



SOUTH I-25 URBAN CORRIDOR TRANSPORTATION MANAGEMENT ASSOCIATION

Last One-Half Mile Transportation Solutions FINAL REPORT

DECEMBER 2012



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EXECUTIVE SUMMARY

This report summarizes strategies to improve access from Regional Transportation District (RTD) Light Rail Stations to the major employment locations throughout the South I-25 Urban Corridor Transportation Management Association (South I-25 TMA) service area. The tools described in this report are specifically aimed at bridging the last one-half mile gap in order to enable the TMA, RTD and the adjacent jurisdictions to realize the full benefits from investment in transit, opportunities to reduce congestion and parking development (and reduce vehicle trips and greenhouse gas emissions), and develop a better connected and integrated multimodal transportation system.

Strategies identified in this study were scored based on an array of factors including costs, whether the strategy had previously been identified in another plan, improved safety for pedestrians and/or bicyclists, success at filling gaps in the transportation network, enhancements to the quality of the pedestrian environment, and implementation complexity.

CAPITAL IMPROVEMENTS

Based on the assessment, a set of capital improvements was identified with priority improvements proposed for each of the transit stations in the corridor. Highest-priority recommendations are as follows (stations listed in alphabetical order):

Arapahoe Station

- Install wayfinding signage at key locations within a 1/3-mile walk to the west station entrance at S. Fiddlers Green Circle.
- Add sidewalks on east side of South Syracuse Way between Greenwood Plaza Boulevard and East Caley Avenue.
- Add sidewalks on east side of Greenwood Plaza Boulevard between East Orchard Road and East Caley Avenue.
- Add sidewalks on west side of South Willow Drive between South Yosemite Street and South Wabash Way.
- Construct paths/ensure paths are included in future development between South Willow Drive, east of Yosemite Street, and the east side of the Light Rail Station, and between Wabash Way and the east side of the Light Rail Station, where desire lines exist.

Belleview Station

- Install sidewalk on north side of East Belleview Avenue from South Quebec Street to the west side of the Belleview Station Development.
- Install sidewalk on west side of South Quebec Street between East Chenango Avenue and the Conoco Gas Station.

County Line Station

- Install high visibility crosswalk across South Valley Highway at entrance to County Line Station parking lot.
- Install high visibility crosswalk across Inverness Parkway between Inverness Way South and Inverness Drive South.
- Improve the pedestrian crossing at South Park Meadows Center Drive and East County Line Road: provide advance stop bars, a median refuge across East County Line Rd., a paved pathway north to the shopping center, and a high visibility crosswalk with flashing beacon at the I-25 off-ramp onto westbound East County Line Rd.
- Add sidewalks on South Valley Highway between Inverness Way and South Jamaica Street (east side) and between County Line Station Parking Lot and South Jamaica Street (west side).
- Add pedestrian pathway from parking lot entrance directly east at South Valley Highway.
- Add sidewalk on west side of Inverness Parkway south of Inverness Way West/County Line.
- Add sidewalk along property on northeast corner of Inverness Parkway and Inverness Dr South.
- Complete sidewalk in front of Colorado Athletic Club, east side of Inverness Parkway.

Dry Creek Station

- Install mid-block crossings at stop locations along flex routes.
- Install pedestrian flashing beacons and yield-to-pedestrian signs at free right turns at all legs of the East Dry Creek Road and Inverness Drive West intersection.
- Close sidewalk gaps on the west side of Inverness Drive from south of Inverness Boulevard to Inverness Lane West.
- Provide a pedestrian pathway (or create a new roadway connection) from the south side of the station to East Mineral Avenue at South Dayton Street.
- Add crosswalk across South Chester Street at East Panorama Drive.

Lincoln Station:

- Install pedestrian crossing on Park Meadows Drive at Station Way.
- Add new traffic signal and crosswalk on Park Meadows Drive at Station Street.
- Close sidewalk gaps on Park Meadows Drive north of Lincoln Station.
- Provide a sidewalk on the east side of South Valley Hwy. and complete sidewalk gap on Bierstadt Way; provide a crosswalk across Bierstadt Way at South Valley Hwy.

Orchard Station

- Install crosswalk across DTC Parkway at the entry sign to 5560-5800 where path to station begins.
- Add sidewalks on outside ring of Greenwood Plaza Boulevard between Marin Dr. and 5889 Greenwood Plaza Boulevard; between El Dorado Place and bus stop at entry to Orchard Station lot; and between Orchard Station lot and turnoff to north.
- Add sidewalks on east side of Greenwood Plaza Boulevard between East Berry Avenue and the Greenwood Plaza Boulevard Loop.
- Add sidewalks on both sides of El Dorado Place.

- Add sidewalks on both sides of Marin Dr.
- Add sidewalks on east side of South Syracuse Way between Greenwood Plaza Boulevard and East Caley Avenue.
- Add sidewalks on east side of Greenwood Plaza Boulevard between East Orchard Road and East Caley Avenue.

PROGRAMMATIC OPPORTUNITIES

In addition to the priority capital improvements, a set of programmatic recommendations are also provided which include improved marketing of transit services within the TMA area, opportunities for better branding of the Call-n-Ride services in the corridor, bicycle parking and amenities for bicyclists, a parking cash-out program, transportation allowance programs, cash subsidies for carpooling/walking/bicycling, alternative work hours, and a set of other tools that have been successfully implemented in other parts of the Denver region and across the US. The report provides a toolbox summarizing these examples.

The report notes that the jurisdictions in the TMA area need to seek a better balance between the various modes: instead of planning and designing for automobiles, appropriate considerations need to be made to ensure development of a multimodal transportation network.

COMMUTE INFORMATION

To support the recommended investments, the report provides information about commutes in the region. The data shows that nearly 52% of all persons who work within the study area live within 10 miles of their job, and an additional 32% live between 10 and 24 miles from work. Although there are more than 60,000 jobs within one-half mile of one of the TMA light rail stations, fewer than 2,000 (3.3%) of those jobholders reside within one mile of any RTD light rail station. The data suggests that a limited audience of commuters exists with potentially walkable access at both ends of their light rail commute trip.

Employers were consulted in the development of the report and most indicated that cost-sensitivity was a key factor in determining how people in the region commute. Employers said improvements were required to the pedestrian network, but also noted that they did not have difficulty recruiting people due to the lack of local connectivity to transit stations.

STATION-BY-STATION SUMMARIES

The report is primarily a summary of opportunities, observations and specific capital investment needs around each of the six light rail stations in the study area. For each station, there is an in-depth pedestrian/bicycle/transit access assessment and a matrix of capital projects. The TMA may use the information in this report when opportunities arise to apply for capital grants, as well as programmatic enhancements, in the south I-25 corridor.

1 INTRODUCTION

The purpose of the Last One-Half Mile Transportation Solutions Report is to generate increased transit ridership by identifying specific strategies that improve access from RTD Light Rail Stations to the major employment locations throughout the South I-25 Urban Corridor Transportation Management Association (South I-25 TMA) service area. The report addresses capital investments as well as some programmatic efforts, that are identified to address service, information, or pedestrian and bicycle network gaps around six stations:

- Belleview Station located at 4855 S. Quebec St. in Denver
- Orchard Station at 5652 Greenwood Plaza Blvd. in Greenwood Village
- Arapahoe at Village Center Station, located at 8800 E. Caley Ave. in Greenwood Village
- Dry Creek Station at 9450 E. Dry Creek Rd. in Arapahoe County
- County Line Station, located at 8340 S. Valley Hwy. in Douglas County
- Lincoln Station at 10203 Station Way in Lone Tree

Although Denver, Greenwood Village, Lone Tree, and unincorporated portions of two counties house the various stations—as well as many of the jobsites and other destinations in the region—the study area also includes adjacent cities without stations, such as Centennial and Cherry Hills Village.

The objective is to offer an assessment – from the perspective of a *pedestrian, transit user or bicyclist* – about capital improvements that could be made to enhance the pedestrian, transit and bicycle infrastructure to advance the appeal of using light rail to access jobs within one-half mile of a station in the TMA area. **Projects that are ultimately pursued will require more extensive analysis and evaluation of safety indications (e.g., accident data), traffic impacts, and impacts on utilities, drainage, canopy, etc. Thus, the preferred capital projects provide a basis for further review by the TMA and its partners.**

WHAT IS THE LAST ONE-HALF MILE?

RTD and the Denver region have made a significant investment in light rail to serve the southeast I-25 corridor, and a large number of existing and future employment sites are located within a relatively short distance of the rail corridor. Nevertheless, TMA survey results, as well as census data, have shown that the vast majority of employees are opting to drive to their workplace rather than use transit to get there. The TMA's 2010 Commuter Patterns Survey found that the highest number of responses for why people who ride transit less than one time per month do not ride more often was that it was neither convenient to get from home to their transit stop nor from the transit stop to their workplace. In fact, almost 64% of survey respondents said that the fact that it is not convenient to travel from the transit stop to their workplace is either a "somewhat important," "important," or "very important" factor in their decision not to use public transit.

Although there are numerous advantages for an individual to use public transit—convenience, cost savings, shorter travel time, environmental benefits, health benefits—the barriers to using transit are also described by some who drive alone: it can be inconvenient, it can take longer to travel by transit than by car, it feels unsafe, it offers less flexibility, etc. The efforts by the South I-25 TMA in developing this report are aimed at addressing some of those barriers by identifying capital and programmatic enhancements that facilitate travel between a light rail station and one's workplace.

Addressing these barriers means looking at ways to reduce the distance an individual must travel, address real or perceived safety issues, and improve the quality of the built environment to be more hospitable to pedestrians and people using bicycles.

The tools described in this report are specifically aimed at bridging the last one-half mile gap in order to enable the TMA, RTD and the adjacent jurisdictions to realize the full benefits from investment in transit, opportunities to reduce congestion and parking development (and reduce vehicle trips and greenhouse gas emissions), and develop a better connected and integrated multimodal transportation system.

THIS REPORT

This report was developed by Nelson\Nygaard Associates, a firm that specializes in public transit planning and in transportation demand management. The consultants provide their perspectives and experience in the area of transit station access to offer information and justification for the South I-25 TMA and its members to pursue grant funds that can be used to implement projects and programs that improve access to transit. New policies and initiatives at the federal, state, and regional level suggest the potential for increased funding in the coming years for transit enhancement and wayfinding projects.

This report includes information about the study area and the evaluation that was undertaken to determine which tools and potential projects might merit future investment. It includes 1) some maps of the analysis and study effort, 2) a toolbox of the various strategy types that can be used by South I-25 TMA staff to support future grant proposals and project implementation activities, 3) a pedestrian/bicycle/transit access assessment of each of the six stations and a matrix of capital projects ranked by the consulting team based on criteria that are often used for grant programs, and 4) a discussion of implementation strategies and program initiatives that are appropriate throughout the TMA area.

2 STATION AREA ANALYSIS METHODOLOGY

Nelson\Nygaard conducted a review of the light rail stations and the surrounding environments to define potential solutions to address access to and from the facilities. Planners reviewed data from existing studies, surveys and the US Census, and collected additional data through fieldwork at each of the stations, through a meeting with some of the major employers in the TMA area, from RTD transit reports, and from a ZIP Code survey conducted by some of the major employers in the study area. Although most of the detailed information is presented in Chapters 4 through 9 as part of the assessment of the individual stations, this chapter provides some general information relevant to the development of this report and information about people who commute to jobs in the area.

COMMUTER TRAVEL TO THE TMA AREA

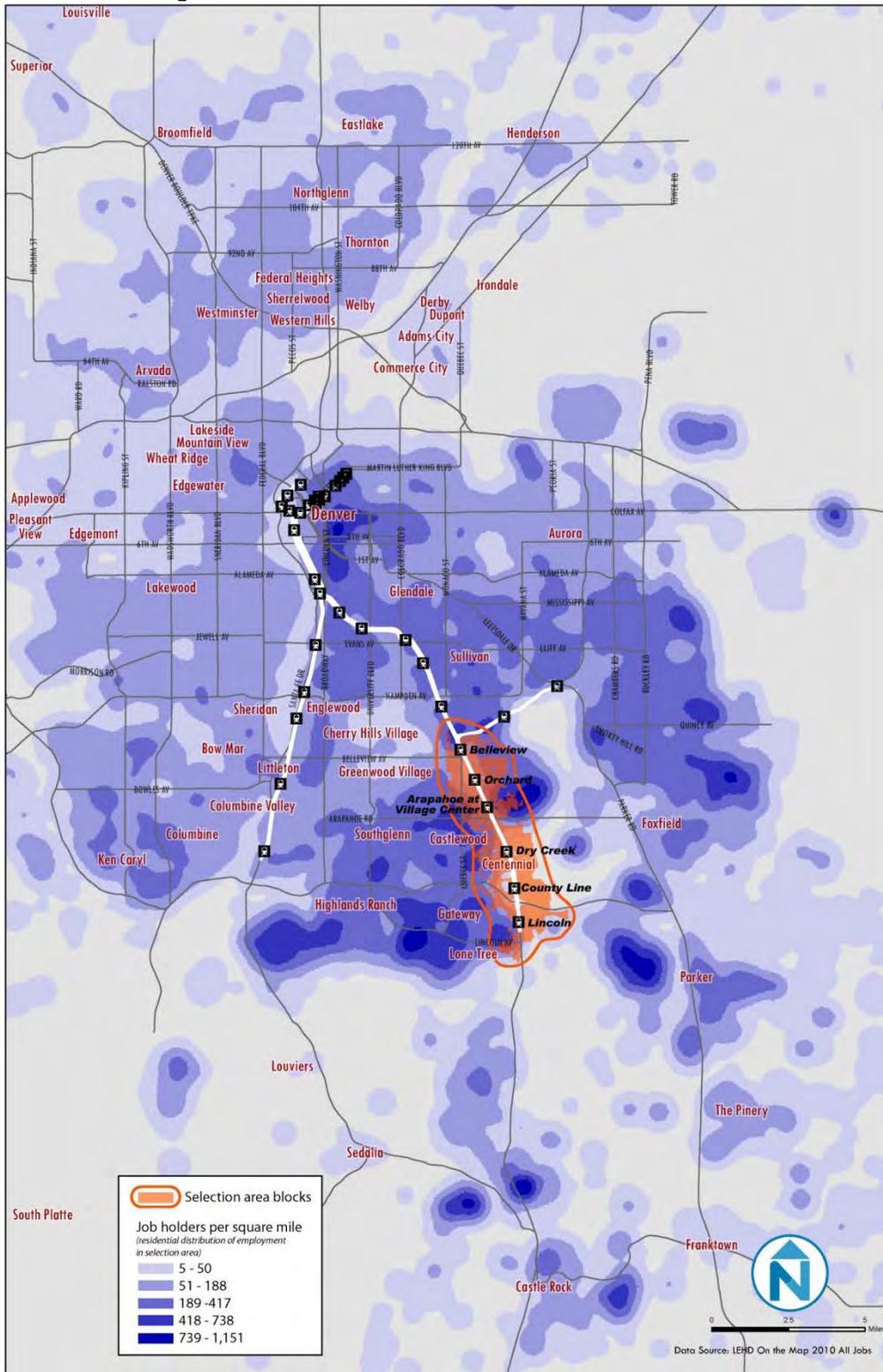
One of the challenges of meeting the needs of commuters traveling to work by light rail is that the people who work in the TMA study area reside throughout the greater Denver region, and many concentrations of employees are not in areas where commuting by light rail would be either convenient or efficient.

An analysis of Longitudinal Employer-Household Dynamics (LEHD) data from the US Census provides data on commutes for people traveling to work within $\frac{1}{2}$ mile and 1 mile of the six light rail stations. Figures 2-1 and 2-2 illustrate where people live who are jobholders in the TMA study area (shown in orange on the maps), at one mile and $\frac{1}{2}$ mile from the light rail stations, respectively. The assumption is that these are individuals who would benefit most from pedestrian and bicycle access improvements in the vicinity of the RTD rail stations.

Dark purple areas are residential locations with high concentrations of jobholders in the orange zone, while very light purple tones represent fewer jobholders. The maps illustrate that the greatest concentrations of jobholders live in areas to the east and west of the six light rail stations, thus rendering the light rail line somewhat unsupportive of the commutes to these jobs from these locations. Nevertheless, there are some significant concentrations of employees who reside in Denver and commute to the area. Some significant concentrations of TMA-area employees are also coming from the south, in Douglas County, which suggests that although it is reasonable for some of them to park at Lincoln Station, for example, and ride transit north to their workplace, most drivers would probably opt to continue their trip in their car to travel directly to their job rather than transfer to transit for a limited portion of their commute for trips within the corridor.

The data shows that nearly 52% of all persons who work within the study area live within 10 miles of their job, and an additional 32% live between 10 and 24 miles from work. Less than 9% of jobholders in the area commute more than 50 miles.

Figure 2-1 Residential Locations for Persons Holding Jobs within 1 mile of the South I-25 TMA-Area Light Rail Stations



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 South I-25 Urban Corridor Transportation Management Association

Figure 2-2 Residential Locations for Persons Holding Jobs within 1/2 mile of the South I-25 TMA-Area Light Rail Stations

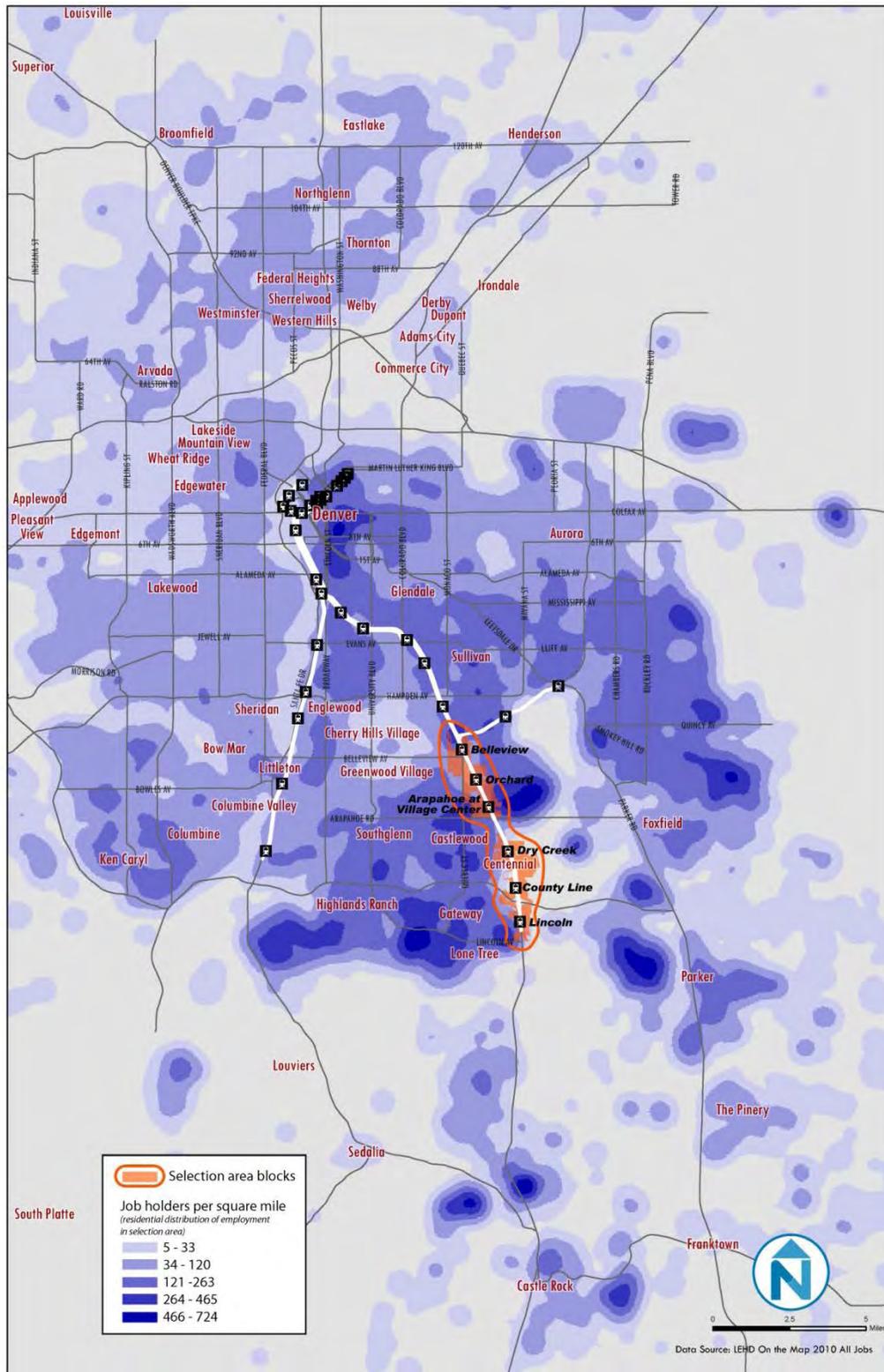


Figure 2-3 shows the city of residence for jobholders within one mile and 1/2 mile of the six light rail stations in the TMA study area. The cities are listed in alphabetical order, showing raw numbers of jobs held in the study area by residents of the cities shown in the maps in Figures 2-1 and 2-2.

Figure 2-3 South I-25 TMA Area: Jobholder Commute Origins by City of Residence

City of Residence	Residents who Work within this Distance of the Study Area Light Rail Stations	
	One Mile	1/2 Mile
Arvada	1,260	744
Aurora	11,057	6,926
Bennett	32	14
Bow Mar	34	21
Broomfield	430	262
Castle Pines	499	281
Castle Rock	2,546	1,571
Centennial	8,821	5,405
Cherry Hills Village	269	170
Columbine Valley	85	48
Commerce City	376	248
Deer Trail	14	10
Denver	16,878	10,352
Edgewater	51	28
Englewood	1,261	788
Foxfield	206	134
Glendale	82	55
Golden	318	187
Greenwood Village	1,304	847
Lakewood	2,774	1,658
Larkspur	16	6
Littleton	1,870	1,125
Lone Tree	1,070	632
Morrison	5	2
Mountain View	3	3
Palmer Lake	19	10
Parker	3,057	1,939
Sheridan	134	82
Superior	96	59
Westminster	1,385	823
Wheat Ridge	376	229

Source: US Census LEHD On the Map, 2010

Understanding where concentrations of jobholders reside is only part of the picture. It is also useful to assess how many of those who are commuting to jobs within ½ mile or 1 mile of the stations in the TMA study area actually live within a short distance of a light rail station. These are individuals who are more likely to consider using transit for their full commute because they can walk or bike on both ends of their trip, and may not require a car for travel at either the origin or destination.

Figure 2-4 South I-25 TMA Area: Jobholder Commute Origins by Proximity to Light Rail Stations at Trip Origin and Destination

Station Area	Total jobs within 1/2 mi	Total jobs within 1 mi	Job within Distance from Light Rail	Live within Distance from Light Rail	Jobs
Study Area (6 stations combined)	60,579	99,103	1 mi	1 mi	6,460
				1/2 mi	4,031
			1/2 mi	1 mi	1,954
				1/2 mi	1,241
Bellevue	7,914	30,308	1 mi	1 mi	2,171
				1/2 mi	657
			1/2 mi	1 mi	589
				1/2 mi	184
Orchard	20,150	36,665	1 mi	1 mi	2,509
				1/2 mi	1,413
			1/2 mi	1 mi	755
				1/2 mi	435
Arapahoe	8,742	27,781	1 mi	1 mi	1,881
				1/2 mi	624
			1/2 mi	1 mi	587
				1/2 mi	195
Dry Creek	12,773	22,556	1 mi	1 mi	1,356
				1/2 mi	771
			1/2 mi	1 mi	405
				1/2 mi	227
County Line	6,494	21,034	1 mi	1 mi	1,252
				1/2 mi	422
			1/2 mi	1 mi	386
				1/2 mi	130
Lincoln	7,854	12,827	1 mi	1 mi	705
				1/2 mi	452
			1/2 mi	1 mi	221
				1/2 mi	141

Source: US Census LEHD On the Map, 2010

Figure 2-4 shows the total number of jobs, based on US Census LEHD data, within the ½-mile and one-mile study area zones. It also shows the number of jobholders who live within ½ mile or one mile of any light rail station. The figure shows that of the more than 60,000 jobs within ½ mile of one of the TMA light rail stations, fewer than 2,000 (3.3%) of those jobholders reside within one mile of any light rail station, and only slightly more than 1,200 (2%) live within ½ mile of any light rail station. If the TMA has been discouraged in its efforts to promote light rail for the area's commuters, these numbers validate the challenge: a limited audience of commuters exists with potentially walkable access at both ends of their light rail commute trip.

EMPLOYER INPUT

Employers consulted in the development of this report included Centura Health, Standard and Poor's, DexOne, Skyridge Medical Center, Plug N Play and Oracle.

The key themes that arose from employers were as follows:

- Cost-sensitivity is a key factor in determining how people in the region commute
- Significant improvements are required to the pedestrian network
- Employers do not have difficulty recruiting people due to the lack of local transit connectivity

Only a few of the employers indicated they offered transportation demand management (TDM) programs for their employees to encourage them to use alternative modes. According to the employers, free parking is the norm in the region, although some employers pay for parking on behalf of their employees. In either case, the abundance of parking makes it difficult to incentivize employees to consider using other modes, including transit.

None of the employers indicated they had any difficulty recruiting employees due to transportation or congestion in the region, but employers talked about tools that would be beneficial to offer employees, including some things that already exist, such as local shuttles, a guaranteed ride home program, a pass program, and a carpool matching program (Ride Arrangers).

Employers talked about unsafe paths of travel between rail stations and employment sites and suggested some improvements that could be made to develop more direct paths of travel and safer pedestrian crossings in some locations. DexOne, which is located directly adjacent to Lincoln Station, indicated that many employees used light rail when a 50% subsidy existed, but once it was reduced, many of them opted to use their cars instead.

The employers talked about the importance of cost savings to encourage transit use, suggesting that financial incentives will be more important than almost any other investment with regard to transitioning people from their car to transit. It was noted that the area is very bicycle-oriented, and Centennial, in particular, is trying to position itself as a bike-friendly community, which could encourage more people to consider biking between the station and their workplace.

Area employers were asked to provide information about where their employees live in order to give planners a better sense of where people live who work in the I-25 Corridor. Only a limited number of employers participated in the survey, including Tony's Market, Oppenheimer Funds, Oracle, Sky Ridge Medical Center, American Family Mutual Insurance, the American Lung Association, Standard & Poors, Centura Health, and Trust Company of America. Figure 2-5 illustrates the data collected from those few employers, which provide supportive information that essentially reflects the residential concentrations of jobholders shown in Figures 2-1 and 2-2. The darkest ZIP Codes, in red, have the highest concentrations of employees residing in them,

while the areas with the lightest shades of gray have the lowest concentrations of employees at these companies. The map shows that of those employers surveyed, the highest concentrations of employees reside within the corridor, making it less likely that they would use light rail service for their commute because commutes would be in a more east-west pattern than north-south.

Based on RTD data, people boarding light rail in the corridor are likely to be traveling north and beyond the TMA area. Certainly some employees come from other portions of the metropolitan Denver region. These are individuals who may be more likely to consider transit—if it is convenient—based on the distance they must travel.

BICYCLING AND WALKING DISTANCES

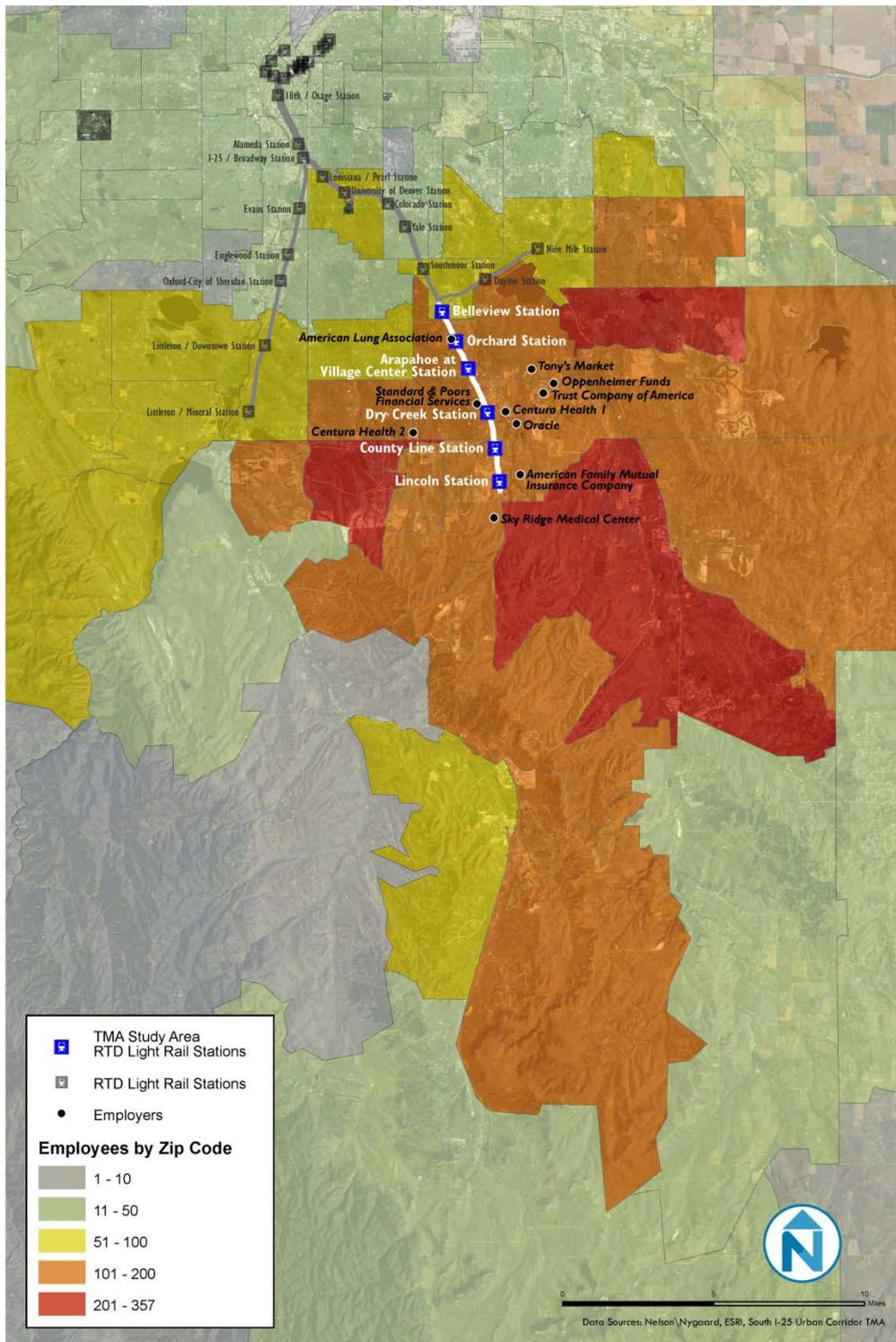
How far people are willing to walk to work between a transit facility and a job depends upon many factors, including topography, the availability and condition of sidewalks, trees and protection from sun or rain, seating and other sidewalk amenities, and the quality of the experience along the way. Studies find greater willingness to walk as the pedestrian accessibility of an area increases. As communities improve neighborhood shopping and achieve higher densities with more pedestrians, the distance its residents are willing to walk should increase. Boris Pushkarev and Jeffrey Zupan report that the median (half are longer and half are shorter) walk to the New York subway is .35 mi, and the median walk to New Jersey commuter rail stations is .5 to .6 mile (1980). They use 1/2 mile walking distance as "rail territory," which aligns with the focus of this study. Although this data is somewhat old, more recent studies have made similar findings.

In areas with land uses and built environments similar to those found in the southeast I-25 corridor, however, most people are likely willing to walk much shorter distances. The National Personal Transportation Study found that 70% of Americans will walk 500 feet for normal daily trips, 40% are willing to walk 1,000 feet (1/5 mile), and 10% will walk a half mile (David Unterman, 1990). This study found little willingness to walk in the pedestrian-unfriendly environments of many portions of the US. The National Personal Transportation Study also found that 10.3% of those living within 1/4 mile of public transit used it to get to work, while only 3.8% of those living within 1/4 and 2 miles used it, and less than 1% of those living farther away used it (U.S.DOT, 1986).¹

Figure 2-6 illustrates walking distances based on 1/4 mile, 1/2 mile and beyond (assuming a 5-minute walk for distances of a 1/4 mile and a 10-minute walk for distances of a 1/2 mile) for each of the stations in the study area.

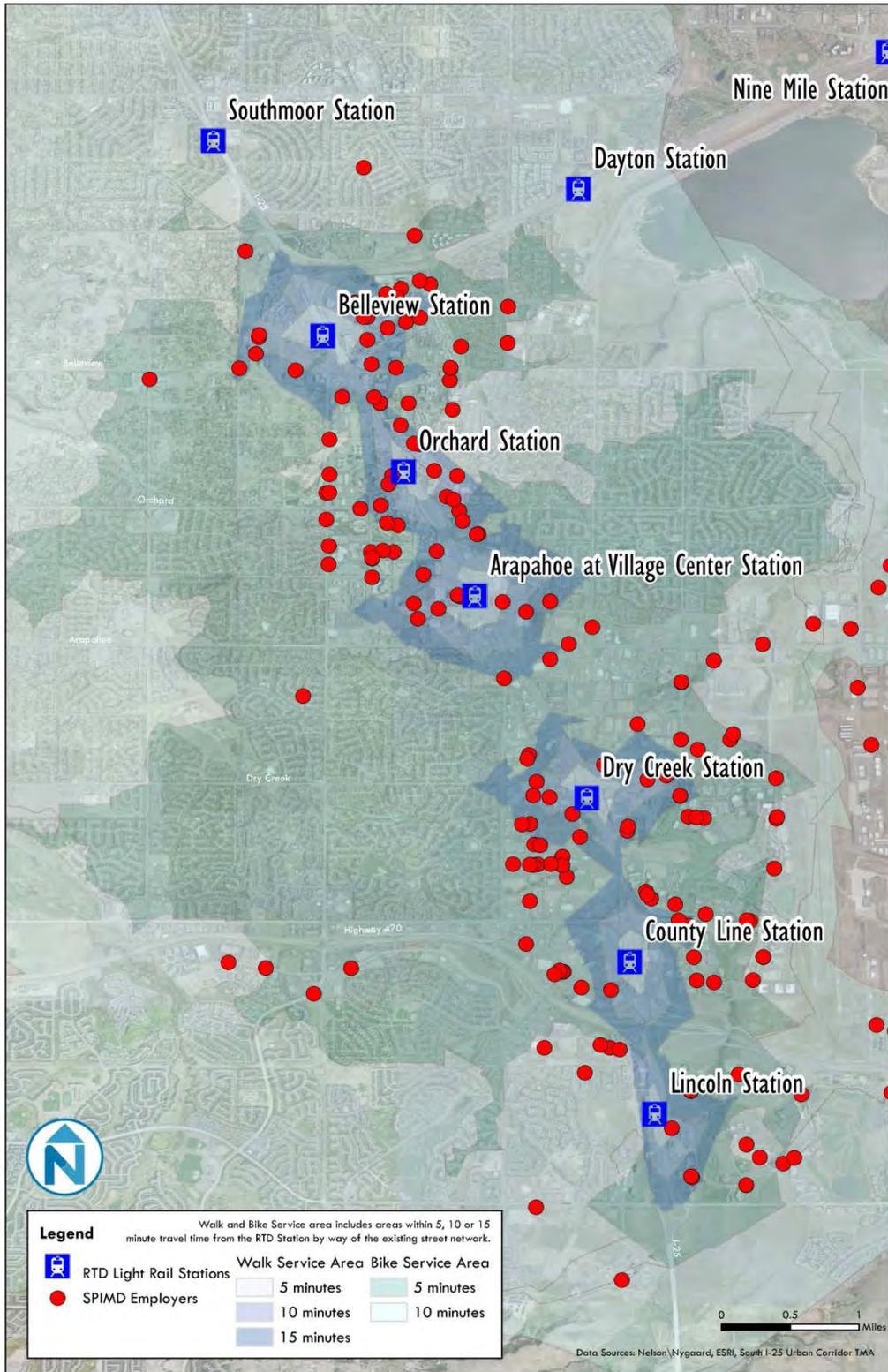
¹ *Using Residential Patterns and Transit To Decrease Auto Dependence and Costs*, John Holtzclaw, June 1994, Natural Resources Defense Council

Figure 2-5 Residences of Employees for Select TMA-Area Employers (Mapped based on ZIP Code data provided by 9 TMA-Area Employers)



Source: TMA Residential ZIP Code survey of the employees of nine TMA- area employers (shown on the map), 2012. Zones depict ZIP Code boundaries.

Figure 2-6 Approximate Biking and Walking Thresholds for the South I-25 Stations



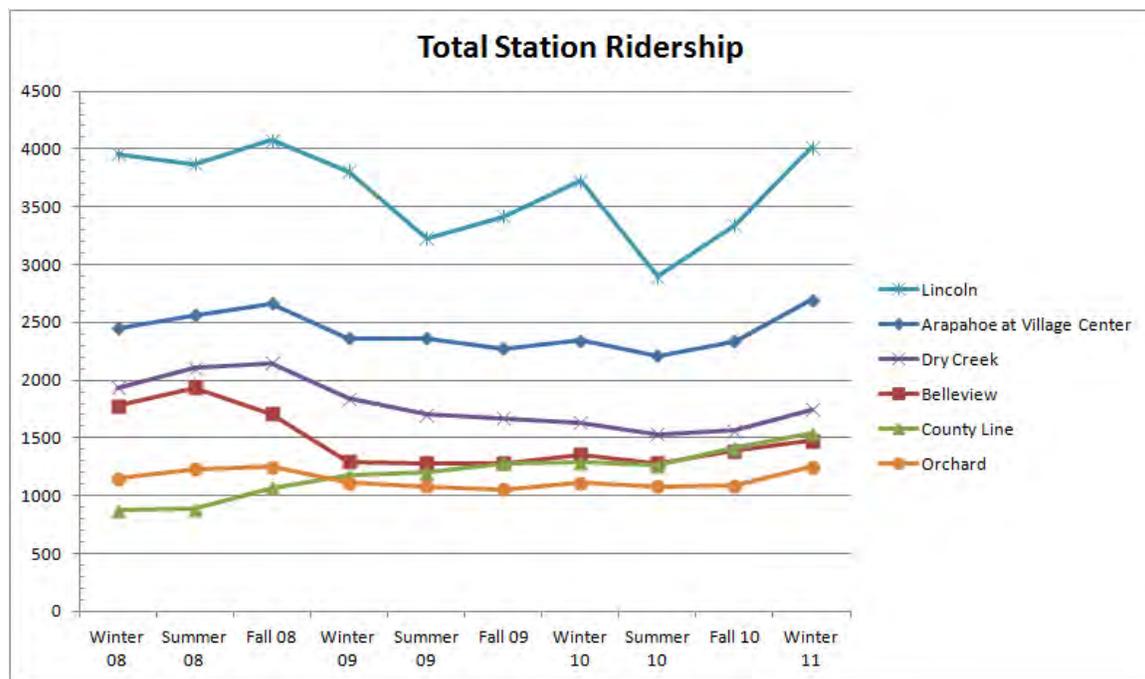
The red dots on the map in Figure 2-6 show major employers within the region, illustrating that many of them are clustered within ¼-mile and ½-mile radii of the light rail stations.

Bicycle distances were also considered and are generally much longer (typically up to three miles from rail stations). Conceptually, within a 10-minute ride of the station, the entire TMA area can be reached by bicycle, provided sufficiently safe bike routes and streets are available to accommodate cycling. This information was used to assess specific areas where connectivity was deemed most critical, and also as a way of determining where connections are needed to the vast network of bicycle and pedestrian paths in the region.

RIDERSHIP BY STATION

Lincoln has the highest ridership of any of the stations, followed by Arapahoe and Dry Creek. Most passengers board at one of the six stations to travel north, although a number of passengers board at Belleview and Arapahoe to travel to destinations south of those stations.

Figure 2-7 Total Station Ridership by Day



Source: RTD passenger counts, Winter 2008 - Winter 2011

EXISTING USE OF CALL-N-RIDE SERVICES

Data was gathered from RTD to understand the number of people who use the local shuttle connections, known as Call-n-Ride services, to travel between light rail stations and worksites. As shown in Figure 2-8, weekday boardings on the Call-n-Ride services are very limited, with the highest ridership on the North and South Inverness Call-n-Rides, followed by the Meridian Call-n-Ride.

Figure 2-8 Call-n-Ride Average Weekday Ridership

Call-n-Ride Service	Station Served	Average Weekday Ridership	Comments
Arapahoe	Arapahoe Station	29	
Belleview	Belleview Station	15	Operates as flex route service during the PM peak only
Dry Creek	Dry Creek Station	23	
Lone Tree	Lincoln Station	19	
Meridian	Lincoln Station	71	Operates as flex-route service
N. Inverness	Dry Creek Station	138	Operates as flex-route service
Orchard	Orchard Station	72	
	Arapahoe Station	1	
S. Inverness	County Line Station	94	Operates as flex-route service

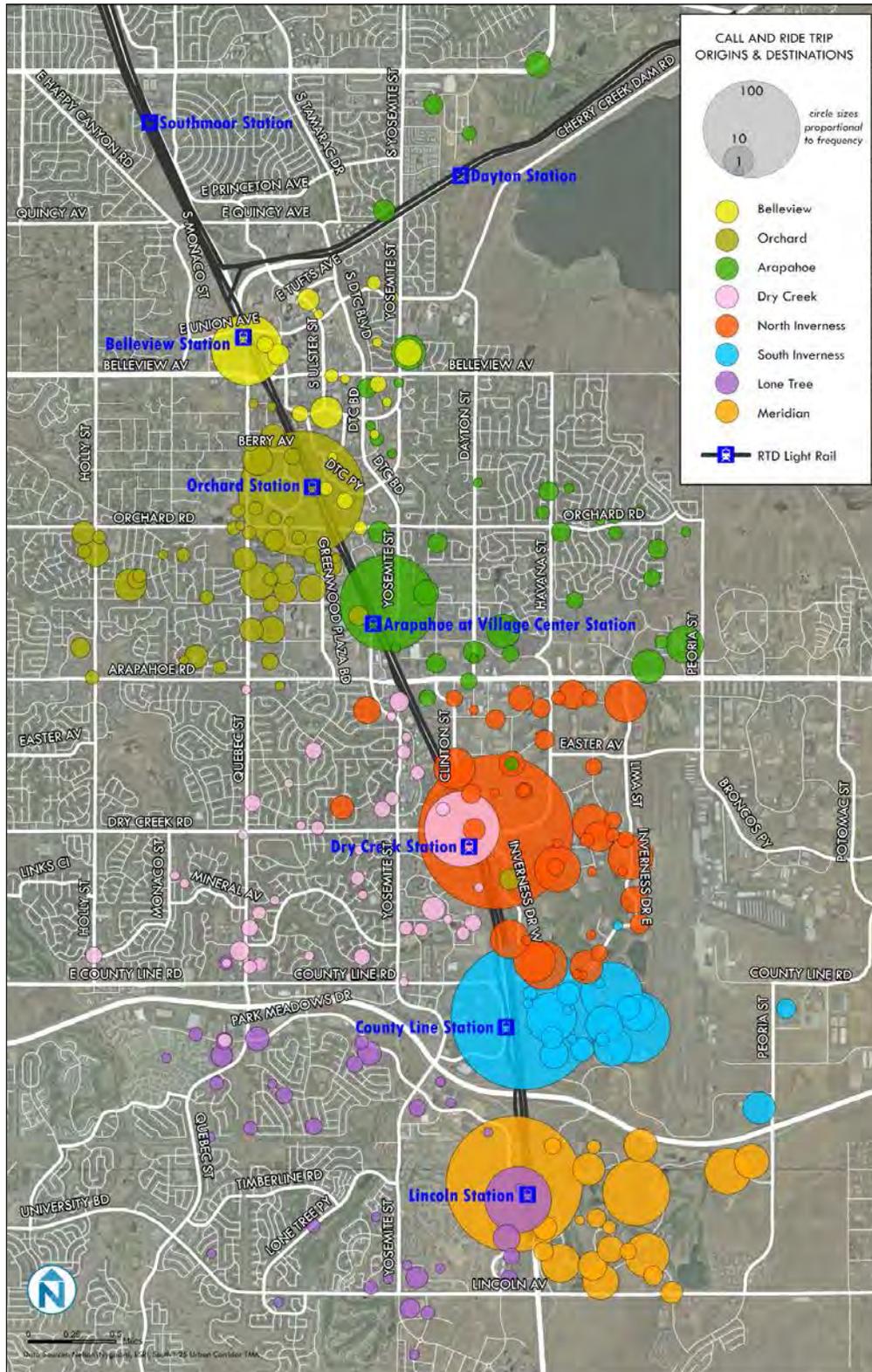
Source: RTD

Three of the busiest Call-n-Ride services operate as flex-routes, which may be more attractive to some riders because they know that there is a consistent schedule of operations. A flex-route operates along a regular bus route with some dedicated stops and time points, but will also deviate off the route to pick up or drop off passengers at other locations within the Call-n-Ride service area.

The other Call-n-Ride services operate on-demand services (at least most of the time on the Belleview Call-n-Ride), with scheduled stops at the station, but all other pick-ups and drop-offs are made upon request.

Figure 2-9 illustrates where people are getting on and off the Call-n-Ride services. The dot locations suggest that people use the Call-n-Ride either because the distances between the station and the origin/destination are too great to walk, or that if improvements were made to the pedestrian network, people might consider walking to destinations within ½ mile of stations for which they currently use the Call-n-Ride. Nevertheless, they pinpoint where people using transit are going in the vicinity of each of the stations and provide some guidance for the development of tools and capital investments in the corridors between the stations and these destinations.

Figure 2-9 Call-n-Ride Trip Origins and Destinations Analysis



ANALYSIS METHODOLOGY

Senior planners from Nelson\Nygaard collected and reviewed data from the TMA and prepared preliminary study area maps, with street overlays and transit services for each of the six stations being studied. Planners conducted fieldwork at each station to evaluate access and amenities within the station, including lighting, parking, signage, etc. Planners walked the area within 1/4 mile of each station to identify major gaps in the sidewalk and bicycle network, wayfinding, lighting systems and the overall pedestrian environment. Planners also drove and used transit to assess links to the station within a 1/2-mile radius. In some cases, planners reviewed street and sidewalk networks beyond one-half mile, looking at access points where significant gaps were identified in areas that were already fully developed.

Planners recorded detailed notes and photographed the areas, and submitted preliminary findings to TMA staff for review, along with a draft toolbox of strategies to address the gaps in the area (see Chapter 3). Based on the recommended tools and the identified gaps, planners detailed specific locations where the tools should be applied (to identify possible capital investments to facilitate access and egress to and from each station). Each potential application of a proposed tool was assessed based on potential cost and a number of other evaluation factors, presented in Chapters 4 through 9. The evaluation of each tool was subjective, based on experience both within the region and elsewhere, and provided in draft format for review by staff and the TMA's technical committee (see below for more information on the evaluation process).

As noted in Chapter 1, the analysis objective is to assess potential capital improvements that could be made to enhance the pedestrian, transit and bicycle infrastructure. Ultimately, this makes commuting by light rail more appealing by removing barriers in the pedestrian and bicycle environment. This analysis is qualitative and does not account for traffic impacts data, accident data, or other factors that must ultimately be considered if a new capital project is being pursued.

Scoring of Proposed Capital Improvement

The Denver Regional Council of Governments' (DRCOG) TDM evaluation criteria for many of its grant proposals considers the potential for vehicle miles traveled (VMT) reduction and overall trip reduction. In this case, the consulting team classified these as transit ridership impacts; in other words, whether or not the improvement would encourage people to use transit service to a greater degree than if the improvement was not made. These were ranked using a 20-point scale with 20 representing a direct correlation to increasing transit ridership, 10 representing a modest increase in transit ridership because of the investment (in most cases, this will be a one-percent ridership increase or less), and 0 representing no impact on transit ridership. Scores of 15 or 5 represent impacts assumed at the midpoints between the other ratings. We assume that the improvement, in combination with programmatic factors, will result in automobile trip reduction, but are not quantifying the outcomes because total ridership impacts have not been modeled and are anticipated to be generally minimal.

Cost effectiveness is another important criterion. For purposes of this evaluation, we have identified a range of capital costs based on cost estimates used in the forthcoming National Cooperative Highway Research Program (NCHRP) *Guidebook for Estimating the Cost of Non-Rail Infrastructure Upgrades Due to Passenger Rail Implementation* to construct physical improvements or purchase equipment to implement the strategy. Total costs, given in a range, are calculated based on a per unit cost, which varies depending on the type of improvement.

Some adjustments have been made to costs based on input from local jurisdictions. We have assessed a cost per overall rating or benefit point as well, looking at the cost per point of the improvement's overall score.

DRCOG also considers whether a cash match is available in the evaluation of some of its grant applications. This will need to be assessed for each of the projects carried forward. The evaluation matrix identifies those projects that have already been identified in a local plan/program document, which suggests that a greater propensity for a local match may exist.

For purposes of scoring the various capital investments, we have also considered additional criteria which may assist the TMA, local jurisdictions and major employers in prioritizing which improvements to make. All are ranked on a 20-point scale, at increments of 5 points. Basic definitions of the point allocations are provided below; it should be assumed that scores of 15 or 5 are equivalent to the midpoint between 10 and 20, or 0 and 10, respectively. These additional evaluation criteria include the following:

- **Safety:** Degree to which the investment would improve safety for pedestrians and/or bicyclists. (20=safety -- primarily pedestrian-vehicle conflicts and bicycle-vehicle conflicts -- is the primary purpose of this investment; 10= safety accounts for about 1/2 of this investment's benefit; 0= this investment has no expected impacts on safety).
- **Connectivity:** The impact on the overall pedestrian/bicycle network in terms of filling gaps or providing links which do not currently exist. (20=connectivity is the primary purpose of this investment; 10= connectivity accounts for about 1/2 of this investment's benefit; 0= this investment has no expected impacts on connectivity).
- **Pedestrian Environment:** The extent to which the improvement would enhance the quality of the area's pedestrian environment, including the overall appeal, ease and attractiveness of walking. (20=improvements to the pedestrian environment are the primary result of this investment; 10= improvements to the pedestrian environment are a secondary result of this investment; 0= this investment will not improve the pedestrian environment).
- **Implementation Complexity:** Projects that call for major right-of-way acquisition, require multijurisdictional coordination, have high costs, or have likely environmental impacts are deemed more complex to implement than relatively straightforward concrete, painting and signage projects. (20=least complex/lowest cost threshold/projects that can be completed in a short period of time/projects that are already planned; 10= moderate complexity/mid-range costs compared to other investments/projects that may require some lead time and community involvement or coordination between at least two jurisdictions; 0= most complex/highest cost/may involve private land ownership/may require environmental review and/or coordination with multiple jurisdictions).

Based on the assessment, an overall ranking was developed, allowing for a comparison of the projects at each station. Although local support was not specifically included in the overall ranking, projects that are already programmed or proposed by one of the local jurisdictions may be considered for advancement based on the potential for greater levels of institutional support and local funding.

3 TOOLBOX

INTRODUCTION

This chapter provides an overview of tools used in other communities that are relevant to the I-25 corridor. It includes a summary table with detailed descriptions of the tools, how they might be applied in the I-25 corridor, and examples and best practices from communities in North America and Europe. This toolbox was used to develop site-specific strategies for each of the six light rail stations in the corridor, as well as corridor-wide recommendations.

TOOLS TO BRIDGE LAST ONE-HALF MILE GAP

Several tools are defined which will provide appropriate solutions in the corridor. Based on the previous peer work that was done by the TMA and on examples from other communities, this section describes the types of capital—and in some cases, programmatic—improvements for the station areas and the roadway and pathway networks in the surrounding areas.

Pedestrian Improvements

Walking is a free transportation option for accessing public transit and is available to most people within a quarter to half mile of transit stations and stops. Consequently, creating a safe, comfortable, and convenient walking environment is a key element in supporting and facilitating transit use. A well-designed network of streets or pathways with a high degree of pedestrian amenity is an important factor in enhancing pedestrian accessibility and connectivity to transit. These tools include, but are not limited to the following:

- Streetscape Improvements
- Sidewalks
- Intersection Improvement Tools
- Intersection Crossing Enhancement Tools
- Mid-Block Crossing Enhancement Tools
- Lighting
- Road Diets

Bicycle Improvements and Programs

Integrating bicycles with transit combines the long-distance coverage of light rail travel with the door-to-door service of bicycle riding. Transit is most effective for trips of moderate to long distance on busy corridors, and bicycles are effective for trips of shorter distance in low- to medium-density areas. For these reasons, the combination of bicycling and transit can provide a high level of mobility comparable to automobile travel in terms of the overall travel time and distance. RTD already promotes and supports the use of bicycles with transit through its Bike-n-Ride program, and bicycles are accommodated on both RTD buses and light rail vehicles.

Bikeways and Bicycle Parking

Allowing bicycles on transit is only one step in promoting bus-bike integration, however. Good bikeways to transit stations are required, and secure bike parking at transit stations and bus stops is important in case of capacity overload or simply for passenger convenience. In addition, access management should be considered, such as how the bicyclists navigate to station areas. Maps of the bicycle network can be provided near stops, and wayfinding signage and/or pavement markings should guide bicyclists from the nearest bike path to stations. A network of bicycle paths exists in the vicinity of the I-25 corridor; safe, attractive cycling connections between stations and the existing trail network are generally absent.

Folding Bikes

Encouraging folding bikes on transit has the advantage of addressing first/last mile barriers on *both* ends of the transit trip. Folding bikes on transit also increases user convenience (compared to leaving a non-folding bike at a transit stop/station all day) without exacerbating peak-hour transit capacity constraints (compared to bringing a non-folding bike on board a transit vehicle). As for the benefits to the rider, a folding bike is highly convenient for anyone who lacks the space to store their bicycle at any point in their journey or work day. Folding bikes can be easily stored in the office or cubicle and unfolded and ready to ride in seconds.

Bicycle Sharing

Similar to car sharing, bike sharing is a form of short-term bicycle rental where people can have access to a shared fleet of bicycles on an as-needed basis. Bicycle sharing programs provide safe and convenient access to bicycles for short trips, such as running errands or transit-work trips. Cities of all sizes from around the world have experimented with bicycle sharing programs for nearly 40 years. Until recently bicycle sharing programs worldwide have experienced low to moderate success, but innovations in technology in the last five years have given rise to a new (third) generation of technology-driven bicycle sharing programs. These new bicycle sharing programs can dramatically increase the visibility of cycling and lower barriers to use by requiring only that the user have the ability to bicycle and some form of electronic payment (smart card, credit card, or cell phone). The Denver B-Cycle bike sharing program started as a pilot program in 2007, and became a full-fledged operation in 2010. In 2011, 202,731 rides were taken.¹

¹ <http://denver.bcycle.com/tabid/99/itemid/185/news.aspx>, accessed February 21, 2012.

Station Bicycles

In addition to the bicycle sharing option at transit stations, some people who may use their bicycles often may opt to maintain a station bicycle. These can be owned by individuals or employers to be kept at major transit facilities for the express purpose of commuting to the workplace and also running errands locally.

Electric Bicycles

Electric bicycles are growing in popularity as a way to encourage bike use in areas with hilly terrain. They also allow people for whom longer bike rides may be difficult to have an electric 'boost' to travel longer distances.

Wayfinding

A successful wayfinding system provides integrated, consistent and user-friendly information to confirm that chosen routes are efficient, safe, and ultimately lead directly to one's destination. Wayfinding particularly helps new users and visitors feel comfortable in an unfamiliar environment and is an essential element of both pedestrian and bicycle improvements.

Shuttles

Shuttle buses typically serve a clearly-defined group of riders within a defined area or along a specific route. Shuttle service is usually from point to point, or between one point and many to fill gaps or make connections with the broader public transit network, often for specific groups of individuals. Fares are usually free or nominal. Shuttles are an important aspect of first mile/last mile connectivity because they provide convenient and direct service to desired destinations.

Private/institutional shuttle services have gained enormous popularity in recent years. They serve as connectors to and from the regional transit system with employers or institutions, and can also provide important neighborhood circulation. Shuttles provide a service that is finely tailored to local needs. Some of the most successful shuttles are privately funded, or funded through public/private partnerships. Shuttle operations usually fall under three main categories or combinations thereof: 1) city supported and operated; 2) transit agency operated; and 3) employer operated.

Ridesharing and Carpooling

Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity. Carpools may be formal - arranged through an employer, public website, etc., or casual, where the driver and passenger might not know each other or have agreed upon arrangements. Carpooling can be used as a first mile/last mile connector by efficiently connecting with public transit or other alternative commute modes.

Casual carpooling, also called real-time ridesharing, refers to the sharing of a ride with a driver and one or more passengers, where the ridesharing between the individuals is not established or prearranged well in advance but coordinated shortly before the trip or even "on the spot." Rides are shared to and from popular origins and destination points, such as from residential neighborhoods with nearby bus stops to downtown business districts. Casual carpooling provides

an alternative to traditional ride-matching and formal carpool/vanpool programs. It differs from traditional carpools in that it is designed to provide an instant “real-time” match of potential drivers and passengers traveling to and from the same area. In contrast to formalized carpooling programs, casual carpooling maximizes travel flexibility and better accommodates occasional and/or unscheduled need to share a ride. Casual carpooling also differs from formal carpooling and the commonplace sharing of rides among friends and family members in that drivers and passengers typically don’t know each other in advance and may never travel together again. Thus, the major benefits of casual carpooling are that it requires minimal advance planning and accommodates variable travel times, reducing the participation barriers to traditional carpooling.

Short-Distance Vanpools

Short-distance vanpools (sometimes called vanshares) are designed to provide “last mile” connections between transit centers and nearby employment locations, typically two to five miles away. Vanpools consist of at least four or five commuters who rideshare to and from work in vans provided by an outside operator. In some cases, vans can be provided by an employer or can be owned by an individual employee.

Car Sharing

Car sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee. Car sharing is similar to conventional car rental programs with a few key differences between most programs: a) system users must be members of a car-sharing organization; b) fee structures typically emphasize short-term rentals rather than daily or weekly rentals; c) vehicle reservations and access is “self-service”; d) vehicle locations are widely distributed rather than concentrated; and e) vehicles must be picked up and dropped off at the same location.²

Hourly Car Rental

As the success of car-sharing programs around the world illustrates, a potential solution to address the first/last mile issue is a related strategy: short-term or hourly car rentals. Since car sharing services may not be successful in all contexts, existing for-profit national rental car companies might be able to provide some of the same benefits (i.e. short-term car rental with convenient pick-up and low rates) in lieu of or in addition to traditional membership-based car-sharing organizations.

Taxis

A taxicab is an automobile with a driver for hire which conveys passengers between locations of their choice. This “vehicle for hire” or expanded taxi service differs from rental car and car-sharing services in that the person making the trip: a) does not drive themselves, b) does not need to reserve in advance, and c) can access the service at many different locations. Taxis can use already existing technology to pick up multiple riders in proximity to one another, provide on-

² It should be noted that certain aspects of the service models offered by car rental companies and car-sharing organizations can overlap. For example, “Connect by Hertz” is a short-term car rental service that shares many of the same attributes as a car sharing service. A key distinction is that traditional car sharing organizations *only* provide short-term car sharing (rather than both short-term and long-term car rental) and typically have an organizational mission to reduce vehicle trips and vehicle miles traveled (VMT).

demand door-to-door travel and connect riders from home to transit or from transit to job centers. Taxis are best for short-distance trips. For these reasons, taxis are an excellent first / last mile connector to bridge the gap between a transit station and a person's origin or destination.

Supportive Programs

Employers and other agencies can provide support and incentives to employees to leave their cars at home and use transit, rideshare, walk, or bike to work. Examples of supportive programs include:

- Priority parking for carpools/vanpools
- Parking cash-out programs
- Information and assistance with transportation options
- Guaranteed or emergency ride home programs
- Subsidies or other incentives such as the commuter pre-tax transit benefit program and deep discount bulk transit pass programs
- Flexible work schedules (to facilitate ridesharing arrangements)
- On-site amenities or vehicles (bicycles or cars) available to run errands during the day
- Lockers and showers for those who bicycle to work as well as secure and convenient bicycle parking
- Secure indoor bicycle parking within workplace office buildings

Figure 3-1 provides a summary table of these tools, providing more detailed information about each, and its potential application. It also includes peer examples that are most appropriate for this area, based on experiences elsewhere.

Figure 3-1 Summary Table: Last One-Half Mile Tools And Their Application

Potential Solutions	Description	Case Study Examples
Pedestrian Improvements	Streetscape Improvements: Streetscape includes the overall look, feel and design of the roadway and public right-of-way, including sidewalks, street trees and landscaping, lighting, paving, signage, and street furnishings.	Encourages walking and can improve pedestrian safety. Applicable to key pedestrian routes within ¼ mile of LRT stations.
	Sidewalks: The sidewalk zone is the portion of the street right of way between the curb and building front. Within this zone, there are four distinct areas that serve different organizational purposes: the edge/curb zone, the furnishing zone, the throughway zone and the frontage zone.	Improves pedestrian safety and mobility, particularly for those with disabilities. All roadways within ¼ mile to ½ mile of stations should have sidewalks on both sides of the roadway.
	Intersection Improvement Tools: <ul style="list-style-type: none"> ▪ Curb Extensions ▪ Reduced curb radii ▪ Pedestrian refuge islands ▪ Curb ramp improvements 	Increases pedestrian safety and mobility by improving visibility, slowing vehicular traffic and reducing crossing distances for pedestrians. Roadway intersections on key pedestrian routes should be designed to maximize pedestrian mobility, safety, and visibility, particularly on roadways with high traffic volumes and/or speeds.
	Intersection Crossing Enhancement Tools: <ul style="list-style-type: none"> ▪ Advanced yield markings for multi-lane roadways ▪ Longer traffic signal walk phases ▪ Pedestrian signal countdown timers ▪ Accessible pedestrian signals ▪ Leading pedestrian signal intervals ▪ Marked and high visibility crosswalks ▪ Raised crosswalks ▪ In-street pedestrian crossing signs ▪ High-visibility signs and markings 	Increases pedestrian safety and mobility by improving visibility, separating or phasing pedestrian and vehicular movements, and providing more time and/or shorter distances to cross roadways. Roadway intersections on key pedestrian routes should be designed to maximize pedestrian mobility, safety, and visibility, particularly on wide roadways with high traffic volumes and/or speeds and large turning volumes.
	Mid-Block Crossing Enhancement Tools: <ul style="list-style-type: none"> ▪ HAWK (High Intensity Activated Crosswalks) or Pedestrian Crossing Hybrid beacons ▪ Rectangular Rapid Flash Beacon (RRFB) ▪ In-pavement flashing lights crosswalk warning system ▪ Staggered pedestrian refuge island 	Pedestrians may need to cross the street at locations other than intersections due to the location of trail crossings, transit stops, or key attractions. The need to cross mid-block increases when the spacing between intersections is very wide, as is often the case in the I-25 corridor. Creating safe mid-block crossings can shorten pedestrian travel distances significantly and make walking a more attractive choice.
	Lighting: <ul style="list-style-type: none"> ▪ Pedestrian-oriented street lighting 	Pedestrian-oriented lighting is generally much lower (10-12 feet) and more closely spaced than conventional street lighting. It increases pedestrian visibility for motorists enhances safety and security, creating a more inviting and appealing walking environment.
	Road Diet Tools: <ul style="list-style-type: none"> ▪ Roadway narrowing (10-12 foot travel lanes) ▪ Lane reductions 	High traffic speeds pose a significant safety threat to pedestrians and can create an unpleasant walking environment. Physical design changes that cause drivers to reduce their speed can improve both safety and overall walkability.
		<p>Numerous cities throughout North America and Europe have made streetscape, sidewalk, intersection and other improvements to enhance the quality and safety of the pedestrian environment in order to increase the number of trips made on foot.</p> <p>The City of Fort Collins, CO recently completed a Pedestrian Plan (http://www.fcgov.com/transportationplanning/pedplan.php) that incorporates a number of the pedestrian improvements listed on the left, including Pedestrian Crossing Hybrid Beacons (http://www.fcgov.com/traffic/ped-cross.php).</p> <p>There are several resources that provide both general and specific guidance for improving the pedestrian environment. These include:</p> <ul style="list-style-type: none"> ▪ "Designing Walkable Urban Thoroughfares: A Context Sensitive Approach", an Institute of Transportation Engineers (ITE) Recommended Practice (http://www.ite.org/css/) ▪ "Model Design Manual for Living Streets", Los Angeles County (http://www.modelstreetdesignmanual.com/) ▪ "Metrorail Bicycle and Pedestrian Access Improvements Study", Washington D.C. Metro (http://planitmetro.com/wp-content/uploads/2010/12/Metrorail-Bicycle-Pedestrian-Access-Improvements-Study-Final.pdf) ▪ "Guidelines for Successful Pedestrian and Bicycle Facilities in the Denver Region", Denver Regional Council of Governments (http://www.drcoq.org/index.cfm?page=BicycleandPedestrianPlan)

Potential Solutions	Description	Case Study Examples
<p>Bicycle Improvements & Programs</p> <p>Bikeways:</p> <ul style="list-style-type: none"> ▪ Bicycle trails and paths ▪ Bicycle lanes (conventional, buffered, separated) ▪ Shared vehicular lanes ▪ Bicycle detection at signalized intersections ▪ Signage/wayfinding 	<p>Bikeways improve mobility for cyclists, and studies have shown that higher levels of bicycle infrastructure are positively and significantly correlated with higher rates of bicycle commuting.³ Bicycle facilities also enable a wider range of cyclists with varying skills and abilities to comfortably and safely travel.</p> <p>There are a number of bicycles paths within the vicinity of several of the stations in the I-25 South light rail corridor, however there are currently few if any bicycle facilities either on- or off-road connecting the light rail stations with the existing trail system.</p>	<p>A number of European cities have provided a combination of bikeway facilities and secure bicycle parking as one of the primary modes of transportation from rail stations to destinations within the city.</p> <p>Resources for bikeway planning and design include:</p> <ul style="list-style-type: none"> ▪ National Association of City Transportation Officials Urban Bikeway Design Guide (http://nacto.org/cities-for-cycling/design-guide/) ▪ “Guidelines for Successful Pedestrian and Bicycle Facilities in the Denver Region”, Denver Regional Council of Governments (http://www.drcog.org/index.cfm?page=BicycleandPedestrianPlan)
<p>Bicycle Parking and Storage:</p> <ul style="list-style-type: none"> ▪ Racks ▪ Shelters ▪ Lockers ▪ Stations 	<p>While all six light-rail stations have bicycle racks, none of the racks are covered, nor do they provide any other type of protection from the elements. All but one of the six light-rail stations in the I-25 corridor has bicycle lockers. However, these lockers are only available to one user at a time, and individual users must rent a locker at a particular station. To effectively increase the capacity of bicycle lockers and provide more convenience and flexibility to users, some transit agencies have installed “eLockers”: computerized, on-demand systems that allow users to check for available lockers or sign up for them online.</p> <p>Models from eLocker and CycleSafe allow keyless access to the locker with the use of a SmartCard or cell phone. Advance reservation systems are being tested that would enable users to reserve a locker in advance. With an internet connection, centralized computerized administration allows the transit agency to monitor and respond to demand for one-time use as well as reserved lockers.</p> <p>Lockers available for one-time use have the advantage of serving multiple users a week. Monthly rentals, by contrast, ensure renters that their own personal locker will always be available, however incidental users cannot be accommodated, and rentals are limited to a particular location.</p> <p>Bicycle stations provide a range of services to cyclists, including secure, valet bicycle parking, bicycle repair and sales on-site, and in some cases bicycle rentals or bike sharing.</p>	<p>In the San Francisco Bay Area, BikeLink (http://www.bikelink.org/) provides secure on-demand parking for bicycles and other small vehicles to make it easier to use transit and other mobility alternatives.</p> <p>Bikestations are located at many European train stations, and are becoming more common in North America (and other continents) as well.</p> <ul style="list-style-type: none"> ▪ The Radstation in Muenster, Germany includes bike parking and other amenities, including a bike washing machine (http://www.radstation.de/). ▪ Bikestation® has several North American locations (http://home.bikestation.com/) and offers secure bicycle parking and other services and facilities for bicyclists. ▪ A new secure bicycle parking center recently opened in Melbourne, Australia. BikePark provides member and drop-in services and provides a host of amenities in addition to secure bicycle parking (http://www.bikepark.com.au/). <p>Bicycle parking resources include:</p> <ul style="list-style-type: none"> ▪ “Bicycle Parking Guidelines, 2nd Edition”, Association of Pedestrian and Bicycle Professionals (http://www.apbp.org/?page=Publications) ▪ “Metrorail Bicycle and Pedestrian Access Improvements Study”, Washington D.C. Metro (http://planitmetro.com/wp-content/uploads/2010/12/Metrorail-Bicycle-Pedestrian-Access-Improvements-Study-Final.pdf)

³ The Atlantic Cities Place Matters, “Do Bike Paths Promote Bike Riding?”, <http://www.theatlanticcities.com/commute/2012/02/do-bike-paths-promote-bike-riding/1318/> (accessed February 24, 2012).

Potential Solutions		Description	Case Study Examples
	Folding Bicycles	Folding bicycles can provide ultimate flexibility for transit users since they can be used for both first and last mile travel and do not necessarily require special storage facilities on trains, stations or at final destinations. A number of bicycle manufacturers produce folding bikes that provide all the comfort and ease of use of a full-size bike, but that then fold easily and quickly for transport and storage.	The City of Santa Cruz, CA initiated a folding bicycle program to allow riders greater access to the metropolitan transit system by bicycle. Although buses were equipped with bike racks, racks on higher-ridership routes were often full. The program offered \$200 in rebates on specific vendors' folding bicycles, and also offered program participants the option of purchasing two months' worth of Santa Cruz Metropolitan Transit District bus passes at up to 70% off retail price. Participants were required to attend a two-hour safety program first before they could qualify for the program. At Stanford University in Palo Alto, CA, Parking and Transportation Services partners with the on-campus bike shop to offer free one-week rentals and \$100 subsidies for certain models. http://transportation.stanford.edu/alt_transportation/BikingAtStanford.shtml
	Bicycle Sharing: <ul style="list-style-type: none"> ▪ Publicly shared bicycles ▪ Private or employer-based programs 	In Denver, the B-Cycle bike sharing program is a city-wide public bike sharing system for short (less than 30 minutes) trips. Denver B-cycle members can pick up a bike at any B-station and return it to that same station or any other B-station when they're done. Membership to the system can be purchased online or at any kiosk. Members can use their credit card or B-card to unlock a bike in seconds. To return a bike, it just needs to be re-docked at any B-Cycle station. The onboard B-cycle trip computer allows members that registered online to track all the miles they ride, the calories they burn, and the carbon emissions they avoid. The B-Cycle program could potentially be expanded to the I-25 South corridor if there were sufficient demand and bicycle facilities to support the program. Bikes could be used for trips between light rail stations and employment destinations, as well as between different employment locations and other local destinations/services.	European cities have used bicycle sharing to facilitate bicycle use for several years. Copenhagen has one of the oldest (and now somewhat outdated systems) that offers free public bikes with the deposit of a coin. <ul style="list-style-type: none"> ▪ Since September 2011, the City of Lille, France provides a public bicycle sharing system called V'Lille. Each V'lille station is equipped with an automatic rental terminal and has stands for dozens of bicycles. Maps showing the locations of the city's V'lille stations are available at all kiosks. Users must have a daily, weekly or annual subscription. With a subscription, bike rental is free for the first half hour. A trip that lasts longer than 30 minutes incurs a charge of €1 for each subsequent 30-minute period. 1100 Free Service bikes are available in areas with transit access in the municipalities of Lille, La Madeleine and Mons in Baroeuland, and 3000 bicycles are available for longer term rentals, with plans to expand. Also, a local bike manufacture ("b'twin") is planning to build a bike-friendly, car-free campus in the area. ▪ Google, based in Mountain View, CA provides a fleet of bikes distinctively painted in red, green, blue and yellow for employees to use to travel around its campus and run errands during the workday.
	Station Bicycles	For some who want to travel between light rail stations and their workplace by bicycle, it may be most convenient to keep a bicycle at the rail station for this express purpose (and to use for errands and other trips during the workday). These "station bicycles" are typically low-cost bikes and ideally would be stored in lockers or covered bicycle parking areas. In the I-25 Corridor, this option could be advertised to individuals, or the TMA could partner with interested employers to combine an employer-based bike sharing program with a station bike program.	There were no case studies of formal station bicycle programs available.

Potential Solutions		Description	Case Study Examples
	<p>Electric Bicycles</p>	<p>Electric bicycles provide a more attractive alternative for some users, particularly in hilly areas, and for riders who have more difficulty accelerating and maintaining higher speeds. Electric bicycles can be combined with trailers or other equipment so that they can transport cargo as well as people.</p>	<ul style="list-style-type: none"> ▪ The My-Go-Pasadena pilot program provided rebates to transit commuters to purchase a two-wheel electric vehicle from one of several participating dealers in the Pasadena area. The goal of the program was to demonstrate the value of these electric vehicles as new transportation options to connect to Metro Gold Line transit stations in lieu of single occupancy automobiles. The program was generously funded by the Los Angeles M.T.A., the City of Pasadena, Pasadena Water and Power, and the Federal Transit Administration. (http://www.calstart.org/projects/first-mile/First-Mile-Projects/MyGo-Pasadena.aspx) ▪ San Francisco-based car sharing nonprofit City Carshare will soon be launching a new electric bike sharing program. City Carshare will integrate e-bikes with trailers into their existing car sharing service. The e-bikes will likely cost less to use than car share cars. Unlike bicycle sharing programs, this program will require participants to make round trips.
	<p>Promotional Events/Programs</p> <ul style="list-style-type: none"> ▪ General marketing and promotion ▪ Bike to Work Day ▪ Bicycle commuter events throughout the year 	<p>A marketing and educational campaign can promote use of improved bicycle parking facilities. People are unlikely to change from established patterns unless they are persuaded that parking bicycles at the transit stop is easier than bringing their bicycles with them, that spaces will be available, that they will be able to retrieve their bicycles easily upon their return, and that it is not going to cost them too much additional money or time.</p>	<ul style="list-style-type: none"> ▪ The Lloyd District TMA in Portland, Oregon sponsors several supportive programs to encourage cycling and walking, including the distribution of safety lights, bicycle maps, sponsored group bike rides, bicycle commuter breakfasts, and a “Bike Champ” mentoring program. (www.lloydtma.org) ▪ Cycling Scotland sponsors a “Cycle Friendly Employer” program that provides information, support and other services to encourage and facilitate cycling to work. (http://www.cyclingscotland.org/our-projects/award-schemes/cycle-friendly-employer/)
<p>Wayfinding</p>	<p>Wayfinding Tools:</p> <ul style="list-style-type: none"> ▪ Station area signage and maps ▪ Local area signage for bicyclists and pedestrians ▪ Guidelines and standards 	<p>A successful wayfinding system provides integrated, consistent and user-friendly information to confirm that chosen routes are efficient, safe, and ultimately lead directly to one’s destination. Wayfinding particularly helps new users and visitors feel comfortable in an unfamiliar environment. Currently, signage is present at LRT stations, but little if any wayfinding to or from the stations is present in surrounding areas.</p>	<p>The City of Portland has a comprehensive pedestrian wayfinding system that combines with transit and bicycle wayfinding. Additionally, TriMet, Portland’s regional transit agency has incorporated the use of “quick response” (QR) codes into its transit signage: http://trimet.org/qrcodes/index.htm.</p>

Potential Solutions		Description	Case Study Examples
Shuttles	<p>Shuttle Programs:</p> <ul style="list-style-type: none"> Partnership Programs Employer Sponsored Shuttles Agency Sponsored Shuttles Short-Distance Vanpools 	<p>Shuttle services provide point-to-point transportation, or between one point and many to fill gaps or make connections with the broader public transit network, often for specific groups of individuals. Shuttle services typically serve riders in a well defined area or along a specific route and provide convenient and direct service to desired destinations.</p> <p>Shuttles can be costly and difficult to administer, however. There are several approaches to shuttle programs, described further below, that can be used to address these issues:</p> <ul style="list-style-type: none"> Partnership Programs: Shuttles are financially sponsored by several partners, including employers, TMAs, and government agencies. Typically, one agency is responsible for ongoing administration, and major decisions are made by a governing board. Employer Sponsored: Shuttles are paid for and administered solely by an employer or group of employers and serve specific employees only. Agency Sponsored: Shuttles are paid for and administered by an agency or TMA and are open to the general public. Call-n-Ride services are offered, but routings could be revised and services could be marketed as local shuttles. Short-Distance Vanpools: Vans are sponsored by employees, employers, or an agency. Vans are parked at transit stations and driven by employees to the worksite, then driven back to the station at the end of the day (or shift). 	<p>Examples of different shuttle programs include:</p> <ul style="list-style-type: none"> South of San Francisco, CA, a number of employer shuttles connecting commuter rail stations to nearby employers are jointly funded by the transit authority, air district, and local employers (http://www.caltrain.com/schedules/Shuttles.html). The Emery Go-Round shuttles connect destinations in Emeryville with the nearest BART rail station. The service is funded entirely by commercial property owners in the citywide transportation business improvement district and does not charge a fare to passengers (http://www.emerygoround.com/). Kaiser Northern California provides a free, public shuttle between its medical campus and the nearest BART rail station. In Oakland, CA the fare-free Broadway shuttle connects nearby destinations with Amtrak, BART, ferry and other bus routes. The shuttle is funded through a partnership of eight different organizations and agencies and is operated by AC Transit, the local bus operator (http://www.meetdowntownoak.com/shuttle.php). In the Seattle, WA area, King County Metro sponsors a van share program to provide last mile connections between public transit and workplaces (http://metro.kingcounty.gov/tops/van-car/commutervans.html). The former LINK shuttle bus in the Denver Tech Center was a 10-mile route that functioned as two 5-mile routes joined together, serving both sides of I-25. The free shuttle operated every 10 minutes from 6:00 AM to 6:30 PM weekdays and was eliminated when rail began operating and Call-n-Ride services were added to provide the local circulation.
Ridesharing/ Carpooling	<p>Carpooling & Vanpooling</p>	<p>Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity.</p> <p>Vanpools typically serve commuters who live and work near each other and travel more than 15 miles to work one-way. In the Denver region, vanpools are operated by VPSI, who provides vehicles and insurance coverage. The vanpool costs are shared among all passengers.</p> <p>It may be possible for longer-distance car- or vanpools to pick up additional passengers at light rail stations and transport them the last few miles to work. Given the fact that stations are located within close proximity of freeway exits, the detour required to pickup someone from the station would be minimal.</p>	<p>In the Denver Region, RideArrangers (http://www3.drcog.org/RideArrangers/) provides carpool matching services as well as a vanpool program.</p>
	<p>Employer-Specific Ridematching</p>	<p>Some employers facilitate ridesharing among their employees, either through a company intranet site or through a third-party provider. This approach enables a greater degree of customizability and has proven more attractive to some employees, particularly those of large employers who have enough individuals to support their own ridematching system. Such systems can be easily combined with incentives and other promotions into a comprehensive employer-based commute program.</p>	<p>RideArrangers can work with employers to provide a more customized interface with their ridematching system. A number of private companies also provide commute and ride matching services, including RideSpring (https://www.ridespring.com/home/), Ride Amigos (http://www.rideamigos.com/), and Greenride (http://www.greenride.com/).</p>

Potential Solutions		Description	Case Study Examples
	Casual Carpooling	<p>Casual carpooling usually falls into two categories, either “self organizing” programs that evolve organically or “facilitated” programs where private sector (often social networking or car sharing companies) are involved. In most “self organizing” programs, carpoolers do not exchange money (the time or money savings to drivers is the incentive to pick up passengers) but in facilitated programs, passengers may pay drivers to subsidize gas, tolls, or other costs (usually payment is via an online payment service such as PayPal).</p> <p>While “self organized” casual carpools are unlikely to be a viable last mile alternative in the South I-25 corridor, a facilitated program or a dynamic carpooling program may be a potential option.</p>	Casual carpooling provides a significant commute alternative in the San Francisco and Washington D.C. areas where drivers save both time and money by forming carpools to take advantage of HOV lanes and reduced or zero tolls. Similarly, passengers are also motivated by time and money savings.
	Dynamic Carpooling (or Real-Time Ridesharing)	Dynamic ridesharing systems consider each trip individually and are designed to accommodate trips to random points at random times by matching user trips without regard to trip purpose. Dynamic ridesharing systems have to provide match information close to the time when users need to travel. Dynamic ridesharing can either be an organized program run by an agency or an informal system run by users (casual carpooling).	Real-time ridesharing pilot programs are underway in Seattle (http://go520.avego.com/st-pilot/) and the San Francisco Bay Area (http://climateprotection.org/our-work/sonoma-county/real-time-ridesharing).
Car Sharing	Car Sharing Organizations (for- and nonprofit)	<p>Car sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee.</p> <p>Car sharing is similar to conventional car rental programs with a few key differences between most programs: a) system users must be members of a car-sharing organization; b) fee structures typically emphasize short-term rentals rather than daily or weekly rentals; c) vehicle reservations and access is “self-service”; d) vehicle locations are widely distributed rather than concentrated; and e) vehicles must be picked up and dropped off at the same location.</p>	<p>In early 2008, the Emeryville, CA TMA negotiated with Zipcar to initiate and help fund car-sharing services at several locations throughout Emeryville. The TMA is under a license fee agreement with Zipcar to provide free membership and corporate rates to TMA members, and helps advertise the services to employees at commercial properties near the Zipcar Pods. Any business that pays into the TMA (including residential complexes) can join Zipcar for free, and users receive a discount on the standard usage rate (subsidized by the TMA). Other residents of Emeryville can join Zipcar and use the cars at the Emeryville pods at the regular Zipcar rates. All members of Zipcar can also use their services elsewhere at the standard rate. The Emeryville TMA is no longer subsidizing car sharing pods. Zipcar has expressed appreciation for the support the TMA has provided in helping them expand their market.</p> <p>The Denver area is served by eGo CarShare and Occasional Car. The South I-25 TMA is currently working to bring car sharing to the corridor.</p>
	Personal Car Sharing or Peer-to-Peer Car Sharing	<p>A number of companies are enabling individuals to rent out their cars (similar to other car sharing operations) when not in use. Companies provide in-car technology to enable borrowing and provide insurance when the car is being used by other members. Owners have the ability to set their own price and schedule for their cars.</p> <p>Peer-to-peer car sharing could serve an important supportive function for employees who use transit in the I-25 corridor by providing them with access to vehicles during the day for errands and work trips.</p>	<p>RelayRides, JustShareIt, Getaround and Wheelz are some of the companies that are enabling individuals to share their vehicles with others for a profit. Currently, these companies only operate in a few locations; however they are expanding to other areas based on demand.</p> <p>Google employees use RelayRides to share their personal vehicles while they're parked at work. This enables employees who didn't drive to work to use other employees' cars (who did drive) for trips during the day.</p>

Potential Solutions		Description	Case Study Examples
Hourly Car Rental	Short-Term and Hourly Car Rental	<p>Since car sharing services may not be successful in all contexts, existing for-profit national rental car companies might be able to provide some of the same benefits (i.e. short-term car rental with convenient pick-up and low rates) in lieu of or in addition to traditional membership-based car-sharing organizations.</p> <p>Car sharing and short-term car rental can exist side-by-side, and programs can be designed to provide multiple types of membership or rentals, including hourly, daily, and “shared lease” monthly rates, depending on need and demand.</p>	<p>Enterprise (www.wecar.com), Hertz (www.hertzondemand.com) and U-Haul (www.ucarshare.com) have all</p> <p>In the San Francisco, CA, area, BART (the regional rail agency) established a pilot program with Hertz. Members of the program paid a monthly lease of between \$2 to \$400 to have the use of a car from a BART station to work, or a BART station to home. Included in the fee were all costs for insurance, fuel, etc. This cost is lower than the \$500/month that AAA estimates for a monthly cost of car ownership. The program was designed to allow two users commuting in opposite directions to share one vehicle. However, this program is not strictly an hourly rental program but is more of a shared lease program and offers limited advantages over car ownership or conventional leasing.</p> <p>Another good practice that Hertz and WeCar have demonstrated is to partner with large institutions that have a relatively centralized user base. Google encourages employees to ride transit or carpool to their main campus, and use a car share program to overcome the “transit isolationism” obstacle of needing a car to run errands during the day. These programs are primarily subsidized by the employer as a means of encouraging public transit and complying with certain air quality regulations or trip reduction ordinances, while users who choose public transit earn credits towards car rentals.</p> <p>A best practice that can be identified from many programs, both successful and those that failed (such as the first iteration of U-haul’s service), is that convenience, cost, and availability trump nearly everything else. People like fun, attractive cars, but will stop using a service if it becomes inconvenient or unavailable.</p>
Taxis	Conventional Taxi Service and Taxi Sharing	<p>Taxi service differs from rental car and car sharing services in that the person making the trip: a) does not drive themselves, b) does not need to reserve in advance, and c) can access the service at many different locations. Under a taxi sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger is headed in the same direction.</p> <p>Under a taxi sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger is headed in the same direction. Taxi sharing allows passengers to pay lower fares for door-to-door journeys than they would if travelling alone. A taxi sharing program is especially beneficial when passengers have a common destination, such as from a transit station to downtown. These arrangements not only benefit customers, but the trade and local communities too. Sharing taxis results in fewer taxi trips overall, which reduces traffic congestion and pollution.</p>	<p>Following are best practice examples that facilitate the use of taxis as a last mile solution:</p> <ul style="list-style-type: none"> ▪ Dedicated taxi phones at rail stations and major bus stops, currently in use by the London Underground. ▪ Advance taxi dispatch service available from transit vehicles, currently used in several German cities. ▪ Integrated transit-taxi fare payment, potentially using “smart card” technology. The Hong Kong Oyster Card enables users to pay for multiple means of transportation. ▪ Streetside taxi stand infrastructure (shelters, lighting, emergency call boxes). Outdoor advertising companies often subsidize the capital and maintenance costs of transit shelters and associated infrastructure as part of their franchise agreement. ▪ Development of enhanced reservation system (online, text messages, etc.). ▪ Development of a “taxi pool” system to allow passengers with similar origins/destinations to “share the fare.” Precedent: New York City shared taxi pilot programs (http://home2.nyc.gov/html/tlc/downloads/pdf/pass_info_card.pdf); online carpool matching systems. ▪ Development of a “flat fare” pricing structure for targeted areas (such as downtown and near transit stations) to simplify customer experience.

Potential Solutions		Description	Case Study Examples
Supportive Programs	<p>Employer-Based Incentives and Support:</p> <ul style="list-style-type: none"> ▪ Priority parking for carpools/vanpools ▪ Parking cash-out programs ▪ Information and assistance with transportation options ▪ Guaranteed or emergency ride home (GRH) programs ▪ Subsidies or other incentives such as the commuter pre-tax transit benefit program and deep discount bulk transit pass programs ▪ Flexible work schedules (to facilitate ridesharing arrangements) ▪ On-site amenities or vehicles (bicycles or cars) available to run errands during the day ▪ Lockers and showers for those who bicycle to work as well as secure and convenient indoor bicycle parking 	<p>Following is a further description of some of the items on the left:</p> <ul style="list-style-type: none"> ▪ Priority parking recognizes that parking is a finite resource and should be managed to assure maximum access for patrons. It reserves the most convenient parking spaces to support customer, client, vendor and visitor access and also to promote ridesharing in the form of carpool/vanpool or car sharing (also sometimes used to promote electric vehicles and motorcycles). ▪ Parking cash out is a policy whereby employees who may be offered parking as a benefit of their job are offered monthly cash benefits or free transit passes in exchange for giving up their free or employee paid parking. Often, revenues from paid parking facilities will pay for the free employee transit passes and other related benefits. A parking cash out policy reduces employee parking demand through financial incentives or free alternative transportation. ▪ GRH programs provide an occasional subsidized ride to commuters who use alternative modes, for example, if a bus rider must return home in an emergency, or a car pooler must stay at work later than expected. ▪ Employers can offer a wide range of incentives to encourage the use of commute alternatives among employees, including selling transit passes on site, providing transit subsidies and establishing pre tax spending accounts to pay for commuting expenses. 	<p>The Community Transportation Association provides a comprehensive Transportation to Work Toolkit for the business community (http://web1.ctaa.org/webmodules/webarticles/anviewer.asp?a=1442), including a number of profiles of employer-sponsored transportation programs (http://www.ctaa.org/webmodules/webarticles/articlefiles/ProfilesofEmployer-SupportedTransportationPrograms.pdf).</p>
	Marketing and Promotion	<p>Marketing is an important component of implementing first/last mile strategies. From a customer perspective, marketing is important for two reasons: 1) What you don't know can't help you, and some auto commuters may be predisposed to take transit but don't know or understand their options; 2) First impressions really do matter, and no program will succeed if first-time users have a negative experience because of technical failure, unclear operating instructions, or even inflated expectations that the service can't meet.</p>	<p>One of the most effective forms of marketing for "choice" transit riders can be personalized marketing programs (sometimes called "personal travel encouragement" or "high touch marketing"). Examples of successful personalized marketing programs include the TravelChoice program and RideNOW in the San Francisco Bay Area.</p>

4 ARAPAHOE STATION

LOCATION AND STATION AREA DESCRIPTION

The area west of the station is occupied primarily by office uses, and the Comfort Dental Amphitheatre (Fiddlers Green) is located there as well. The amphitheater has a capacity of 18,000, making it the largest outdoor amphitheater in the Denver Metro area. It is generally open from May to September. A fee for parking is included in the price of the ticket for all Comfort Dental Amphitheatre patrons, a potential disincentive for using light rail to access the Amphitheatre. VIP Parking is located adjacent to Comfort Dental Amphitheatre on the south side. Owned by the Museum of Outdoor Arts, Fiddlers Green Amphitheatre currently operates under a long-term facility lease with Live Nation, the largest live music promoter in the world. The east side of the station area has a number of vacant parcels immediately adjacent to the station, with residential and office uses just beyond. The station's east side includes an RTD bus transfer center.



People walking across the pedestrian bridge said they often walk across the undeveloped land to access their jobs and school.

Source: Nelson\Nygaard

The station area north of Arapahoe and east of Greenwood Plaza Boulevard is located in Greenwood Village. West of Greenwood Plaza and south of Arapahoe is within the City of Centennial. Arapahoe Road is a major regional arterial, running east-west south of the station. The area around Arapahoe Road between Havana Street and Lima Street (in the City of Centennial), about 1.5 miles east of the station, is a major retail destination and includes a Wal-Mart. Figure 4-1 below shows the area surrounding the station.

Arapahoe Station has the second highest ridership among the six stations in this area, after Lincoln. Most travel is to and from origins and destinations to the north (about 1,000 northbound boardings and southbound alightings). It also has the highest travel to the south, but is significantly lower than travel to the north (between 100-150 southbound boardings and northbound alightings).

Figure 4-1 Arapahoe Station Aerial



Source: Google Earth

PROJECTS AND PLANS

Some existing plans include development recommendations and guidelines for the transportation network in the Arapahoe Station area. The Arapahoe Road Corridor Study Report (2007) includes direction for bike/pedestrian signal improvements at Yosemite, improved bike/pedestrian access to the east side of the station, and bike route signage/wayfinding program.

There is a trail project at Arapahoe Road, east of Yosemite from Fair Avenue south under Caley Avenue back over to Yosemite (an extension to the west of the path on the south side of Caley Avenue).

From the Greenwood Village I-25 Corridor Transportation Improvement Study, the following are identified:

- Complete accessibility and connections to continuous sidewalks at all transit stops within the study area. Include in the recommended transit study;
- Add bus shelters or other amenities at larger stops, hubs, transfer points, or other key locations (coordinate with RTD);
- Construct protective canopy on the LRT platform (Arapahoe Station); and
- Provide route information at all stops, including time schedule, fare information, and other important transit user data (coordinate with RTD).

The Centennial Transportation Plan also provides some direction for improvements in the area.

EXISTING TRANSIT SERVICES

The station has eight bus bays, plus additional capacity for layovers. Bus services are as follows:

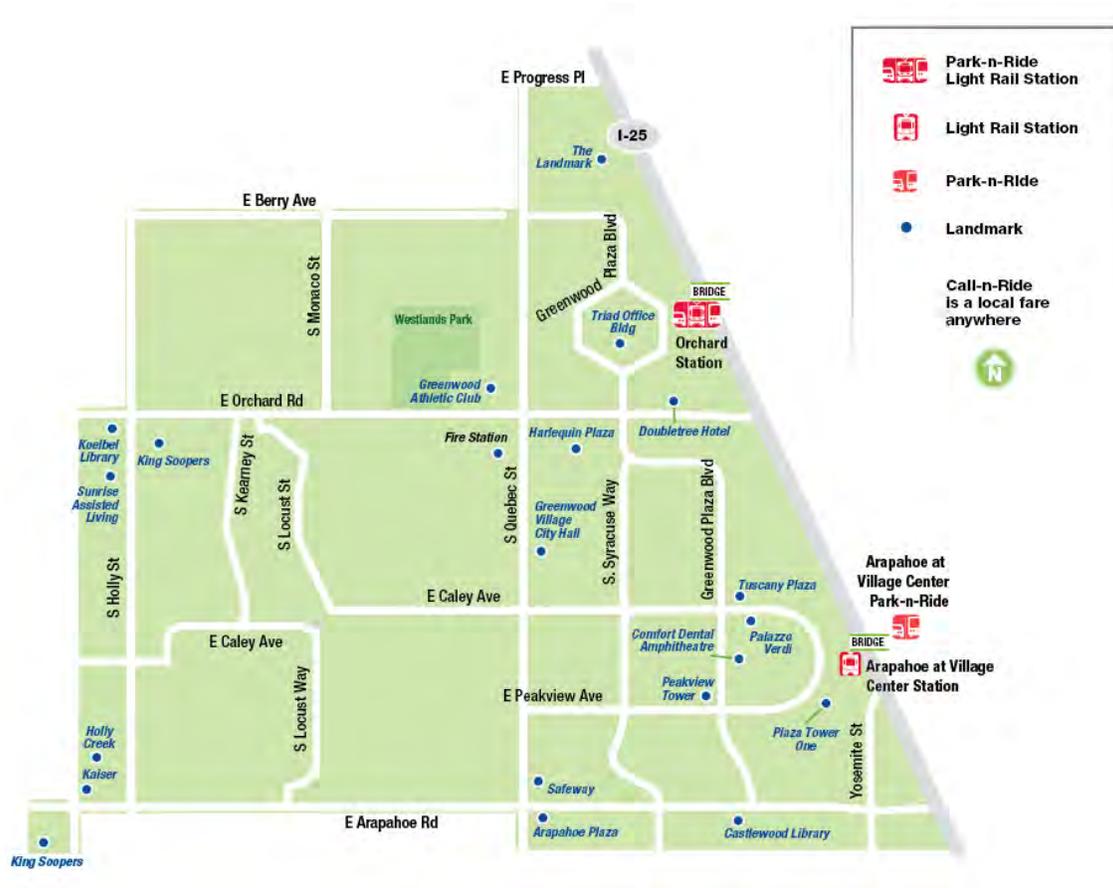
- Routes 65, 66, AT, ATX, and T serve the station
 - 65 - Service north on DTC Blvd (east side of I-25) to Stapleton Park-n-Ride 6 AM- 7 PM.
 - 66 - Arapahoe Crosstown service 6 AM – 10:30 PM.
 - 73 - Serves Fiddlers Green Drive west of station and travels north to Stapleton Park-n-Ride.
 - T - Peak only service from Table Mesa Park-n-Ride in Boulder to Arapahoe (3 trips AM, 3 trips PM). Serves west side of station to the north.
 - AT – Service between Arapahoe, Aurora and Denver International Airport.
 - ATX – Morning (4 AM – 6 AM) and afternoon (1 PM and 3 PM) from Arapahoe to Denver International Airport .
- Call-N-Rides: Arapahoe (service area shown in Figure 4-2) and Orchard (service area shown in Figure 4-3)

Figure 4-2 Arapahoe Call-n-Ride: Northeast of Station



Source: RTD

Figure 4-3 Orchard Call-n-Ride: Northwest of Station



Source: RTD

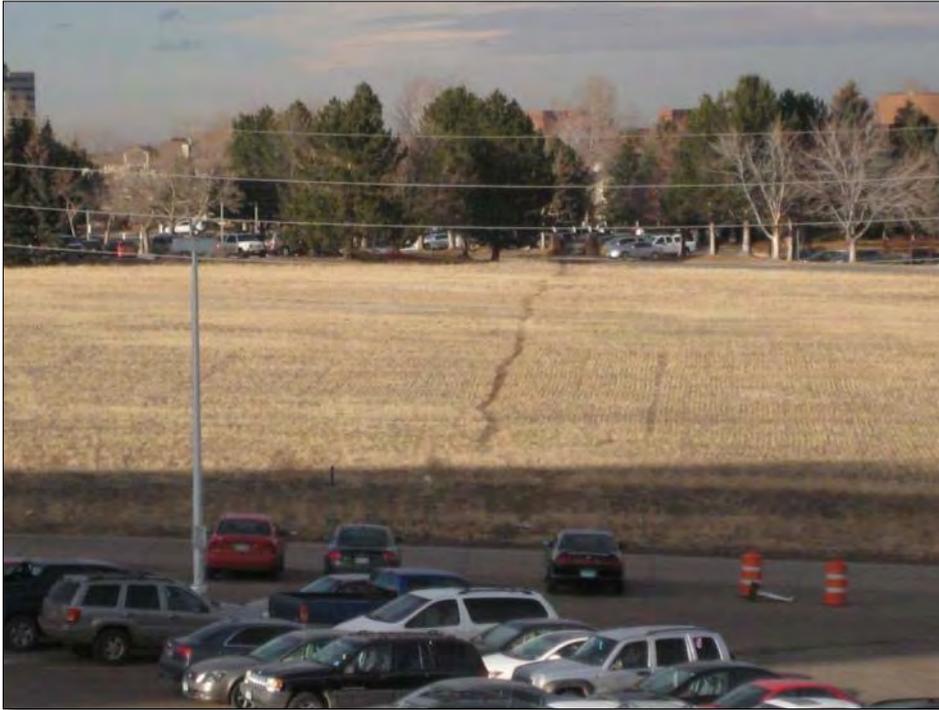
Station Facilities Observations

- There is significant capacity for additional transit vehicles, if needed, as well as layover space.
- The station platform is partly under the I-25 overpass, which provides better weather protection than any of the other stations. This station platform is also the quietest (although still is affected by a lot of freeway noise) since it is at a somewhat lower grade than the freeway.
- There are no clear safe crossing signs at the station platform for people crossing the tracks ("Look Left" or "Look Right").
- There is only one basic shelter per bus bay and some leaning bars near the bus boarding locations. Benches are provided, but they are all located outside of shelters.
- There are two transit ticket machines by the buses and two on the platform.
- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.

- There is good visibility within and around the station, and good lighting in the garage. There are two emergency phones located at the station and security cameras. Lighting at the platform is good. No security guards were spotted during the inventory.
- RTD keeps signage at the station updated. For example, transit maps and signs were updated for the transit service changes implemented in January, prior to the service changes taking effect.

PEDESTRIAN ACCESS AND AMENITIES

South Yosemite Street provides the most direct access north from Arapahoe Road on the east side of I-25. Despite this, people walk to and from the station across private property, particularly on the east side of the station. For example, as shown in the image below, the pathway (or “desire line”) through the field shows that people are walking across the undeveloped lot north of the surface parking lot to access destinations directly north of the station.



Desire lines north to Willow Drive from the parking lot show where people are walking across undeveloped land.

Source: Nelson\Nygaard

On the west side of the station, access to the platform is via the Village Center plaza to Fiddlers Green Circle.

Pedestrian Observations

- On the west side of the station, there is good pedestrian design with the plaza, mix of walkways, benches and varied paving at the crosswalks on Fiddlers Green Circle. The accessible path of travel is well marked, though long and somewhat circuitous due to the

- slope, but allows for access for wheelchairs and strollers. A small gate separates the plaza on the west side from the access to the platform, which can be an accessibility barrier for some mobility devices. Signage at this location would be helpful, too.
- Pedestrian wayfinding signage is needed to/from the amphitheater and other locations. There is no clearly visible direct path to the amphitheater or most other locations in the vicinity of the station once a pedestrian reaches the exterior of the Village Center development.



Wayfinding signage is good within the station area, but nonexistent just beyond the station boundaries.

Source: NelsonNygaard

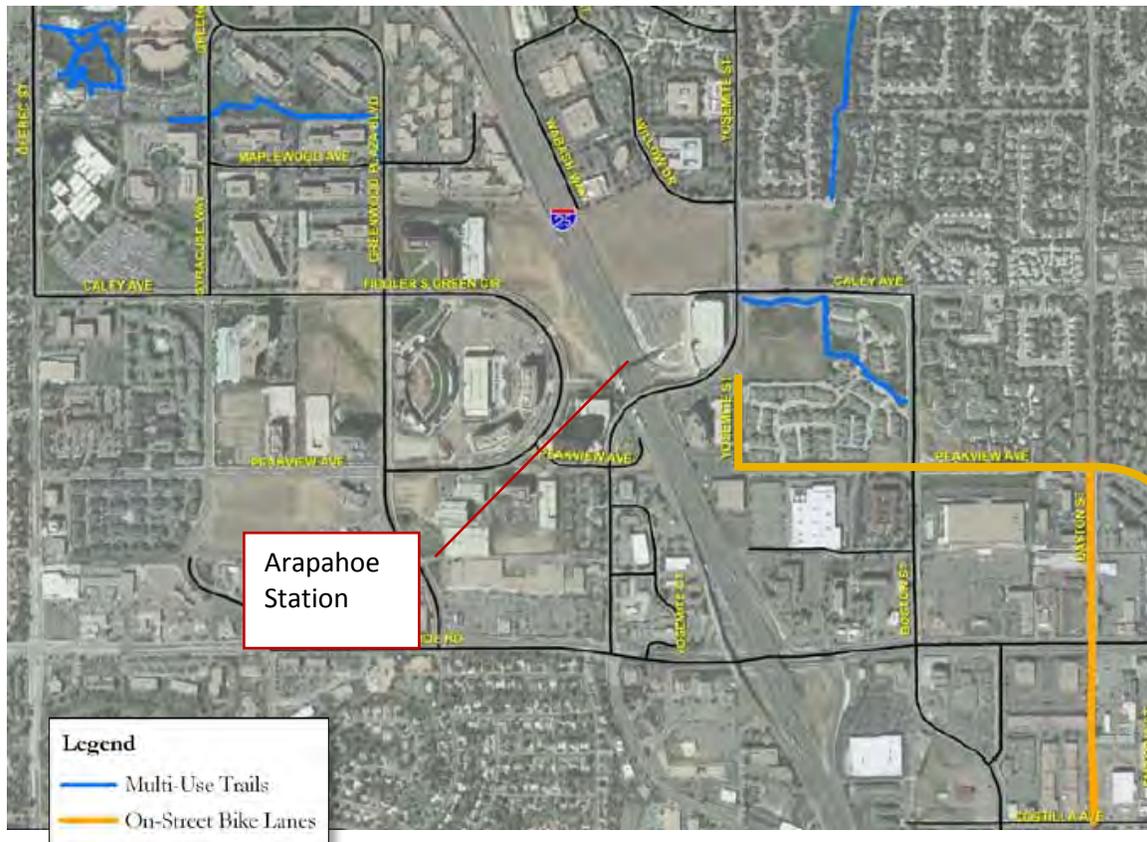
- The area around the station has a well-developed network of sidewalks and pedestrian paths. In some ways, this station has better sidewalk access than many of the other stations in the corridor, in part due to the level of urban development on the west side of the station. On the east side of the station, undeveloped parcels contribute to a less desirable pedestrian environment. Talking with users of the station, several indicated they walk across fields or down dirt paths to access their places of work.

BICYCLE ACCESS AND AMENITIES

The station has a total of 22 racks and 10 lockers. Only one bike was locked to a rack at the time the inventory was conducted. In addition, 11 racks are placed outside of the station on the west side, at the fountain and at the top of the hill near Fiddlers Green Circle.

The I-25 Corridor Transportation Improvement Study noted the locations of multiuse trails and the limited number of on-street bike lanes available in the area, as shown in Figure 4-4.

Figure 4-4 Local Trail Network from I-25 Corridor Transportation Improvement Study



Source: I-25 Corridor Transportation Improvement Study; Includes additional striped bike lanes from City of Greenwood Village

Bicycle Observations

- Connections to the existing trail system are limited and improvements are needed at key arterial crossings.
- No bicycle safety or parking information was posted at the station. No information was available about how to access bike lockers.
- The Centennial Transportation Plan found that E. Caley Avenue is an ideal road for bicycle infrastructure, as it connects light rail to the trail network. Designated lanes or sharrows are identified as improvements.
- Recommended improvements from the Centennial Parks, Open Space, Trails and Recreation Master Plan are as follows:
 - Improve existing sidepath along Caley and Fiddlers Green Circle to Yosemite, continuing on sidepath bridge facility over I-25 to the Arapahoe station (See Figure 4-5 below).
 - Complete missing facilities from Yosemite to Elmira Circle.

Figure 4-5 Centennial Parks, Open Space, Trails and Recreation Master Plan: Close-Up of Map Section for Missing Links in the Trail System



Source: Centennial Parks, Open Space, Trails and Recreation Master Plan, Section; Street names and station marker added.

TRANSIT ORIENTED DEVELOPMENT

As noted above, an attractive pedestrian plaza and office/retail/restaurant development exists in the transit-oriented development on the west side of the station.

This area is still very much under development, which provides a good opportunity for better interconnectivity with light rail than at some of the station areas, which are already built out. It will be important to apply transit-oriented development guidelines to the undeveloped lots to ensure access to buildings on those lots and access through those lots. For example, the parcel north of the park-n-ride lot should ideally be integrated into a pedestrian friendly design that provides good access to the bridge. New development on this parcel should not become a barrier for access to the locations to the north. The placement of the parking structure is already a barrier to accessing future development on the east side of Yosemite, and better pedestrian accessways will be required.



The parking lot and structure on the east side of the station creates physical barriers which separate the station from nearby development.

Source: Nelson\Nygaard

PARKING

The facility has 1,115 spaces (surface lot and structure), all on the east side of the station. In addition, privately owned paid parking or free short-term (less than two hours) is available in the structure on the west side of the station.

RECOMMENDED CAPITAL PROJECTS

Figure 4-6 shows a list of recommended capital investments in the station area to improve station access. Although some of these improvements have been identified in other reports, as noted, many of them have not. Figure 4-7 provides a graphic illustrating where these recommendations are proposed.

Figure 4-6 Arapahoe Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$) High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
Pedestrian																	
A-P1	Pedestrian	Wayfinding signage at S Fiddlers Green Cir	Key locations within 1/3 mi walk to the west station entrance	10 signs	Wayfinding	Signage is available within Village Center, but not beyond. Directions to the Amphitheatre should be posted (including at pathways that serve the Amphitheatre), as well as additional wayfinding signage	City of Greenwood Village, Comfort Dental Amphitheatre, RTD	\$3,000 \$1,000	10	5	20	20	20	75	\$27		1
A-P2	Pedestrian	Crosswalk across S Yosemite St at S Willow Dr, along with bike/ped activated signal	North or south corners at Fair Av/S Willow Dr	1 crosswalk, 1 signal	Connectivity Safety	People are taking shortcuts across the undeveloped property north of the lot at Caley Ave and do not have a safe place to cross S. Yosemite St.	City of Greenwood Village	\$103,000 \$60,300	5	15	20	15	15	70	\$1,166		7
A-P3	Pedestrian	Sidewalks on east side of S Syracuse Way	S Syracuse Way between Greenwood Plaza Blvd and E Caley Ave	2100 FT	Connectivity	Provide a sidewalk between major employment sites along a major street	City of Greenwood Village	\$49,000 \$21,000	10	5	20	20	20	75	\$467		1
A-P4	Pedestrian	Install pedestrian crossings on east and west side of intersection of Greenwood Plaza Blvd and S Syracuse way	Intersection of Greenwood Plaza Blvd and S Syracuse way	2 new crosswalks and pedestrian crossing signals	Safety	Pedestrians may cross S Syracuse Way, but not Greenwood Plaza Blvd at this intersection. In combination with new sidewalks, a fully integrated pedestrian crossing is appropriate at this intersection. Update signals for new crosswalk.	City of Greenwood Village	\$3,040 \$1,520	5	10	20	20	15	70	\$33		7
A-P5	Pedestrian	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Orchard Rd and E Caley Ave	3700 FT	Connectivity	Provide a sidewalk between major employment sites along a busy boulevard	City of Greenwood Village	\$8,000 \$37,000	10	5	20	20	20	75	\$300		1
A-P6	Pedestrian	Provide median pedestrian refuges at E Arapahoe Rd and S Yosemite St	At S Yosemite St for crosswalks across E Orchard Rd	2	Safety	Pedestrian crossing distances across E Arapahoe Rd are about 125 feet long. The existing median could be modified to provide a pedestrian refuge to increase the safety and comfort of pedestrians crossing this roadway.	City of Greenwood Village, City of Centennial	\$60,000 \$8,000	5	20	5	20	10	60	\$567		10

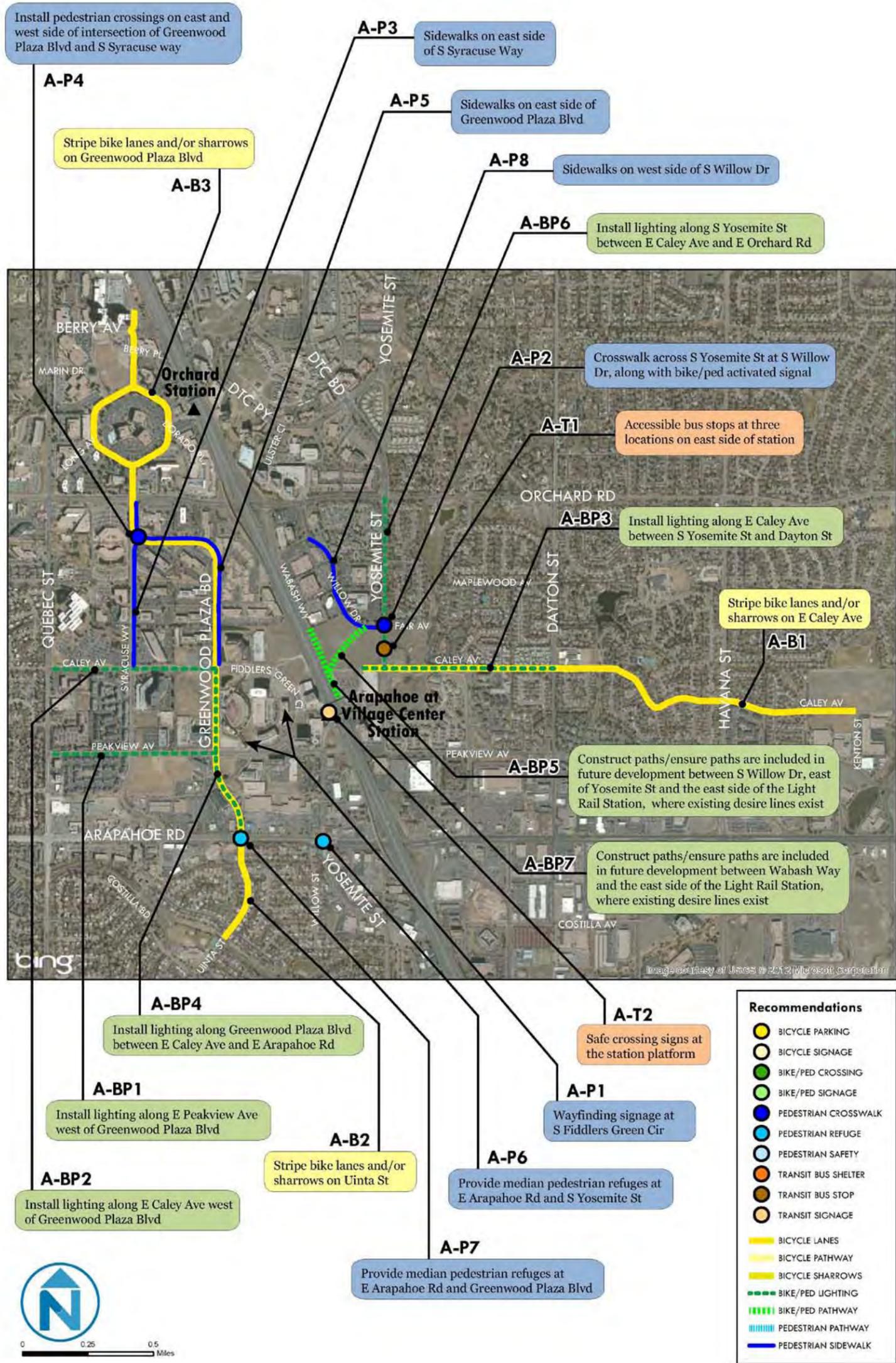
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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$) High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
A-P7	Pedestrian	Provide median pedestrian refuges at E Arapahoe Rd and Greenwood Plaza Blvd	At Greenwood Plaza Blvd for crosswalks across E Orchard Rd	2	Safety	Pedestrian crossing distances across E Arapahoe Rd are about 105 feet long. The existing median could be modified to provide a pedestrian refuge to increase the safety and comfort of pedestrians crossing this roadway, as is currently provided across Greenwood Plaza Blvd	City of Greenwood Village, City of Centennial	\$60,000 \$8,000	5	20	5	20	10	60	\$567		10
A-P8	Pedestrian	Sidewalks on west side of S Willow Dr	S Syracuse Way between S Yosemite St and S Wabash Way	2400 FT	Connectivity	Provide a sidewalk adjacent to major employment sites along a major street with bus service.	City of Greenwood Village	\$56,000 \$24,000	10	5	20	20	20	75	\$533		1
Bicycle																	
A-B1	Bicycle	Stripe bike lanes and/or sharrows on E Caley Ave	E Caley Av between station and S Kenton St	1.7 mi	Connectivity	Bicycle facilities on E Caley St will provide improved bicycle connections to the residential neighborhoods to the east and the trail system.	City of Greenwood Village, City of Centennial	\$34,000 \$8,500	5	10	20	0	20	55	\$386	Centennial Transportation Master Plan	13
A-B2	Bicycle	Stripe bike lanes and/or sharrows on Uinta St	Uinta St between Little Dry Creek Trail and E Arapahoe Rd	1600 FT	Connectivity	Bicycle facilities on Uinta and then on Greenwood Plaza Blvd (see below) offer bicycle connections to the residential neighborhoods to the south and the trail system.	City of Greenwood Village, City of Centennial	\$6,000 \$1,500	5	10	20	0	20	55	\$68	Centennial Transportation Master Plan	13
A-B3	Bicycle	Stripe bike lanes and/or sharrows on Greenwood Plaza Blvd	Greenwood Plaza Blvd between Landmark Way and E Arapahoe Rd	2 mi	Connectivity Safety	Bicycle facilities on Greenwood Plaza Blvd will complete the link from the bike lanes to the north to two light rail stations and provide improved bicycle connections to the residential neighborhoods to the south	City of Greenwood Village	\$40,000 \$10,000	10	10	20	0	20	60	\$417		10
Combined Pedestrian/Bicycle Improvement																	
A-BP1	Bike/Ped	Install lighting along E Peakview Av west of Greenwood Plaza Blvd.	E Peakview Av between Greenwood Plaza Blvd and S. Quebec St	.5 mi new lighting	Safety	Median lighting exists at intersections only. Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village, City of Centennial	\$200,000 \$100,000	10	20	0	20	5	55	\$2,727		13
A-BP2	Bike/Ped	Install lighting along E Caley Av west of Greenwood Plaza Blvd.	E Caley Av between Greenwood Plaza Blvd and S. Quebec St	.5 mi new lighting	Safety	Median lighting exists at intersections only. Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village, City of Centennial	\$200,000 \$100,000	10	20	0	20	5	55	\$2,727		13

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
A-BP3	Bike/Ped	Install lighting along E Caley Av between S Yosemite St and S Dayton St	E Caley Av between S Yosemite St and S Dayton St	.5 mi new lighting	Safety	Lighting exists at two intersections only. Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village	\$200,000	\$100,000	10	20	0	20	5	55	\$2,727		13
A-BP4	Bike/Ped	Install lighting along Greenwood Plaza Blvd. between E Caley Av and E Arapahoe Rd	Greenwood Plaza Blvd. between E Caley Av and E Arapahoe Rd	.5 mi new lighting	Safety	Median lighting exists at intersections only. Installing street lighting will improve visibility along this road for bicyclists and pedestrians. Recommendation also exists to install lighting north of E Caley Av (see Orchard Station)	City of Greenwood Village	\$200,000	\$100,000	10	20	0	20	5	55	\$2,727		13
A-BP5	Bike/Ped	Construct paths/ensure paths are included in future development between S Willow Dr, east of Yosemite St and the east side of the Light Rail Station, where existing desire lines exist	Undeveloped land that individuals are using to walk and bike between S Willow Dr and the Light Rail Station	600 FT	Connectivity	Ensure that future development allows for direct access between the road and the station	City of Greenwood Village, Property owner	\$14,000	\$6,000	15	5	20	20	15	75	\$133		1
A-BP6	Bike/Ped	Install lighting along S Yosemite St between E Caley Av and E Orchard Rd	S Yosemite St between E Caley Av and E Orchard Rd	.5 mi new lighting	Safety	Median lighting exists at intersections only. Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village	\$200,000	\$100,000	10	20	0	20	5	55	\$2,727		13
A-BP7	Bike/Ped	Construct paths/ensure paths are included in future development between Wabash Way and the east side of the Light Rail Station, where existing desire lines exist	Undeveloped land that individuals are using to walk and bike between jobsites on Wabash Way	650 FT	Connectivity	Ensure that future development allows for direct access between the road and the station	City of Greenwood Village, Property owner	\$15,000	\$6,500	15	5	20	20	15	75	\$143		1
Transit Access and Information																		
A-T1	Transit	Accessible bus stops at 3 locations on east side of station	Accessible bus stops with paved pads on east side of S Willow Dr and on S Yosemite St between S Willow Dr and E Caley Av	3	Transit access	Install proper bus stops for pedestrian use with paved waiting area allowing for passenger access	RTD	\$400	\$200	10	15	10	15	15	65	\$5		9
A-T2	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$300	\$120	0	20	0	5	20	45	\$5		20

Figure 4-7 Arapahoe Station Recommended Capital Projects (Illustration)



5 BELLEVUE STATION

LOCATION AND STATION AREA DESCRIPTION

Bellevue is the northernmost of the six stations in the study area. The Denver Tech Center (DTC) is on the east side of the station. The west side of the station is still largely undeveloped in the immediate vicinity with office and residential development to the west and north, and a mix of fast food restaurants, as well as a motel and gas stations south of the station along Quebec Street.

The station area north of Bellevue Avenue from Monaco Street on the west to South Yosemite Street on the east is within the City and County of Denver. West of Monaco Street is within Cherry Hills Village and is primarily low-density residential. The area east of DTC Boulevard and Yosemite Street is also primarily single-family residential development. Development surrounding the station is shown in Figure 5-1 below.

Figure 5-1 Bellevue Station Aerial



PROJECTS AND PLANS

Improvements are planned at the Bellevue/Quebec intersection; specific improvements have not yet been determined but a number of needs were identified.

A new project to widen the Union Avenue Bridge was undertaken, and according to RTD, plans are in place to add an elevator/stair tower to the south side of the bridge (the eastbound lanes), add dedicated bus-lanes for passenger drop-off and pick-up on both sides of Union Avenue and a reconstructed pathway will provide direct pedestrian access to the existing Bellevue Light Rail station from the south side of the bridge.

TRANSIT SERVICES

The new Bellevue Call-n-Ride began operating on January 22, 2012. The service boundaries are I-225 on the north, I-25 on the west, Yosemite Street on the east, and Orchard Road to the south, though the service operates along a basic flex route designed as a figure eight loop running every 30 minutes, as shown in Figure 5-2.

Figure 5-2 Bellevue Call-n-Ride Service



Source: RTD

Very nearby, a number of bus routes serve the Denver Tech Center, operating to the Ulster/Tufts Transit Center. Routes 46 and 73 serve the station, operating along Union Avenue (and Route 73 also goes south to Orchard Station). The Ulster/Tufts Transfer Center is served by Routes 27, 46, 65, 73, 105, 121 and T. Opportunities to better link the two facilities could be explored.



Although just a few blocks from the station, there is almost no relationship between Belleview Station and Ulster/Tufts Transfer Center.

Source: NelsonNygaard

Station Facilities Observations

- During the inventory, the station lot and bus circulation area was under construction. Temporarily, buses were stopping in the small Park-n-Ride lot to the south of the station. Ordinarily, buses stop in close proximity to the rail line and are easy to access. The Belleview Call-n-Ride may be among the best-situated Call-n-Ride services because it operates directly to the station and does not require users to cross any bridges.
- There are two ticketing machines at this location, adjacent to the bus stops.
- There are sufficient bus waiting shelters at the station (three), although one of them is a steel mesh design that allows wind and moisture into the shelter. There are no shelters at the temporary stops.
- There is ample space for vehicles to turn around and for layover.
- There is limited route signage: signage could be larger and make it easier to find routes.
- Wayfinding signage is limited. There is no signage at Union Ave.

- There are no safe crossing signs at the station platform for people crossing the tracks ("Look Left" or "Look Right").
- There is good visibility within and around the station. The stairway/elevator area from the platform to the road is isolated but has a security camera. The station area feels isolated at night and the lack of staffing makes this station feel somewhat unsafe. There is lighting at the station and between the station and the parking lot, as well as street lighting on the surrounding streets. No security guards were present during the inventory.
- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.



The pedestrian tunnel is visually interesting with art made of reflectors, but is dark.

Source: Nelson\Nygaard



Bicycle lockers are a nice amenity, but there are no instructions on how to use them posted at the station.
Source: NelsonNygaard

PEDESTRIAN ACCESS AND AMENITIES

This station is located away from most of the development in the surrounding area, making pedestrian access less than ideal. Access is primarily via Union Avenue and Quebec Street.

Pedestrian Observations

- Union Avenue is undergoing a widening project, but currently has wide, direct sidewalks that link the bridge/station area to the employers in the DTC area, as well as to the development on the west. Access down from the bridge is via a stairway and elevator and then an underpass. The area where the stairs are seems deserted and is not visible from the road or the station, making it an unpleasant pedestrian area. The underpass includes an art installation with numerous colored reflectors in what is, effectively, a pedestrian tunnel and is relatively dark.
- Access via Quebec Street is along many cracked/broken sidewalks that are contiguous on the east side of the street and incomplete on the west side of the street. The intersection at Belleview has a number of accessibility constraints: there are only three crosswalks, faded and cracked, and a barrier prevents pedestrians from walking under the freeway on the south side of Belleview. The street is not well maintained, and sidewalks discontinue on the north side of Belleview east of Quebec. The pedestrian signals require maintenance.
- This area is underdeveloped and will benefit from new development planned to the north and west of the station.

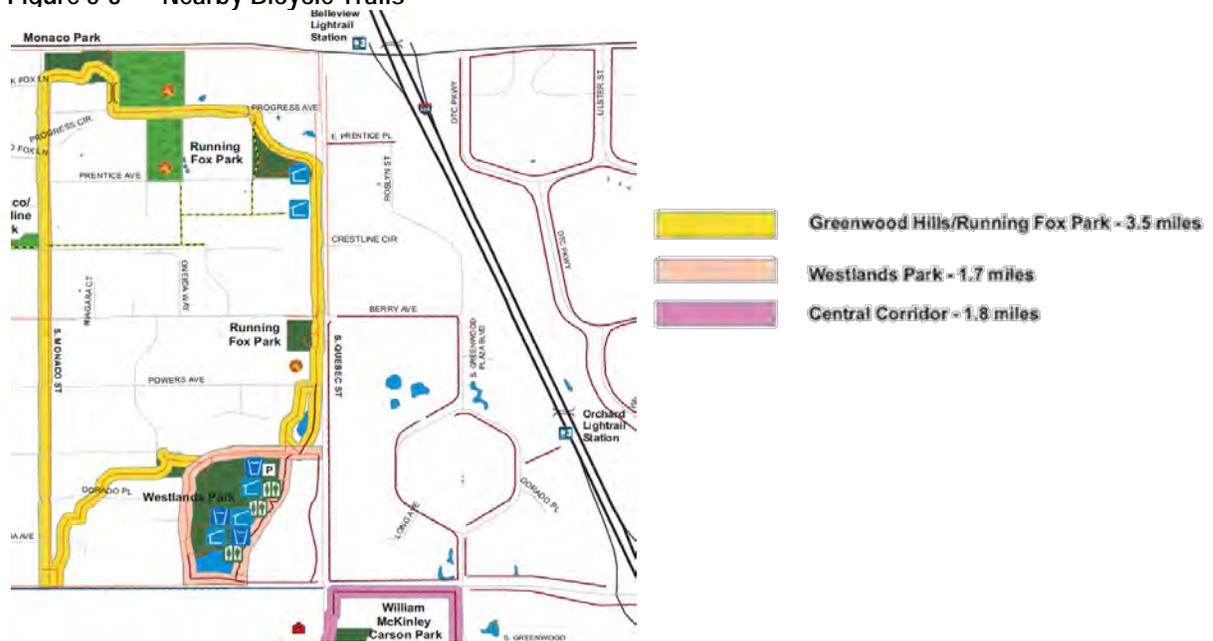


The sidewalk ends on E. Belleview Ave. just west of S. Quebec Street.
Source: Nelson\Nygaard

BICYCLE ACCESS AND AMENITIES

There is a city bicycle trail southwest of the station that runs along Quebec Street and also along Monaco with park-like links between the two north-south runs, as shown in Figure 5-3 below. The station has 12 bike racks and 12 lockers.

Figure 5-3 Nearby Bicycle Trails



Source: Greenwood Village Trails Plan

Bicycle Observations

Opportunities exist to connect the bicycle trails with the station, making a clear link between the station and the existing pathways to the west.

- The sidewalk on Union Street is wide enough to accommodate bicycles and could be designated as an east-west multiuse path. Sharrows currently are painted in the right lanes on the street.
- Opportunities also exist to improve key arterial crossings.
- No bicycle safety or parking information was posted at the station. No information was available about how to access bike lockers.
- Wayfinding signage is limited beyond the station boundaries. There is signage for the trail system by the upper elevator (on Union), but the sign has few labels making it somewhat schematic and limiting its utility.



The trail signs posted adjacent to the station can be difficult to interpret.

Source: NelsonNygaard

TRANSIT ORIENTED DEVELOPMENT

Several projects are planned, but existing development is primarily automobile-oriented. Blocks are very long and there are no midblock crossings on most of the surrounding streets. Due to its close proximity to the large employment sites in the DTC, new development efforts should be made to better connect the site with the surrounding land uses.

PARKING

The station has only 59 parking spaces in a surface lot, three of which are designated as accessible. Many cars are parked along Quebec Street and Chenango Avenue, where there are no posted parking restrictions. A parking validation machine is located near the platform.

RECOMMENDED CAPITAL PROJECTS

Figure 5-4 is a list of recommended capital investments in the station area to improve station access. These projects are illustrated in Figure 5-5.

Figure 5-4 Belleview Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
Pedestrian																		
B-P1	Pedestrian	Install sidewalk on west side of S Quebec St	E Chenango Ave to Conoco Gas Station	385 FT	Connectivity	Sidewalk gaps should be closed on this key pedestrian route to the station. Pedestrians must walk in the street and around parked cars.	City of Denver	\$9,000	\$3,900	10	5	20	20	20	75	\$86	Belleview Station development project may eventually address this	2
B-P2	Pedestrian	Install sidewalk on north side of E Belleview Ave	S. Quebec St. to the west side of the Belleview Station Development property	1050 FT	Connectivity	No sidewalks exist in this undeveloped area west of E. Quebec St and E Belleview Ave. This is a the key pedestrian link to major office buildings at S Monaco St	City of Cherry Hills Village	\$25,000	\$10,500	10	10	20	20	20	80	\$222	Belleview Station development project may eventually address this	1
B-P3	Pedestrian	Install pedestrian crossings on four sides of intersection of S Quebec St and E Belleview Ave	Intersection of S Quebec St and E Belleview Ave	1 new crosswalk	Safety	Pedestrians may cross S Quebec St on both the north and south side of E Belleview Ave, but may only cross E Belleview Ave on the west side of the intersection, not on the side of the LRT station. A fully integrated four-way pedestrian crossing and improved crosswalks are appropriate at this intersection. Update signals for new crosswalk	City of Denver, City of Greenwood Village	\$12,300	\$8,100	5	10	20	20	15	70	\$146	Improvements are planned but specifics have not been determined	3
B-P4	Pedestrian	Provide median refuges at the intersection of S Quebec St and E Belleview Ave	Extend E Belleview Ave median on west side of intersection and construct new one on east side	2	Safety	Individuals must cross 9 lanes of traffic. High traffic speeds on E Belleview Ave require improved pedestrian safety amenities, and a refuge would be the preferred investment	City of Denver, City of Greenwood Village	\$60,000	\$8,000	5	20	5	20	10	60	\$567	Improvements are planned but specifics have not been determined	7
B-P5	Pedestrian	Install pedestrian crosswalks along S Quebec St north of E Belleview Ave	S Quebec St and Chenango Ave; S Quebec St at Homestead Suites	2 new crosswalks	Safety	Crosswalks are required along S Quebec St at Chenango Ave and opposite the Homestead Suites hotel.	City of Denver	\$6,000	\$600	5	10	10	20	20	65	\$51		6

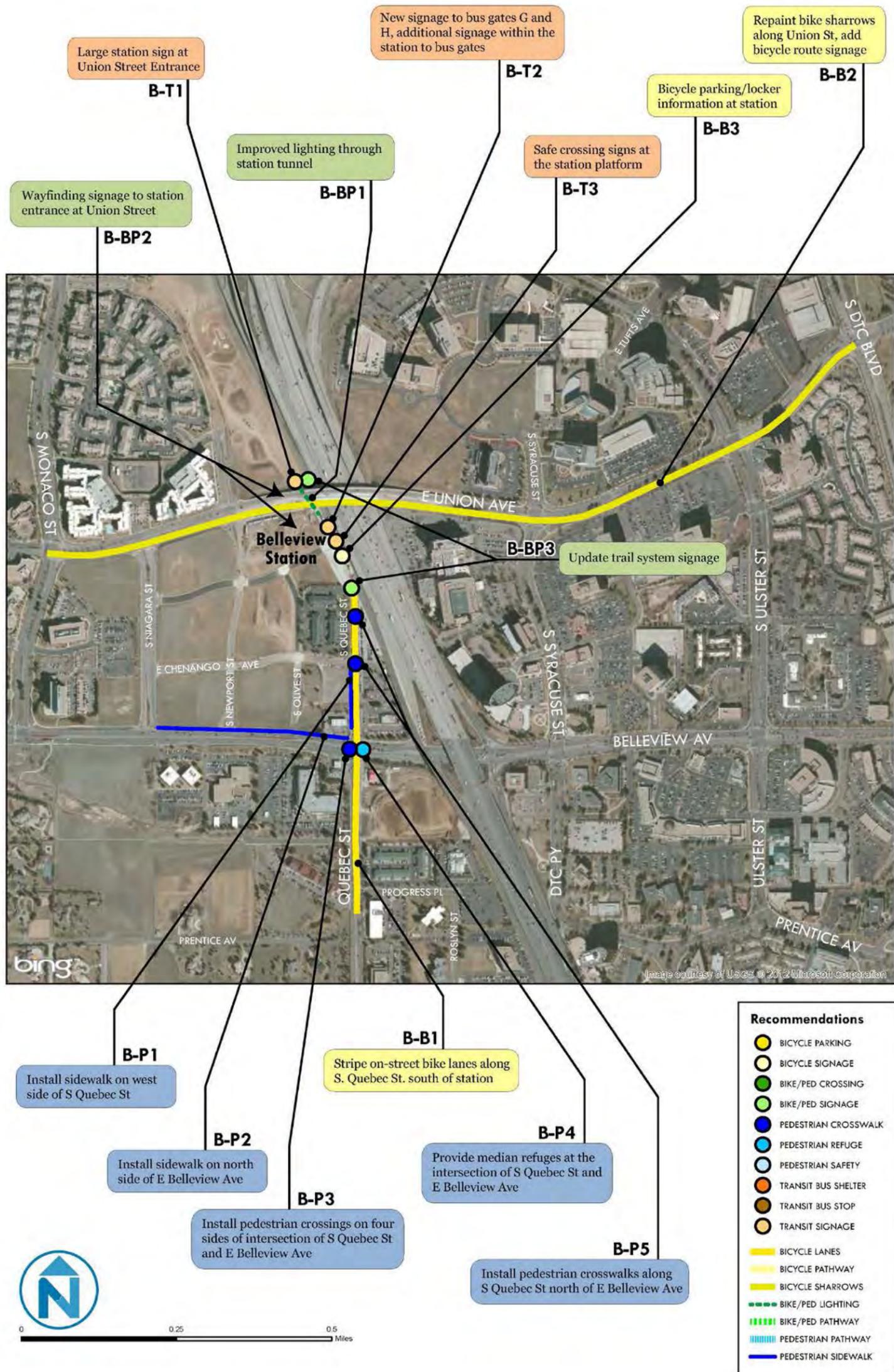
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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
Bicycle																		
B-B1	Bicycle	Stripe on-street bike lanes along S. Quebec St. south of station	Between Station and Running Fox Train (~5280 S Quebec St)	.4 mi	Connectivity	Bicycle facilities will afford bicycle access between the station and areas to the south, including connectivity to the Greenwood Hills/Running Fox Park trail	City of Denver, City of Greenwood Village	\$8,000	\$2,000	10	15	20	0	10	55	\$91		8
B-B2	Bicycle	Repaint bike sharrows along Union Street, add bicycle route signage	S Monaco St to DTC Blvd	1.1 mi	Maintenance, Safety	Better visibility is required to indicate shared bike-auto use lane, signage can indicate to bicycle users and drivers that the lanes are shared	City of Denver	\$8,000	\$5,000	5	10	15	0	20	50	\$130		11
B-B3	Bicycle	Bicycle parking/locker information at station	Near lockers	2	Marketing	Signage is necessary to indicate how lockers can be secured to encourage people to consider leaving bikes at station	RTD	\$300	\$200	5	5	5	0	20	35	\$7		14
Combined Pedestrian/Bicycle Improvement																		
B-BP1	Bike/Ped	Improved lighting through station tunnel	Tunnel under Union Street Bridge	6 additional lighting units	Safety	Although decorated with reflective art, tunnel is dark and opens on north side to an area with poor sight lines/visibility	RTD	\$30,000	\$15,000	5	20	5	20	20	70	\$321		3
B-BP2	Bike/Ped	Wayfinding signage to station entrance at Union Street	Key locations within 1/3 mi walk to the west station entrance	6 signs	Wayfinding	The station entrance is not prominent because there is not parking or a visual link between the street level and the station. Wayfinding signage to the station would make this location more accessible.	City of Denver, RTD	\$1,800	\$600	5	5	20	20	20	70	\$17		3
B-BP3	Bike/Ped	Update trail system signage	Union Street entry to Belleview Station (replace) and S Quebec Street entry to station (new)	2	Wayfinding	The trail map is poorly designed and difficult to understand. The map should be updated, legibility improved.	City of Denver, RTD	\$210	\$150	5	5	15	10	20	55	\$3		8
Transit Access and Information																		
B-T1	Transit	Large station sign at Union Street Entrance	Elevator/Staircase entry	1	Transit marketing/branding	There is no large RTD logo or station name to indicate this is a primary entrance to the station	RTD	\$2,100	\$800	10	0	5	15	20	50	\$29		11

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
B-T2	Transit	New signage to bus gates G and H, additional signage within the station to bus gates	Platform area	6	Transit marketing/branding	The station map provides basic direction, but additional signage is needed to direct people to bus transfers on Union Street and provide better direction for transfers at the shelters adjacent to the station	RTD	\$1,800	\$600	10	0	15	10	20	55	\$22		8
B-T3	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$1,200	\$400	0	20	0	5	20	45	\$18		13

Figure 5-5 Belleview Station Recommended Capital Projects (Illustrated)



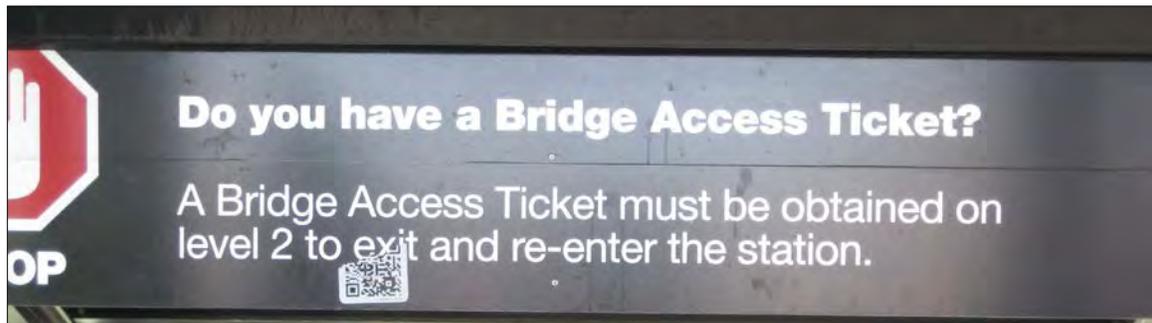
6 COUNTY LINE STATION

LOCATION AND STATION AREA DESCRIPTION

County Line Station is located south of County Line Road. Park Meadows Shopping Mall is on the west side of the station, just west of Park Meadows Center Drive and is accessible via a pedestrian bridge to the platform. The east side of the station has a large surface parking lot north of a school and church, some hotels, several large office buildings, some vacant parcels and some low intensity/underutilized light industrial/maintenance facility parcels. Northwest of the station is another strip commercial shopping center, Centennial Promenade, and IKEA is approximately 0.7 miles northwest of the station.

County Line Road forms the border between Douglas County to the south and Arapahoe County to the north. West of I-25, the area south of County Line Road is within the City of Lone Tree, and the northern area is within the City of Centennial. The area east of I-25 and north of County Line Road is under the jurisdiction of Arapahoe County. The area east of I-25, both north and south of County Line Road, is also under the jurisdiction of the Inverness Metropolitan Improvement District (IMID), which sets standards and guidelines for building design and land planning, and reviews and approves signage and building architecture. The District is also responsible for sidewalk construction, signage and other physical improvements in the area.

Even with a large shopping mall, ridership at this station is among the lowest in the corridor, although it has been increasing. The majority of riders are arriving at the station from origins to the north (approximately 800 alightings), or boarding trains to travel to northern destinations (approximately 700 boardings).



Outdated signage and equipment from a now discontinued policy is still in the station.

Source: NelsonNygaard

Figure 6-1 County Line Station Aerial



Source: Google Earth

PROJECTS AND PLANS

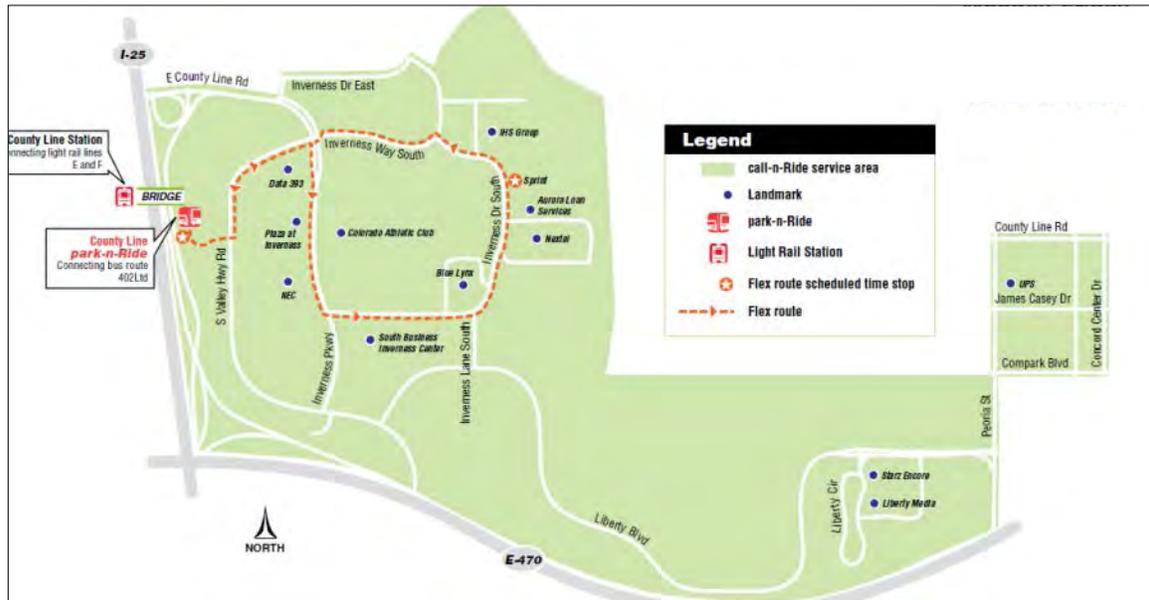
Douglas County will be studying the County Line and I-25 interchange. The Northwest quadrant—Centennial Promenade Shopping Center—may be a future redevelopment site and will be covered by the subarea plan that the City of Centennial has recently started.

TRANSIT SERVICES

All connecting transit only provides service from the station to areas south of County Line Road. For transit connections north of County Line Road, passengers must travel to Dry Creek Station. The routes and services are as follows:

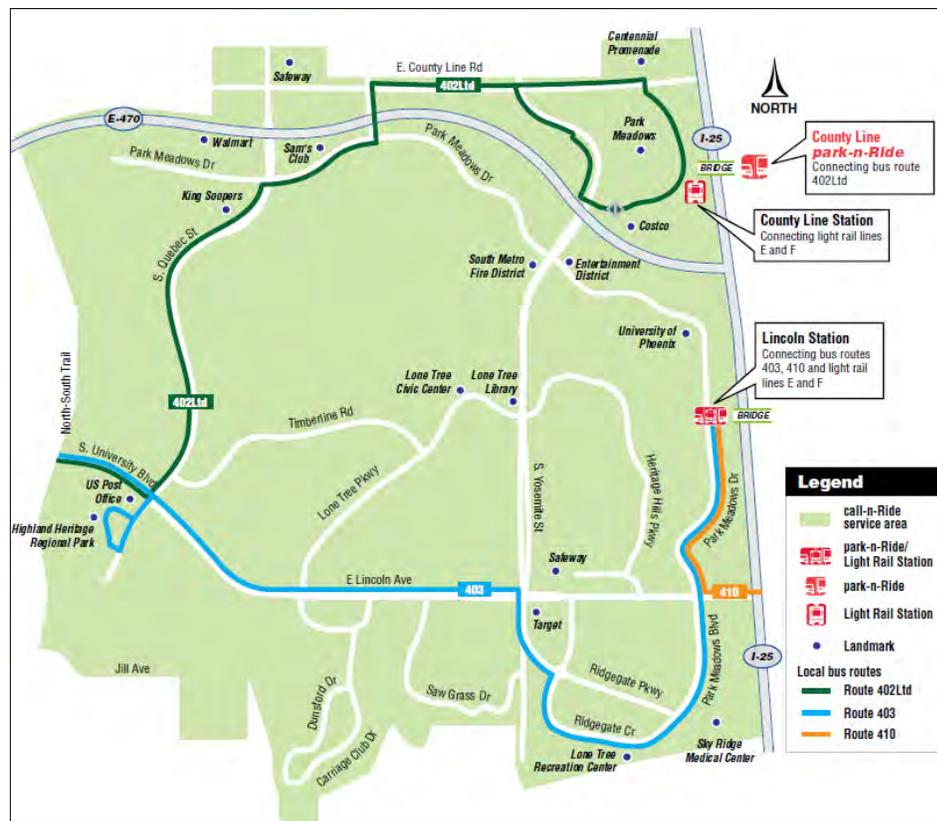
- **402 Ltd** – Provides service south and west of County Line Road. It operates from 5:30 AM to 10:00 PM with 30-minute headways during peak periods and 60-minute headways midday. It is not timed to meet train arrivals/departures at County Line station, and stops at a bus bay along Park Meadows Center Drive on the west side of the station.
- **South Inverness Call-n-Ride** (Figure 6-2) operates from 5:30 AM to 8:00 PM. During the morning and evening rush hours, the South Inverness Call-n-Ride leaves from County Line Station every 10 minutes. During mid-day hours, scheduled stops are made at County Line Station every 30 minutes. The flex route is in effect only in the evening rush hours. The service operates from a stop on the east side of the station.
- **Lone Tree Call-n-Ride** (Figure 6-3) operates Monday through Friday from 5:30 AM-8:00 PM and serves both Lincoln and County Line Stations. The stop for this service is on Park Meadows Center Drive on the west side of the station.

Figure 6-2 South Inverness Call-n-Ride: Southeast of Station



Source: RTD

Figure 6-3 Lone Tree Call-n-Ride: Southwest of Station



Source: RTD

Transit service north of County Line Road connects to the Dry Creek Station. No shuttle services operate along County Line Road to the west, which would allow people to walk to their offices from the road. The employment location at Holly and County Line Rd. is not easily accessible because the shuttle does not run during rush hour (location is about 3 miles from the station).

The IMID has installed 12 bus shelters at stops throughout the District area in cooperation with RTD. The shelters are clean and attractive and have an interior bench (unlike the RTD shelters), but are generally unmarked: they have no signage or information, as shown in the image below.



IMID Shelters are attractive and clean, but have no transit information.

Source: NelsonNygaard

Station Facilities Observations

- There are three functional bus bays: two on the east side and one on the west side. The station area on east side has capacity to accommodate additional vehicles. Additional transit vehicles could also be accommodated along the curb on the west side and at unused bays on the east side if required.
- The station has shelters and benches, but benches are located outside of the shelters.
- Transit wayfinding is poor.
- There is ample space for vehicles to turn around and for layover on the east side.
- There is limited route signage: signage could be larger and make it easier to find routes.
- There is a kiss-n-ride area, but there is no weather screening: benches are in the open.
- A vending kiosk is present but closed.
- There is good visibility within and around the station on the west side, but on the east side, the station area feels isolated at night and somewhat unsafe. There is lighting at the station and between the station and the parking lot, as well as street lighting on some of the surrounding streets. No security guards were present during the inventory.

- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.



The pedestrian bridge includes security cameras and telephones.

Source: Nelson\Nygaard

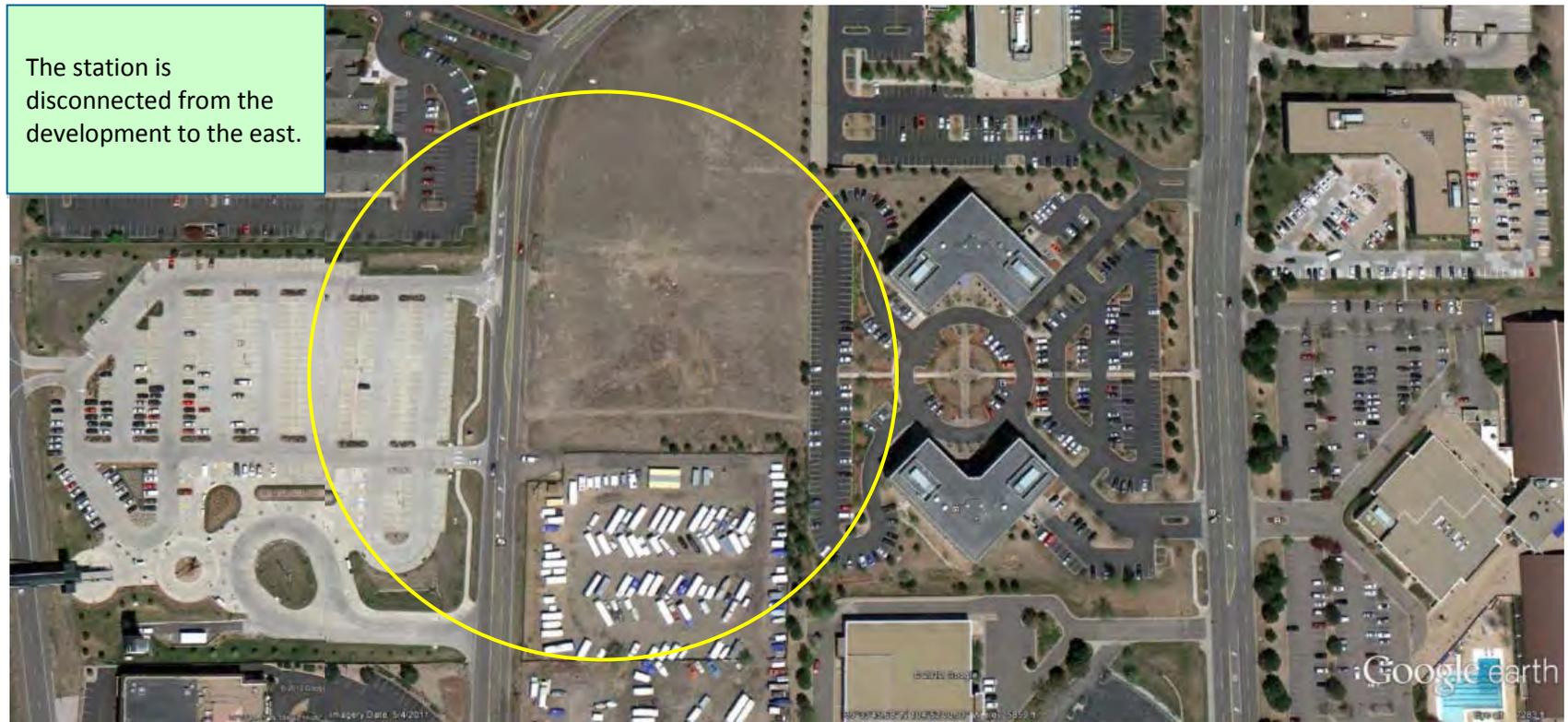
PEDESTRIAN ACCESS AND AMENITIES

There are some significant disconnects between the land uses in this area. For example, a lack of a connection exists, as shown in Figure 6-4, between the transit facility and the denser office developments on the east side.

There is no pedestrian-oriented lighting outside of the station area. Workers in the nearby Sprint building reported that their shifts end at 11 PM after the call-n-ride service hours, and if they walk, they walk in a dark area. Lighting late at night is especially poor.

On the west side of the station, the mall development is entirely oriented toward automobiles. There are very few pedestrian amenities in this portion of the station area, and very limited access designed for pedestrians other than basic sidewalks. There is a pedestrian bridge that provides access to the mall, added after the station was completed for safety reasons, and people may walk down the paved path to access the front door of the mall. Nevertheless, this is not the most direct access to the mall, and many individuals were observed walking across the large parking lot. Other pedestrians were observed running across the streets where there were no crosswalks to access the shopping centers and IKEA to the north, particularly at the southeast corner of Centennial Promenade.

Figure 6-4 Development Gaps on East Side of Station



Source: Google Earth



Although crosswalks and a designated pathway exist to the front door of the mall, the indirectness of the route leads many pedestrians to chart their own path across the roads and through the parking lot.

Source: Nelson\Nygaard

Pedestrian Observations

Some significant opportunities exist to improve access to the station.

- It was noted that there is no direct access to hotels on east side of station directly to the north (separated by an embankment and five-foot wall).
- Desire lines across the undeveloped land east of the station lead to several office buildings and a large recreational sports facility less than a quarter-mile from of the station.

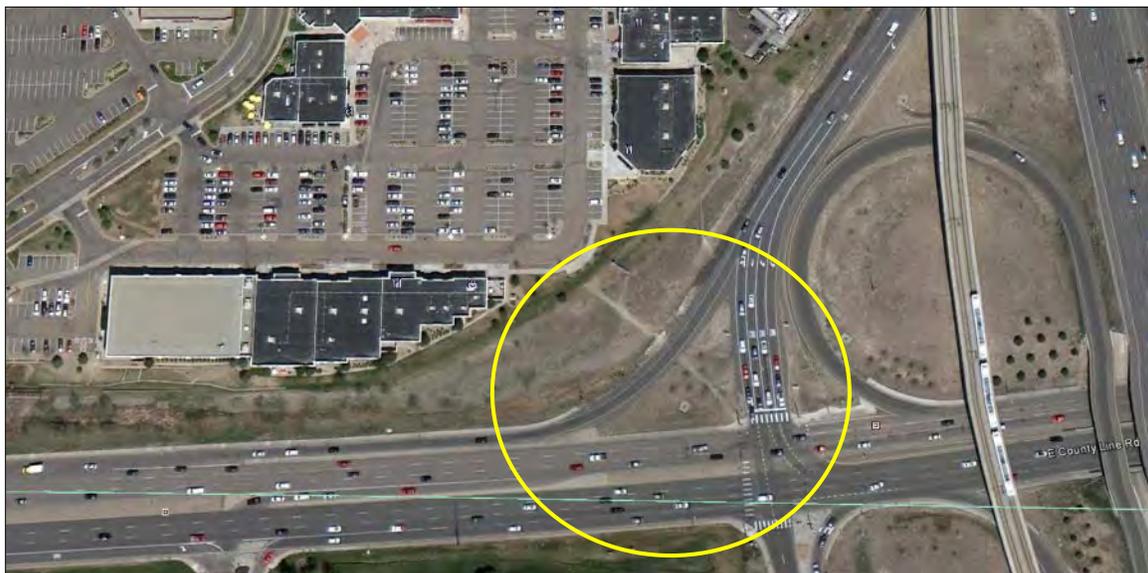


Pedestrian Access Obstacles on the East Side of the Station. From L to R: (1) No connection to adjacent hotels (2) Heavily used dirt patch immediately east of the station, with no sidewalks.

Source: Nelson\Nygaard

- **Crossing East County Line Road on the northwest side of the station is challenging.** Desire lines show that there are people crossing at this location to reach destinations north of County Line Rd. (Average daily traffic (ADT) on County Line Rd. is over 34,000 vehicles.) (See Figure 6-5)
- **According to the Centennial Transportation Master Plan, the intersection of County Line Rd. and S. Chester St. is listed among the top 25 crash locations in the city. Pedestrian improvements can enhance safety.**

Figure 6-5 Pedestrians Cross E. County Line Road



Source: Google Earth

BICYCLE ACCESS AND AMENITIES

The station has eight racks (4 U racks) and 16 lockers for bicycles. There are no bicycle lanes or other bicycle facilities in the vicinity of the station (other than racks and lockers). However, directly south of the west side of the station is Centennial Trail, which parallels Highway 470. (The trail is approximately 1,500 feet south of the west station entrance on S. Park Meadows Center Dr.)

To the west, Centennial Trail connects to a north-south trail system. The Trail has a grade separated crossing at the I-25/470 interchange and continues east. There are no connections from Centennial trail to the Inverness Business Park area east of I-25.

Bicycle Observations

- Opportunities exist to connect the station to the existing off-street trail network.
- Bicycle infrastructure improvements will be necessary on the east side of I-25.
- No bicycle safety or parking information was posted at the station. No information was available about how to access bike lockers.
- Wayfinding signage is limited beyond the station boundaries. There is no information about accessing the available bike trails.
- Efforts to identify bicycle enhancements to the west are limited due to the design of the road network, which prioritizes automobile movements on high-capacity roadways.

TRANSIT-ORIENTED DEVELOPMENT

There is no existing transit-oriented development in the station area. However, there are several opportunity sites on both the west and east sides of the station and there is the potential for significant redevelopment at Centennial Promenade.



Long distances separate the station from employment sites on the east side.

Source: Nelson\Nygaard

PARKING

This facility has 388 parking spaces. At the time of the inventory, on a Thursday midday, the lot was observed to be only a little more than half full.

RECOMMENDED CAPITAL PROJECTS

Figure 6-7 is a list of recommended capital investments in the station area to improve station access. Figure 6-8 maps these recommended projects.

Figure 6-7 County Line Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
Pedestrian																		
C-P1	Pedestrian	Sidewalk on S Valley Highway (east side)	Inverness Way to S Jamaica St	3400 FT	Pedestrian Access/Egress	There are no sidewalks on the east side of S Valley Highway except for approximately 350 feet adjacent to the intersection with Inverness Parkway	Inverness Metropolitan Improvement District; Douglas County	\$79,300	\$34,000	10	5	20	20	20	75	\$755		4
C-P2	Pedestrian	Sidewalk on S Valley Highway (west side)	South of County Line Station Parking Lot to S Jamaica St	2400 FT	Pedestrian Access/Egress	Sidewalks are present from the County Line Station parking lot to Inverness Parkway. There are no sidewalks south of the station to the intersection with S Jamaica St.	Inverness Metropolitan Improvement District; Douglas County	\$56,000	\$24,000	10	5	20	20	20	75	\$533		4
C-P3	Pedestrian	Pedestrian pathway from parking lot entrance directly east	S Valley Highway at entrance to County Line Station parking lot	380 FT	Pedestrian Access/Egress	When the parcel directly east of the station parking lot entrance is developed, a pedestrian pathway through the property should be maintained to provide direct pedestrian access to destinations east of the station.	Private property owners; Inverness Metropolitan Improvement District; Douglas County	\$8,900	\$3,800	15	5	20	20	15	75	\$85		4
C-P4	Pedestrian	High visibility crosswalk across S Valley Highway	S Valley Highway at entrance to County Line Station parking lot	single crosswalk	Pedestrian Access/Egress	Pedestrians currently cross S Valley Highway at the entrance to the parking lot to reach destinations west of the station. A high visibility pedestrian crosswalk should be installed in conjunction with sidewalks on the east side of S Valley Highway and a pedestrian pathway through the parcel directly west of the station parking lot.	Inverness Metropolitan Improvement District; Douglas County	\$3,000	\$300	15	15	20	20	15	85	\$19		1
C-P5	Pedestrian	Sidewalk on west side of Inverness Parkway	South of Inverness Way West	490 FT	Pedestrian Access/Egress	Complete the sidewalk network along Inverness Parkway just south of Inverness Way South/South Valley Highway	Inverness Metropolitan Improvement District; Douglas County	\$11,400	\$4,900	10	5	20	20	20	75	\$109		4
C-P6	Pedestrian	High visibility crosswalk across Inverness Parkway	Between Inverness Way South and Inverness Dr South	single crosswalk	Pedestrian Access/Egress	Provide a direct pedestrian connection across Inverness Parkway from properties near the Colorado Athletic Club. Coordinate with existing east-west pedestrian pathways from Inverness Parkway.	Inverness Metropolitan Improvement District; Douglas County	\$3,000	\$300	15	15	20	20	15	85	\$19		1

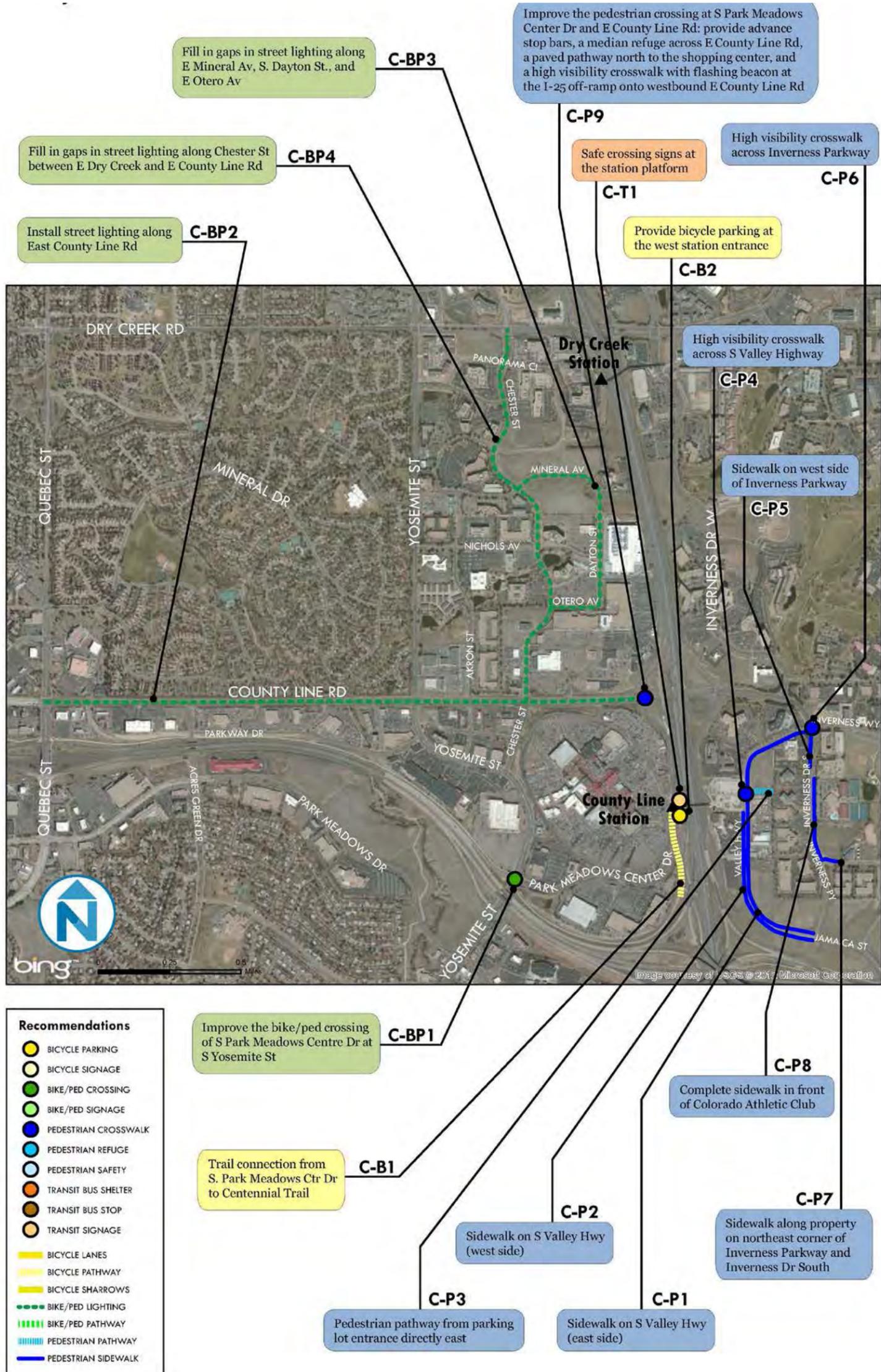
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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
C-P7	Pedestrian	Sidewalk along property on northeast corner of Inverness Parkway and Inverness Dr South	East side of Inverness Parkway; north side of Inverness Dr South	850 FT	Pedestrian Access/Egress	Sidewalk should be provided either in advance of or when this property is developed.	Inverness Metropolitan Improvement District; Douglas County	\$19,800	\$8,500	10	5	20	20	20	75	\$189		4
C-P8	Pedestrian	Complete sidewalk in front of Colorado Athletic Club	East side of Inverness Parkway	545 FT	Pedestrian Access/Egress	This sidewalk should be completed in conjunction with the northeast corner of Inverness Parkway and Inverness Dr South	Inverness Metropolitan Improvement District; Douglas County	\$12,700	\$5,500	10	5	20	20	20	75	\$121		4
C-P9	Pedestrian	Improve the pedestrian crossing at S Park Meadows Center Dr and E County Line Rd: provide advance stop bars, a median refuge across E County Line Rd, a paved pathway north to the shopping center, and a high visibility crosswalk with flashing beacon at the I-25 off-ramp onto westbound E County Line Rd.	Intersection of E County Line Rd and S Park Meadows Center Dr	1 median refuge Two stop bars 1 high vis. crosswalk with pedestrian flashing beacon 265 FT path	Intersection improvement	Improve the safety and visibility of the north/south crossing of E County Line Rd at Park Meadows Dr. Currently, there are a number of people crossing this roadway as shown by the "desire line" pathways that exist just north of the intersection.	City of Lone Tree; City of Centennial	\$60,000	\$30,000	10	20	20	20	15	85	\$529		1
Bicycle																		
C-B1	Bike	Trail connection from S. Park Meadows Ctr Dr to Centennial Trail	S. Park Meadows Ctr Dr to Centennial Trail	400 FT	Pathway Connection	Provide a pathway connection between the Centennial Trail and the west station entrance	City of Lone Tree	\$9,300	\$4,000	10	10	15	5	10	50	\$133		14
C-B2	Bike	Provide bicycle parking at the west station entrance	West station entrance at S Park Meadows Centre Dr	3 racks	Bicycle Parking	Installing bicycle racks or lockers at the west station entrance will facilitate bicycle access from the west. Currently, cyclists approaching from the west must go out of their way to park their bikes on the east side of the station.	RTD	\$1,200	\$180	5	5	10	0	20	40	\$17		16

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
Combined Pedestrian/Bicycle Improvement																		
C-BP1	Bike/Ped	Improve the bike/ped crossing of S Park Meadows Centre Dr at S Yosemite St	N-S crossing of S Park Meadows Center Dr at S Yosemite St	2 corners	Intersection improvement	Increase the curb space and reduce the crossing distance for bicyclists and pedestrians crossing this intersection and connecting from the Centennial Trail to the west of the intersection. Slow traffic and improve safety by reducing the right hand turn radius from westbound S Park Meadows Centre Dr to northbound S Yosemite St and from northbound S Yosemite St to eastbound S Park Meadows Center Dr. The free right turn from southbound S Yosemite St to the 470 freeway on-ramp should be signalized (with a ped/bike activated signal) to enable for safe bicycle and pedestrian crossings.	City of Lone Tree	\$70	\$30	5	20	15	15	15	70	\$1		10
C-BP2	Bike/Ped	Install street lighting along East County Line Rd	E County Line Rd between S Quebec St and I-25	1.6 miles	Lighting	Installing street lighting will improve visibility along this busy highway for bicyclists and pedestrians.	City of Lone Tree; City of Centennial	\$640,000	\$320,000	10	20	0	20	5	55	\$8,727		11
C-BP3	Bike/Ped	Fill in gaps in street lighting along E Mineral Av, S. Dayton St., and E Otero Av	E Mineral Av, S. Dayton St., and E Otero Av	.7 miles	Lighting	Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Centennial	\$240,000	\$120,000	10	20	0	20	5	55	\$3,273		11
C-BP4	Bike/Ped	Fill in gaps in street lighting along Chester St between E Dry Creek and E County Line Rd	Chester St between E Dry Creek and E County Line Rd	1.1 miles	Lighting	Fill in the lighting gaps along this key north-south route, where there are only a few streetlights on adjacent to the sidewalks, typically at intersections, and some median-only lighting	City of Centennial, Arapahoe County	\$400,000	\$200,000	10	20	0	20	5	55	\$5,455		11
Transit Access and Information																		
C-T1	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$1,200	\$400	0	20	0	5	20	45	\$18		15

Figure 6-8 County Line Station Recommended Capital Projects (Illustrated)



7 DRY CREEK STATION

LOCATION AND STATION AREA DESCRIPTION

The area surrounding area is primarily office uses, but there are also large multi-family residential developments on the west (one-third mile from station) and east sides of the station. The pedestrian bridge was recently extended to the Vallagio residential/retail development on the east side of the station. The area immediately west of the station is in unincorporated Arapahoe County. The remainder of western station area is within the City of Centennial. The east side of the station is within the jurisdiction of Arapahoe County.

Compared to County Line, IKEA is closer to Dry Creek station as the crow flies (0.5 vs. 0.7 miles to County Line). The walking distance, however, following existing roadways is 1.1 miles.

Ridership at Dry Creek is third highest of the six stations. Most riders are traveling between origins and destinations north of the station area (northbound boardings and southbound alightings are both approximately 800).



The west entrance to the Dry Creek Station is tucked behind office buildings, private parking lots and the RTD Park-n-Ride.
Source: NelsonNygaard

Figure 7-1 Dry Creek Station Aerial



Source: Google Earth

PROJECTS AND PLANS

The Centennial Short Term Transportation Plan, part of the Transportation Master Plan, provides some direction for transportation planning in the area.

TRANSIT SERVICES

The Dry Creek Call-n-Ride (see Figure 7-2) operates on the west side, while the North Inverness Call-n-Ride provides service on east side. Line 77, which operated down East Dry Creek Road was canceled in early 2012. The Call-n-Ride pick up location on the west side is on East Panorama Circle, about 0.1 miles from the station. The east side has a waiting area with covered benches and includes an indoor, heated kiss-n-ride waiting area, the only such facility of the stations in this area.

Figure 7-2 Dry Creek Call-n-Ride

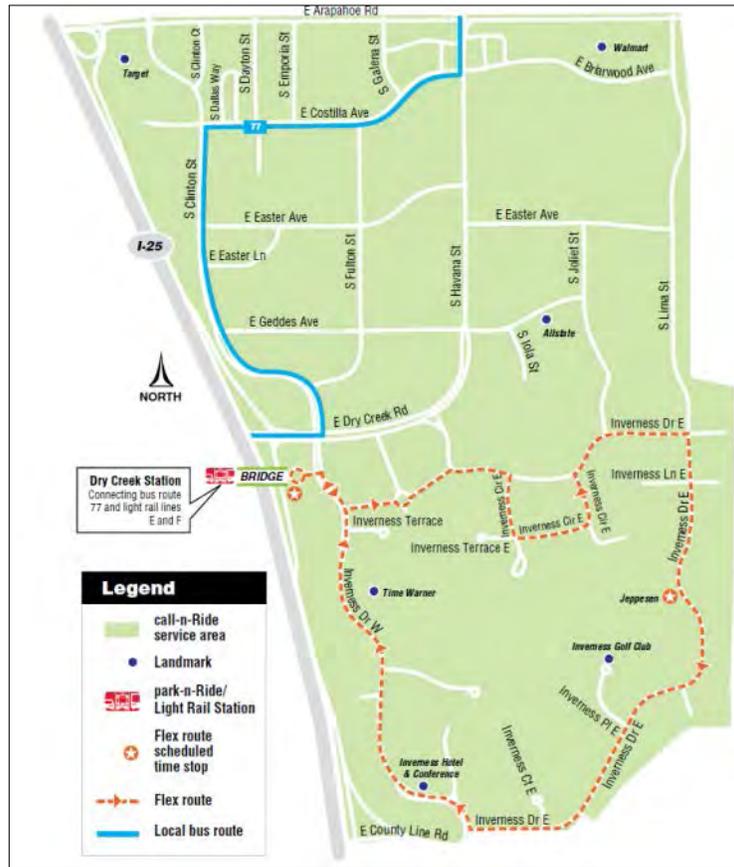


Source: RTD

The Dry Creek Call-n-Ride area (shown above in Figure 7-2) is larger from 9:00 AM to 3:00 PM and from 6:00 PM to 8:00 PM than at other times. The larger service area goes as far west as S. Holly Street, while the smaller service area is bounded by S. Quebec Street.

During morning and evening peaks (6 AM-9 AM and 3:00 PM-6:00 PM), the North Inverness Call-n-Ride leaves the east side of the station every 10 minutes. Midday, scheduled stops are made at the station every 30 minutes. The North Inverness Call-n-Ride service area is shown in Figure 7-3.

Figure 7-3 North Inverness Call-n-Ride



Source: RTD

Station Facilities Observations

- This station has very limited capacity for additional buses.
- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.
- Using the pedestrian bridges to access the platform from near Casa Bella Lane on the east side of the station requires about a ¼ mile walk. The pedestrian links at this station are very long.
- The elevator on the west side does not refer to the transit entry as "platform level," which should be done to eliminate confusion.
- There is no retail space located on the station premises.
- The west side of the station is especially confusing for pedestrians. The station is hidden behind office buildings and there is no pedestrian wayfinding or signage from the surrounding area to station.
- A safe crossing sign is needed at the one track location where people must cross. There is good visibility within the station, but visibility of the station is very poor just outside of the station on the west side.

- There is good lighting in the garage. Lighting at the platform is good. No security guards were spotted during the inventory.
- There is no covered bicycle parking or bicycle lockers at this station.



Pedestrian bridges at the Dry Creek station to the east side entrance are the longest of the RTD light rail stations in the corridor.

Source: NelsonNygaard

PEDESTRIAN ACCESS AND AMENITIES

This station is well situated in terms of its access to a number of different office buildings, but was built within a fairly narrow right-of-way and much of the access to the station was not clearly defined (particularly on the west side). The station has limited pedestrian amenities. For example, on the east side of the station, there is no pedestrian-oriented lighting or pedestrian-oriented signage. This is one of the quietest station platforms because the station abuts the freeway access road rather than the freeway directly.

Pedestrian Observations

- Generally, there is poor access from the station to any destinations north of E. Dry Creek Road due to difficult crossings.
- Dry Creek Road and Inverness Dr. West had the second highest number of collisions in the county. Dry Creek and Yosemite also had a very high number of collisions.
- There is no direct access to IKEA, which is a half-mile directly south of the station (on the west side).

- One must cross Dry Creek Road to access the northwest quadrant of this station service area (via South Alton Court). Sidewalks are only on one side of S. Alton Court.
- On the east side of I-25, Inverness Drive West is a barrier and there are few safe pedestrian crossings. The station pedestrian bridge crosses Inverness Drive West, but may not provide the most direct access to locations north and south.
- Significant sidewalk gaps exist on Inverness Drive West south of Dry Creek Road.
- Centennial has preliminary plans to construct five-foot wide sidewalks in gap areas on Yosemite Street from Arapahoe to County Line as well as to add five-foot minimum sidewalks on Alton Way from Yosemite Street and I-25.
- Patrons and a transit operator expressed a desire for Call-n-Ride services to drop them off on the side of the street where their stop is to avoid unsafe crossings.



One of the few stations in the corridor with exterior signage. Even still, this west entrance sign is difficult to see from the street.

Source: NelsonNygaard

BICYCLE ACCESS AND AMENITIES

The station has six bike racks and no lockers. Some additional wave racks were located within the parking structure on the west side. This station has no covered bike parking.

The bicycle infrastructure in the vicinity is limited, although some plans for improvement have been identified and streets, in many cases, are designed for multimodal infrastructure, although their wide lanes may encourage higher speeds than posted.

Bicycle Observations

- Yosemite Road is a major barrier for bicyclists and pedestrians traveling to the station from residential areas to the west. There are several trails/pathways that terminate on Yosemite but there are very limited crossings.

- Dry Creek Road is a major barrier, as well. There are no bike facilities along Dry Creek Rd. across I-25.
- It is difficult to cross Yosemite at Mineral, which would provide the most direct route from residential areas in the west to station.
- The Centennial Transportation Plan notes the need to connect the trail system to the Dry Creek Light Rail Station by striping bike lanes on East Panorama Drive and East Panorama Circle and by providing either a grade separated crossing of Yosemite or a pedestrian signal. The Plan noted that East Dry Creek Road is currently the only place to cross I-25 south of Yosemite for bicycles and pedestrians. East Panorama Drive is certainly wide enough to accommodate a striped bike lane without interfering with traffic flow.
- Centennial has multi-modal street standards and some planned bike improvements. According to the City of Centennial, the following enhancements have been identified:
 - Chester and Nichols Intersection: Stripe bike lanes and add connection along Yosemite
 - E Panorama Circle/Panorama Drive/Yosemite Street - Add flashing sign or HAWK at parking garage entrance on Panorama Circle and stripe bike lanes on Panorama
 - Dry Creek at I-25 – add multi-use path for crossing
 - Alton Way from Yosemite Street and I-25 – Stripe bike lanes
 - Clinton Street from I-25 to Peakview Avenue - add bike lanes along corridor

TRANSIT ORIENTED DEVELOPMENT

There is high-quality, mixed use transit oriented development going in around the east side of the station, and the sidewalks and extended pedestrian bridges connect well with it. The west side of the station has the potential for much better pedestrian amenities for improved access to development to the west and northwest. The City of Centennial currently has a sub area plan under way for this area to plan for future development including connectivity. Land use plans and patterns are likely to change in this corridor in the future.



Mixed use transit-oriented development is being constructed on the east side of the station.

Source: Nelson\Nygaard

PARKING

This lot has 235 spaces, which based on RTD data, are typically occupied (at capacity). Parking is only on the west side of the station, although the east side has some on-street parking and a number of privately owned garages. There may be the potential to partner with private garage owners on the east side to provide some additional parking; as the light rail system is expanded to the south, more and more drivers may opt to travel to the stations with greater parking capacity.



Adjacent property owners are protective of their parking.

Source: Nelson\Nygaard

RECOMMENDED CAPITAL PROJECTS

Figure 7-4 is a list of recommended capital investments in the station area to improve station access. Although some of these improvements have been identified in other reports, as noted, many of them have not. These recommended investments are illustrated on the map in Figure 7-5.

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Figure 7-4 Dry Creek Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency*	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
Pedestrian																		
D-P1	Pedestrian	Install pedestrian flashing beacons and yield to pedestrian signs at all free right turns at all legs of the E Dry Creek Rd and Inverness Dr W intersection	E Dry Creek Rd and Inverness Dr W	4 beacons, signs	Safety	Free right turns can create dangerous conditions for pedestrians. Safety can be improved by installing pedestrian flashing beacons and yield to pedestrian signs to heighten drivers' awareness of pedestrian crossings.	Arapahoe County	\$61,000	\$40,000	10	20	15	20	10	75	\$673		2
D-P2	Pedestrian	Provide median pedestrian refuges at three intersections along E Dry Creek Rd	E Dry Creek Rd intersections with Inverness Dr W, Inverness Blvd, Inverness Dr E	Median refuges at three intersections (2+2+1)	Safety	Pedestrian crossing distances across E Dry Creek Rd are 115 to over 120 feet long. The existing median could be modified to provide a pedestrian refuge which would increase the safety and comfort of pedestrians crossing this roadway.	Arapahoe County	\$150,000	\$20,000	5	20	5	20	10	60	\$1,417		7
D-P3	Pedestrian	Close sidewalk gaps on Inverness Dr W	West side of Inverness Dr W from south of Inverness Blvd to Inverness Lane West	3200 FT	Connectivity	Close sidewalk gaps along Inverness Dr W southeast of the station	Arapahoe County	\$75,000	\$32,000	10	5	20	20	20	75	\$713		2
D-P4	Pedestrian	Provide median refuge on Inverness Dr W at intersection with Inverness Blvd	Inverness Dr W at Inverness Blvd	2	Safety	Extend the existing medians to create a pedestrian refuge across Inverness Dr W at Inverness Blvd	Arapahoe County	\$60,000	\$20,000	5	20	5	20	10	60	\$667		7
D-P5	Pedestrian	Provide a pedestrian pathway (or create a new roadway connection) from the south side of the station to E Mineral Ave at S Dayton St	Dry Creek Station to E Mineral Ave and S Dayton St.	1300 FT	Connectivity	A direct connection between the station and E Mineral Ave just west of the rail line would significantly shorten walking distances to destinations southwest of the station.	City of Centennial; private property owner	\$30,000	\$13,000	15	5	20	20	10	70	\$307	City of Centennial will evaluate this as part of sub area plan underway	5
D-P6	Pedestrian	Crosswalk across S Chester St at E Panorama Dr	S Chester St at E Panorama Dr	2 crosswalks	Connectivity Safety	Install two crosswalks across S Chester St at E Panorama Dr. Pedestrians traveling to or from the station can then cross S Chester directly and cut through adjacent development to access the station more directly.	City of Centennial	\$6,000	\$600	5	15	20	20	15	75	\$44		2

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency*	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
D-P7	Pedestrian	Provide median refuges at the intersection of S Chester St/S Alton Ct and E Dry Creek Rd	E Dry Creek Rd and S Chester St/S Alton Ct	4	Safety	Pedestrian crossing distance across E Dry Creek Road is over 130 feet. S Chester is almost as wide as E Dry Creek Rd, and S Alton Ct nearly 70 ft wide.	City of Centennial	\$120,000	\$20,000	5	20	5	20	10	60	\$1,167		7
D-P8	Pedestrian	Wayfinding signage to western station entrance	Key locations within 1/3 mi walk to the west station entrance	10 signs	Wayfinding	The west side of the station is especially confusing for pedestrians. The station is hidden behind office buildings and there is no wayfinding signage to the station from the surrounding area.	RTD; City of Centennial	\$3,000	\$1,000	10	0	20	20	20	70	\$29		5
D-P9	Pedestrian	Mid-block crossings at stop locations along flex routes	Flex route service areas	Per crossing	Transit access	Because flex routes travel in one-way loops, passengers with destinations on the opposite side of the street must either jay walk to reach their destinations directly, or travel a significant distance out of their way to a marked crosswalk.	Arapahoe County	\$19,600	\$11,100	10	20	20	20	15	85	\$181		1
Bicycle																		
D-B1	Bicycle	Covered and/or secure bicycle parking	At station	4 lockers (8 bicycles)	Bicycle Parking	This station has only six bike racks and no lockers or covered bicycle parking.	RTD	\$8,000	\$4,000	5	5	10	0	20	40	\$150		19
D-B2	Bicycle	Retrofit Inverness Dr W/Inverness Parkway with bicycle accommodation south to South Valley Highway	E Dry Creek Rd to S Valley Hwy	1.3 mi	Connectivity	Bicycle facilities on Inverness Dr West will provide improved bicycle connections to the east side of the Dry Creek light rail station.	Arapahoe County	\$26,000	\$6,500	5	15	15	0	15	50	\$325	Centennial Parks, Open Space, Trails and Recreation Master Plan (p. 8-14)	12
D-B3	Bicycle	Stripe bike lanes on S Clinton St	E Dry Creek Rd to E Arapahoe Rd	1.2 mi	Connectivity	Bicycle facilities on S Clinton St will provide improved bicycle connections to the east side of the Dry Creek light rail station to and from areas northeast of the station.	City of Centennial	\$24,000	\$6,000	5	15	15	0	15	50	\$300	Centennial Transportation Master Plan Short Term Transportation Plan (p. 46)	12

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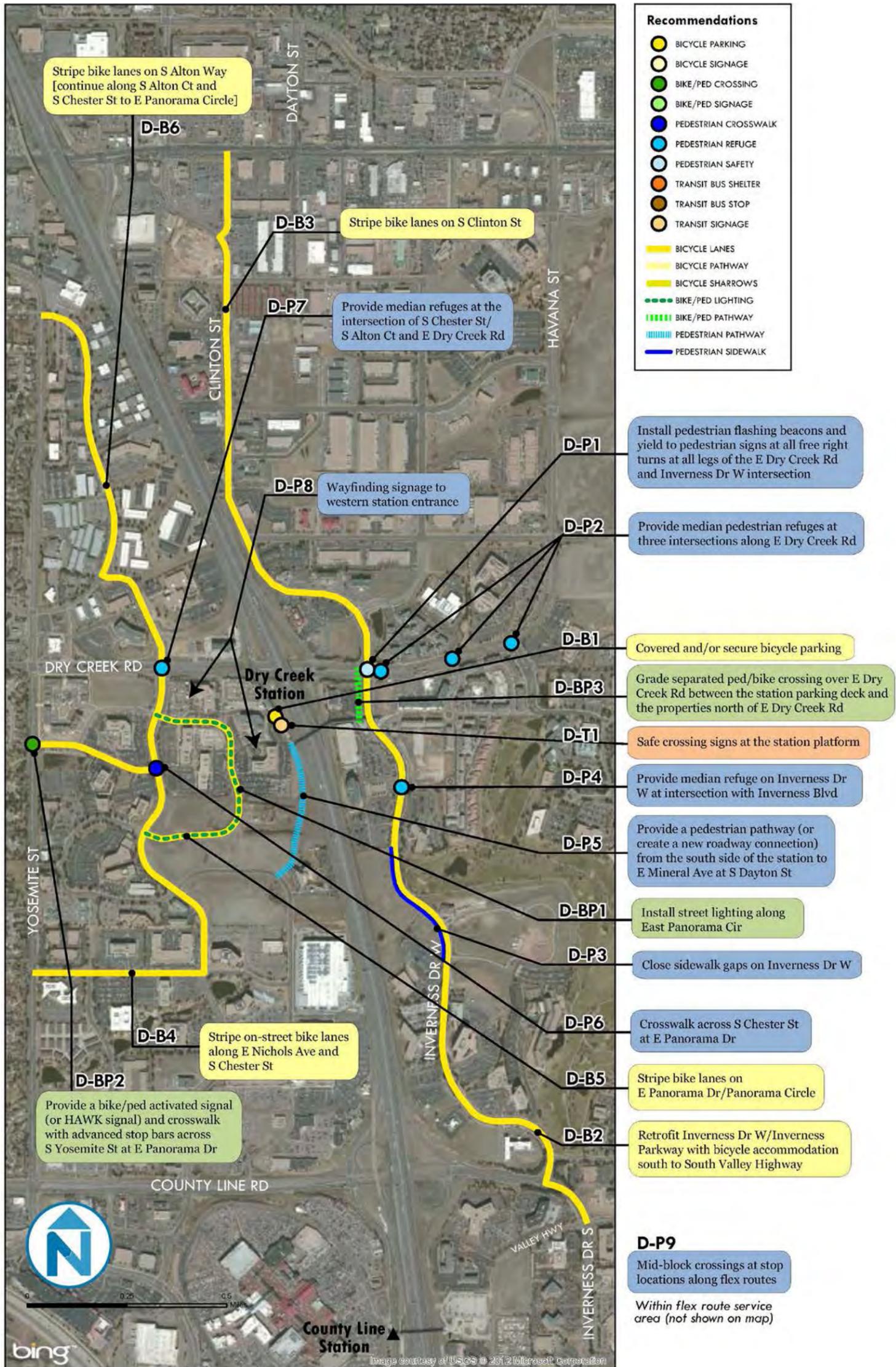
Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency*	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
D-B4	Bicycle	Stripe on-street bike lanes along E Nichols Ave and S Chester St	S Yosemite to light rail station	1 mi	Connectivity	Bicycle facilities will provide access between the station and areas to the southwest.	City of Centennial	\$20,000	\$5,000	5	15	15	0	15	50	\$250	Centennial Transportation Master Plan Short Term Transportation Plan (p. 46)	12
D-B5	Bicycle	Stripe bike lanes on E Panorama Dr/Panorama Circle	S Yosemite to light rail station	1 mi	Connectivity	Bicycle facilities will provide access between the station and areas to the southwest.	City of Centennial	\$20,000	\$5,000	5	15	15	0	15	50	\$250	Centennial Transportation Master Plan Short Term Transportation Plan (p. 46)	12
D-B6	Bicycle	Stripe bike lanes on S Alton Way [continue along S Alton Ct and S Chester St to E Panorama Circle]	S Yosemite St to S Chester St and E Panorama Circle	1 mi	Connectivity	Bicycle facilities will provide access between the station and areas to the southwest.	City of Centennial	\$20,000	\$5,000	5	15	15	0	15	50	\$250	Centennial Transportation Master Plan Short Term Transportation Plan (p. 46)	12
Combined Pedestrian/Bicycle Improvement																		
D-BP1	Bike/Ped	Install street lighting along East Panorama Cir	E Panorama Cir	.7 miles	Lighting	Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Centennial	\$280,000	\$140,000	10	20	0	20	5	55	\$3,818		11
D-BP2	Bike/Ped	Provide a bike/ped activated signal (or HAWK signal) and crosswalk with advanced stop bars across S Yosemite St at E Panorama Dr	S Yosemite St at E Panorama Dr	1 HAWK signal 1 crosswalk	Connectivity Safety	Providing a safe bicycle and pedestrian crossing across S Yosemite St at E Panorama Dr will significantly decrease the travel distance from the residential neighborhood west of S Yosemite to the light rail station.		\$103,000	\$60,300	10	20	10	0	20	60	\$1,361	Centennial Transportation Master Plan Short Term Transportation Plan	7

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency*	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Or 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
D-BP3	Bike/Ped	Grade separated ped/bike crossing over E Dry Creek Rd between the station parking deck and the properties north of E Dry Creek Rd	Dry Creek Station elevated walkway extension to north side of E Dry Creek Rd	470 feet	Connectivity Safety	Providing a new pedestrian bridge over E Dry Creek will further extend the reach of the station to this commercial area with some higher density housing.	City of Centennial, RTD	\$9,400,000	\$141,000	5	15	20	10	0	50	\$95,410	Not identified in existing plans; identified for inclusion by City of Centennial	12
Transit Access and Information																		
D-T1	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$1,200	\$400	0	20	0	5	20	45	\$18		18

*Note: The Inverness Metropolitan Improvement District would likely play a significant role in implementation of some of the recommendations on the east side of the station.

Figure 7-5 Dry Creek Station Recommended Capital Projects (Illustrated)



8 LINCOLN STATION

LOCATION AND STATION AREA DESCRIPTION

Lincoln Station is located a little less than a mile north of the intersection of East Lincoln Avenue and Park Meadows Drive, and approximately 1.5 miles north of Sky Ridge Medical Center (about a half-mile south of E. Lincoln Ave.). Northwest of the station along Park Meadows Drive are several multi-family housing developments and retail centers. Less than a mile northwest is a University of Phoenix campus and several large office buildings.

Most of the area within a half-mile of the station is within Douglas County, including development on both sides of Park Meadows Drive to Lincoln Avenue and the area east of I-25.

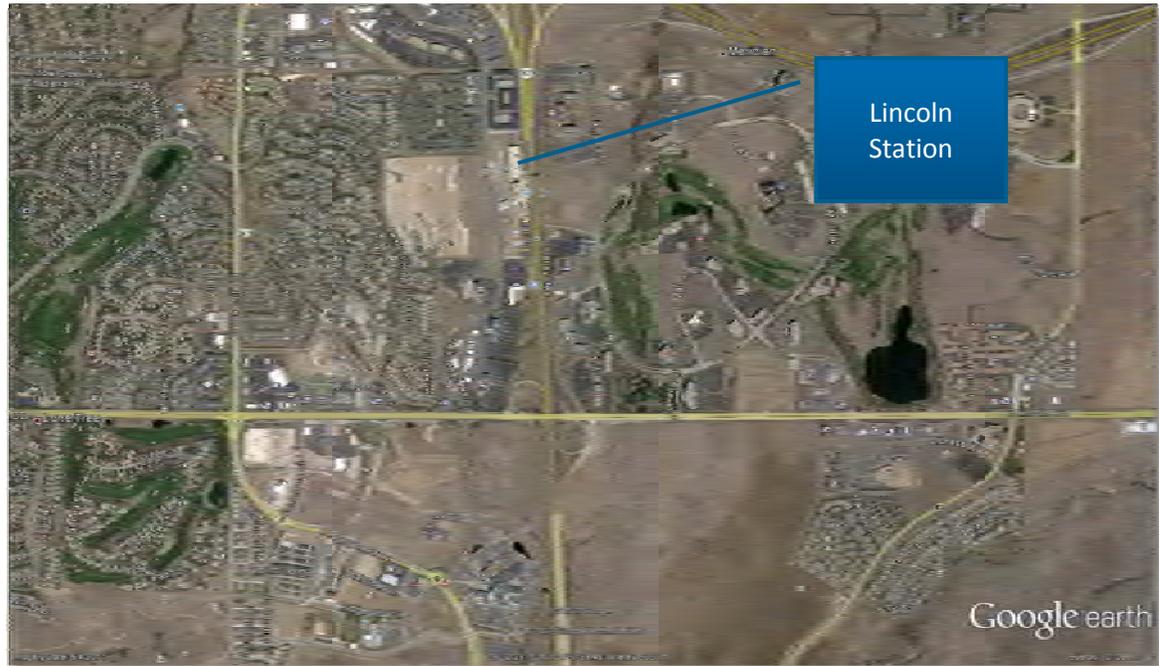
Employers in the immediate station area include the following:

- DexOne
- Cook Financial Associates
- Aurora Bank & Loan Services
- Marriott Hotel
- Global Employment Solutions
- Freedom Financial Services
- HPSC
- Aztec Professional Services

To the south, Sky Ridge Medical Center has more than 1,100 employees, with an additional 300 to 400 employees in the adjacent medical building. (The facility also has nearly 300 beds and hundreds of visitors and patients daily).

Lincoln station, as the southernmost terminus, has the highest ridership in the I-25 corridor. It serves as the point at which residents from elsewhere in Douglas County and locations to the south access the light rail system.

Figure 8-1 Lincoln Station Area



Source: Google Earth

PROJECTS AND PLANS

As the southernmost light rail station, the facility is in one of the less developed areas compared to the stations to the north. As a result, a significant amount of development is planned or projected in the near future, including the following:

- Kaiser Permanente is constructing a new 275,000 square-foot medical office building across the street from the station. Completion is scheduled for the end of 2013.¹ There will be approximately 100 employees working at the facility, which is anticipated to serve patients from rural areas to the south and east, as well as surrounding communities. An enlargement of the facility in a second phase of development is projected to be completed in 2017.
- A large multifamily development, as well as one or two hotels, are planned in the southwest quadrant (Ridgegate) in the next five years.
- The southeast quadrant is also part of the Ridgegate planned development and will take at least five years before development due to water and sewer connection limitations.
- RTD is planning a 2.3-mile LRT extension south of Lincoln Station, shown in Figure 8-2. It will run from the existing Lincoln Station along the west side of I-25, cross to the east side of I-25 just north of Sky Ridge Hospital, and continue south to the Ridgegate Parkway interchange. The LRT crosses Ridgegate Parkway via an overpass. The planned extension provides three new stations, including two kiss-n-rides (stations without

¹ Lone Tree Voice "Kaiser specialty services coming to northern Douglas County", by Chris Michlewicz, September 19, 2011. http://www.ourcoloradonews.com/lonetree/news/kaiser-specialty-services-coming-to-northern-douglas-county/article_c7f80fe2-06a9-5b29-9d89-e4cee6d4405b.html. Accessed January 24, 2012.

parking), one just north of Sky Ridge Avenue across from Sky Ridge Medical Center, and another, the Lone Tree City Center Station, which is situated in the core of the Ridgegate Planned Development. A new end-of-line station at Ridgegate Parkway would provide 2,000 parking spaces. The plan includes bus service to the Ridgegate Park-n-Ride.

Figure 8-2 Map Showing Potential Light Rail Extension



Source: RTD

TRANSIT SERVICES

Several bus routes serve the Lincoln Station:

- The west side of the station is served by the Lone Tree Call-n-Ride, which operates Monday through Friday from 5:30 AM until 8:00 PM. It stops at the station every 60 minutes between 6:00 AM and 7:00 PM.
- The east side of the station is served by the Meridian Call-n-Ride, which also operates Monday through Friday from 5:30 AM until 8:00 PM. During the morning and evening rush hours, the Meridian Call-n-Ride leaves from the east side of Lincoln Station every 15 minutes. During mid-day, scheduled stops are made at the east side of Lincoln Station every 30 minutes. The flex route is in effect only in the evening hours.

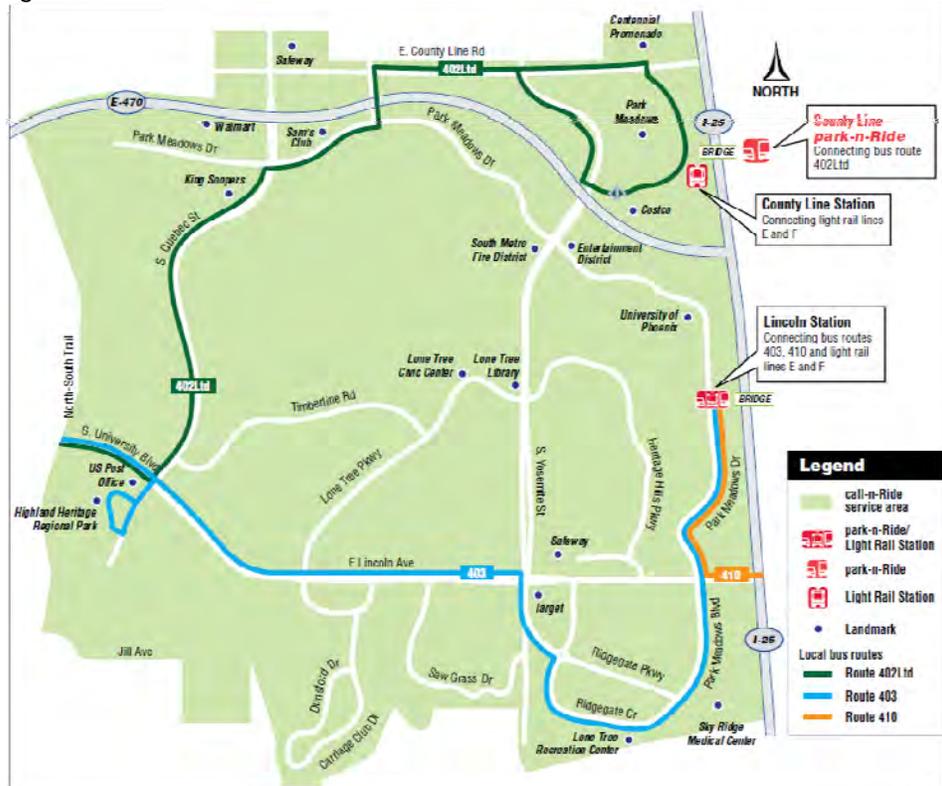
- Sky Ridge Medical Center also operates a single-vehicle shuttle Monday through Friday from 8:00 AM to 5:00 PM. The shuttle provides service between the medical center, parking facilities and the Lincoln Station. There is no signage or information at the station or the stop observed on Park Meadows.
- RTD Route 403 operates on 30-minute headway Monday through Friday from 5 :00 AM until 7:30 PM between Lincoln Station and Littleton/Mineral Station to the west. The one-way travel time for the route is approximately 45 minutes.
- RTD Route 410 buses travel south on Park Meadows to Lincoln and then east serving three different park-n-rides. The route not timed with train schedules. The buses leave the station at 6:21 AM and 6:51 AM, and then at 4:00 and 5:00 pm, as well as :24 and :54 past the hour. The route arrives at the station at half-hour intervals starting at 6:13 AM and then at 5:22 and 5:52 PM.



Inside a Call-n-Ride vehicle serving Lincoln Station. Drivers reported low ridership and expressed concerns about unsafe pedestrian crossings.

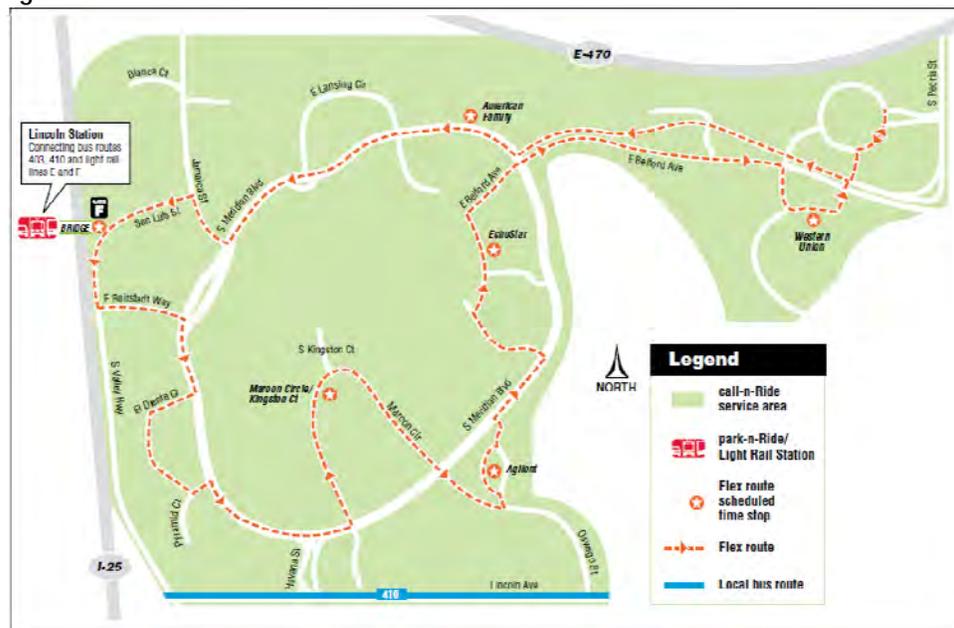
Source: Nelson\Nygaard

Figure 8-3 Lone Tree Call-n-Ride



Source: RTD

Figure 8-4 Meridian Call-n-Ride



Source: RTD

Staff from the City of Lone Tree and Sky Ridge Medical Center noted that they are interested in developing a new shuttle route: it would connect the station, medical buildings on the east, hospital, offices along Lincoln, and then serve retail areas.



The area in front of the station has ample space for shuttles and waiting passengers. There is no signage indicating shuttle shops or directing patrons to shuttles.

Source: Nelson\Nygaard

Station Facilities Observations

- There are three bus bays at the station and there is capacity to accommodate additional vehicles.
- There are three benches and three shelters, however benches are all located outside of the shelters.
- There is a potential concern about traffic to the new parking structure and possible conflicts with transit vehicles.
- There is a kiosk at the station, but was shuttered.
- The station has eight bicycle racks and 16 lockers. There are three inverted U racks at the station and three in front of DexOne.
- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.



Bus shelters, adjacent to the tracks with exterior benches and bike lockers.

Source: Nelson\Nygaard

PEDESTRIAN ACCESS AND AMENITIES

As a developing area, the amenities, once constructed, are often good. Nevertheless, portions of the area are still developing. Sidewalks are present in most developed areas, but there are significant gaps along vacant parcels. There is poor pedestrian lighting along Park Meadows Drive – primarily streetlights in the median of street. South of Lincoln, streetlights are on-street facing away from the sidewalk, which has a significant separation from the street.

According to planning staff, there used to be a pedestrian crosswalk between the Marriott hotel and the Aurora Loan Services building, but it was installed improperly and was removed after a pedestrian-vehicle collision. The consultant observed people crossing midblock at this location without the crosswalk.



Park Meadows Drive today has few pedestrian amenities or crossings.

Source: Nelson\Nygaard

Pedestrian Observations

- Wayfinding and signage is very limited, or nonexistent in some areas.
- “Mid-block” crossings are not available along Park Meadows Drive in the vicinity of the station, and crossing major and minor arterials can be difficult.
- A Call-n-Ride driver indicated the need for a signal for both transit vehicles and pedestrians at Park Meadows and Station St.
- Curb ramps at Park Meadows and Lincoln are poor. There are no median pedestrian refuges at Lincoln and Park Meadows, and there is no pedestrian crossing at Heritage Hills and Lincoln.



Very limited development exists on the east side of the station. The pedestrian bridge provides access to the Meridian Call-n-Ride stop.

Source: Nelson\Nygaard

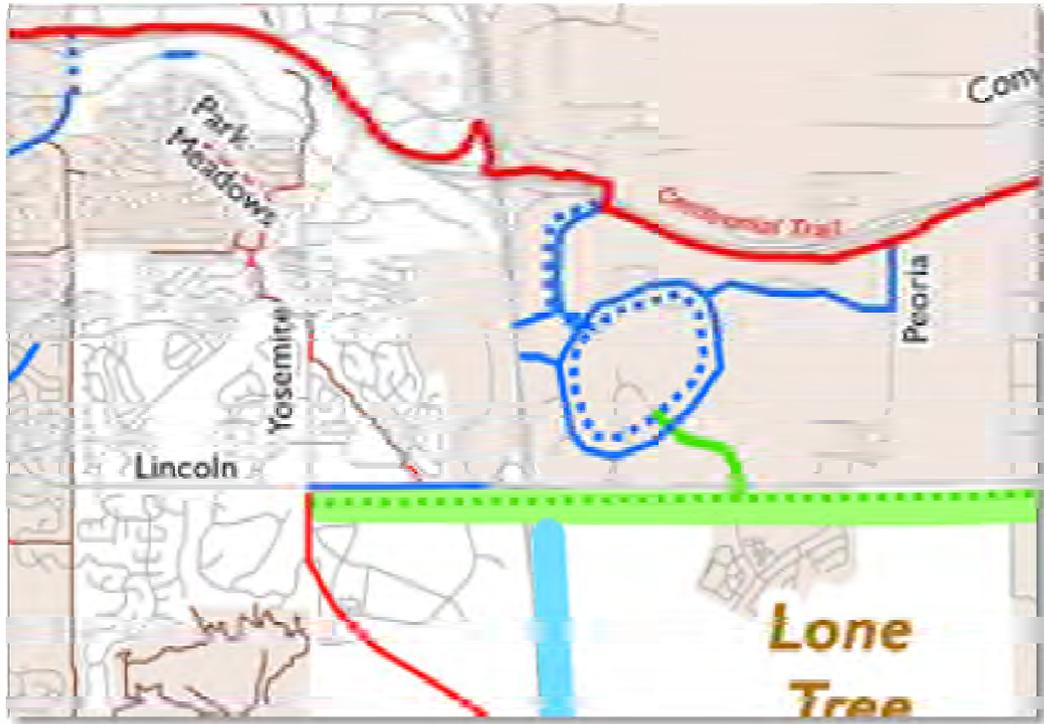
BICYCLE ACCESS AND AMENITIES

There are some bicycle trails within the vicinity of Lincoln Station but none are directly connected to the station. Park Meadows Drive provides a very accessible link between the station and the pathways south of Lincoln to Sky Ridge Medical Center. Access from the north of the station is within close proximity of the regional train system.

Bicycle Observations

- There is very limited wayfinding and signage for bicycle users.
- The transit station is not connected to the trail network to the west, but could be.
- According to the Douglas County 2030 Transportation Plan: “The existing roadway network does provide the basis for implementing a bicycle plan for Douglas County. Roadways that have painted shoulders with sufficient width could be converted to bike lanes. Some of the collectors have lower traffic volumes, no parking, and sufficient width where bike lanes could also be added. As streets and roadways are resurfaced, additional width could be added for a painted shoulder which could be used for bicycling.”
- The 2010 Douglas County Bicycle Plan includes lanes and/or off-street trails in the area east of the station/I-25. According to the plan, bicycle facilities along Lincoln are to be considered – likely as an off-street trail. There are no planned bicycle facilities in the area immediately west of the station, however.
- Employers in the area generally do not have bicycle parking or other bike facilities.

Figure 8-5 Lincoln Station Area Bike Lanes



TRANSIT-ORIENTED DEVELOPMENT

There is existing transit-oriented development at the station, with primarily office uses and ground-floor retail. There is also a pedestrian plaza with some seating and public art.

PARKING

Lincoln Station is an RTD Park-n-Ride facility with 1,734 parking spaces in structured parking that is shared with neighboring office buildings.

RECOMMENDED CAPITAL PROJECTS

The list in Figure 8-6 is of recommended capital investments in the station area to improve station access. Although some of these improvements have been identified in other reports, as noted, many of them have not. Figure 8-7 illustrates these recommendations on a map.

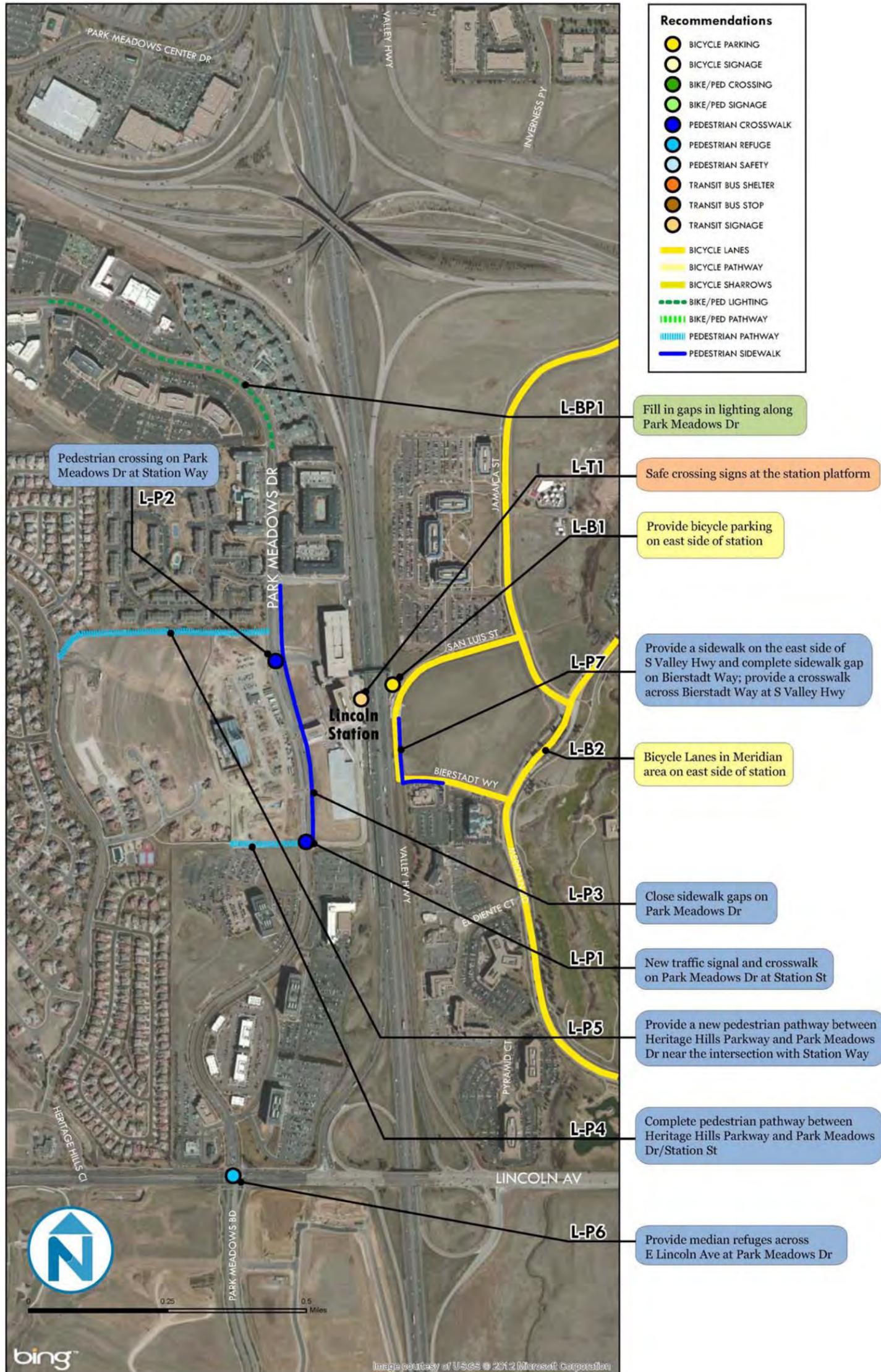
Figure 8-6 Lincoln Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$) High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking	
Pedestrian																	
L-P1	Pedestrian	New traffic signal and crosswalk on Park Meadows Dr at Station St	Station St and Park Meadows Dr	one signal and crosswalk	Safety and Connectivity	In conjunction with a new traffic signal, install a high visibility pedestrian crosswalk across Park Meadows Dr and State St to facilitate pedestrian and bicycle access to and from the west side of the station. The Meridian Call-n-Ride flex route provides good connecting service to office developments on the east side of the station. However, stakeholders indicated that there may be opportunities to better market and advertise the route to businesses and employees which it serves.	City of Lone Tree	\$203,000 \$75,300	10	20	20	20	10	80	\$1,739		2
L-P2	Pedestrian	Pedestrian crossing on Park Meadows Dr at Station Way	Station Way and Park Meadows Dr	one crosswalk	Safety and Connectivity	In coordination with the newly constructed Kaiser facility directly west of the station, provide a high visibility pedestrian crosswalk and advance stop bars on Park Meadows Dr at Station Way. Also include a crosswalk across Station Way.	City of Lone Tree	\$9,080 \$2,150	10	20	20	20	15	85	\$66		1
L-P3	Pedestrian	Close sidewalk gaps on Park Meadows Dr	North of Lincoln Station to Station St	3300 FT	Connectivity	There are a number of sidewalk gaps along undeveloped parcels bordering Park Meadows Dr	City of Lone Tree, private land owners	\$77,000 \$33,000	10	5	20	20	20	75	\$733		3
L-P4	Pedestrian	Complete pedestrian pathway between Heritage Hills Parkway and Park Meadows Dr/Station St	Heritage Hills Parkway east to Park Meadows Dr/Station St	515 FT	Connectivity	Completing the existing pathway from Heritage Hills Parkway would provide direct access and significantly shorten the walking/biking distance to the light rail station to and from neighborhoods to the west.	City of Lone Tree, private land owners	\$12,017 \$5,150	10	5	20	20	10	65	\$132		5
L-P5	Pedestrian	Provide a new pedestrian pathway between Heritage Hills Parkway and Park Meadows Dr near the intersection with Station Way	Heritage Hills Parkway east to Park Meadows Dr/Station Way	1550 FT	Connectivity	Providing a direct pedestrian connection would significantly shorten the walking and biking distance to and from areas northwest of the light rail station.	City of Lone Tree, private land owners	\$36,167 \$15,500	10	5	20	20	10	65	\$397		5
L-P6	Pedestrian	Provide median refuges across E Lincoln Ave at Park Meadows Dr	E Lincoln Ave at Park Meadows Dr	2	Safety	The crossing distance on E Lincoln Ave is 110 to 120 feet. Providing median refuges on the east and west legs of the intersection will reduce the distance pedestrians and cyclists must cross all at once and improve safety and comfort.	City of Lone Tree	\$60,000 \$8,000	5	20	5	20	10	60	\$567		7

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
L-P7	Pedestrian	Provide a sidewalk on the east side of S Valley Hwy and complete sidewalk gap on Bierstadt Way; provide a crosswalk across Bierstadt Way at S Valley Hwy	Call-N-Ride stop to Bierstadt Way	710 FT	Connectivity	Provide a continuous sidewalk connection between the east side of the light rail station and developments on Bierstadt Way and S Meridian Blvd	Douglas County	\$19,567	\$7,400	10	5	20	20	20	75	\$180		3
Bicycle																		
L-B1	Bicycle	Provide bicycle parking on east side of station	East side of Lincoln Station	4 racks	Bicycle parking	Provide bicycle parking on the east side of the station to facilitate bicycle access from the east.	RTD	\$1,600	\$240	5	5	10	0	20	40	\$23		11
L-B2	Bicycle	Bicycle Lanes in Meridian area on east side of station	San Luis Ct, S Valley Hwy, Bierstadt Way, S Meridian Blvd	3 MI	Connectivity	The 2030 Douglas County Transportation Plan includes a Bicycle Vision Plan that recommends a network of bicycle facilities, including the area directly east of the light rail station.	Douglas County	\$60,000	\$15,000	10	15	15	0	15	55	\$682	Douglas County 2030 Transportation Plan, planned bicycle improvements (p. 71)	8
Combined Pedestrian/Bicycle Improvement																		
L-BP1	Bike/Ped	Fill in gaps in lighting along Park Meadows Dr	South/West side of Park Meadows Dr from 9562 to 10100	.4 miles	Lighting	Median street lighting along Park Meadows Dr is very high and illuminates the sidewalk and all street lanes better than most median lighting within the study area. Some path lighting exists on the east/north side of the street. Nevertheless, some additional lighting will improve visibility along this road for bicyclists and pedestrians.	City of Lone Tree	\$80,000	\$40,000	10	20	0	20	5	55	\$1,091		8
Transit Access and Information																		
L-T1	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$1,200	\$400	0	20	0	5	20	45	\$18		10

Figure 8-6 Lincoln Station Recommended Capital Projects (Illustrated)



9 ORCHARD STATION

LOCATION AND STATION AREA DESCRIPTION

The station area is located within the City of Greenwood Village, and adjacent land uses are primarily offices, with the southern end of the Denver Tech Center (DTC) on the east side of the station. There is also a single-family housing development less than a quarter mile from the east side of the station. On the west side of the station, the Landmark retail/residential development is less than a half-mile north of the station, and includes housing, retail and restaurants.

This is an area that was developed, in some cases, more than 20 years ago and much of the older development is exclusively designed for automobile access. Streets tend to be wide and circuitous, as is often seen in older office park developments. East Orchard Road is approximately a half-mile from the station.

Both the east and west station entrances are behind existing office buildings and are not immediately obvious to someone driving or walking in the area. There is a sign (and parking area) on the west side of the station area accessible from Greenwood Plaza Boulevard, but limited signage pointing to the station. The east side of the station is only accessible from a pathway located behind existing office buildings that connects to DTC Parkway and is virtually unmarked.

Perhaps not surprising given its location in an automobile-oriented office park and limited parking on site, Orchard Station has the lowest ridership of the six stations in the I-25 corridor and ranks in the bottom quarter for ridership among all 34 RTD light rail stations. The majority of riders are traveling to and from areas north of the station.

Figure 9-1 Orchard Station Area



Source: Google Earth

PROJECTS AND PLANS

This is an area with some redevelopment potential and some new construction already underway. Some improvements to the transportation network are planned or projected in the near future, including new sidewalks along Greenwood Plaza Boulevard from Berry Avenue to Dorado Place and from Marin Drive to Long Avenue (Design 2013, Construction 2014). According to the Greenwood Village I-25 Corridor Transportation Improvement Study, a recommendation was provided to coordinate with RTD to install bike parking at Orchard station, noting that this may require converting one vehicular parking stall into bike parking.

TRANSIT SERVICES

The area is served by some existing transit routes:

- Route 73 picks up on Greenwood Plaza Boulevard, just west of the station, and travels north to Stapleton Park-n-Ride, and south to the Arapahoe Station.
- The station is served by Orchard Call-n-Ride on the west side, shown in Figure 9-2. While the east side of the Orchard Station is located within the Arapahoe Call-n-Ride area, it does not serve the station directly.
- Route T runs along the west side of Greenwood Plaza Boulevard, and links Arapahoe Station with The DTC.
- East of the station, Route 65 operates north-south along DTC Boulevard which is about a half-mile from the east side of the station.

Figure 9-2 Orchard Call-n-Ride Service Area



Source: RTD



Signage instructs pedestrians to look both ways before crossing, but a painted sign on the sidewalk would improve safety.

Source: NelsonNygaard

Station Facilities Observations

- There are no bus shelters at the bus stops immediately adjacent to the station platform.
- Transit connections are at least a half-mile away from the station on the east side.
- This station has limited capacity for additional buses.
- Opportunities may exist to rebrand existing Call-n-Ride services, develop public-private partnerships, or market these services differently.
- The pedestrian bridge at this station feels more isolated than at the other stations.
- There is no retail space located on the station premises.
- On both sides of the station, the entrance is hidden behind office buildings and there is little wayfinding signage from the surrounding area to station.
- A safe crossing sign is needed where people must cross the tracks. Although there is good visibility within the station, the station is more isolated than most, perhaps leading to a perception that once is vulnerable at this location with regard to personal safety.
- Lighting at the platform is good. According to the city, some concerns have been expressed about the lighting in the pedestrian bridge.
- No security guards were spotted during the inventory.
- Racks have capacity for six bikes at this station location. There are no bike lockers.



The busy call-n-ride pickup area has no covered waiting area.

Source: NelsonNygaard

PEDESTRIAN ACCESS AND AMENITIES

Pedestrian access at this station is poor in general. On the west side of the station, although Greenwood Plaza Boulevard is not an especially busy street, the sidewalk network around it is incomplete and pedestrians in the area must walk on the side of the road or through parking lots to access nearby offices and residential developments. The road network is somewhat circuitous, with circles and cul de sacs, reducing the directness of a pedestrian's path of travel.

On the east side of the station, efforts were made to provide a pedestrian pathway that would provide access to/from the station pedestrian bridge. Nevertheless, the pathway is hidden behind nearby office development and routes some pedestrians on indirect pathways to the front doors of their buildings.

The aerial image in Figure 9-3 illustrates the circuitous road and path network in the immediate vicinity of the station, highlighting some example pathways.



Pathways to the east side of the station are attractive and well lit, but circuitous, unmarked and somewhat isolated.

Source: Nelson\Nygaard

Pedestrian Observations

- No sidewalks exist on the outside ring of Greenwood Plaza Blvd. Consequently, there is no direct pedestrian path between the Landmark residential/retail complex a half-mile to the north and the station.
- Lighting on the west side of the station consists only of lamps located in the median of the street; sidewalk lighting is consequently poor.

- There are no pedestrian countdown timers at the 4-way crossing at Orchard and Greenwood Plaza Blvd. There are no sidewalks on the east side of Greenwood Plaza Blvd. south of Orchard, only on the west side.
- The pedestrian connections on the east side of the station are very indirect albeit with a nice pathway adjacent to fences.
- Sidewalk and landscaping improvements are planned for Greenwood Plaza Blvd. loop.

Figure 9-3 Orchard Area Pedestrian/Street Network



Source: Google Earth; NelsonNygaard

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There are no sidewalks on portions of the outer ring of Greenwood Plaza Boulevard west of the Station. Lighting is limited and is in the median only.

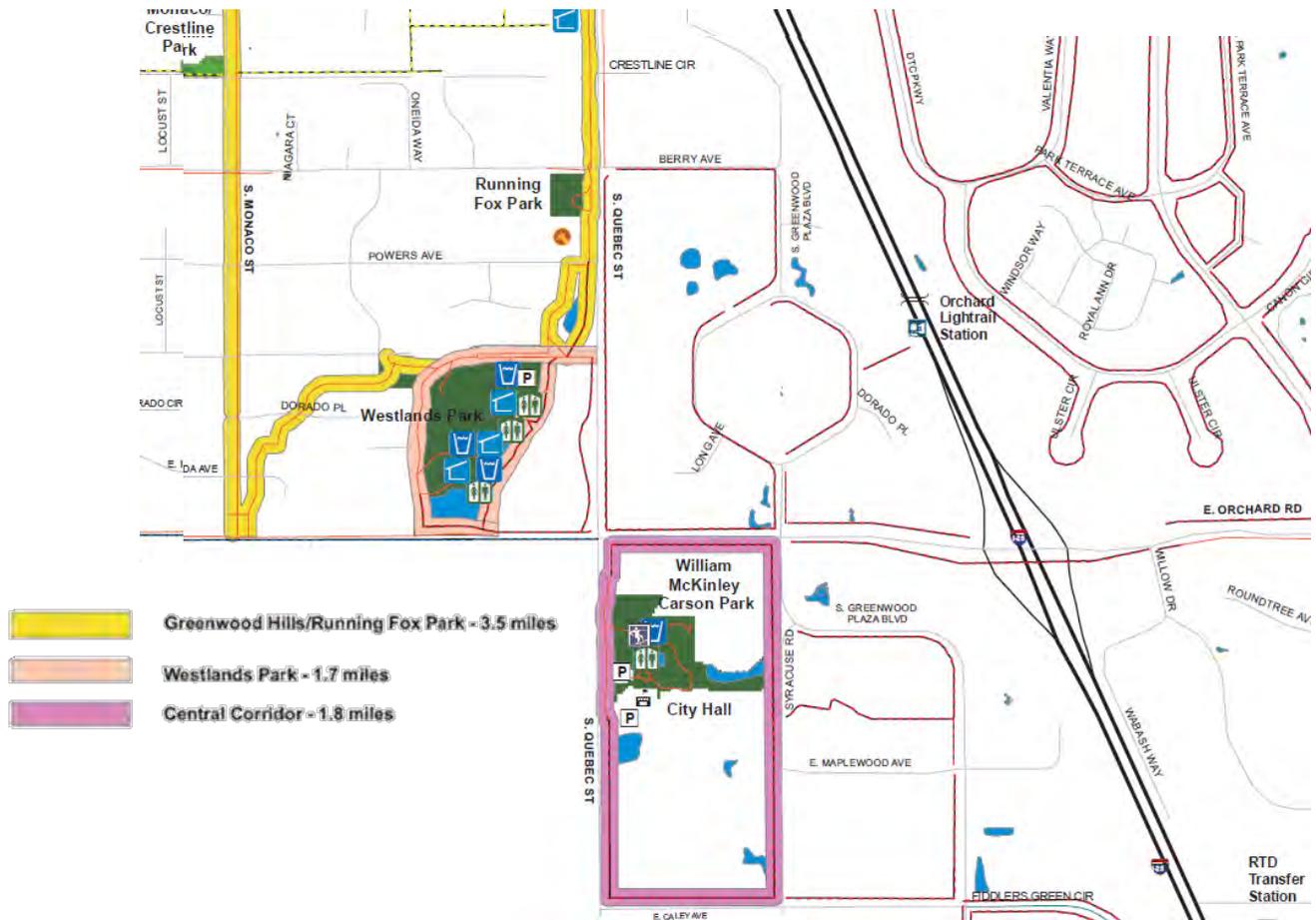
Source: NelsonNygaard



The Landmark Development is designed at a pedestrian scale, but the link between is station and the development is poor.

Source: NelsonNygaard

Figure 9-5 Orchard Area Trails



Source: Greenwood Village Trails Plan

Bicycle Observations

- Quebec Street Trail (at Berry and S. Quebec) is about 0.7 miles from the station. There are bike lanes on Berry from Quebec to Greenwood Plaza Boulevard.
- The addition of bicycle lockers would be an improvement at this station.
- The office development environment on the east side of the station could be a good location for bicycle paths and amenities.
- Connections to the existing trail system are limited and improvements are needed at key arterial crossings.
- No bicycle safety or parking information was posted at the station.

TRANSIT ORIENTED DEVELOPMENT

There are no obvious opportunity sites immediately adjacent to the station, although the Landmark residential/retail complex a half-mile to the north should be a logical connection that is missing.

PARKING

This station does not support a significant Park-n-Ride facility. There are 48 parking spaces, which are not well signed. The station has a designated scooter parking area at the north end of the platform. There is no kiss-n-ride or passenger drop-off area.



The station includes designated scooter parking.

Source: NelsonNygaard

RECOMMENDED CAPITAL PROJECTS

Figure 9-6 presents a list of recommended capital investments in the station area to improve station access. These recommended investments are illustrated in Figure 9-7.

Figure 9-6 Orchard Station Recommended Capital Projects

Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
Pedestrian																		
O-P1	Pedestrian	Provide median pedestrian refuges at E Orchard Rd and Greenwood Plaza Blvd	At Greenwood Plaza Blvd for crosswalks across E Orchard Rd	2	Safety	Pedestrian crossing distances across E Orchard Rd are about 120 feet long. The existing median could be modified to provide a pedestrian refuge to increase the safety and comfort of pedestrians crossing this roadway.	City of Greenwood Village	\$60,000	\$8,000	5	20	5	20	10	60	\$567		14
O-P2	Pedestrian	Crosswalk across DTC Parkway	DTC Parkway at the entry sign to 5560-5800 where path to station begins	1 crosswalk	Connectivity Safety	Two other crosswalks are already installed along DTC Parkway with median refuges and crosswalk safety signs. One is needed in this location because it provides the most direct access to the light rail station for individuals walking from the north. This is also near the bus shelter opposite the Athletic Club.	City of Greenwood Village, DTC	\$3,600	\$800	5	20	20	20	15	80	\$28		1
O-P3	Pedestrian	Wayfinding signage to western station entrance	Key locations within 1/3 mi walk to the west station entrance	10 signs	Wayfinding	The station is hidden behind office buildings and there is no wayfinding signage to the station from the surrounding area.	City of Greenwood Village, RTD	\$3,000	\$1,000	10	0	20	20	20	70	\$29		8
O-P4	Pedestrian	Wayfinding signage to eastern station entrance	Key locations within 1/3 mi walk to the east station entrance	5 signs	Wayfinding	Pathways to the station bridge are unmarked from DTC Parkway. Access points to the path should be marked at DTC Parkway.	City of Greenwood Village, RTD, DTC	\$1,500	\$500	10	0	20	20	20	70	\$14		8
O-P5	Pedestrian	Sidewalks on outside ring of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between Marin Dr and 5889 Greenwood Plaza Blvd; between El Dorado Pl and bus stop at entry to Orchard Station lot; between Orchard Station lot and turnoff to north	2340 FT	Connectivity	Close sidewalk gaps along Greenwood Plaza Blvd	City of Greenwood Village	\$55,000	\$23,400	10	5	20	20	20	75	\$523	Programmed for City of Greenwood Village	2
O-P6	Pedestrian	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Berry Av and the Greenwood Plaza Blvd Loop	1050 FT	Connectivity	Install a sidewalk to link the station with the development with residences, jobs and retailers at Landmark Development	City of Greenwood Village	\$25,000	\$10,500	10	5	20	20	20	75	\$237	Programmed for City of Greenwood Village	2

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
O-P7	Pedestrian	Install pedestrian walkway through parking lot at 5440 Greenwood Plaza Blvd	Through private parking lot	420 FT	Connectivity Safety	Individuals can cross Greenwood Plaza Blvd at the Crosswalk opposite Orchard Station, but are dumped into a parking lot to make their journey to the office buildings in the center of the Boulevard ring, or to cross through the property to the opposite side. A pedestrian walkway through the lot would improve safety and direct access.	Property owner	\$10,000	\$4,200	5	5	10	10	15	45	\$158		20
O-P8	Pedestrian	Sidewalks on both sides of El Dorado Pl	Length of El Dorado Pl	840 FT	Connectivity	Install sidewalk where no sidewalk currently exists to provide access between the station and E Orchard Rd Christian Center Complex	City of Greenwood Village	\$20,000	\$8,400	10	5	20	20	20	75	\$189		2
O-P9	Pedestrian	Install pedestrian pathway link between El Dorado Pl cul de sac and E Orchard Rd via striping and new sidewalks	El Dorado Pl to E Orchard Rd	500 FT	Connectivity	Paint pedestrian walkway on existing paved area and install sidewalk as necessary along edge of property	City of Greenwood Village, property owner	\$8,000	\$2,300	5	5	10	10	15	45	\$114		20
O-P10	Pedestrian	Sidewalks on both sides of Marin Dr	Length of Marin Dr, excluding existing sidewalk	1000 FT	Connectivity	Install sidewalk where no sidewalk currently exists to provide access between the station and business off Marin Dr	City of Greenwood Village	\$23,000	\$10,000	10	5	20	20	20	75	\$220		2
O-P11	Pedestrian	Sidewalks on east side of S Syracuse Way	S Syracuse Way between Greenwood Plaza Blvd and E Caley Ave	2100 FT	Connectivity	Provide a sidewalk between major employment sites along a major street	City of Greenwood Village	\$49,000	\$21,000	10	5	20	20	20	75	\$467		2
O-P12	Pedestrian	Install pedestrian crossings on east and west side of intersection of Greenwood Plaza Blvd and S Syracuse way	Intersection of Greenwood Plaza Blvd and S Syracuse way	2 new crosswalks and pedestrian crossing signals	Safety	Pedestrians may cross S Syracuse Way, but not Greenwood Plaza Blvd at this intersection. In combination with new sidewalks, A fully integrated pedestrian crossing is appropriate at this intersection. Update signals for new crosswalk.	City of Greenwood Village	\$30,000	\$16,600	5	10	20	20	15	70	\$333		8
O-P13	Pedestrian	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Orchard Rd and E Caley Ave	3700 FT	Connectivity	Provide a sidewalk between major employment sites along a busy boulevard	City of Greenwood Village	\$86,000	\$37,000	10	5	20	20	20	75	\$820		2
O-P14	Pedestrian	Provide more direct access to station bridge from closest office buildings on east side of station	1 sidewalk from Legacy Center (5613 DTC Parkway) to pathway adjacent to I-25	200 FT	Connectivity	The current pathway to the doorway of the building is .3 mile from the station platform due to the roundabout pathways. A direct pathway could shorten the distance by approximately 800 feet.	Property owner, RTD	\$5,000	\$2,000	10	5	20	20	15	70	\$50		8

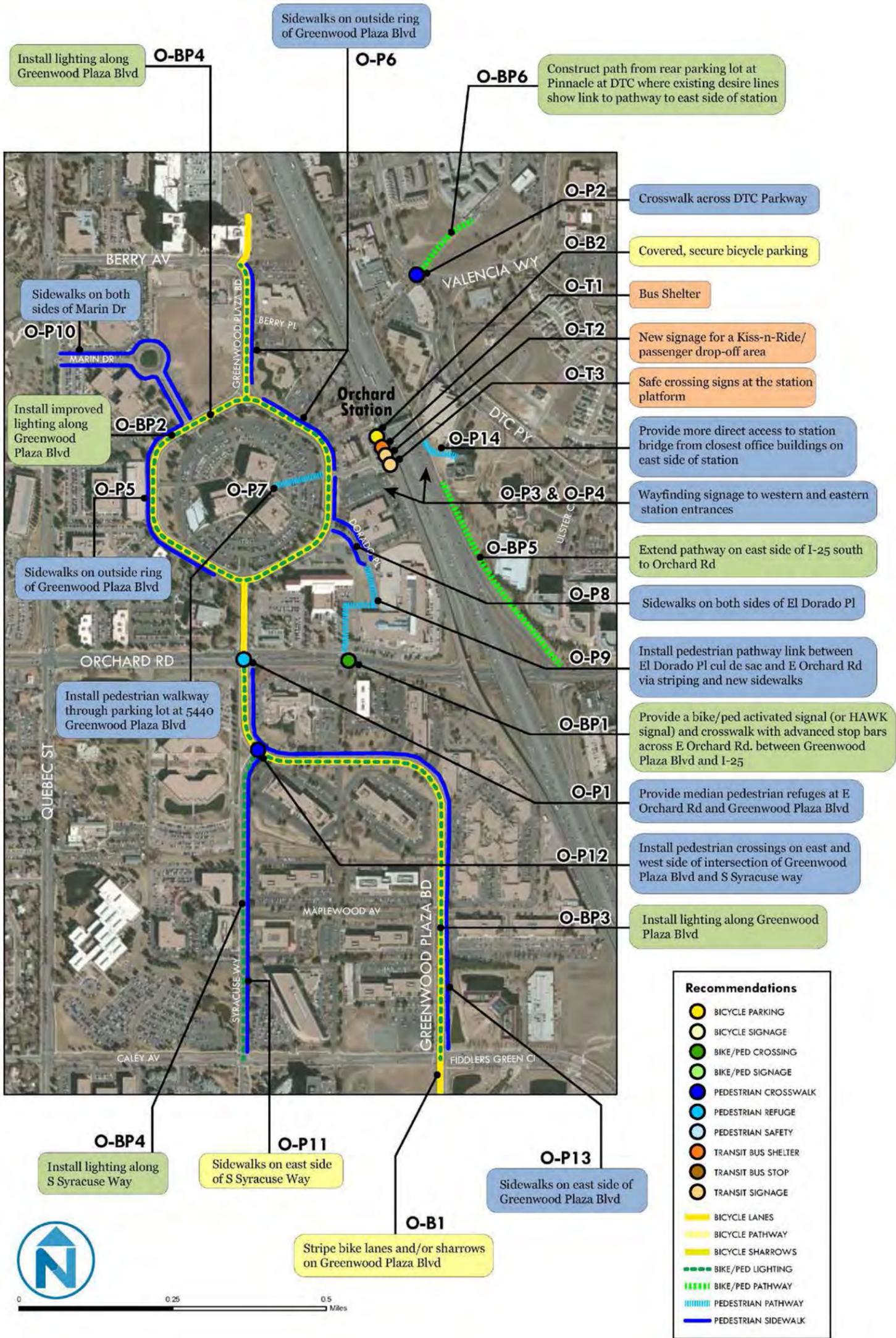
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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
Bicycle																		
O-B1	Bicycle	Stripe bike lanes and/or sharrows on Greenwood Plaza Blvd	Greenwood Plaza Blvd between Landmark Way and E Arapahoe Rd	2 mi	Connectivity Safety	Bicycle facilities on Greenwood Plaza Blvd will complete the link from the bike lanes to the north to two light rail stations and provide improved bicycle connections to the residential neighborhoods to the south	City of Greenwood Village	\$40,000	\$10,000	10	10	20	0	20	60	\$417		14
O-B2	Bicycle	Covered, secure bicycle parking	At station	4 lockers (8 bicycles)	Bicycle Parking	This station has only six bike racks and no lockers. Lockers should be installed along with signage indicating how to use the lockers.	RTD	\$18,000	\$10,000	5	5	10	0	20	40	\$350		24
Combined Pedestrian/Bicycle Improvement																		
O-BP1	Bike/Ped	Provide a bike/ped activated signal (or HAWK signal) and crosswalk with advanced stop bars across E Orchard Rd. between Greenwood Plaza Blvd and I-25	E Orchard Blvd adjacent to drives for 7896 and 7897	1 HAWK signal across each lane, one pedestrian refuge, and 1 crosswalk	Connectivity Safety	Providing a safe bicycle and pedestrian crossing across E. Orchard Blvd will decrease the travel distance between the light rail station and the offices on Greenwood Plaza Blvd south of E. Orchard Blvd	City of Greenwood Village	\$236,000	\$125,000	5	5	10	0	20	40	\$4,513		24
O-BP2	Bike/Ped	Install improved lighting along Greenwood Plaza Blvd.	Greenwood Plaza Blvd from southern end of ring to E Berry Ave	1 mi new lighting	Safety	Installing lighting along outside lanes/sidewalks will improve visibility along this road for bicyclists and pedestrians. Current lighting is located in the median and only serves automobiles.	City of Greenwood Village	\$400,000	\$200,000	10	20	0	20	5	55	\$5,455		17
O-BP3	Bike/Ped	Install lighting along Greenwood Plaza Blvd.	Greenwood Plaza Blvd from E Orchard Rd to E Caley Ave	.7 mi new lighting	Safety	Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village	\$280,000	\$140,000	10	20	0	20	5	55	\$3,818		17
O-BP4	Bike/Ped	Install lighting along S Syracuse Way	S Syracuse Way from Greenwood Plaza Blvd to E Caley Ave	.4 mi new lighting	Safety	Installing street lighting will improve visibility along this road for bicyclists and pedestrians.	City of Greenwood Village	\$160,000	\$80,000	10	20	0	20	5	55	\$2,182		17
O-BP5	Bike/Ped	Extend pathway on east side of I-25 south to Orchard Rd	Extended south to E Orchard R at intersection of Willow Dr	2200 FT	Connectivity	Extending the existing pathway to the south, and providing access to the Great West property will improve the pedestrian and bicycle network on the east side of the station	City of Greenwood Village, DTC, Property owner	\$51,000	\$22,000	10	5	20	20	10	65	\$562		13

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Project #	Category	Description	Limits (N-S Or E-W)	Units	Strategy Type	Detailed Recommendations	Jurisdiction/ Lead Agency	Total Capital Cost (\$)	High & Low Estimates	Transit Ridership	Safety	Connectivity	Pedestrian Environment	Implementation Complexity	Overall Rating (Of 100 Points)	Average Cost Per Rating Point	Already Included In Existing Study Or Project?	Overall Ranking
O-BP6	Bike/Ped	Construct path from rear parking lot at Pinnacle at DTC where existing desire lines show link to pathway to east side of station	Undeveloped land that residents are using to walk and bike between DTC Parkway and the development	350 FT	Connectivity	Ensure that future development allows for direct access to DTC Parkway and the path that leads to the station	City of Greenwood Village, DTC, Property owner	\$8,000	\$3,500	10	5	20	20	15	70	\$82		8
Transit Access and Information																		
O-T1	Transit	Bus Shelter	Adjacent to platform	1	Transit access	Install covered waiting area between platform and bus stops. The pathway is narrow, so sheltered area will need to be customized to maintain access along sidewalk and ensure ADA accessibility.	RTD	\$100,000	\$20,000	10	5	10	20	15	60	\$1,000		14
O-T2	Transit	New signage for a Kiss-n-Ride/Passenger Drop Off Area	Platform area	2	Transit marketing/branding	A designated area with signage may reduce conflicts with buses and pedestrians for vehicles dropping off or picking up passengers	RTD	\$600	\$200	5	10	5	5	20	45	\$9		20
O-T3	Transit	Safe crossing signs at the station platform	Platform area	4	Safety	Add safe crossing signs for pedestrians to "look left" or "look right" when crossing the tracks to the station platform.	RTD	\$300	\$120	0	20	0	5	20	45	\$5		20

Figure 9-7 Orchard Station Recommended Capital Projects (Illustrated)



10 SUMMARY AND PROGRAMMATIC ENHANCEMENTS

This report provides a list of improvement strategies and tools to support efforts by the South I-25 Urban Corridor TMA and member jurisdictions' staff to pursue federal, state, regional, and local funds to implement the recommended projects and programs.

The capital projects identified in the previous chapters point to physical improvements that can be made to encourage people to travel via light rail. The projects have demonstrated some level of effectiveness in other communities to meet the TMAs goals. Nevertheless, some programmatic efforts are also identified for consideration throughout the study area. These supportive programs are also discussed in this chapter.

PRIORITY CAPITAL PROJECTS

The priority capital enhancements support a land use strategy to create a consistent, pedestrian-friendly environment within the vicinity of the light rail stations. By looking at programmatic solutions as well, the TMA can further increase transportation choices, boosting the attractiveness of the area for existing and future employers and employees. Providing shuttle connections, encouraging increased transit, offering incentives, and looking at creative tools to market the use of bicycles will enable more people to take advantage of the capital investments in the transportation network. Ultimately, the South I-25 TMA area can become an increasingly attractive place to do business, not in spite of growth and densification, but because of it: higher concentrations of populations, more mixed uses and more services makes the alternatives to driving more attractive. Based on the ranking of the various capital improvements identified in Chapters 4 through 9, Figure 10-1 highlights those investments that are assumed to provide the greatest benefits in bridging the last one-half mile gaps that exist within the area. These are the 33 projects that were ranked highest in the overall evaluation. More information about each of these projects can be found in the chapter describing the station area where the improvement would be made.

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Figure 10-1 Highest Priority Improvements Based on Evaluation

Project #	Description	Limits (N-S or E-W)	Strategy Type	Likely Responsible Entity
Pedestrian Improvements				
Lincoln: Pedestrian-P2	Pedestrian crossing on Park Meadows Dr at Station Way	Station Way and Park Meadows Dr	Safety and Connectivity	City of Lone Tree
County Line: Pedestrian-P4	High visibility crosswalk across S Valley Highway	S Valley Highway at entrance to County Line Station parking lot	Pedestrian Access/Egress	Douglas County
County Line: Pedestrian-P6	High visibility crosswalk across Inverness Parkway	Between Inverness Way South and Inverness Dr South	Pedestrian Access/Egress	Douglas County
County Line: Pedestrian-P9	Improve the pedestrian crossing at S Park Meadows Center Dr and E County Line Rd: provide advance stop bars, a median refuge across E County Line Rd, a paved pathway north to the shopping center, and a high visibility crosswalk with flashing beacon at the I-25 off-ramp onto westbound E County Line Rd.	Intersection of E County Line Rd and S Park Meadows Center Dr	Intersection improvement	City of Lone Tree; City of Centennial
Dry Creek: Pedestrian-P9	Mid-block crossings at stop locations along flex routes	Flex route service areas	Transit access	Arapahoe County; City of Centennial
Orchard: Pedestrian-P2	Crosswalk across DTC Parkway	DTC Parkway at the entry sign to 5560-5800 where path to station begins	Connectivity Safety	City of Greenwood Village, DTC
Lincoln: Pedestrian-P1	New traffic signal and crosswalk on Park Meadows Dr at Station St	Station St and Park Meadows Dr	Safety and Connectivity	City of Lone Tree
Bellevue: Pedestrian-P2	Install sidewalk on north side of E Bellevue Ave	S. Quebec St. to the west side of the Bellevue Station Development property	Connectivity	City of Cherry Hills Village
Arapahoe: Pedestrian-P1	Wayfinding signage at S Fiddlers Green Cir	Key locations within 1/3 mi walk to the west station entrance	Wayfinding	City of Greenwood Village, Comfort Dental Amphitheatre, RTD
Arapahoe: Pedestrian-P3	Sidewalks on east side of S Syracuse Way	S Syracuse Way between Greenwood Plaza Blvd and E Caley Ave	Connectivity	City of Greenwood Village
Arapahoe: Pedestrian-P5	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Orchard Rd and E Caley Ave	Connectivity	City of Greenwood Village
Arapahoe: Pedestrian-P8	Sidewalks on west side of S Willow Dr	S Willow Drive between S Yosemite St and S Wabash Way	Connectivity	City of Greenwood Village
Dry Creek: Pedestrian-P1	Install pedestrian flashing beacons and yield to pedestrian signs at all free right turns at all legs of the E Dry Creek Rd and Inverness Dr W intersection	E Dry Creek Rd and Inverness Dr W	Safety	Arapahoe County;

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Project #	Description	Limits (N-S or E-W)	Strategy Type	Likely Responsible Entity
Dry Creek: Pedestrian-P3	Close sidewalk gaps on Inverness Dr W	West side of Inverness Dr W from south of Inverness Blvd to Inverness Lane West	Connectivity	Arapahoe County;
Dry Creek: Pedestrian-P5	Provide a pedestrian pathway (or create a new roadway connection) from the south side of the station to E Mineral Ave at S Dayton St	Dry Creek Station to E Mineral Ave and S Dayton St.	Connectivity	City of Centennial; private property owner
Dry Creek: Pedestrian-P6	Crosswalk across S Chester St at E Panorama Dr	S Chester St at E Panorama Dr	Connectivity Safety	City of Centennial
Orchard: Pedestrian-P5	Sidewalks on outside ring of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between Marin Dr and 5889 Greenwood Plaza Blvd; between El Dorado Pl and bus stop at entry to Orchard Station lot; between Orchard Station lot and turnoff to north	Connectivity	City of Greenwood Village
Orchard: Pedestrian-P6	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Berry Av and the Greenwood Plaza Blvd Loop	Connectivity	City of Greenwood Village
Orchard: Pedestrian-P8	Sidewalks on both sides of El Dorado Pl	Length of El Dorado Pl	Connectivity	City of Greenwood Village
Orchard: Pedestrian-P10	Sidewalks on both sides of Marin Dr	Length of Marin Dr, excluding existing sidewalk	Connectivity	City of Greenwood Village
Orchard: Pedestrian-P11	Sidewalks on east side of S Syracuse Way	S Syracuse Way between Greenwood Plaza Blvd and E Caley Ave	Connectivity	City of Greenwood Village
Orchard: Pedestrian-P13	Sidewalks on east side of Greenwood Plaza Blvd.	Greenwood Plaza Blvd between E Orchard Rd and E Caley Ave	Connectivity	City of Greenwood Village
Lincoln: Pedestrian-P3	Close sidewalk gaps on Park Meadows Dr	North of Lincoln Station to Station St	Connectivity	City of Lone Tree, private land owners
Lincoln: Pedestrian-P7	Provide a sidewalk on the east side of S Valley Hwy and complete sidewalk gap on Bierstadt Way; provide a crosswalk across Bierstadt Way at S Valley Hwy	Call-N-Ride stop to Bierstadt Way	Connectivity	Douglas County
Belleview: Pedestrian-P1	Install sidewalk on west side of S Quebec St	E Chenango Ave to Conoco Gas Station	Connectivity	City of Denver
County Line: Pedestrian-P1	Sidewalk on S Valley Highway (east side)	Inverness Way to S Jamaica St	Pedestrian Access/Egress	Douglas County
County Line: Pedestrian-P2	Sidewalk on S Valley Highway (west side)	South of County Line Station Parking Lot to S Jamaica St	Pedestrian Access/Egress	Inverness Metropolitan Improvement District; Douglas County

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Project #	Description	Limits (N-S or E-W)	Strategy Type	Likely Responsible Entity
County Line: Pedestrian-P3	Pedestrian pathway from parking lot entrance directly east	S Valley Highway at entrance to County Line Station parking lot	Pedestrian Access/Egress	Private property owners; Inverness Metropolitan Improvement District; Douglas County
County Line: Pedestrian-P5	Sidewalk on west side of Inverness Parkway	South of Inverness Way West	Pedestrian Access/Egress	Inverness Metropolitan Improvement District; Douglas County
County Line: Pedestrian-P7	Sidewalk along property on northeast corner of Inverness Parkway and Inverness Dr South	East side of Inverness Parkway; north side of Inverness Dr South	Pedestrian Access/Egress	Inverness Metropolitan Improvement District; Douglas County
County Line: Pedestrian-P8	Complete sidewalk in front of Colorado Athletic Club	East side of Inverness Parkway	Pedestrian Access/Egress	Inverness Metropolitan Improvement District; Douglas County
Bicycle and Pedestrian Improvements				
Arapahoe: Bike and Pedestrian-BP5	Construct paths/ensure paths are included in future development between S Willow Dr, east of Yosemite St and the east side of the Light Rail Station, where existing desire lines exist	Undeveloped land that individuals are using to walk and bike between S Willow Dr and the Light Rail Station	Connectivity	City of Greenwood Village, Property owner
Arapahoe: Bike and Pedestrian-BP7	Construct paths/ensure paths are included in future development between Wabash Way and the east side of the Light Rail Station, where existing desire lines exist	Undeveloped land that individuals are using to walk and bike between jobsites on Wabash Way	Connectivity	City of Greenwood Village, Property owner

PROGRAMMATIC ENHANCEMENTS

The toolbox in Chapter 3 describes an array of programmatic alternatives for consideration in the area. In addition to these programmatic options, and the capital improvements described above, some additional considerations are described as a means of improving the transit and pedestrian orientation of the area.

Implementing Desired Programs

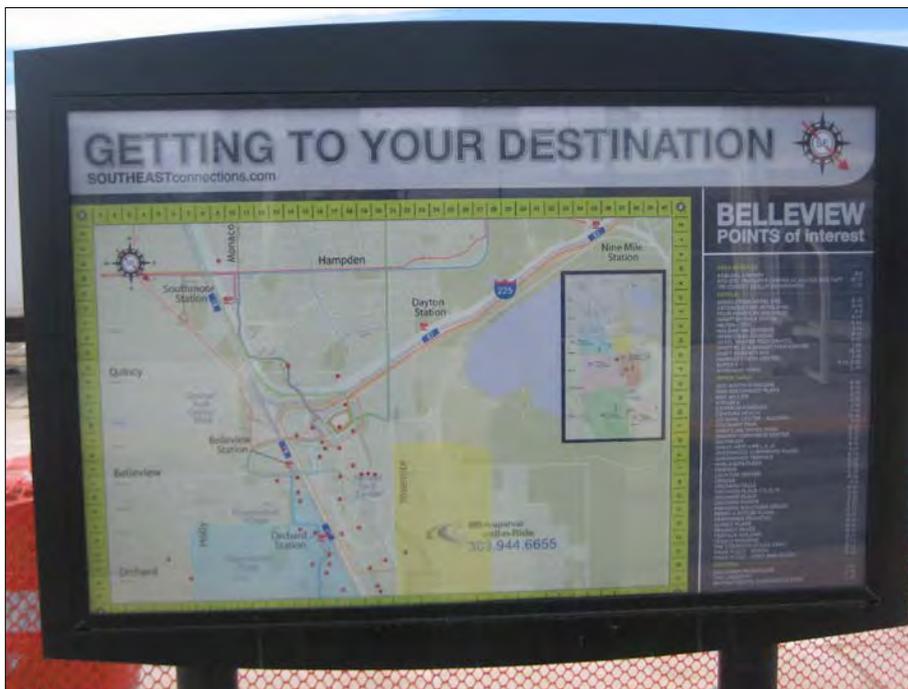
One of the best ways to test the market for new transportation programs and strategies is to conduct a pilot program. While a significant amount of market and business case analysis precedes pilot implementation, actual on-the-ground testing is a critical component necessary for understanding the broader market potential. Additionally, development and implementation of a pilot program (as opposed to simply conducting another study) is more likely to attract regional funding as well as community and private sector business support. The TMA may want to work with RTD and local jurisdictions and employers to develop one or more pilot programs at a

station or stations within the South I-25 Corridor. Successful programs could then be expanded to stations throughout the corridor.

Transit Improvements

Marketing of Transit Services within TMA Area

The TMA has done a nice job of providing local area information at each of the light rail stations, pointing people to where local businesses operate. Signs are installed at each station with a map and set of nearby destinations. This information is neither available in electronic format on the RTD website, which provides profiles of each of the stations, but could be added, nor is it included on the TMA website.



The TMA provides a map of nearby destinations at each station.

Source: NelsonNyggaard

Likewise, many of the bus shelters have limited information about existing transit services and in some cases, shelters have no identifiers or posted information. There are 12 bus shelters with benches throughout the Inverness Business District that do not have bus route or schedule information, nor do they have maps. In the stakeholder meeting with representatives of major employers, many were familiar with the Call-n-Ride services, but some were not aware that their worksites were served by Call-n-Rides; they also indicated information is not available at their workplace on how to use and access Call-n-Ride services.

Flex Route Branding

User-friendly marketing and useful public information are key elements of successful transit operations. A brand identity makes it easy to understand a service and makes it recognizable.

Although Call-n-Ride services are a unique deviated and demand-response general public service implemented by RTD in areas with lower densities or with difficult-to-serve destinations, the Call-n-Ride brand is not marketed well. It may be perceived as a service for people with disabilities or for seniors, or its route-less design may simply not be easily understood by people who are comfortable using fixed guideway services. Likewise the name suggests one must "call" in advance to use the service, which, although true from an office to the station, is not true when boarding at the station. If the goal is make the Call-n-Ride services work effectively for people using transit, opportunities exist to better explain the service through brochures, posters and travel training efforts. Opportunities also exist to recast the Call-n-Ride services as a different brand. The Commuter Patterns Study highlighted interest in shuttle services between the light rail station and workplaces. Although this describes the Call-n-Ride service, the service is not promoted as a shuttle operation. Although it would set a new precedent for RTD, with TMA dollars going to fund some of the Call-n-Ride services, consideration might be given to a new name and look for the Call-n-Ride operations (i.e., the Bellevue Shuttle), perhaps with some employer funding.



Information about connecting transit services is posted in a case at each station.

Source: Nelson\Nygaard

Flex Route Operations

The knowledge that a fixed route operates on a schedule and provides round-trip service to and from a designated point is reassuring to non-transit-dependent riders. They are accustomed to consulting schedules and like the convenience of being able to follow the route on a map. In addition to the name, the on-demand operation may be considered less appealing than a fixed/deviated route. On some services, consideration should be given to providing fixed or flex route service to the key destinations. On other services, such as the Meridian Call-n-Ride, consistency of service should be considered: PM services operate as a flex route, but AM services do not. AM and PM commuter operations should be consistent on all flex routes.

Promote and Foster the Link Between Belleview Station and Ulster/Tufts Transfer Center

Belleview Station and the Ulster/Tufts Transfer Center are 3/5 mile from one another, but there is no sense of this connection at either facility. Promoting services on Routes 73 and 46 will make the link more seamless. In the long term, the Ulster/Tufts Transfer Center could be relocated to the Belleview Station to improve connectivity and provide better transit routing alternatives for people using the light rail station.

Bicycle Improvements

Bicycle Parking

In order for bicycles to really take hold within the area, the various jurisdictions need to continue to implement their programmed bicycle improvements, which are primarily capital investments. Some bicycle promotional programs could be led by the TMA, or by employers in the area to help develop a bicycle culture. In some places, this has included the development of programs for cyclists, such as a “pedal club,” while in other areas, TMAs and ridesharing agencies have sponsored events to promote cycling, kept bicycle maintenance supplies in designated offices (such as extra tire tubes, a tire pump, wrenches, etc.), or offered on-site bicycle registration.

The TMA can encourage building owners and major employers throughout the area to purchase and maintain bicycle rack parking in common areas, in building lobbies, and adjacent to parking lots. Guidelines could be established that the bicycle racks must be easy to use, support the bicycle frame, and allow cyclists to lock both the bicycle frame and wheel with a u-lock. Ideally, bike racks would be located within 50 feet of building entrances, and racks should be placed to avoid pedestrian conflicts. Bike racks in public spaces are usually installed within easy viewing distance from a main pedestrian walkway and although sidewalks with bicycle parking would ideally be at least 12 feet wide to accommodate bicycle parking, they could be placed on cement pads adjacent to existing sidewalks that are narrower.

Bike lockers at the transit stations should ideally be electronic and accessible using a pre-paid card. As described earlier in this report, signage at the stations should at the very least describe how lockers can be rented and used.



A bicycle rack next to Dry Creek Station.
Source: NelsonNygaard

On-Site Bicycle Fleet

A fleet of bicycles, including some electric bikes, could be provided to facilitate travel between the light rail station and major employment sites within the area. A number of corporate campuses, such as Microsoft and Google, have bicycles, which can be used by employees to travel to offices and off-site locations during the workday. Because many of the employment sites in the DTC and adjacent to the light rail stations are not within an easy walk to stores or restaurants, employees may be compelled to drive their cars so they can travel around during the day as needed. The Call-n-Ride services do not necessarily operate at the frequencies that would be helpful to allow people to access a shuttle for lunch, but bicycles can be made available to borrow, whether for midday travel or for people to park overnight at the light rail stations and use to commute from the station to the workplace.

If a program were implemented to provide bicycles at certain employment sites, they should be of high enough quality to make them an attractive alternative for getting around. Helmets must also be provided, and locks. If theft is a concern, these bicycles could be equipped with GPS trackers.

Showers and Clothing Lockers for Bicycle and Pedestrian Commuters

Efforts can be made to ensure that major employers in the area offer their employees free access to showers and a changing facility with clothing lockers. Some TMAs have asked that employees who bicycle have access to a shower and locker within ¼ mile of a workplace as a condition of TMA membership.

Other Employer Programs

Efforts should be made to encourage some of the tools described in Chapter 3. Programs that include parking cash-out, providing a taxable carpool/walk/bike subsidy equal to the value of the parking; a transportation allowance program, whereby employees would receive monthly allowances (e.g. \$50 per month) that they can apply to their transportation costs; cash subsidies for carpooling, walking and bicycling; alternative work hours that can move trips outside the AM and PM peaks and/or reduce weekly trip generation, including allowances for flex-time, compressed work weeks and telecommuting programs to either allow or encourage their employees to work at home.

TMA ADVOCACY FOR GREATER CONSIDERATION OF TRANSIT ACCESS IN LAND USE DEVELOPMENT AND STREET DESIGN

Opportunities identified in this report address opportunities for last one-half mile improvements, but as noted, the effectiveness of light rail and other non-auto modes will be made more relevant by advocating for transit-supportive land uses, particularly in undeveloped areas adjacent to the light rail stations.

While neither the TMA nor even some of the local jurisdictions can directly influence all aspects of development patterns in the area, they can advise elected officials, developers and major employers on smart development guidelines to maximize the utility of the existing investment in light rail. Ultimately, by working together, the TMA and partner jurisdictions can provide for an environment that supports ongoing investment in an effective — and more efficient — transit system.

Land Use

Land use policies should support the goals of the TMA in vehicle trip reduction. If stakeholders want to see more effective transit and commuter transportation alternatives, land uses will play an important role in increasing their feasibility in the future.

- **Land uses should be mixed.** In effective transit-oriented development, vertical mixed uses, with ground floor retail in developed areas and activity centers as identified through land use plans, can increase the vitality of the street and provide people with the choice of walking to desired services. Development near the light rail line (and proposed future rail expansion to the south) should emphasize vertical mixed uses. For much of the area, mixing uses horizontally can prevent desolate, single-use areas, and encourages increased pedestrian activity. For example, developments that include a mix of office, residential and retail uses in close proximity to one another are important to successful horizontal mixed-use development.
- **Support and enhance major activity centers.** Activity centers have a strong impact on commuter transportation patterns as the major destinations in are like the south I-25 corridor. They are generally characterized by their regionally important commercial, employment, and service uses. To make these places more transit-supportive they can be enhanced by land use decisions that locate new housing and complementary neighborhood-scale retail and employment uses to diversify the mix, creating an environment that maximizes transportation choice. Much of the current employment

- development in the area is isolated, in large office buildings surrounded by parking lots, which reduces the likelihood that people would opt to do anything but drive.
- **Land use intensities should be at levels that will encourage use of transit and support pedestrian and bicycle activity.** Commercial and employment/educational uses with high employment densities support more transit use than do those with lower employment densities (e.g., industrial or warehousing). Extensive areas of retail tend to be auto-dominated – like Park Meadows Mall – if not scaled appropriately and mixed with other uses.
 - **Parking requirements (and parking provision) should be compatible with compact, pedestrian and transit-supportive design and development.** Requirements should account for mixed uses, transit access, and the linking of trips that reduce reliance on automobiles and total parking demand.



The trail system is good, but access to it along major roadways can be difficult.

Source: Nelson\Nygaard

Circulation and Connectivity

Transit and transportation systems need to provide a balance of hierarchy and integration between and among modes. The circulation system facilitates access and safety for all travel modes, with particular attention to pedestrian and bicycle access, as these modes support transit ridership, and especially commuter transit use.

- **The transportation and circulation framework should define compact districts and corridors** that are characterized by high connectivity of streets to not overly concentrate traffic on major streets and to provide more direct routes for pedestrians, good access to transit, and streets that are designed for pedestrians and

- bicycles, as well as vehicles. Very few of the developments in this area are effective for transit, pedestrians and bicycles because most of the development is relatively spread out.
- **New residential developments** should include streets that provide connectivity. Cul de sacs and walls around communities, which have been the norm in many of the developments on the west side of I-25 are especially challenging for providing effective local circulation and access to light rail and nearby activity centers.
 - **Transit improvement projects** should be targeted at areas with transit-supportive land uses (existing and planned), in and around key destinations and projects that can increase pedestrian activity. Light rail stations that are tucked behind existing office buildings with limited access points, such as Orchard and Dry Creek, and are less successful in terms of their contribution to a multimodal environment in the south I-25 TMA area than facilities that are better integrated with existing land uses, such as Lincoln Station and Arapahoe.

Urban Design

High quality urban design, including street and building design, can support increased use of commuter transit services and encourage pedestrian and bicycle activity.

- **Streets should be designed to support use by multiple modes**, including transit, bicycles, and pedestrians, through proper scaling and provision of lighting, landscaping, and amenities. Amenities must be designed from the beginning to provide comfortable walking environments.
- **Buildings should be human scaled**, with a positive relationship to the street (including entries and windows facing onto public streets, and appropriate articulation, signage, etc.).
- **The impact of parking on the public realm should be minimized** by siting parking lots behind buildings or screening elements (walls or landscaping). Buildings should be close to the road so parking can be located on the side or in the rear.

CONCLUSION

Ultimately, the objectives are to promote access via transportation modes that reduce the reliance on single-occupancy vehicles and reduce peak-hour vehicle trips, since these add more demand on the transportation system than do trips made at other times of the day. To accomplish the objectives, a combination of capital improvements and programmatic enhancements are recommended, based on some of the potential solutions discussed in the toolbox in Chapter 3. Essentially, the outcomes of this effort include proposed capital improvements and some additional programmatic enhancements to 1) address high priority pedestrian safety and connectivity, which were identified in the TMA's survey as the primary barriers for using light rail, 2) improve access to public transit service, and 3) complete the bicycle network and improve bicycle amenities.

Ultimately, the jurisdictions in the TMA area need to seek a better balance between the various modes: instead of planning and designing for automobiles, appropriate considerations need to be made to ensure development of a multimodal transportation network. This will require better collaboration between RTD, local planning agencies, and developers to phase out current practices that have resulted in disconnected street networks that prioritize high traffic volumes over multiple uses, circuitous pedestrian accessways, single-use developments designed without

regard to the adjacent land uses, and a lack of prioritization of transit as a mode that is beneficial for the economic development and health of the I-25 Corridor and the region.