible Preferred Alternative that met the following objectives:

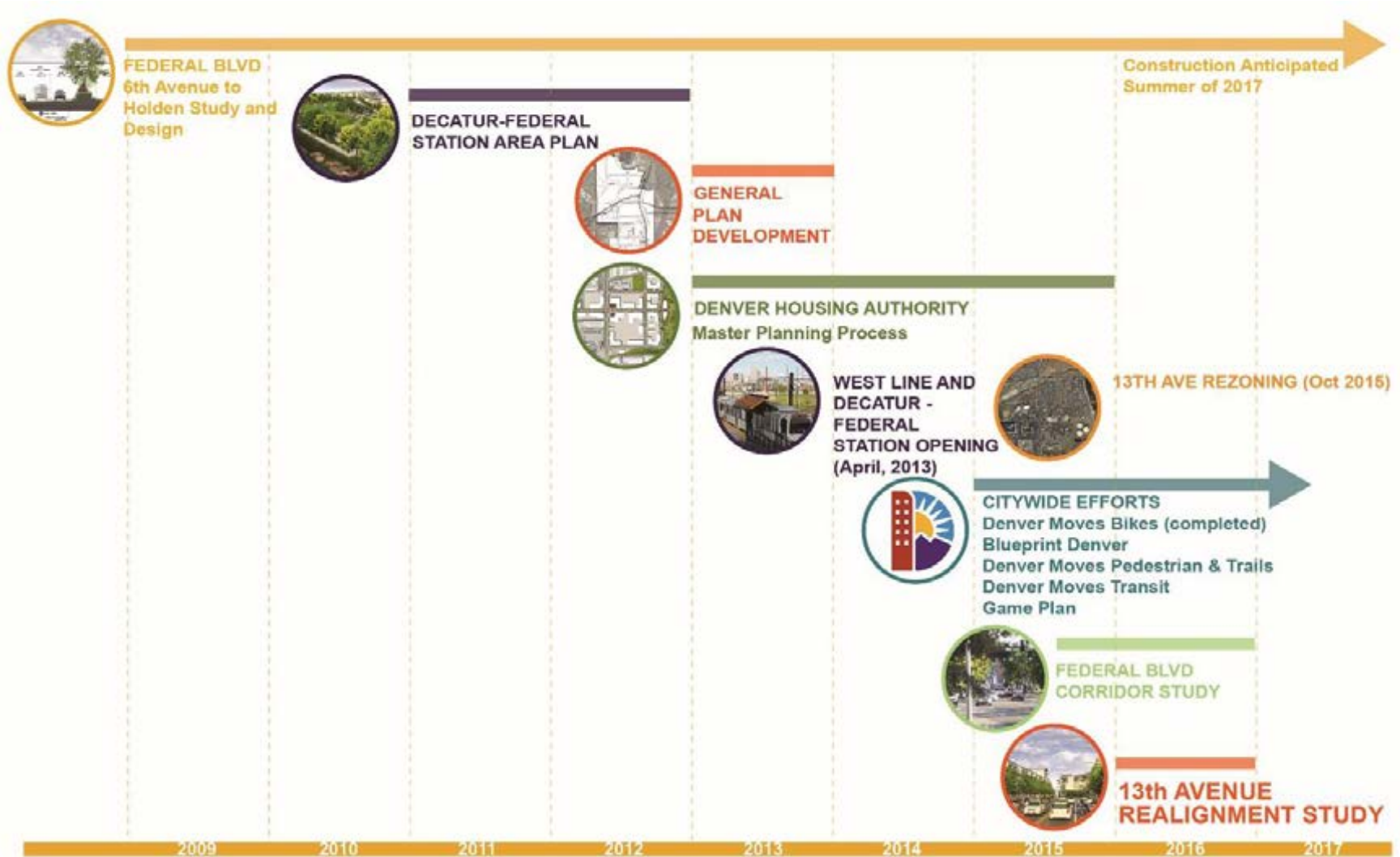
- ▶ Connect Sun Valley to Downtown and surrounding neighborhoods
- ▶ Provide safe and convenient routes/facilities for all modes
- ▶ Extend a gridded street network to support community vitality
- ▶ Enhance 13th Avenue and Holden Place as green connections to parks and trails
- ▶ Create a street network that supports economic development

1.2 Previous Plans

Previous planning efforts guided the Realignment Study. **Figure 1** shows a timeline of previously completed plans. Specifically, the Decatur-Federal Station Area Plan and the Sun Valley Master Plan provided a foundation for the realignment feasibility.



Figure 1. Timeline of Previous Plans



1.2.1 Decatur-Federal Station Area Plan

The City and County of Denver and the Denver Housing Authority (DHA) jointly led the Decatur-Federal Station Area Plan—a plan that guides future growth and change near the light rail station and in the Sun Valley neighborhood for the next 20 years. The plan focuses on reconnecting an isolated low-income neighborhood to the city, building physical infrastructure, connecting to the new light rail station, and building social capital for long-term returns. The vision is to transform Sun Valley into a neighborhood that is celebrated, connected, innovative, and healthy. The plan includes six transformative projects in the recommendations, all of which are essential to achieving the plan vision. The six projects include the 13th Avenue realignment, a new riverfront park, an entertainment district near the stadium, high quality residential, connecting people to jobs and education, 10th Avenue enhancements, and improvements to the Federal and Colfax interchange.



Additionally, a General Development Plan (GDP) was completed following the Station Area Plan that anticipates the necessary infrastructure to support the future development. This was approved in 2014.

1.2.2 Sun Valley Master Plan

The Sun Valley Master Plan, led by the DHA, builds on the work done in the Station Area Plan providing a more detailed building program, additional information on infrastructure, district energy and stormwater systems, and the associated phasing for the redevelopment of the neighborhood. The master plan is built around six priority areas that are essential to the future success of the community: youth and education; food; opportunity; intentional housing; connections and open space; and sustainable infrastructure. The plan further supports the vision for 13th Avenue as a key east/west connector and further emphasizes the importance of the timing of the 13th Avenue realignment so that DHA can build their early phases of housing along the realigned road.

1.3 Project Area

The project area includes a portion of the Denver neighborhood of Sun Valley, roughly bound by Federal Boulevard on the west, Colfax Avenue on the north, the South Platte River on the east, and 10th Avenue on the south. Certain existing conditions were collected for resources located outside the project vicinity but that influence the study area, such as railroad crossing counts and traffic counts. **Figure 2** shows the study area.

1.4 Study Process and Schedule

The study began in April 2014 and was intended to be a six-month process. However, in late May 2014, the decision was made to pause the study until the Public Utilities Commission’s (PUC) final ruling on Xcel’s docket concerning the operation and decommissioning of the Zuni Plant. The project restarted in February 2016 with completion anticipated by December 31, 2016. **Figure 3** shows the schedule for 2016.



Figure 2. Project Area



Figure 3. Schedule



2.0 Existing Conditions

An inventory and analysis of the existing transportation conditions in the primary study area and surrounding neighborhoods was conducted to present a snapshot of how transportation is currently provided to the Sun Valley area. The purpose of this inventory is to establish a baseline of the current roadway, bicycle, pedestrian, transit, rail, and environmental conditions. The inventory was initially completed in spring 2014. The project team verified the inventory and updated, as necessary, to reflect conditions once the project restarted in spring 2016. The completed inventory and analysis maps are included on the following pages.



Holden Place (looking east toward downtown) currently dead ends into the Xcel Energy property

2.1 Demographics

The Sun Valley neighborhood is a young, diverse community, with 57 percent of residents less than 20 years old and only 13 percent of residents 40 years or older. Forty-nine percent of residents are Hispanic or Latino, and another 20 percent of the resident population is Black or African American. Most households (58 percent) make less than \$10,000 a year. In terms of transportation, nearly 30 percent of households rely on public transportation as their primary means of transportation to work, and another 17 percent carpool (American Community Survey [ACS], 5-year estimate, 2010–2014). These figures are significantly higher than both national and Denver averages.

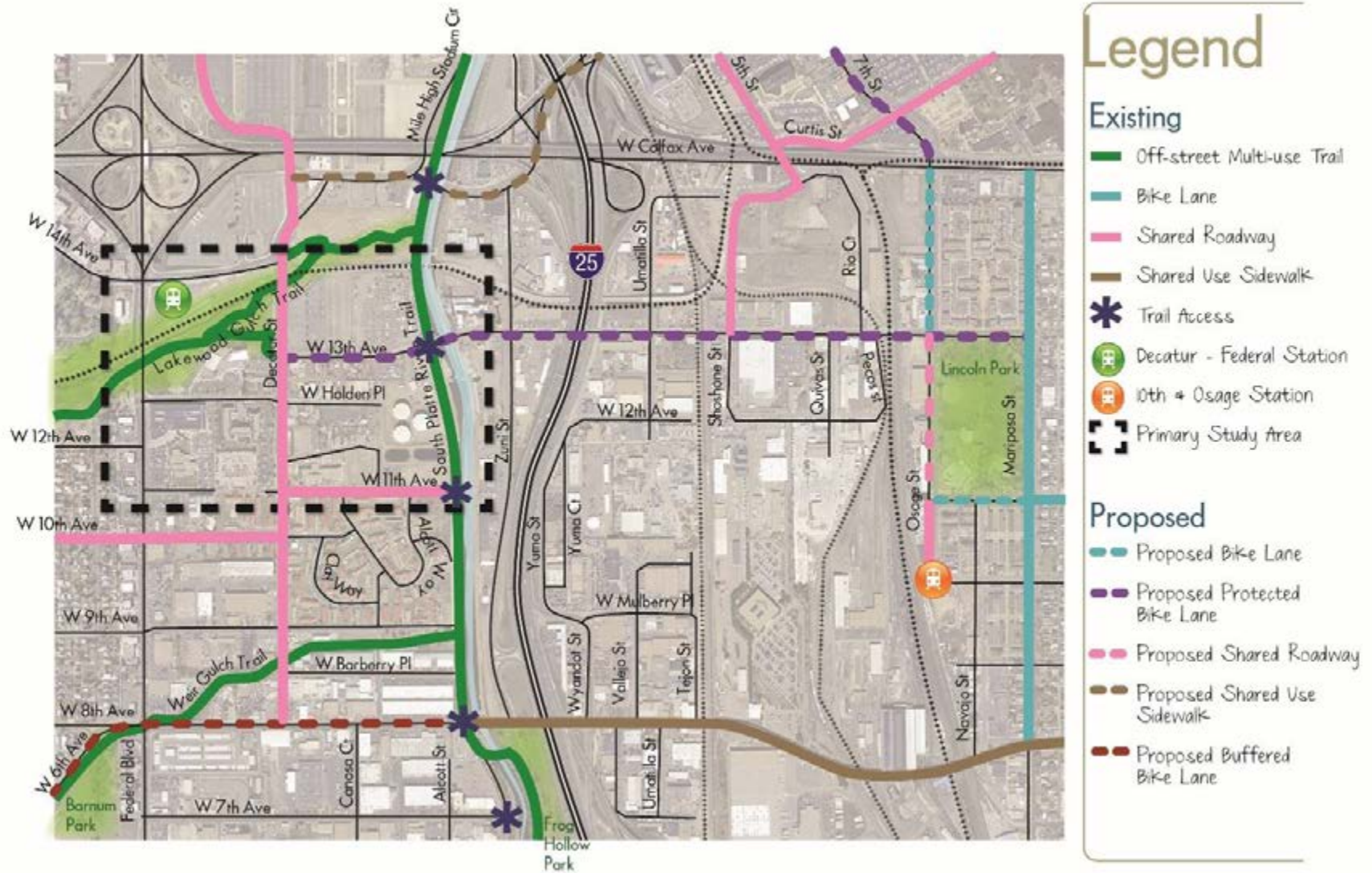
2.2 Infrastructure

2.2.1 Bike Routes

The primary study area is served by shared roadway facilities (on N. Decatur Street and W. 13th Avenue) and off-street trails facilities (including Lakewood Gulch Trail and South Platte River Trail). Denver Moves: Enhanced Bikeways, Denver’s plan for enhanced on-street bicycle facilities, was updated in 2016. This plan identifies W. 13th Avenue as a protected bike lane facility. The proposed facility on W. 13th Avenue would connect users to the existing and proposed facilities surrounding the study area. **Figure 4** shows these connections. The plan also identifies the intersection of the facility on W. 13th Avenue and the South Platte River Trail as an important connection between the on-street and trail networks.



Figure 4. Bike Routes



Source: Denver Moves: Bikes

2.2.2 Transit Routes

The study area is served by RTD rail and bus service. **Figure 5** shows the existing transit routes. The W Rail Line, which opened in May 2013, stops at the Decatur/Federal Station, located in the northwest portion of the study area. Connections can be made to bus routes 1, 16, 30, 33, and 36L near the station along Federal Boulevard and W. 14th Avenue. The Route 9 bus also connects the Sun Valley neighborhood and the La Alma/Lincoln Park neighborhood.

Rail lines C, D, E, F, and H also stop at the 10th and Osage Station in the surrounding neighborhood of La Alma/Lincoln Park.

2.2.3 Average Daily Traffic

Traffic counts were collected in the study area in 2014. **Figure 6** uses coloring and bandwidths to show the current daily traffic volumes. The primary streets in the study area (W. 13th Avenue, W. Holden Place, and Decatur Street) experience far less traffic than the more major thoroughfares of Federal Boulevard and W. Colfax Avenue. W. 13th Avenue carries approximately 3,300 vehicles per day (vpd). Decatur Street carries approximately 3,800 vpd and W. Holden Place carries approximately 2,100 vpd west of Decatur Street and less than 250 vpd east of Decatur Street. This is to be expected as W. Holden Place is currently a dead-end east of Decatur Street.

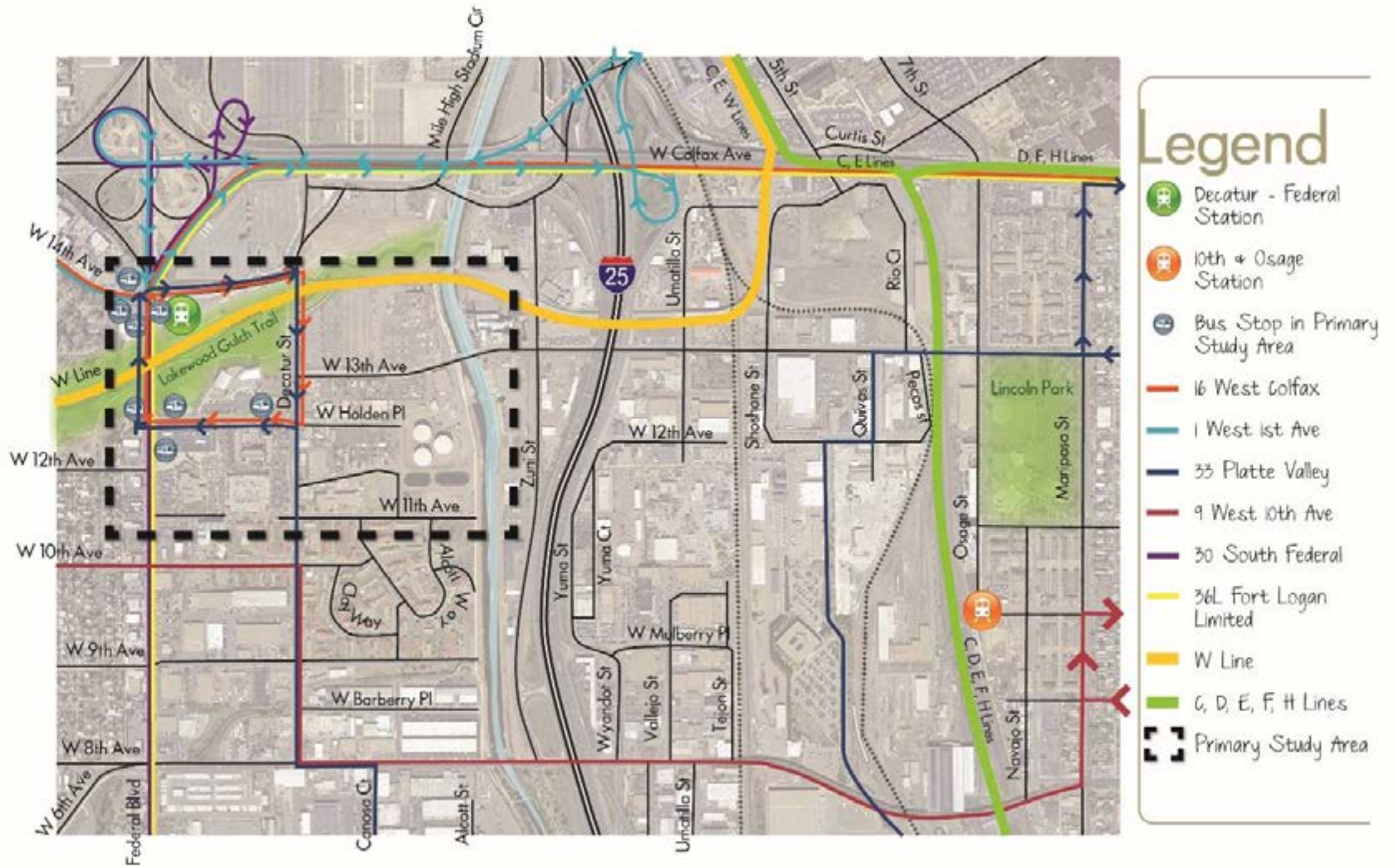
2.2.4 Level of Service

The study evaluated five major intersections in the primary study area and surrounding neighborhoods to determine the level of service (LOS) for motorists. Three of the intersections are unsignalized (Decatur Street and W. 13th Avenue, Decatur Street and W. Holden Place, Decatur Street and W. 10th Avenue) and two are signalized (Federal Boulevard and W. Holden Place, Zuni Street and W. 13th Avenue).

LOS is a qualitative measure used to rate the quality of traffic and delay experienced by motorists. The rating uses a scale of A through F, with A being the best and F being the worst. All the turning movements evaluated in 2014 received a LOS rating of A or B, except for one movement in the primary study area, turning onto Decatur Street from W. 13th Avenue. This movement had a LOS rating of C. However, since the study restarted in spring 2016, this intersection location has been converted to a three-way stop, which improved the LOS to A/B (AM/PM). **Figure 7** shows the results of the LOS evaluation.



Figure 5. Transit Routes



Legend

- Decatur - Federal Station
- 10th + Osage Station
- Bus Stop in Primary Study Area
- 16 West Golfax
- 1 West 1st Ave
- 33 Platte Valley
- 9 West 10th Ave
- 30 South Federal
- 36L Fort Logan Limited
- W Line
- G, D, E, F, H Lines
- Primary Study Area

Figure 6. Average Daily Traffic

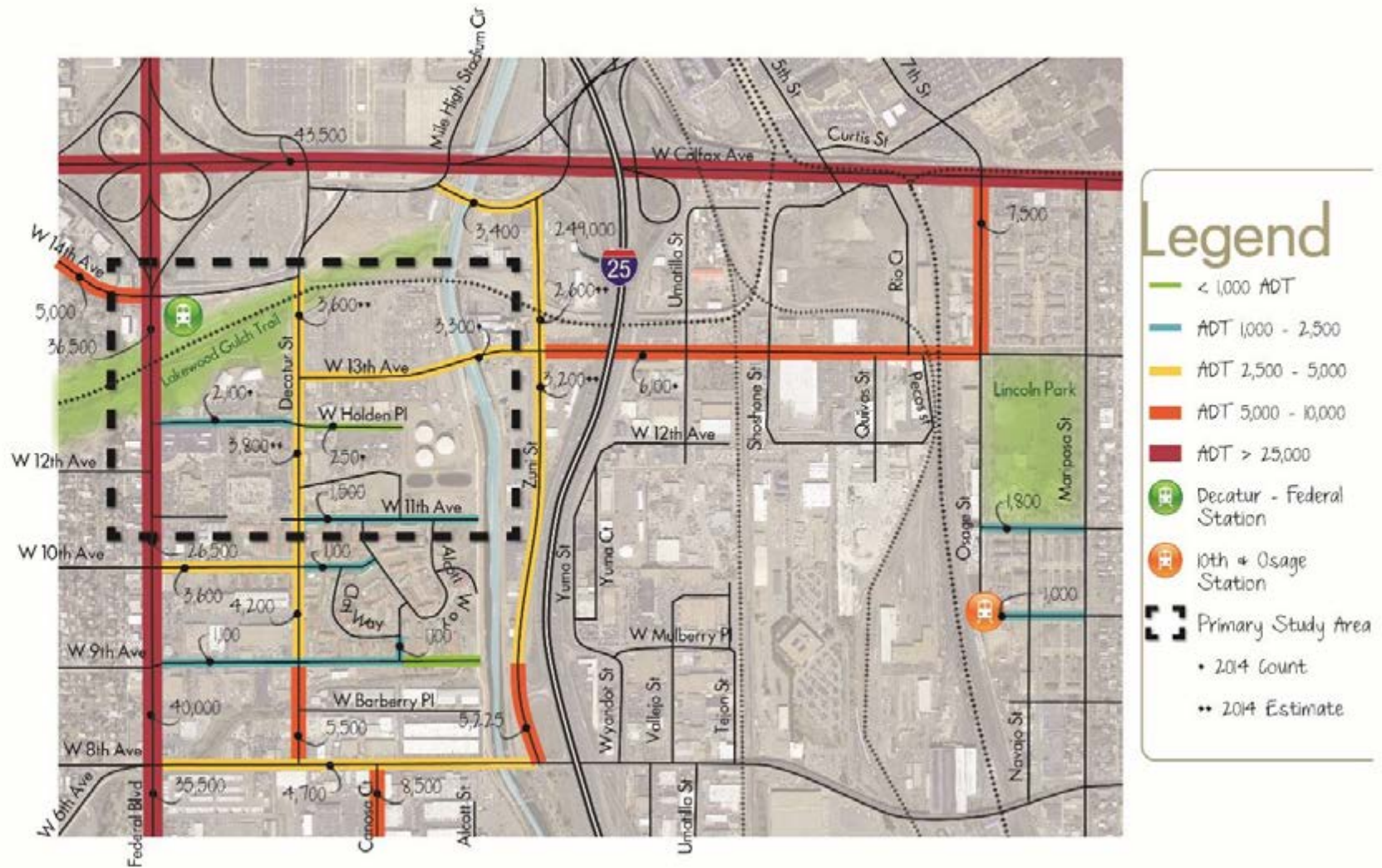
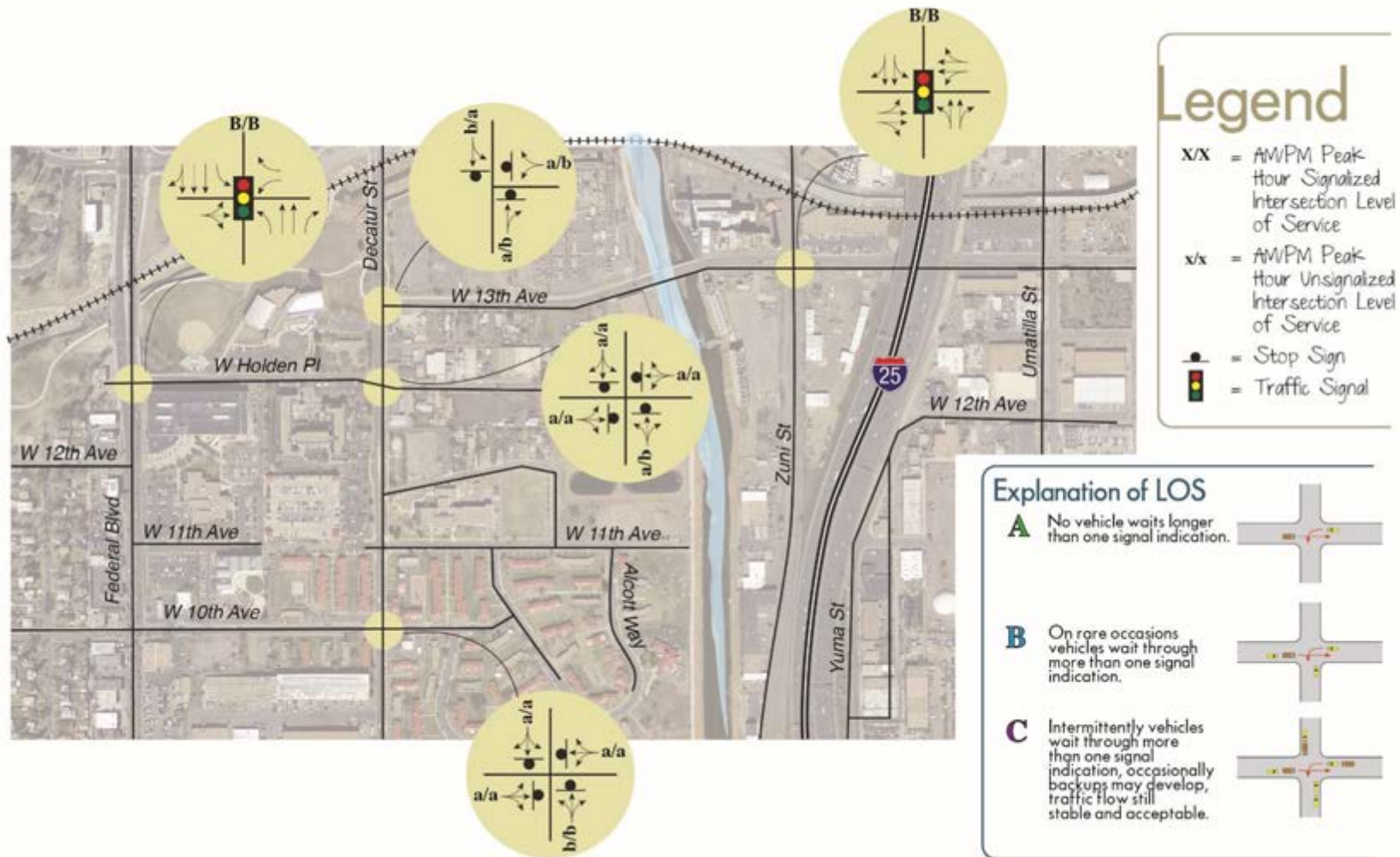


Figure 7. Level of Service



2.2.5 Railroad Crossings

The primary study area includes one at-grade railroad crossing on N. Decatur Street located immediately south of W. Howard Place. The tracks serve the RTD West Rail Line (W Line). Approximately 176 light rail trains cross at this location daily. Two additional at-grade railroad crossings just east on W. 13th Avenue have an impact on the primary study area. The first crossing, between Umatilla Street and Shoshone Street, includes two industry spurs and two mainline tracks. This crossing experiences on average 38 trains daily. The second crossing, between Pecos Street and Osage Street, includes one industry spur and two light rail tracks (RTD lines C, D, E, F, and H). This crossing experiences on average 447 trains daily, which includes both light rail trains and freight rail. **Figure 8** shows the crossing locations.

2.2.6 Existing Cross Sections

An inventory of the existing roadway cross sections was completed to understand travel lane widths, parking, sidewalks, and landscaping characteristics. **Figure 9** shows the cross sections of six locations.

2.3 Environmental Considerations

The potential for environmental impacts was also considered as part of the existing conditions. The purpose of identifying existing environmental conditions is to have a clear understanding of the existing physical opportunities and constraints of the study area. The project team identified a list of resources potentially present within the study area to evaluate. These resources include:

- ▶ Noise Conditions
- ▶ Air Quality
- ▶ Historic Resources
- ▶ Park and Recreation Resources
- ▶ Hazardous Materials
- ▶ Biological
- ▶ Wetlands
- ▶ Demographics

Appendix A provides a summary of each resource evaluation. Should future phases of the project be funded by a federal funding source, a more in-depth environmental assessment may be required.

Of the resources inventoried, the following should be addressed in future phases of the project:

- ▶ Construction noise would be subject to relevant local regulations and ordinances
- ▶ A hot spot conformity analysis to assess air quality would need to be conducted
- ▶ If construction activities affect Rude Park or the South Platte River Greenway, a Section 6(f) evaluation would be required

The following resources would need to be evaluated if a detention basin is a part of the final design:

- ▶ A 404 permit from the US Army Corps of Engineers (USACE) would need to be attained
- ▶ A wetland delineation around the detention basin outflow would need to be conducted
- ▶ A historical survey around the detention basin outflow would need to be conducted

A full evaluation of all resources discussed in **Appendix A** would need to be conducted if federal funds are used or if any other activity that initiates the National Environmental Policy Act (NEPA) process occurs.



Figure 8. Railroad Crossings

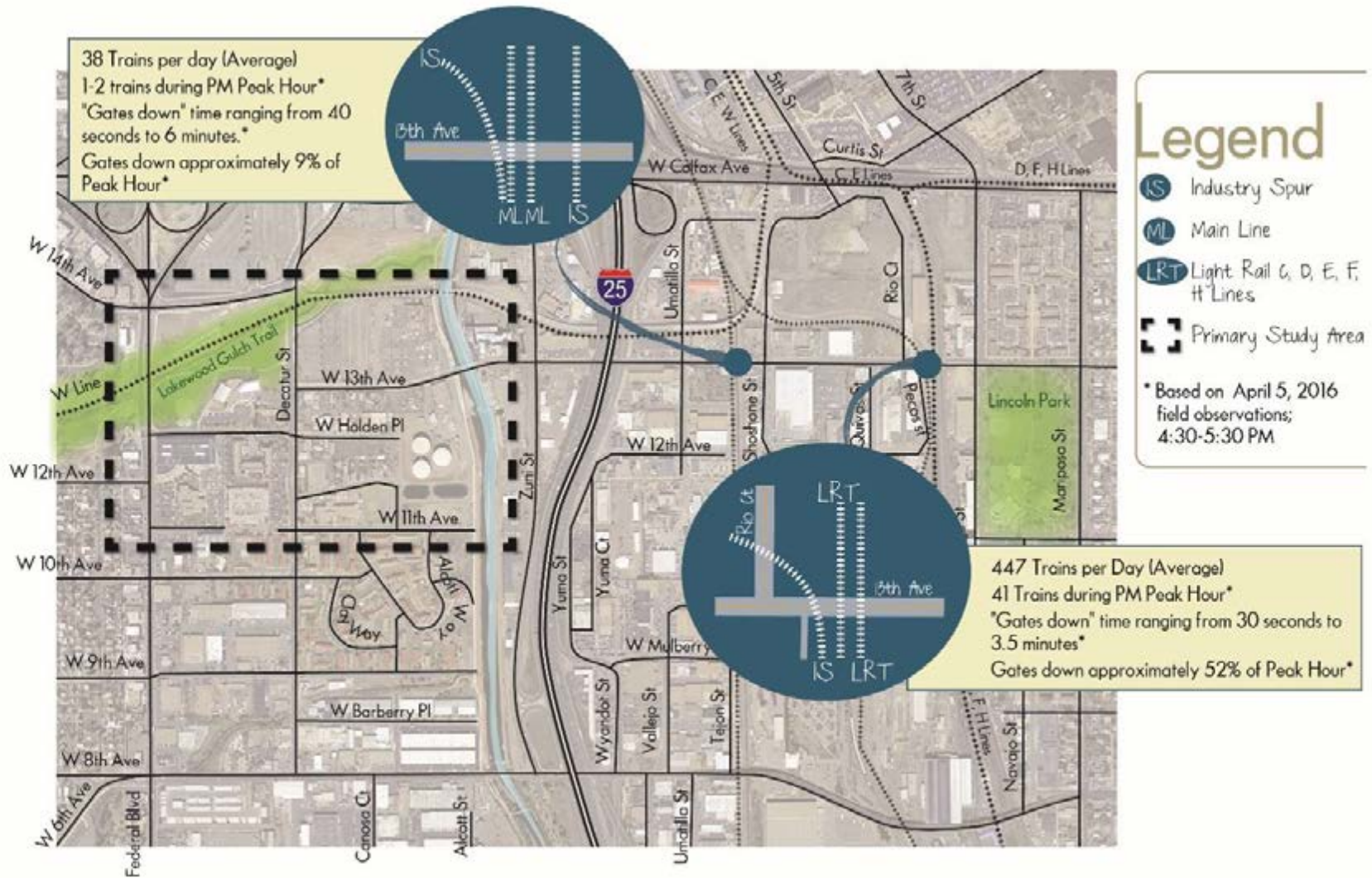


Figure 9. Existing Cross Sections



3.0 Public Outreach

3.1 Introduction

The public involvement process was a two-pronged approach; the outreach focused on reaching the broader community and engaging key stakeholders, specifically the most-impacted residents and business owners along Holden Place, Decatur Street, and W. 13th Avenue. This process allowed engagement with the broader community such as residents of surrounding neighborhoods, citywide coalitions, the Sun Valley Registered Neighborhood Organization (RNO), patrons of the community services located in the study area, and home and business owners in the corridor.



3.2 Project Website

A project website (www.denvergov.org/w13thave) was maintained throughout the life of the project. The website provided a project overview and history, a fact sheet for download, contact information for the project team, and up-to-date information on meetings. Public meetings and stakeholder workshops were advertised on the project website, and meeting materials were uploaded to the website following every meeting.

3.3 Outreach Activities and Events

3.3.1 Outreach Activities and Events in 2014

The project team began meeting with key stakeholders and community members in spring 2014. City staff and project team members attended the Sun Valley RNO Meeting on May 6, 2014, to provide general information on the project and public process and to invite people to attend the Land Use Committee meeting (LUC) scheduled for May 12, 2014. The Sun Valley LUC Meeting was held on May 12, 2014. This was primarily a question and answer session with local residents and business and property owners in the immediate study area.

On May 28, 2014, at a meeting with Xcel Energy, it was decided that the application process for decommissioning was out of sync with the study process and it was ultimately decided to put the study on “pause” until the PUC application process was complete. A public open house already planned for June 4 was not cancelled so that the public would have an opportunity to get an update about the PUC process and the study.

A public meeting was held on June 4, 2014. A presentation at the beginning of the meeting provided an overview of the study and the events that led to the decision to put the project on pause. An Xcel Energy representative explained the PUC process, and a DHA representative provided an update of the Master Planning efforts for Sun Valley homes. The meeting was a time for attendees to understand why the project was paused and to ask any questions. **Appendix B** includes a full summary.

3.3.2 April 2016 Public Meeting

A public meeting, held on Thursday, April 28, 2016, after a pause in 2015 and early 2016, reintroduced the community to the study, provided information on the current and future conditions, solicited input from the community on transportation values and priorities, and provided attendees the opportunity to participate in a “Design Your Roadway” game to discuss the tradeoffs and challenges in developing possible roadway cross sections.

Public meeting participants were asked to rate the following as either very unimportant, unimportant, neutral, important, or very important:

- ▶ Improve access to public transit
- ▶ Provide better walking connections
- ▶ Provide better biking connections
- ▶ Keep on-street parking on W. 13th Avenue and W. Holden Place
- ▶ Have safe streets with slow speeds
- ▶ Have safe streets with separate spaces for different users (walk, bike, car)
- ▶ Make improvements that attract residents and businesses
- ▶ Limit land impacts to businesses and homes
- ▶ Keep the existing character
- ▶ Other



Every respondent rated “have safe streets with slow speeds” as very important. Every respondent rated “limit land impacts to businesses and homes” as either important or very important. The write-in values say, “Green space: gardens, parks, and landscaping”; six respondents agreed that this is very important. The other categories received mixed responses. This input guided the development of alternatives.

Appendix C includes a full summary of this meeting and the community input.

3.3.3 June 2016 Stakeholder Workshop

The primary purposes of a stakeholder workshop, held on Tuesday, June 28, 2016, were to:

- ▶ Report back to the community what the project team learned about transportation values and priorities from the first public meeting in April 2016
- ▶ Explain how the transportation values and priorities were used to develop alternatives and the evaluation process
- ▶ Solicit input from stakeholders on the preliminary alternatives



The preliminary alternatives presented included the Grid Completion Alternative, the Green Infrastructure Alternative, and the Multimodal Enhancements Alternative.

Most stakeholders were actively engaged and stayed for the entire meeting to complete the survey, provide in-depth responses, and speak with other community members and project team members.

The stakeholders communicated the importance of the following:

- ▶ Ensure safety for all, especially children and pedestrians
- ▶ Increase connectivity and create a high-impact corridor through Sun Valley
- ▶ Minimize negative impacts to current property owners, especially regarding property loss
- ▶ The design of the Holden Place and Decatur Street intersection protects the community assets that surround the intersection
- ▶ The design of the Holden Place and Decatur Street intersection ensures safety for all users
- ▶ 13th Avenue should be the primary east/west bike route
- ▶ On-street parking should be maximized
- ▶ Would like to see the removal of industrial uses and the increase in trees and plants

Appendix D provides a full summary of this meeting and community input.

Sun Valley Community Coalition Response

As a follow-up to the June stakeholder workshop, the Sun Valley Community Coalition RNO sent a letter to the project team highlighting the ways in which they support the project and their remaining concerns. The Coalition included an alternative for consideration. These letters and the Coalition's alternative are provided as **Appendix E**.

3.3.4 September 2016 Stakeholder Workshop

A stakeholder workshop was held on Tuesday, September 13, 2016. The primary purposes of the meeting were to:

- ▶ Report back to the stakeholders how the project team had refined the preliminary alternatives based on community input
- ▶ Solicit input from stakeholders on the advanced alternative and discuss the design options for the Holden Place and Decatur Street intersection



Meeting attendees were encouraged to participate in the breakout discussions, held at two separate tables. One table focused on the design of the Holden Place and Decatur Street intersection. The design elements base map highlighted the following key elements:

- ▶ Alternating bioswales and parking on 13th Avenue, Holden Place (from Federal Boulevard to the South Platte River), and Riverfront Drive
- ▶ Two-way cycle track on 13th Avenue from the Lakewood Gulch Trail to the realigned 13th Avenue
- ▶ Enhanced sidewalks



The other table focused on the design elements of the realignment along 13th Avenue and Holden Place. The Holden Place and Decatur Street intersection base map compared two intersection alternatives: a western realignment of the intersection and the mini-roundabout configuration.

Community leaders provided a copy of a petition advocating to not impact the Sun Valley Kitchen and Community Center. The petition contains 119 signatures from youth and adults who live or work in the community who support the realignment of Holden Place and Decatur Street intersection to the west.

Appendix F provides a full summary of this meeting and community input as well as the petition.

3.3.5 Property Owner Meetings

Individual meetings were held with property owners to have an open-ended dialogue about any concerns and to answer any questions. The project team met with the following property owners on the following dates:

- ▶ May 13 – Ink Monstr
- ▶ June 27 – Mercy Housing
- ▶ August 31 – Sun Valley Kitchen, Sun Valley Youth Center, Sun Valley RNO
- ▶ August 31 – EarthLinks
- ▶ September 9 – Mercy Housing
- ▶ September 14 – Lion’s Club Rude Park Board

3.3.6 November 2016 Public Meeting

The final public meeting, held in November 2016, presented the Preferred Alternative to the community. The project team explained the project lifecycle and highlighted what this phase of the project determined (such as the roadway alignment) and what will be determined in future phases (such as access to properties). **Appendix G** provides a full summary of this meeting and community input.

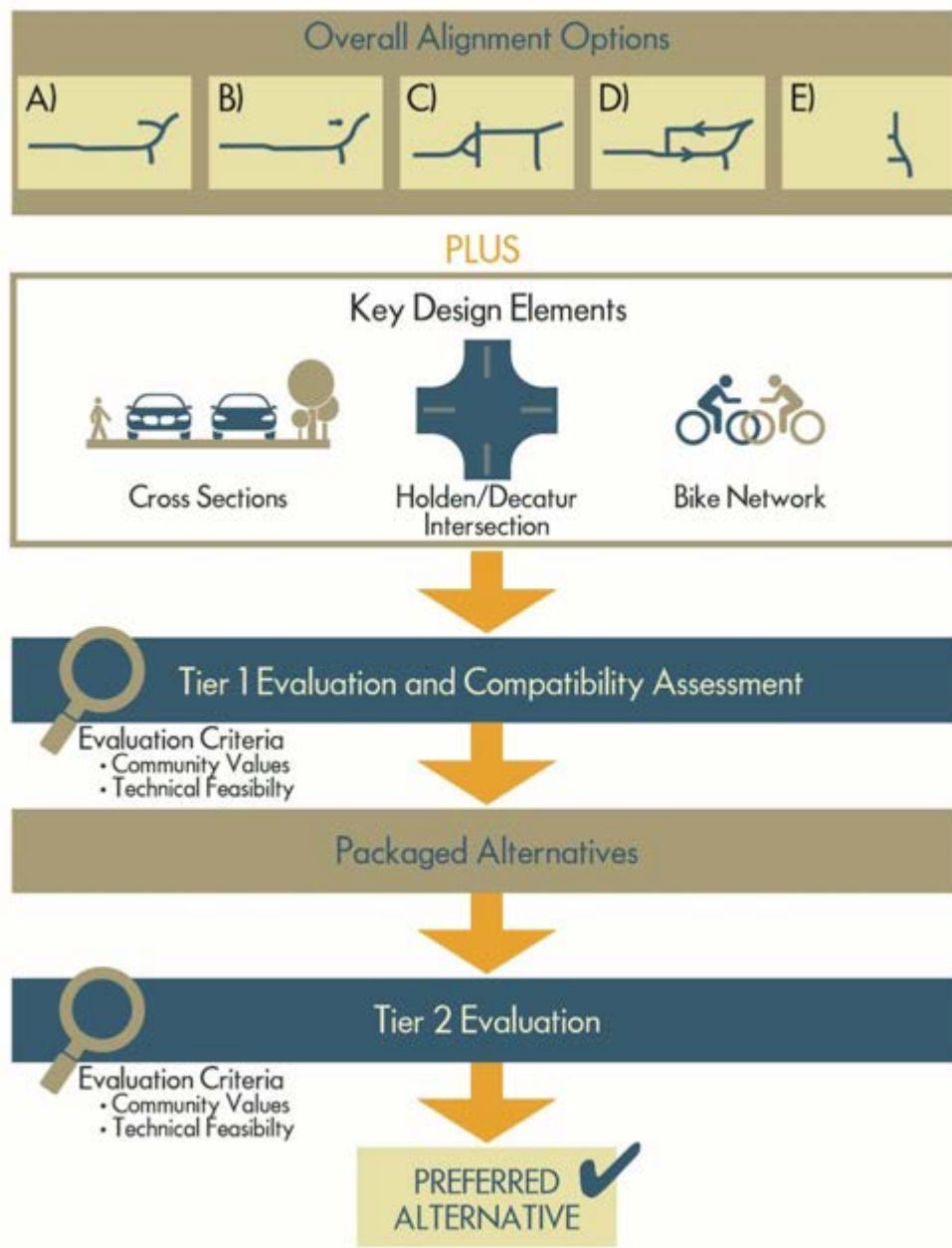
4.0 Alternatives Development and Evaluation Process

4.1 Introduction, Purpose

Alternatives were developed and evaluated using a two-tiered evaluation process.

Figure 10 shows the steps in the process. Tier 1 involved a high-level compatibility assessment of various roadway alignments and design elements. The retained roadway alignments and design elements were packaged into complete alternatives which were further evaluated in Tier 2.

Figure 10. Process Flowchart



Design Speed

Prior to the Tier 1 evaluation, the project team considered the ways in which different design speeds would impact the alignments.

The following design speeds were considered:

- ▶ 20 MPH
- ▶ 25 MPH
- ▶ 30 MPH
- ▶ 35 MPH, existing bridge over the South Platte River
- ▶ 35 MPH, new bridge over the South Platte River

Design speeds of 20 MPH, 25 MPH, and 30 MPH all allow tighter roadway curves and minimize impacts to properties. Design speeds of 35 MPH would either require a new bridge over the South Platte River or use the existing bridge but have major property impacts to properties on the north side of Holden Place.

Figure 11 shows the alignment of these design speeds.

The Technical Advisory Committee (TAC) eliminated the 35 MPH design speed because it is not compatible with the future vision for this area. The 35 MPH design speed is too impactful to properties and too expensive if a new bridge would be required. A 25 MPH design speed was selected because it is compatible with the community values of “safe streets and slow speeds,” while still allowing reasonable mobility through the study area.

4.2 Tier 1

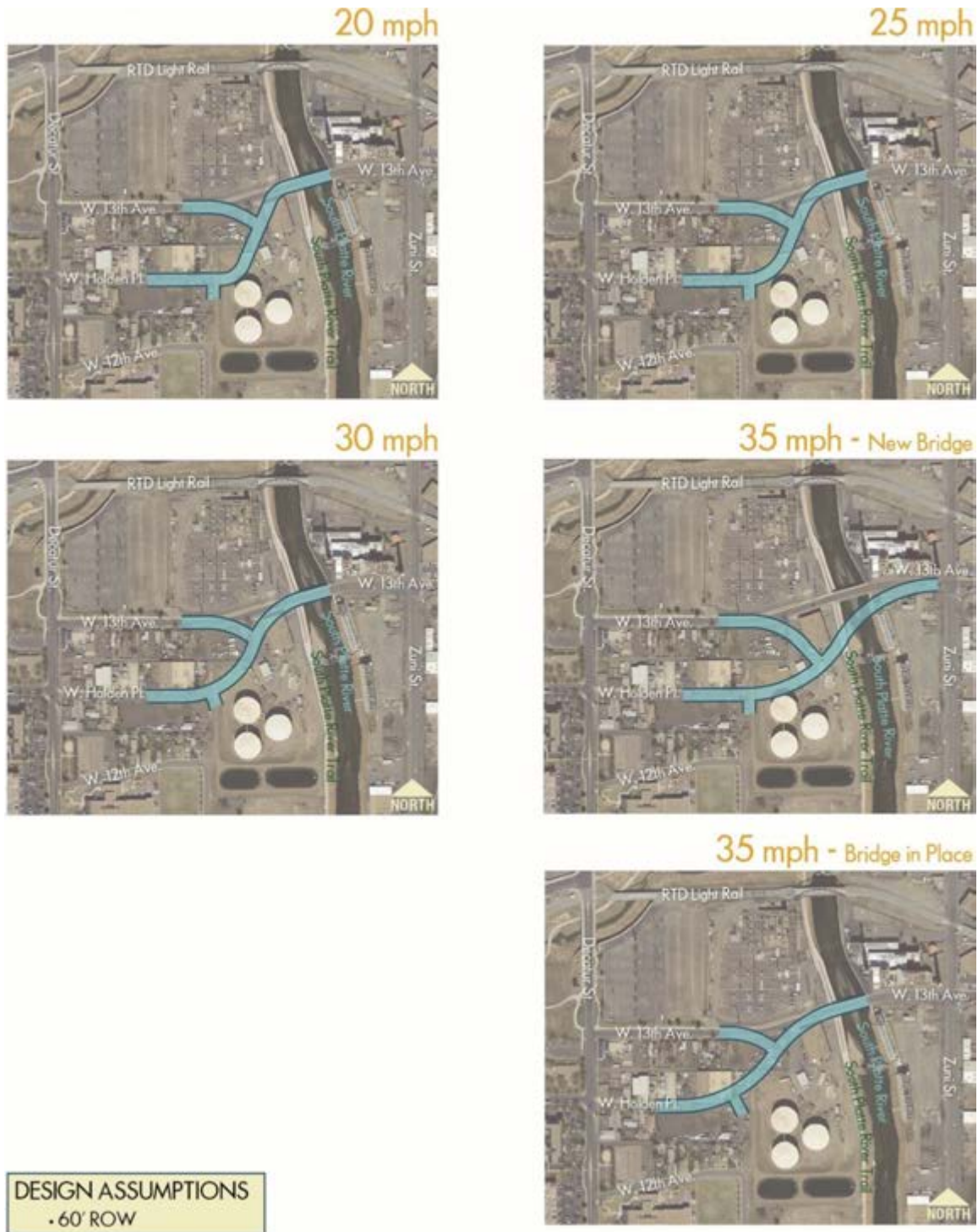
Tier 1 focused on the overall alignment of 13th Avenue and Holden Place in conjunction with other design elements such as roadway cross sections, intersection type at Holden Place and Decatur Street, and the bike facilities and network. The goal of Tier 1 was to eliminate any alignments or design elements that did not meet the evaluation criteria.

4.2.1 Tier 1 Elements

Figure 10 identifies the alignment concepts and design elements that were evaluated.



Figure 11. Design Speeds



Overall Alignment Concepts

The following alignment concepts were developed and evaluated:

- ▶ No Action
- ▶ Transition west of S. Platte River with 13th Avenue tie-in
- ▶ Transition west of S. Platte River with 13th Avenue dead end
- ▶ Transition west of Decatur Street
- ▶ One-way couplet
- ▶ Grid network completion

Transition West of S. Platte River with 13th Avenue Tie-in

This concept proposes the roadway realignment to begin immediately west of the South Platte River bridge and connect to the current dead end of Holden Place. Existing 13th Avenue and the proposed Riverfront Drive would both tie-in at right-angles. **Figure 12** shows this concept. This alignment was retained for further consideration.

Transition West of S. Platte River with 13th Avenue Dead End

This concept proposes the roadway realignment to begin immediately west of the South Platte River bridge and connect to the current dead end of Holden Place. Existing 13th Avenue would not connect to the realigned roadway. The proposed Riverfront Drive would tie-in at a right-angle. **Figure 13** shows this concept. This alignment was eliminated because it does not provide adequate connectivity.

Transition West of Decatur Street

This concept proposes the roadway realignment to begin immediately west of the 13th Avenue and Decatur Street intersection. Holden Place would also be realigned to connect to 13th Avenue at a right angle. The proposed Riverfront Drive would tie-in at a right-angle. **Figure 14** shows this concept. This alignment was eliminated because it would create closely spaced intersections (which could create operational and safety problems) and would create an unusable parcel.

One-way Couplet

This concept proposes the roadway realignment to begin immediately west of the South Platte River bridge and connect to the current dead end of Holden Place. 13th Avenue would be a westbound one-way street and Holden Place would be an eastbound one-way street. Traffic would remain as two-way traffic on Decatur Street and Holden Place west of Decatur Street. The proposed Riverfront Drive would tie-in at a right angle. **Figure 15** shows this concept. This alignment was eliminated because it would not achieve the connectivity objective.

Grid Network Completion

This concept does not propose realigning 13th Avenue but rather completing the street grid network by extending the proposed Riverfront Drive to 13th Avenue. 12th Avenue, Holden Place, and 13th Avenue would all tie-in to Riverfront Drive at right angles. **Figure 16** shows this concept. This alignment was retained for further consideration.



Figure 12. Transition West of S. Platte River with 13th Avenue Tie-in



Figure 13. Transition West of S. Platte River with 13th Avenue Dead End



Figure 14. Transition West of Decatur Street



Figure 15. One-way Couplet



Figure 16. Grid Network Completion



Cross Sections

The project team recognized that every street could not include every design element without having significant impacts to properties. Therefore, cross sections were developed to include some elements while minimizing the needed right-of-way. The following cross sections were developed and evaluated:

- ▶ No Action
- ▶ Basic with Tree Lawn
- ▶ Basic with Bike Lanes
- ▶ Parking One Side
- ▶ Sun Valley Master Plan

Basic with Tree Lawn

This cross section includes two drive lanes, parking on both sides, and 6' sidewalks on both sides. This cross section emphasizes the inclusion of green infrastructure elements and includes 5' tree lawns on both sides. **Figure 17** shows this cross section.

Basic with Bike Lanes

This cross section includes two drive lanes, parking on both sides, and 8' sidewalks on both sides. This cross section emphasizes the inclusion of bike lanes and includes 6' bike lanes on each side. **Figure 18** shows this cross section.



Parking One Side

This cross section includes two drive lanes, parking on one side, and 8' sidewalks on both sides. This cross section includes tree lawns and bioswales on both sides of the street. This cross section is the narrowest cross section at 60'. **Figure 19** shows this cross section.

Sun Valley Master Plan

The recommended cross section from the Sun Valley Master Plan is a wider, more robust cross section which includes wide sidewalks with amenity space, wide tree wells and bioswales, parking on both sides and a bike lane on both sides. This cross section requires an 80' right-of-way. **Figure 20** shows this cross section.

Every cross section was retained for further consideration.



Figure 17. Basic with Tree Lawn Cross Section

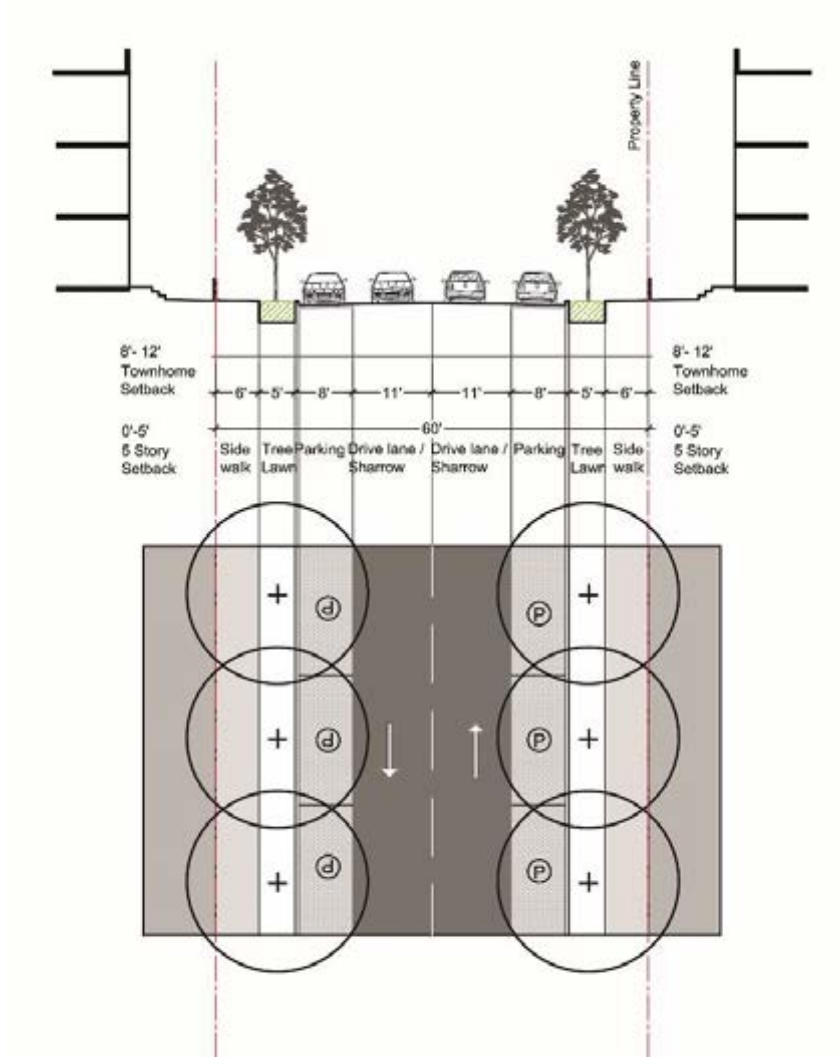


Figure 18. Basic with Bike Lanes Cross Section

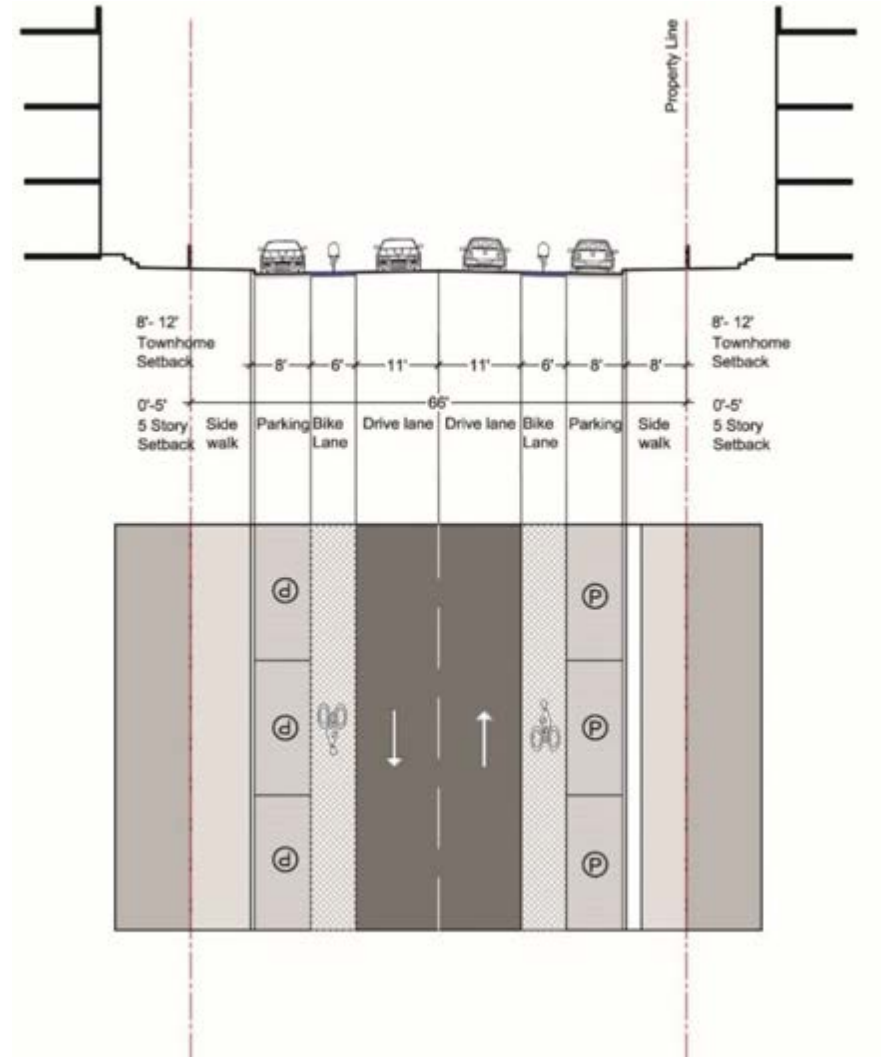


Figure 19. Parking One Side Cross Section

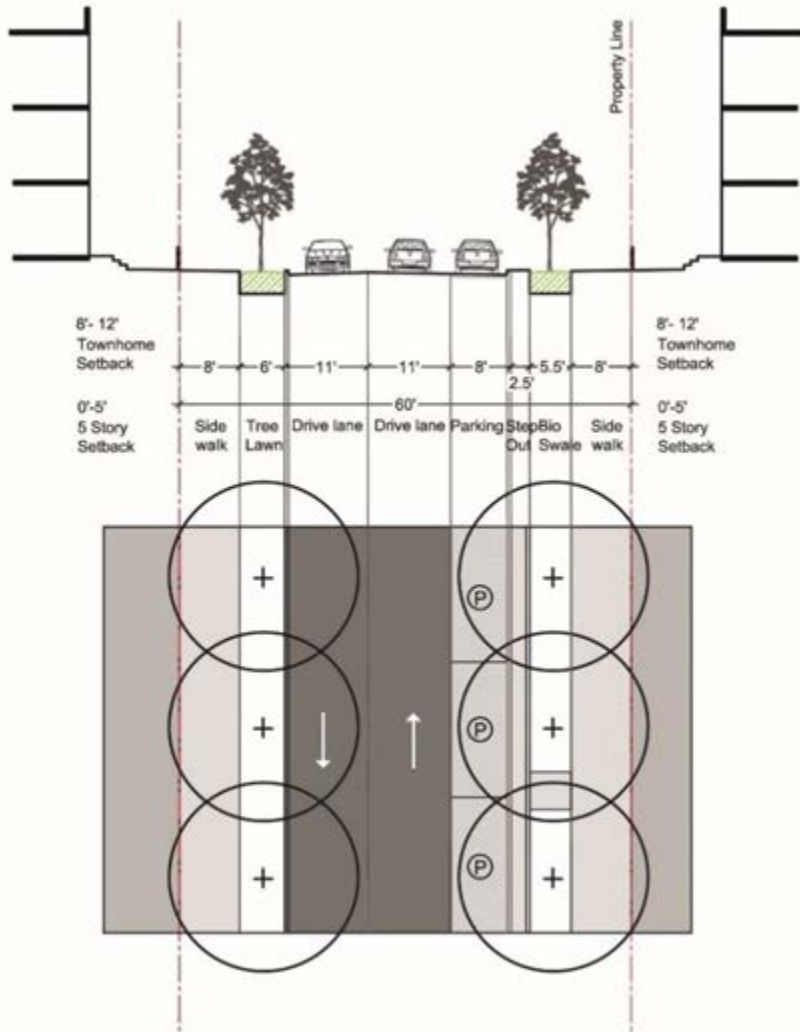
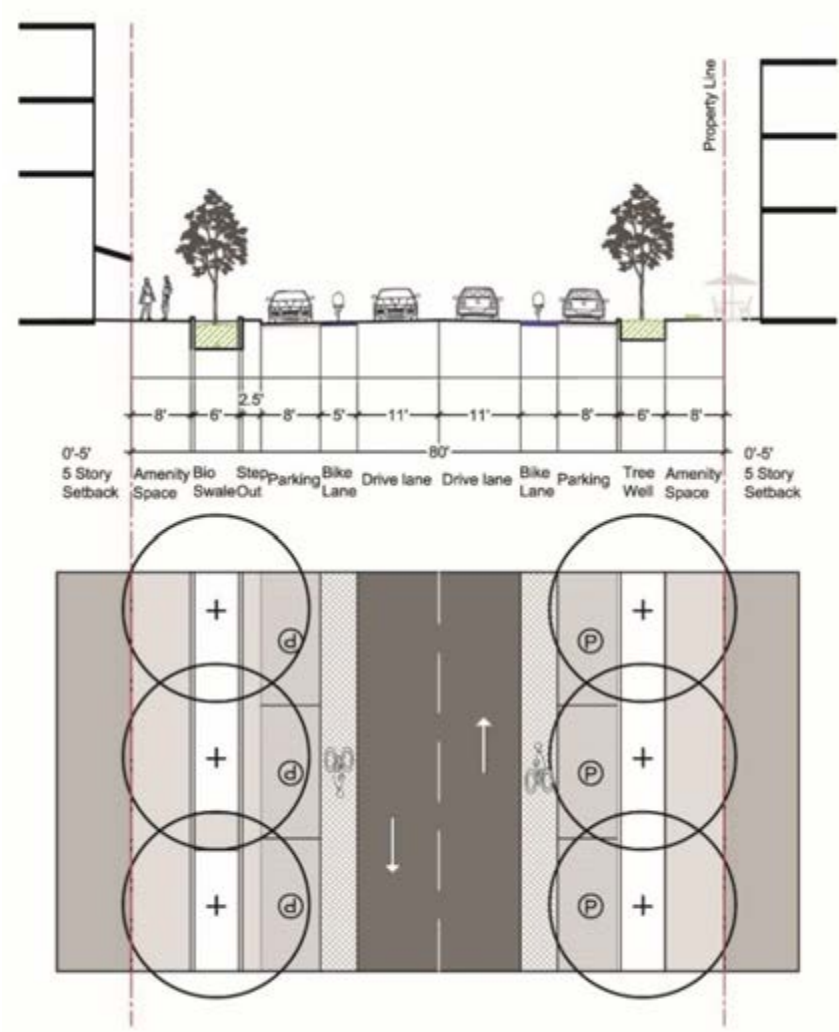


Figure 20. Sun Valley Master Plan Cross Section



Holden/Decatur Intersection

The intersection of Holden Place and Decatur Street is currently misaligned and offset, which complicates vehicular movements and compromises safety for all users. This intersection would need to be improved to support a roadway realignment of 13th Avenue and increase connectivity of Holden Place. The following intersections were developed and evaluated for the Holden Place and Decatur Street intersection:

- ▶ No Action
- ▶ Realign west of Decatur
- ▶ Realign east of Decatur
- ▶ Roundabout

Realign West of Decatur

The concept of realigning Holden Place to the west of Decatur Street aligns the intersection at a right-angle with minor property impacts to the parking lot at Decatur Place. **Figure 21** shows this alignment. This realignment was retained for further consideration.

Realign East of Decatur

The concept of realigning Holden Place to the east of Decatur Street aligns the intersection at a right-angle with major property impacts to the Sun Valley Kitchen. **Figure 22** shows this alignment. This realignment was retained for further consideration.

Roundabout

A full sized roundabout intersection would address the offset alignment at Holden Place. The alignment splits the property impacts between the east side and the west side of the intersection. **Figure 23** shows this intersection type. This intersection was retained for further consideration.

Bike Network

Bike connectivity is an important element of the project. The project team first identified key entry points, or places where cyclists would be originating or leaving the project area. **Figure 24** identifies these key points. The two bike route alternatives were to focus the bike facilities on 13th Avenue or on Holden Place. The bike route on Holden Place would require a new connection east of Federal Boulevard to the Lakewood Gulch Trail. The bike route on 13th Avenue may require a new connection through Rude Park to the Lakewood Gulch Trail. Both routes would provide a connection to the Decatur-Federal Light Rail Station. Both routes were retained for further consideration.



Figure 21. Realign West of Decatur



Figure 22. Realign East of Decatur



Figure 23. Full-size Roundabout



Figure 24. Tier 1 Bike Network Alternatives



4.2.2 Tier 1 Evaluation Criteria

The Tier 1 alignment alternatives and key design elements were evaluated based on seventeen categories. **Table 1** identifies the criteria used in the Tier 1 evaluation.

Table 1. Evaluation Criteria

Category	Question
Pedestrian connectivity, comfort and safety	<i>Would the alternative enhance connectivity and/or the level of comfort and safety for pedestrians?</i>
Bicycle comfort and safety	<i>Would the alternative enhance the level of comfort and safety for bicyclists (e.g., separate bicyclists from traffic)?</i>
Access to trails and green space	<i>Would the alternative provide convenient access to the Lakewood Gulch Trail, the S. Platte River Trail, and Riverfront Park?</i>
Transit access	<i>Would the alternative enhance access to the Decatur/Federal Station and/or local bus stops?</i>
Traffic operations	<i>Would the alternative provide convenient traffic routing and operations?</i>
Connectivity	<i>Would the alternative improve the connectivity of Sun Valley to Downtown Denver and surrounding neighborhoods?</i>
Complete Street vision	<i>Would the alternative realize the complete street vision for 13th Avenue/Holden Street and encourage active uses along the street?</i>
Safety for all modes	<i>Would the alternative balance the safety needs of all travel modes?</i>
Parking	<i>Would the alternative provide adequate on-street parking?</i>
Property impacts	<i>Would the alternative minimize impacts to adjacent properties?</i>
Economic development	<i>Would the alternative contribute toward economic redevelopment opportunities in the area?</i>
Community character	<i>Would the alternative preserve the community culture and character of the Sun Valley?</i>
Green infrastructure	<i>Does the alternative incorporate green infrastructure design elements (focus on stormwater and soft infrastructure)?</i>
Environmental resource impacts	<i>Could the alternative's impacts to environmental resources be easily mitigated?</i>
Construction cost	<i>What is the magnitude cost of the alternative?</i>
Consistency with other plans	<i>Is the alternative consistent with other plans (e.g., Decatur-Federal Station Area Plan, Sun Valley Master Plan, Denver Moves)?</i>



4.2.3 Tier 1 Scoring

The following range was used to qualitatively score each alternative and design element:

- The alternative would contribute **positively** toward the criterion
- The alternative would contribute **somewhat positively** toward the criterion
- The alternative would have **no contribution** toward the criterion
- The alternative could contribute **somewhat negatively** toward the criterion
- The alternative would contribute **negatively** toward the criterion

4.2.4 Tier 1 Outcome

Table 2 summarizes the outcome of the Tier 1 evaluation. All alignment options and design elements were retained for further consideration, except the following overall alignment options: the transition west of S. Platte River with the 13th Avenue dead end, the transition west of Decatur Street, and the one-way couplet. These options were eliminated.

The roadway alignments and design elements retained for further consideration were packaged into three alternatives which were evaluated further in Tier 2.



Table 2. Evaluation Matrix

Alternatives and Key Design Elements		Pedestrian comfort and safety	Bicycle comfort and safety	Access to trails and green space	Transit access	Traffic operations	Connectivity	Complete streets vision	Safety for all modes	Parking	Property impacts	Economic redevelopment	Community character	Green infrastructure	Environmental resource impacts	Construction cost	Consistency with other plans	Summary of Evaluation	Recommendation
Overall Alignment Options	No Action	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain as No Action
	Transition west of S. Platte River; 13 th Ave tie-in	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Transition west of S. Platte River; 13 th Ave dead end	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●	Compared to the 13 th Ave tie-in option, this one would not achieve the connectivity objective.	Eliminate
	Transition west of Decatur Street	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●	Compared to other alignment options, this one would create closely spaced intersections that could create operational and safety problems and would create an unusable parcel.	Eliminate
	One-way couplet	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●	Compared to other alignment options, this one would not achieve the connectivity objective.	Eliminate
	Grid network completion	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
Cross-Sections	No Action	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain as No Action
	Basic with Tree Lawn	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Basic with Bike Lanes	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Parking one side	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Sun Valley Master Plan	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
Holden/ Decatur Intersection	No Action	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain as No Action
	Realign west of Decatur	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Realign east of Decatur	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Roundabout	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain

Alternatives and Key Design Elements		Pedestrian comfort and safety	Bicycle comfort and safety	Access to trails and green space	Transit access	Traffic operations	Connectivity	Complete streets vision	Safety for all modes	Parking	Property impacts	Economic redevelopment	Community character	Green infrastructure	Environmental resource impacts	Construction cost	Consistency with other plans	Summary of Evaluation	Recommendation
Bike Network	No Action	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain as No Action
	Bike route on Holden Place	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain
	Bike route on 13 th Avenue	●	●	●	-	-	●	●	●	●	●	●	●	●	-	-	●		Retain

4.3 Tier 2

The result of the Tier 1 evaluation was retained roadway alignments and design elements. The Technical Advisory Committee (TAC) worked together to package the remaining alignments and design elements into viable alternatives for consideration and comparison in Tier 2.

4.3.1 Tier 2 Alternatives

Tier 2 included the No Action alternative and three packaged alternatives: the Grid Completion Alternative, the Green Infrastructure Alternative, and the Multimodal Enhancements Alternative.

The Grid Completion Alternative

The Grid Completion Alternative would complete the street network by adding Riverfront Drive with connections to 13th Avenue, Holden Place, and 12th Avenue. This alternative would retain the existing curb to curb width on 13th Avenue and Holden Place but may require restriping. Nothing would change behind the curbs. The intersection of Holden Place and Decatur Street was proposed as a roundabout. Bike lanes were included on 13th Avenue. Parking would remain on the north side of Holden Place but would be eliminated on the south side.

The Green Infrastructure Alternative

The Green Infrastructure Alternative would include the realignment of 13th Avenue to the west of the South Platte River with 13th Avenue and Riverfront Drive connections. The west leg of the intersection of Holden Place and Decatur Street would be realigned. Alternating parking and stormwater bumpouts would be included on both sides of 13th Avenue and Holden Place. Additionally, tree lawns would be included on both sides of Holden Place. Bike lanes would be included on 13th Avenue. Parking would remain on the south side of 13th Avenue and the north side of Holden Place.

The Multimodal Enhancements Alternative

The Multimodal Enhancements Alternative would include the realignment of 13th Avenue immediately to the west of the South Platte River with 13th Avenue and Riverfront Drive connections. The east leg of the intersection of Holden Place and Decatur Street would be realigned. Tree lawns would be on both sides of 13th Avenue and on both sides of Holden Place. Protected bike lanes (separated by parking on the north side, and protected on the south side with a curb) are included on Holden Place. Amenity space and wide sidewalks with tree wells are shown on Holden Place. Parking would remain on both sides of 13th Avenue and the north side of Holden Place.

The three packaged alternatives are summarized in **Table 3** and shown in **Figure 25** through **Figure 27**.



Table 3. Tier 2 Alternative Summary

Grid Completion Alternative	Green Infrastructure Alternative	Multimodal Enhancements Alternative
<ul style="list-style-type: none"> ▪ Completes grid network by adding Riverfront Drive with connections to W. 13th Avenue, W. Holden Place, and W. 12th Avenue ▪ W. Holden Place and Decatur Street – roundabout (shared property impact) ▪ W. Holden Place – only restriping to include one parking lane (north side), two travel lanes ▪ W. 13th Avenue – only restriping to include two bike lanes, two travel lanes and no parking (parking removed) ▪ Bike route on W. 13th Avenue 	<ul style="list-style-type: none"> ▪ Roadway transition west of the South Platte River ▪ W. Holden Place and Decatur Street – realign intersection west of Decatur Street (property impact to Mercy Housing) ▪ W. Holden Place – Basic with tree lawn and bioswales (Mix of 1/3 bioswales and 2/3 parking) cross section ▪ W. 13th Avenue – Basic with bike lanes with intermittent bioswales (Mix of ½ bioswales and ½ parking) with more deliberate green infrastructure on the north side ▪ Bike route on W. 13th Avenue 	<ul style="list-style-type: none"> ▪ Roadway transition west of the South Platte River ▪ W. Holden Place and Decatur Street – realign intersection east of Decatur Street (property impact to Sun Valley Kitchen) ▪ W. Holden Place – Modified Sun Valley master plan cross section with protected bike lanes (10’ sidewalk and tree wells, 8’ bike lane including curb buffer, 8’ parking, 11’ travel lane, 11’ travel lane, curb buffer, 8’ bike lane including curb buffer, 10’ sidewalk and tree wells) ▪ W. 13th Avenue – Basic with tree lawn cross section ▪ Bike route on W. Holden Place; enhanced sidewalks with amenity space

4.3.2 Tier 2 Evaluation Criteria

Tier 2 evaluation criteria were the same as the Tier 1 evaluation criteria. See **Table 4** for a complete list of categories and evaluation questions.

4.3.3 Tier 2 Scoring

Each packaged alternative was scored using the same range as the Tier 1 evaluation:

- The alternative would contribute **positively** toward the criterion
- The alternative would contribute **somewhat positively** toward the criterion
- The alternative would have **no contribution** toward the criterion
- The alternative could contribute **somewhat negatively** toward the criterion
- The alternative would contribute **negatively** toward the criterion



Figure 25. Grid Completion Alternative

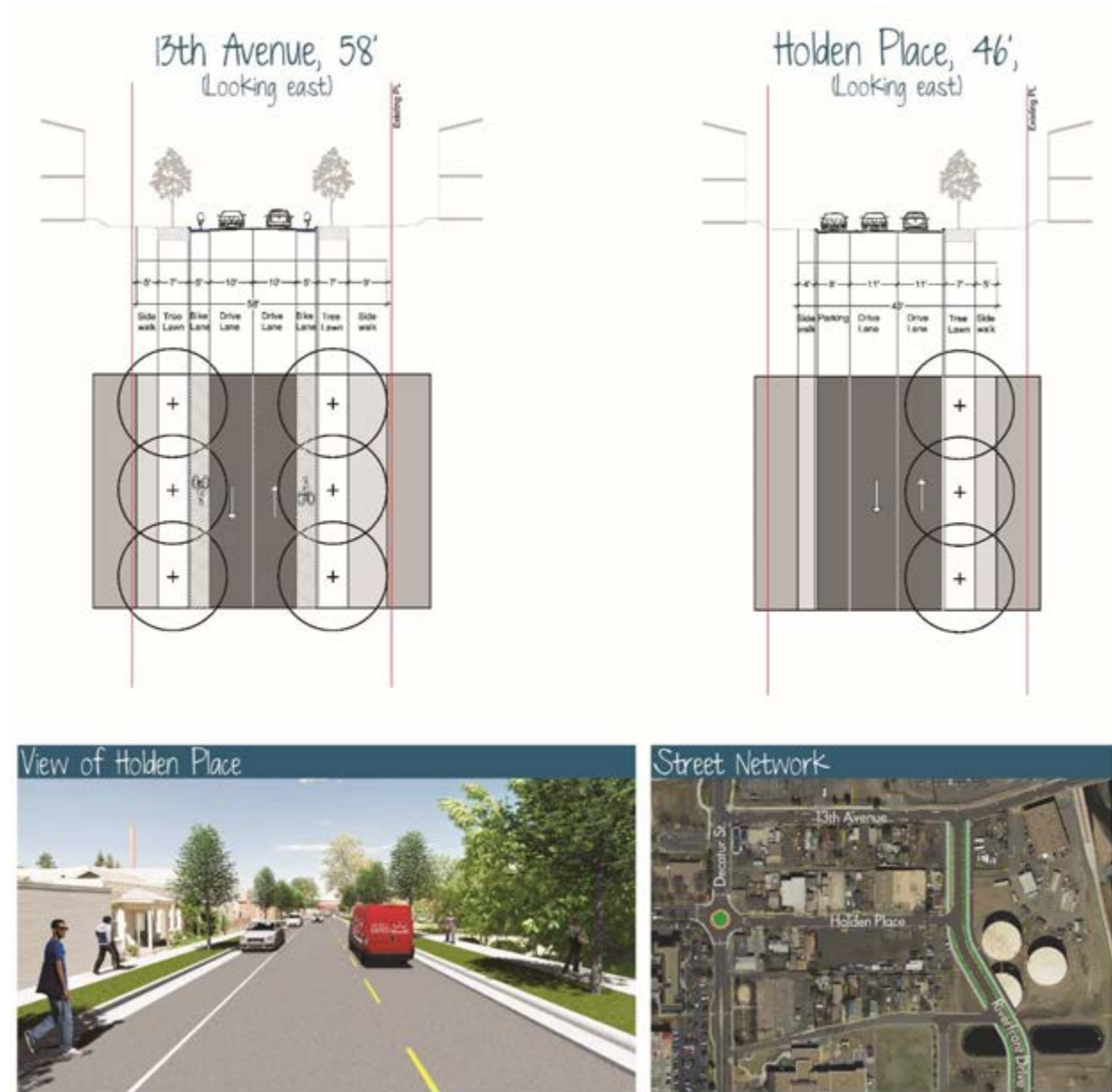


Figure 26. Green Infrastructure Alternative

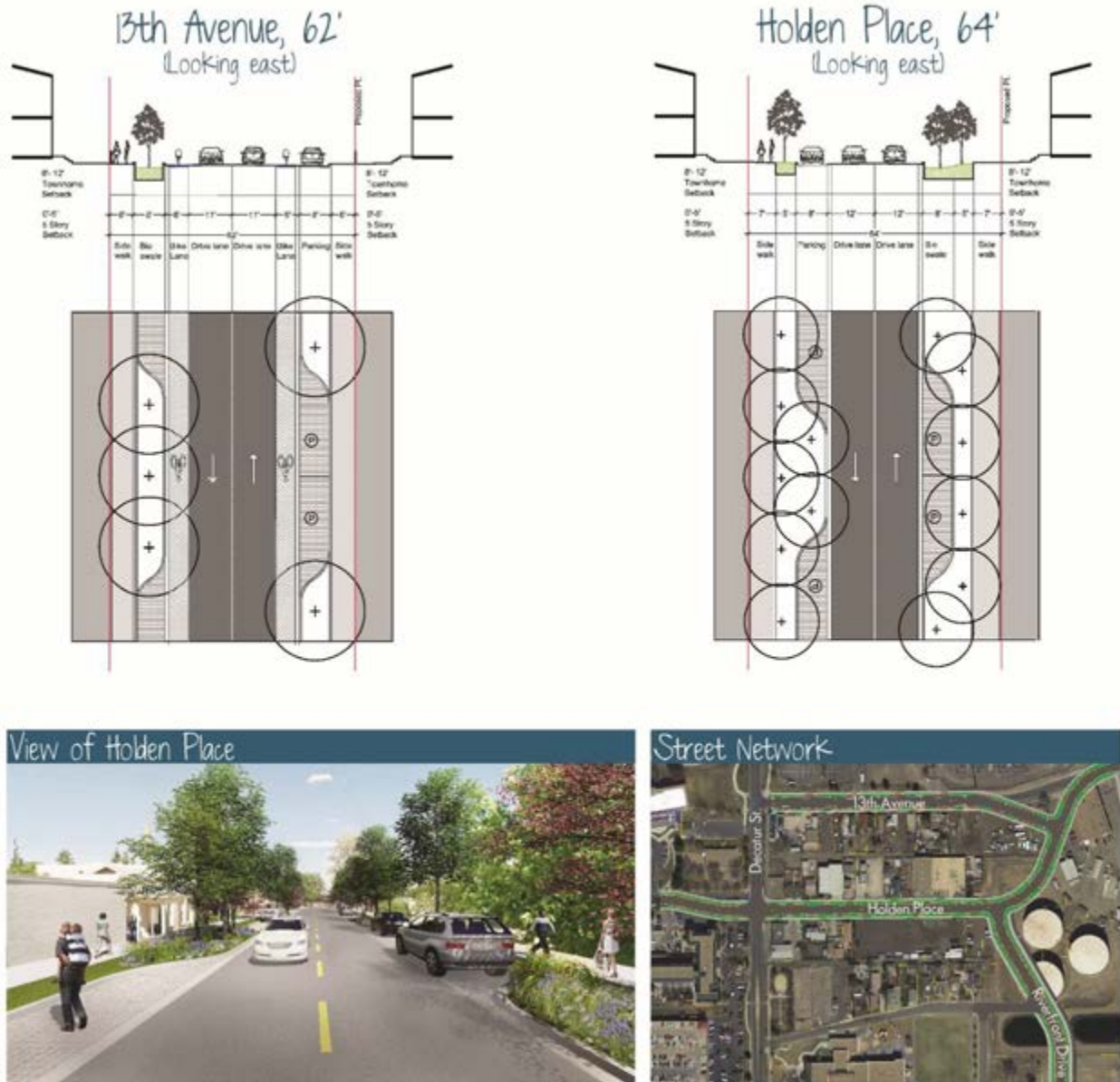


Figure 27. Multimodal Enhancement Alternative

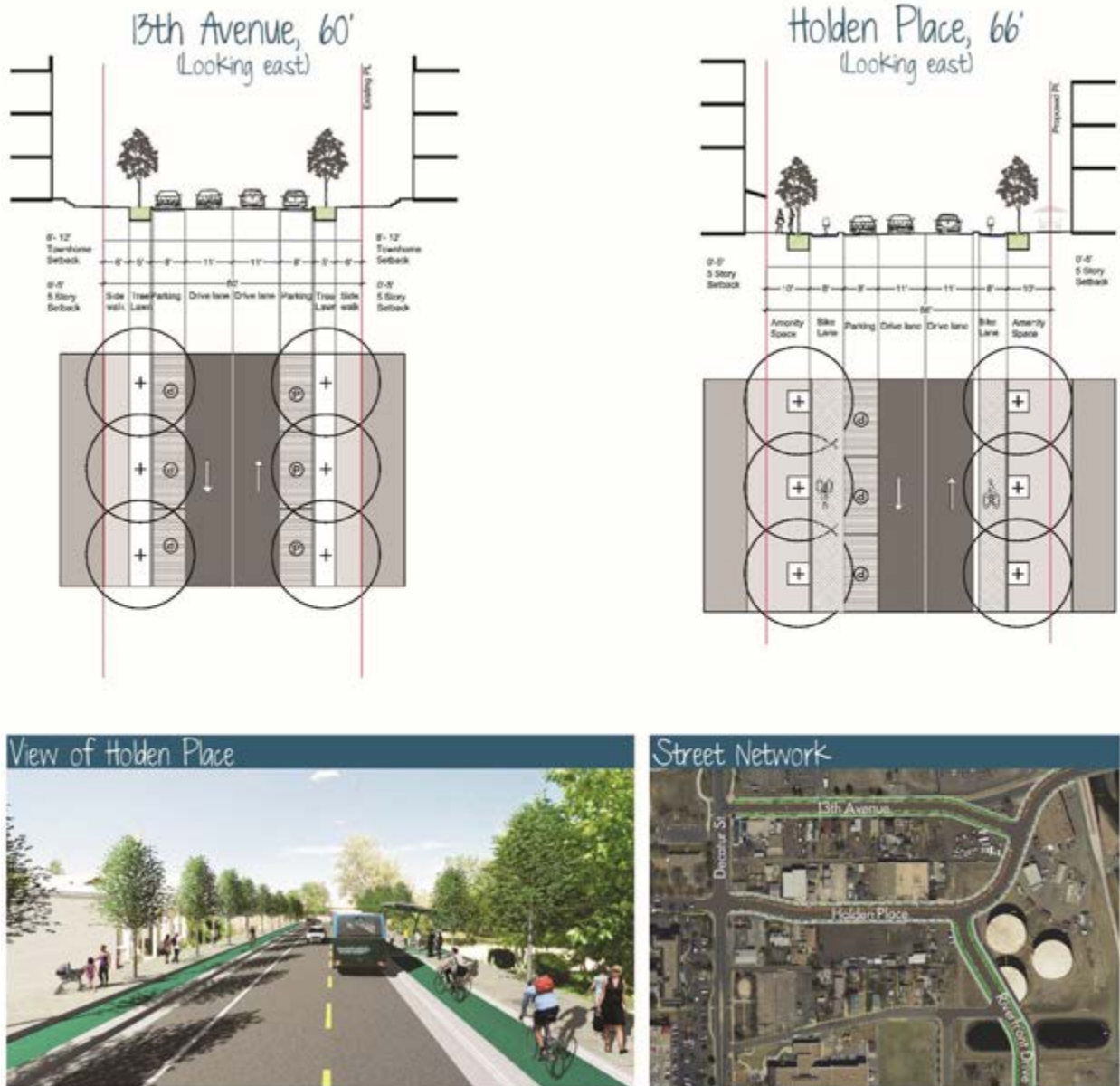


Table 4. Results

Alternatives and Key Design Elements		No Action	Grid Network Completion	Multimodal Enhancements	Green Infrastructure
Pedestrian comfort and safety <i>Would the alternative enhance connectivity and/or the level of comfort and safety for pedestrians?</i>	Evaluation	●	●	●	●
	Supporting Data	No improvements	Minimal improvements to the street environment	Wider sidewalks with amenity space on W. Holden Place	Wider sidewalks on 13th Avenue and W. Holden Place
	Comment	Current design could benefit from enhancements to increase comfort and safety	Mini-roundabout provides shorter crossing distances for pedestrians	Would enhance the pedestrian environment, particularly on W. Holden Place; realigned intersection improves safety and visibility for pedestrians (right angle crossings)	Would enhance pedestrian environment on 13th Avenue and Holden Place; realigned intersection improves safety and visibility for pedestrians (right angle crossings)
Bicycle comfort and safety <i>Would the alternative enhance the level of comfort and safety for bicyclists (e.g., separate bicyclists from traffic)?</i>	Evaluation	●	●	●	●
	Supporting Data	No bike facility	Bike lane on 13th Avenue	Protected bike lane on W. Holden	Bike lane on 13th Avenue
	Comment	No connection; bicyclists must use W. 13th Avenue which does not have any bike accommodations before connecting to another facility (S. Platte River Trail or bike route that begins on 13th near Zuni Street)	Provides direct connection to Lakewood Gulch Trail; does not provide direct connection to Federal Boulevard crossing (preferred at 10th Avenue); less separation compared to the Green Infrastructure Alternative	Provides the greatest amount of separation from vehicles; does not provide direct connection to Federal Boulevard crossing (preferred at 10th Avenue)	Provides direct connection to Lakewood Gulch Trail; provides some separation as bikes are on 13th Avenue and majority of cars are on Holden Place; does not provide direct connection to Federal Boulevard crossing (preferred at 10th Avenue); intersection of W. Holden Place and W. 13th Avenue will require thoughtful design
Access to trails and green space <i>Would the alternative provide convenient access to the Lakewood Gulch Trail, the S. Platte River Trail, and Riverfront Park?</i>	Evaluation	●	●	●	●
	Supporting Data	W. Holden Place remains a dead-end and disconnected	Adds connection from W. Holden Place to Riverfront Park and S. Platte River; adds direct bike connection to Lakewood Gulch Trail	Adds connection from W. Holden Place to Riverfront Park and S. Platte River; connection to Lakewood Gulch is not as good as Green Infrastructure Alternative or Grid Completion	Adds connection from W. Holden Place to Riverfront Park and S. Platte River; direct bike connection to Lakewood Gulch Trail
	Comment	Current street system limits the number of options to connect to trails and green space	Enhances overall connectivity	Enhances overall connectivity	Enhances overall connectivity

Alternatives and Key Design Elements		No Action	Grid Network Completion	Multimodal Enhancements	Green Infrastructure
<u>Transit access</u> <i>Would the alternative enhance access to the Decatur/Federal Station and/or local bus stops?</i>	Evaluation	●	●	●	●
	Supporting Data	W. Holden Place remains a dead-end and disconnected	Would enhance pedestrian environment to access existing routes on Decatur Street; would allow more direct connection from Riverfront Park to transit	Would enhance pedestrian environment to access existing routes on Decatur Street; would allow more direct connection from Riverfront Park to transit	Would enhance pedestrian environment to access existing routes on Decatur Street; would allow more direct connection from Riverfront Park to transit
	Comment	Current street system limits the number of options to connect to transit	No new bus routes are proposed to utilize the realignment at this time	No new bus routes are proposed to utilize the realignment at this time	No new bus routes are proposed to utilize the realignment at this time
<u>Traffic operations</u> <i>Would the alternative provide convenient traffic routing and operations?</i>	Evaluation	●	●	●	●
	Supporting Data	2040 AM/PM LOS: Holden/Decatur (all way) 13th/Decatur (all way) LOS D or better	2040 AM/PM LOS: Holden/Decatur (Roundabout) 13th/Riverfront (Riv stops) Holden/Riverfront (Hol stops) LOS D or better; LOS E or F on minor street approaches	2040 AM/PM LOS: Holden/Decatur (all way) 13th/Decatur (all way) Holden/13th (all way) LOS D or better; LOS E or F on minor street approaches	2040 AM/PM LOS: Holden/Decatur (all way) 13th/Decatur (all way) Holden/13th (all way) LOS D or better; LOS E or F on minor street approaches
	Comment	Current conditions require disjointed traffic pattern (13th/Decatur/Holden), intersection of Decatur/Holden is offset (does not meet standards), Holden Place is dead-end (inconvenient)	Improves convenience for traffic through better connectivity; eliminates sub-standard intersection design; all study intersections would operate well through 2040	Greatly improves convenience for traffic by eliminating disjointed pattern; eliminates sub-standard intersection design; all study intersections would operate well through 2040	Greatly improves convenience for traffic by eliminating disjointed pattern; eliminates sub-standard intersection design; all study intersections would operate well through 2040
<u>Connectivity</u> <i>Would the alternative improve the connectivity of Sun Valley to Downtown Denver and surrounding neighborhoods?</i>	Evaluation	●	●	●	●
	Supporting Data	No	Yes	Yes	Yes
	Comment	Lack of connectivity would remain	Provides greater connectivity in the neighborhood, specifically Holden Place, but does not provide a direct connection through the neighborhood	Provides direct connection from 13th Avenue over the S. Platte River to Federal Boulevard	Provides direct connection from 13th Avenue over the S. Platte River to Federal Boulevard
<u>Complete streets vision</u> <i>Would the alternative realize the complete street vision for 13th Avenue/Holden Street and encourage active uses along the street?</i>	Evaluation	●	●	●	●
	Supporting Data	No	Somewhat	Yes	Yes
	Comment	Existing conditions discourages active uses	Alternative would reconstruct the roadway and provide new connections, but these connections would not be as robust as other alternatives	Alternative would really encourage active uses and enhance the street environment	Alternative would really enhance the street environment and encourage active uses

Alternatives and Key Design Elements		No Action	Grid Network Completion	Multimodal Enhancements	Green Infrastructure
Safety for all modes <i>Would the alternative balance the safety needs of all travel modes?</i>	Evaluation	●	●	●	●
	Supporting Data	No	Somewhat	Yes	Yes
	Comment	Current design does not provide a safe route for bicyclists	The grid completion may reduce traffic on 13th Avenue, creating a balanced system and lower volume streets; mini-roundabout is safer than the existing skewed alignment	Provides the greatest amount of separation of uses (bike, ped, cars); Holden and Decatur intersection will be safer with the right-angle alignment	Provides separation of uses (bike, ped, cars); Holden and Decatur intersection will be safer with the right-angle alignment
Parking <i>Would the alternative provide adequate on-street parking?</i>	Evaluation	●	●	●	●
	Supporting Data	119 existing spots	Reduction	Increase	Marginal decrease
	Comment	No change in parking	Addition of spots on new Riverfront Drive but removal of some parking on Holden Place and 13th Avenue	Increase in parking due to additional parking on Riverfront Drive	Marginal decrease in a few spots on 13 th Avenue and Holden Place
Property impacts <i>Would the alternative minimize impacts to adjacent properties?</i>	Evaluation	●	●	●	●
	Supporting Data	None	Low	Significant	Moderate
	Comment	No impact to properties	Minor impacts near Holden and Decatur intersection; no acquisition of Sun Valley Kitchen	Significant impacts and full acquisition of Sun Valley Kitchen and 4 properties to the east; modest sliver widening on 13th and north side of Holden Place	Impact to Mercy Housing parking; modest sliver widening elsewhere
Economic redevelopment <i>Would the alternative contribute toward economic redevelopment opportunities in the area?</i>	Evaluation	●	●	●	●
	Supporting Data	No positive or negative impacts on existing businesses	Restriping would add formal parking in front of businesses on the northside of the street. Connecting the grid would increase traffic on Holden for businesses.	East / west transit, bike and vehicular connections would increase traffic in area while still allowing on-street parking	Alternating bioswales and parking spots would more evenly distribute parking between north and south but would not add parking. More equitable distribution of parking along Holden and 13th Avenue
	Comment	Current design will neutrally impact existing businesses but may negatively impact or fail to attract new businesses	Design would disproportionately favor businesses on the northside of the street but would not negatively impact existing businesses, however lack of streetscape on the north side of Holden could prevent outdoor retail/commercial uses	Allowances for bike parking and comfortable bus shelters may increase linger time and increase consumer base. Beautification may increase desirability for future tenants.	Traffic slowing impacts of the bioswales may encourage secondary use for vehicular traffic. Bioswales may have to be reapportioned in front of businesses to allow visibility from the street. Beautification may increase desirability for future tenants.

Alternatives and Key Design Elements		No Action	Grid Network Completion	Multimodal Enhancements	Green Infrastructure
<u>Community character</u> <i>Would the alternative preserve the community culture and character of the Sun Valley?</i>	Evaluation	●	●	●	●
	Supporting Data	No impacts	Design would maintain current design and mitigating property impacts.	Improved connectivity may bring more outsiders into the community, which may have both positive and negative impacts on community character	Traffic slowing design and bioswales would add to the family friendly character of the community, of which over 50% are under 18 years of age.
	Comment	Current design would not further negatively impact the community however it does physically cut off the community from Central Denver, which contributes to its isolation	With no property takes and improved striping, this option is an improvement but does not address the systemic problems facing the community. The lack of streets with trees and landscape negatively impacts the character of the neighborhood.	This option has the most property impacts, both in section and plan, which need to be weighed with the social benefits of more traffic and connectivity.	Physically this roadway would be a departure from the current roadway but we anticipate would have few negative community impacts
<u>Green infrastructure</u> <i>Does the alternative incorporate green infrastructure design elements (focus on stormwater and soft infrastructure)?</i>	Evaluation	●	●	●	●
	Supporting Data	No impacts; no green infrastructure	No impacts; no green infrastructure	Could look at using permeable paving for bike path or parking	Bioswales and permeable paving in parking spots
	Comment	Existing ROW	Existing ROW	New infrastructure	New infrastructure
<u>Environmental resource impacts</u> <i>Could the alternative's impacts to environmental resources be easily mitigated?</i>	Evaluation	●	●	●	●
	Supporting Data	No impacts	Requires acquisition of one site with potential hazardous materials conditions (Xcel property), potential impacts to a community resources (Sun Valley Kitchen) and parking at another community resource (Decatur Place) can be avoided	Requires acquisition of one site with potential hazardous materials conditions (Xcel property) and acquisition of a community resource (Sun Valley Kitchen)	Requires acquisition of one site with potential hazardous materials conditions (Xcel property) and acquisition of a community resource (Mercy Housing)
	Comment	Sun Valley is an historically underserved and isolated community; although No Action minimizes environmental impacts, build alternatives would strongly benefit the community	Acquisition of a site with potential hazardous materials conditions may add to project cost (materials management, handling, disposal, and worker health & safety), as well as potential long-term remediation of site; further investigation of roundabout design shows we could avoid impacts to Sun Valley Kitchen and Decatur Place.	Acquisition of a site with potential hazardous materials conditions may add to project cost (materials management, handling, disposal, and worker health & safety), as well as potential long-term remediation of site; Acquisition of Sun Valley Kitchen will require relocation of facility prior to acquisition of site, preferably within the immediate vicinity in the Sun Valley Neighborhood	Acquisition of a site with potential hazardous materials conditions may add to project cost (materials management, handling, disposal, and worker health & safety), as well as potential long-term remediation of site; evaluating options to offset parking impacts at Decatur Place

Alternatives and Key Design Elements		No Action	Grid Network Completion	Multimodal Enhancements	Green Infrastructure
Construction cost <i>What is the magnitude cost of the alternative?</i>	Evaluation	●	●	●	●
	Supporting Data	-	\$\$	\$\$\$	\$\$\$
	Comment	No cost	Cost includes reconstruction and mini-roundabout	Plan includes property impact as well as reconstruction and intersection realignment	Plan includes property impact as well as reconstruction, intersection realignment and green infrastructure
Consistency with other plans <i>Is the alternative consistent with other plans (e.g., Decatur-Federal Station Area Plan, Sun Valley Master Plan, Denver Moves)?</i>	Evaluation	●	●	●	●
	Supporting Data	No alignment with previous plans	Connection to the riverfront drive coincides with Decatur Fed and Sun Valley MP but does not advance east/west connectivity goals of past plans	Best alignment with previous plans by allowing for ground floor activation, mixed use and multimodal connections as proposed in all previous plans	Best alignment with previous plans by creating green street along Holden. Lower intensity use on Holden than planned in Decatur Federal and Sun Valley MP, advances area's vision as an ecodistrict from Sun Valley MP
	Comment	Limits Holden's potential as an important E/W connection across the Platte in all previous plans	Limits Holden's potential as an important E/W connection across the Platte in all previous plans	Best east/west connectivity which has been a continued goal of other plans	Best east/west connectivity which has been a continued goal of other plans
Community support <i>Does the alternative have significant support from the community?</i>	Evaluation	●	●	●	●
	Supporting Data	Community wants to see improvements made to the infrastructure	Many survey participants expressed their concern of The Sun Valley Kitchen property being impacted. This may be why most respondents indicated lukewarm support ('maybe') for the advancement of the Grid Completion Alternative towards the Preferred Alternative.	Survey respondents were concerned about the protected bike lane on Holden Place as well as the alignment of the Holden Place and Decatur Street intersection. Nine respondents said they could not support this alternative. Again, this may be due to the eastern alignment of Holden Place and the impact to The Sun Valley Kitchen property.	11 of 21 respondents said yes, and another 6 indicated that they would maybe support the Green Infrastructure Alternative towards the Preferred Alternative
	Comment	-	There are concerns from the community that the roundabout at Decatur Street would be challenging to navigate as a pedestrian and would impact Sun Valley Kitchen	Cyclists have voiced their concern of the separated bike lane being too restrictive for advanced/commuters; impact to Sun Valley Kitchen is a major concern	Concern about number of parking spaces and impact to Decatur Place

4.3.4 Mini Roundabout

The Sun Valley Community Coalition’s letter suggested a mini-roundabout for the Holden Place and Decatur Street intersection. A mini-roundabout is a type of roundabout that has a smaller overall diameter and a traversable center island (usually just striped). This concept was added as an option and was presented at the Stakeholder Workshop in September 2016. The mini-roundabout concept was eliminated, however, for the following reasons:

- ▶ To accommodate all modes, the mini-roundabout would still impact the Sun Valley Kitchen property because the building is so close to the existing intersection
- ▶ The stakeholders had concerns about the safety of pedestrians navigating the roundabout
- ▶ The stakeholders had concerns about vehicular traffic ignoring the striped center island

4.3.5 Tier 2 Outcome

Table 4 summarizes the outcome of the Tier 2 evaluation. Any of the three alternatives are feasible from a technical perspective; however, the Green Infrastructure Alternative was selected as the foundation for the Preferred Alternative because compared to the other alternatives it would:

- ▶ Fulfill the green infrastructure vision established in the Sun Valley Master Plan and the Decatur-Federal Station Area Plan
- ▶ Retain parking on both sides of 13th Avenue and Holden Place
- ▶ Minimize property impacts
- ▶ Meet the community’s desire for the bike route to be on 13th Avenue
- ▶ Provide the most direct connection for bicyclists between the South Platte River Trail and the Lakewood Gulch Trail



5.0 Preferred Alternative

The Preferred Alternative includes the alignment and features of the Green Infrastructure Alternative with those of the western alignment of the Holden Place and Decatur Street intersection. The Preferred Alternative recommends realigning 13th Avenue immediately west of the South Platte River to connect to Holden Place. The Preferred Alternative maintains on-street parking, widens existing sidewalks, includes bumpouts to manage stormwater, and includes a two-way cycle track on 13th Avenue.

Minor property impacts are anticipated. It is assumed that 3 feet of additional right-of-way will be needed from the south side of Holden Place. It is also assumed that 13 feet of additional right-of-way will be needed from the north side of existing 13th Avenue. These recommended shifts in the roadways minimize the property impacts.

5.1 Alignment

The Preferred Alternative alignment connects 13th Avenue to Holden Place through the Xcel property. Existing 13th Avenue ties into the new alignment at a right-angle, creating a new intersection and a new higher-impact gateway into Sun Valley. The Preferred Alternative also includes a new intersection with the future Riverfront Drive.

5.2 Cross Section

The Preferred Alternative recommended different cross sections for 13th Avenue and Holden Place, as seen in **Figure 28**.

The 13th Avenue cross section is recommended to be 73 feet wide and to include two 11-foot drive lanes, a 6-foot sidewalk on both sides, a 12-foot two-way bikeway on the north side, 5-foot tree lawns on both sides, and alternating stormwater bumpouts and parking. **Figure 29** is a rendering of 13th Avenue.

The Holden Place cross section is recommended to be 63 feet wide and to include two 11-foot drive lanes, 7-foot sidewalks on each side, 5-foot tree lawns on both sides, and alternating stormwater bumpouts and parking. The exact location of the stormwater bumpouts and parking will be determined in final design. **Figure 30** is a rendering of this cross section.

5.3 Bike Facilities

The Preferred Alternative includes a two-way cycle track on the north side of 13th Avenue. This provides a direct connection to/from the Lakewood Gulch Trail and to/from the South Platte River Trail as well as to/from existing bike lanes on 13th Ave. Final design will determine the details of the cycle track design.



Figure 28. Preferred Alternative Cross Sections

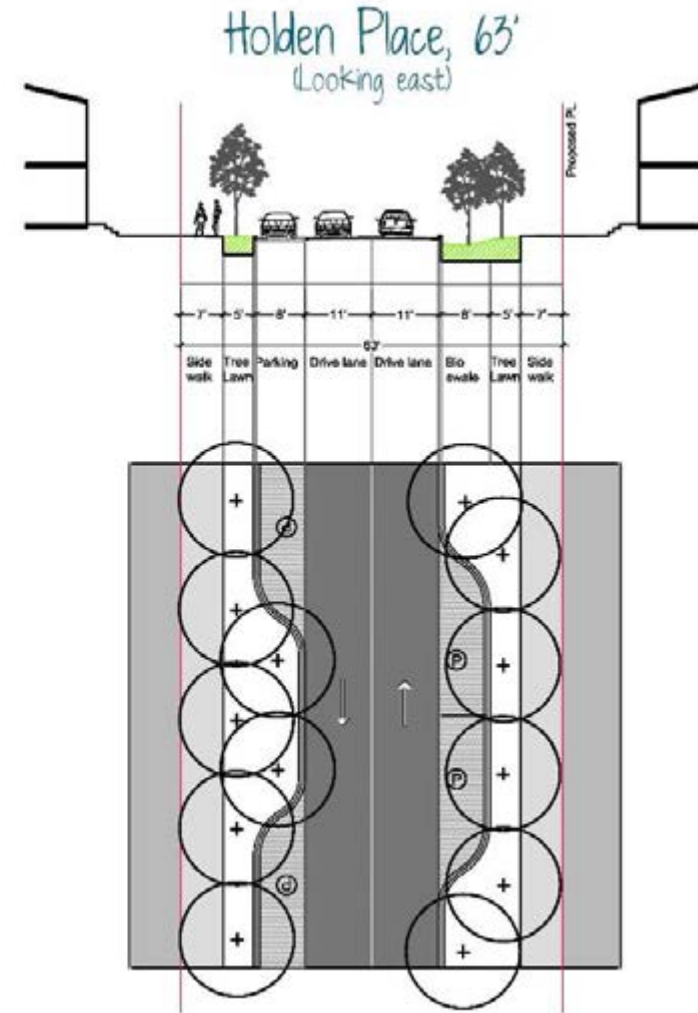
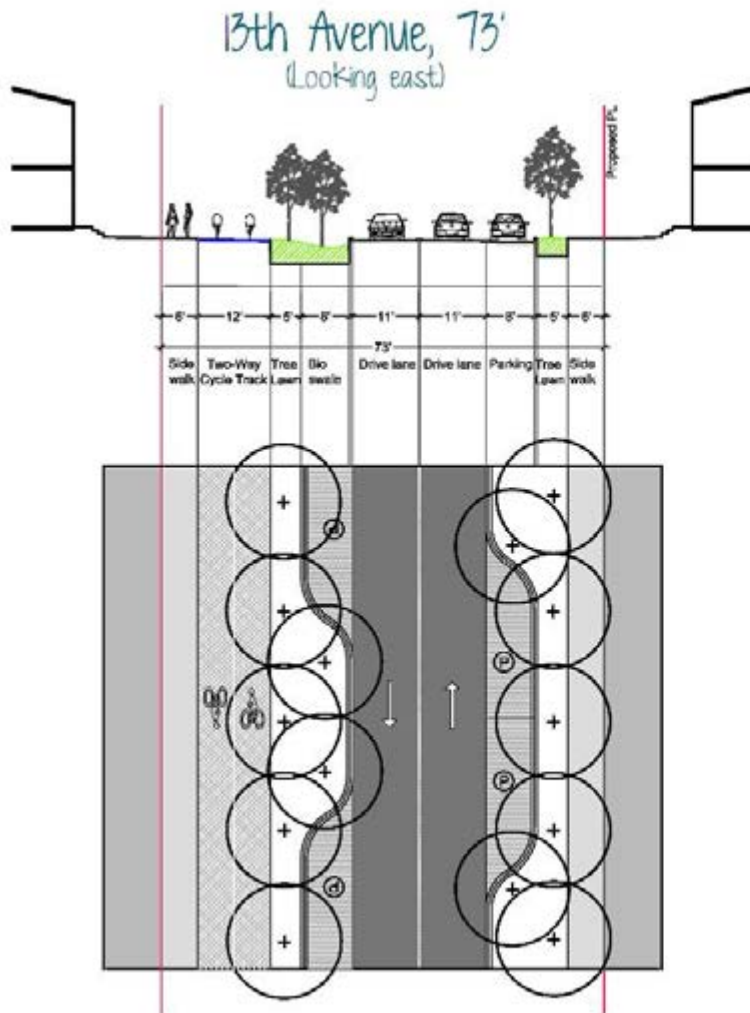


Figure 29. View of 13th Avenue



Figure 30. View of Holden Place



5.4 Green Infrastructure

The Preferred Alternative prioritizes the inclusion of green infrastructure elements, specifically bumpout stormwater planters. A bumpout stormwater planter helps clean stormwater by using plants and soils before stormwater drains into streams and rivers.

A bumpout stormwater planters works as follows:

- ▶ Stormwater fills the gutter and instead of going down a drain, it enters the stormwater planter through inlets
- ▶ The planter fills with water and native plants begin to absorb the water. Through this process, the plants remove many of the chemicals that may contaminate the water. The soils also minimize harsh toxins
- ▶ The cleaner water slowly drains from the stormwater planter

The project recommends using a handful of parking spaces to help manage stormwater. To fit these planters in the public right-of-way, the curb where a parking spot would normally be is “bumped out” to make room for the planter, as seen in **Figure 31**. These bumpouts will happen only where needed and will maintain on-street parking in the neighborhood. The planters have the added effect of making the neighborhood greener and have been shown to slow traffic and increase safety.



Figure 31. Stormwater Bumpout



5.5 Future Traffic Operations

The Denver Regional Council of Governments (DRCOG) 2040 Compass Model was selected for development of the 2040 future year travel projections in the study area. To ensure that the 2040 planning horizon includes the most up to date population and employment projections for the area, land use forecasts in the DRCOG model were modified to account for land use changes in the study area associated with the Sun Valley Master Plan and the relocation of CDOT's Headquarters to 14th Avenue and Federal Boulevard. This analysis reflects those land use changes and associated travel demand forecasts, as refined for the 13th Avenue Realignment Feasibility Study. Specifically, land use modifications include:

- ▶ 700 new jobs associated with CDOT's Headquarters
- ▶ 2,700 new residential units in Sun Valley
- ▶ 181,000 square feet of new service and retail employment in Sun Valley

The Transportation Research Board's publication National Cooperative Highway Research Program (NCHRP) 255 provides a methodology for approximating future intersection turning movements using existing daily and peak hour traffic counts, and future daily traffic volumes. The NCHRP 255 Modeling Adjustment process uses model growth estimates and observed counts to arrive at a final set of 2040 traffic volumes. **Figure 32** shows projected volumes. These forecasts account for the land use changes expected in the area and for the realignment of 13th Avenue, as proposed in the Preferred Alternative.

To evaluate traffic operations within the study area, techniques documented in the Highway Capacity Manual (Transportation Research Board, 2010) used the projected 2040 traffic volumes, intersection geometry, and traffic control. The 13th Avenue/Decatur Street, Holden Place/Decatur, and 13th Avenue/Holden Place intersections are anticipated to have all-way STOP control. The Holden Place/Riverfront Drive intersection is anticipated to have STOP sign control on the Riverfront Drive approach.

Level of Service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. LOS is described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. For stop-sign controlled intersections, LOS is calculated for each movement that must yield the right-of-way. In urbanized areas, LOS D is typically considered to be acceptable for peak hour traffic operations; minor movements at unsignalized intersections may be allowed to fall below LOS D.

2040 traffic forecasts were used in intersection capacity analyses, the results of which are shown on **Figure 32**. All intersections within the study area have been evaluated under two-way or all-way STOP control. All movements are projected to operate at LOS D or better through the year 2040. The northbound approach to the Holden Place and Riverfront Drive intersection is projected to operate at LOS F during the PM peak hour; the northbound approach is under STOP control, with free through movements on Holden Place with projected limited gaps to enter traffic flow from the minor approach. At the Holden Place and 13th Avenue intersection, the northbound approach is projected to operate at LOS E during the AM peak hour and the southbound approach is projected to operate at LOS F during the PM peak hour; the increased delay is primarily associated with the highly directional commuter traffic volumes anticipated on Holden Place, but is a temporary condition associated with the primary travel direction during each peak hour; the intersection is not projected to meet signalization warrants.



Figure 32. 2040 Traffic Volumes

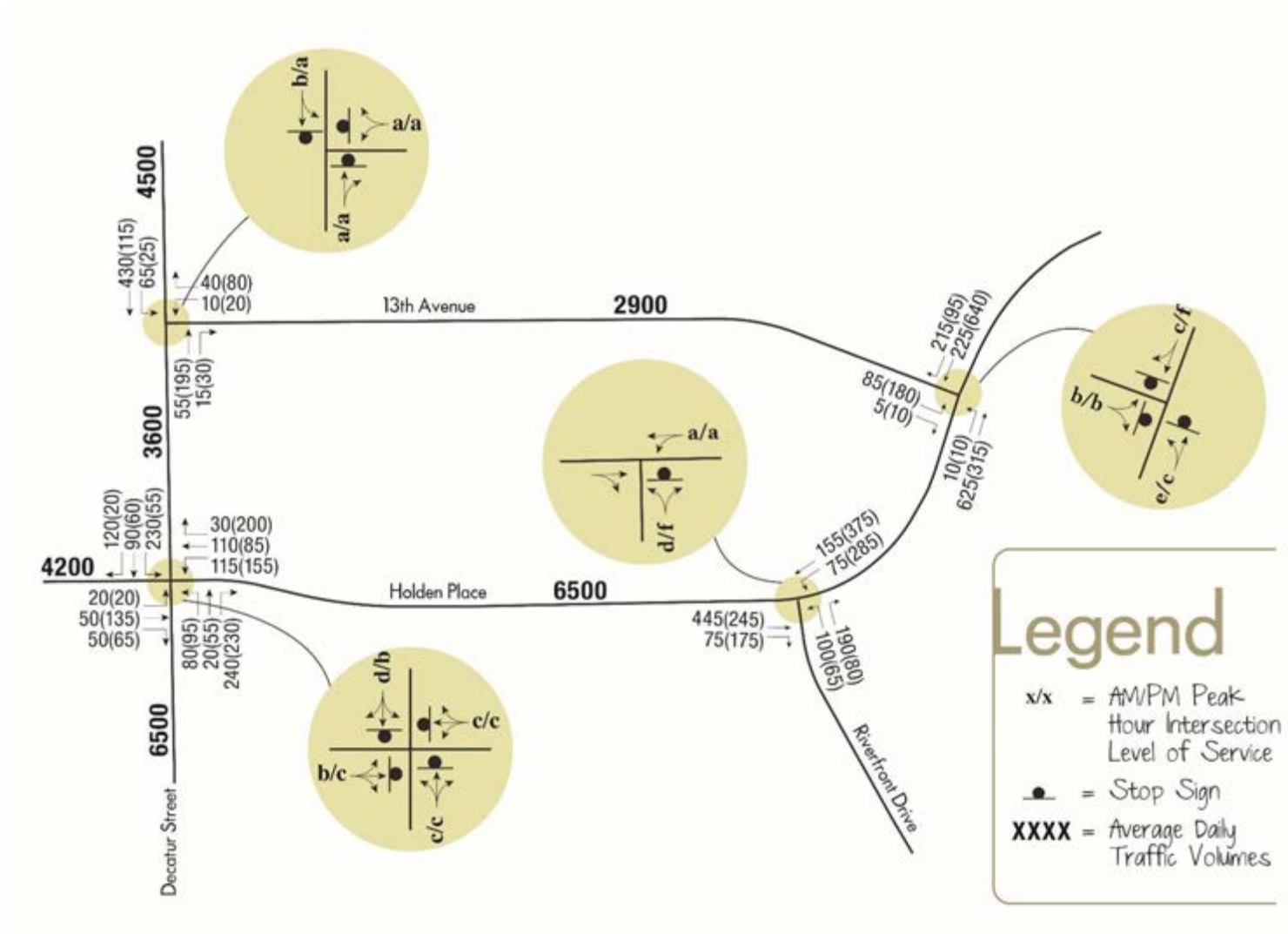


Figure 33. Preferred Alternative Design



6.0 Recommended Next Steps

This project is one of many steps in the overall project lifecycle. The next steps will be to secure funding for final design, right-of-way, and construction.

The feasibility study determined the following:

- ▶ Roadway alignment
- ▶ Roadway elements to be included in the final design (stormwater bumpouts, parking, sidewalks, tree lawn, and bikeway)
- ▶ Intersection type at Holden Place and Decatur Street
- ▶ Realignment of Holden Place west of Decatur Street
- ▶ Bikeway on 13th Avenue
- ▶ Alignment connection of Riverfront Drive to Holden Place

The final design will further evaluate and refine the following:

- ▶ Access to properties
- ▶ Traffic control at intersections
- ▶ Configuration of the bikeway
- ▶ Number and length of stormwater bumpouts
- ▶ Street parking
- ▶ Property impacts

