

FITZSIMONS AREA WIDE MULTI-MODAL TRANSPORTATION STUDY

Prepared for: City of Aurora, Colorado



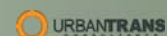
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I. EXECUTIVE SUMMARY

A. Study Purpose

The purpose of this study is to provide a detailed and comprehensive understanding of the multi-modal transportation needs surrounding the Fitzsimons medical campus. In addition, this study also coordinates with various current studies, including I-225 FasTracks Environmental Evaluation, East Corridor Environmental Impact Statement, FasTracks Station Area Plans, and the Aurora Strategic Parking Plan and Program Study, for the development of an integrated transportation plan in the Fitzsimons area.

The study includes an existing multi-modal assessment, future traffic projections, and project recommendations. The future traffic projections were developed using a sub-area travel demand model, with the input from the DRCOG regional modal, for the Fitzsimons area along with traffic simulations which modeled key multi-modal interactions. In addition, this study provides information on conceptual cost and phasing to facilitate the implementation of the recommendations.

B. Study Area

The 4,593 acre (7.2 square mile) study area is bounded by Moline Street and Havana Street to the west, 6th Avenue to the south, Chambers Road to the east, and 37th Avenue and Interstate 70 to the north. The study area includes a network of freeways, arterials, collectors, and local streets including 56 signalized intersections. The study area also includes a sidewalk network, a network of hard surface multipurpose trails running along eight major streets, and two soft surface multipurpose trails. Seven RTD bus routes serve the study area. While specific boundaries have been drawn for the technical analysis, the study examines multi-modal connections to Downtown Denver, Aurora City Center, and the surrounding region.

C. Public Involvement and Stakeholder Coordination Process

A public involvement and stakeholder coordination process consisting of a series of meetings and work sessions was designed to identify key transportation issues and provide opportunities for input at key points in the process. The stakeholders included representatives from City of Aurora, Regional Transportation District (RTD), Colorado Department of Transportation (CDOT), Fitzsimons Transportation Management Association (TMA), Anschutz Medical Campus, The Children's Hospital and the Veterans Administration (VA). Through these meetings, several concepts were presented, tested and refined. In addition, the stakeholders provided a means of coordination to the various ongoing study efforts.

The formal meetings for the study included Project Stakeholder meetings, a public Open House, and presentations to the Transportation Management Association, the Transportation and Airport Policy Committee (TAPC), and the Fitzsimons Redevelopment Authority (FRA).

D. Deficiencies and Needs

A summary of deficiencies and needs was developed early in the study process with input from stakeholders and the public. This information was used to identify areas of emphasis for more detailed study, guide the technical methods for analysis, and to set the stage for study recommendations.

Roadway System

Critical issues relating to traffic and vehicle circulation were identified at the stakeholder meetings and through evaluation of existing conditions. Roadway issues included:

- Regional vehicular access capacity
- Internal and external wayfinding and parking
- Emergency vehicle access and delay
- Need for improved street design and quality

Transit System

Stakeholder input and the existing conditions evaluation identified critical issues for transit, both in terms of transit service and the physical environment around transit. Transit issues included:

- Difficult bus route connections to and from Colfax Avenue
- Lack of information on service, arrival and departure times
- Lack of shelters, a sense of security and multimodal connections

Pedestrian & Bicycle System

The following critical issues relating to the bicycle and pedestrian network were identified at stakeholder meetings and through evaluation of existing conditions. Pedestrian and bicycle issues included:

- Need for improved pedestrian connection across high volume streets with long crossing distances
- Lack of trail and bicycle connections
- Narrow sidewalks and maintenance issues
- Lack of bicycle wayfinding, signage, and parking
- Missing links and trail connections

E. Future Growth and Transportation Projections

Land Use Growth

Employment at the Fitzsimons medical campus will grow from 16,000 in 2008 to 43,505 by the time it builds out according to a recent economic report prepared by Sammons/Dutton, LLC. In addition, the City of Aurora is in the process of planning dense mixed use transit-oriented developments (TOD) around the future light rail stations. Major redevelopment along the south side of Colfax has also been planned or approved and some is currently under construction.

The major development projects within the study area contributing to the growth include:

- New VA Hospital (NW corner of Colfax and Fitzsimons Parkway)
- Life Sciences District (Colorado Science & Technology Park) (north half of Fitzsimons campus)
- Fitzsimons Village (south side of Colfax)
- Station Area Plans (Peoria, Colfax, and 13th Avenue Stations)
- Mt. Nebo (SW of Colfax and Peoria)

Transportation Projections

The land use information served as a key input to the regional transportation model. A Fitzsimons subarea model was created from DRCOG's regional travel demand model which served as the primary tool in forecasting future traffic demands and transit demands in the study area.

Without any interchange improvements, Colfax Avenue will continue to be the busiest arterial street within the study area. The highest traffic volume is projected to occur on the short segment between Fitzsimons Parkway and the west ramp intersection of

the I-225 interchange. By 2015, 58,000 vehicles per day are projected to utilize this segment. Peoria Street, north of Colfax Avenue is expected to be the next busiest arterial street with 41,000 vehicles per day.

If the interchange improvements are implemented by 2015, there would be significant relief provided to Colfax Avenue. An approximate 25 percent drop in traffic could be expected with the interchange improvements. The Colfax Avenue and Fitzsimons Parkway intersection is expected to experience the most dramatic decrease in peak hour traffic, a 16 percent decrease of the total PM peak hour traffic passing through this intersection.

By 2035, there is significantly more growth expected in the study area. Accordingly, the traffic forecasts in the area are expected to increase significantly from 2015, with increases of as much as 60 percent over the 2015 traffic projections in some locations. The busiest arterial segment in the study area would continue to be Colfax Avenue between Fitzsimons Parkway and the West I-225 Ramps, serving 68,000 vehicles per day, even with the interchange improvements. Many other arterial roads will also experience significant increases. Other sections of Colfax Avenue will exceed 60,000 vehicles per day, as will Peoria Street north of Fitzsimons Parkway. Roadways internal to Fitzsimons will also experience increases with Fitzsimons Parkway estimated to carry a range of 21,000 to 37,000 vehicles per day. Montview Boulevard is projected to serve as much as 16,000 vehicles per day by 2035.

In addition to increased vehicular activity, transit, bicycle, and walking trips are all expected to grow significantly, with pedestrian crossing demand forecast at 300-500 pedestrians per hour in some locations.

F. Project Recommendations

Roadway

Roadway and street improvements are essential to the accessibility of the Fitzsimons campus as well as to the surrounding areas. The final roadway project recommendations are listed below and summarized in Figures ES.1 and ES.2. Figure ES.1 provides the laneage configurations that are anticipated to be necessary to serve the 2035 vehicular traffic volumes. Figure ES.2 depicts the roadway system recommendations.

Reconstruction of Peoria Street/Sand Creek Bridge – Reconstruct the Peoria Street/Sand Creek Bridge and widen to six lanes.

Peoria Street Railroad Overpass – Construct a new Peoria Street overpass crossing the Railroad tracks. Relocate the Smith Road intersection with Peoria Street to a point south of the railroad tracks.

Reconstruct I-225/Colfax Avenue Interchange – Reconfigure the existing interchange to include ramps and structures to provide direct access to the Fitzsimons campus via 17th Place.

I-225 Colfax Interchange/Tollgate Creek Bridge – Increase left turn laneage for east and west bound Colfax Avenue from single to dual left turn lanes under I-225. Widen the existing Tollgate Bridge to provide an exclusive right turn lane from Colfax Avenue to the southbound I-225 on-ramp.

Colfax Avenue Widening Between Sable Boulevard and Chambers Road – Add one additional eastbound through lane resulting in three eastbound through lanes.

Add Additional Turning Capacities to Fitzsimons Parkway – Provide a right turn lane and a shared/through right turn lane for westbound to northbound traffic at Fitzsimons Parkway and 17th Place intersection. Add dual right turn lanes for eastbound to southbound traffic at Fitzsimons Parkway and Montview Boulevard intersection. Restripe the southbound to eastbound left turn lanes to triple left turn lanes at Fitzsimons Parkway and 17th Place intersection.

Peoria Street/Colfax Avenue Intersection Improvement – Provide an additional northbound left turn lane resulting in dual left turn lanes, a westbound left turn lane resulting in dual left turn lanes, an eastbound left turn lane resulting in dual left turn lanes, and the addition of a northbound right turn lane resulting in an exclusive right turn lane.

FIGURE ES.1 PROPOSED 2035 INTERSECTION AND ROADWAY LANEAGE

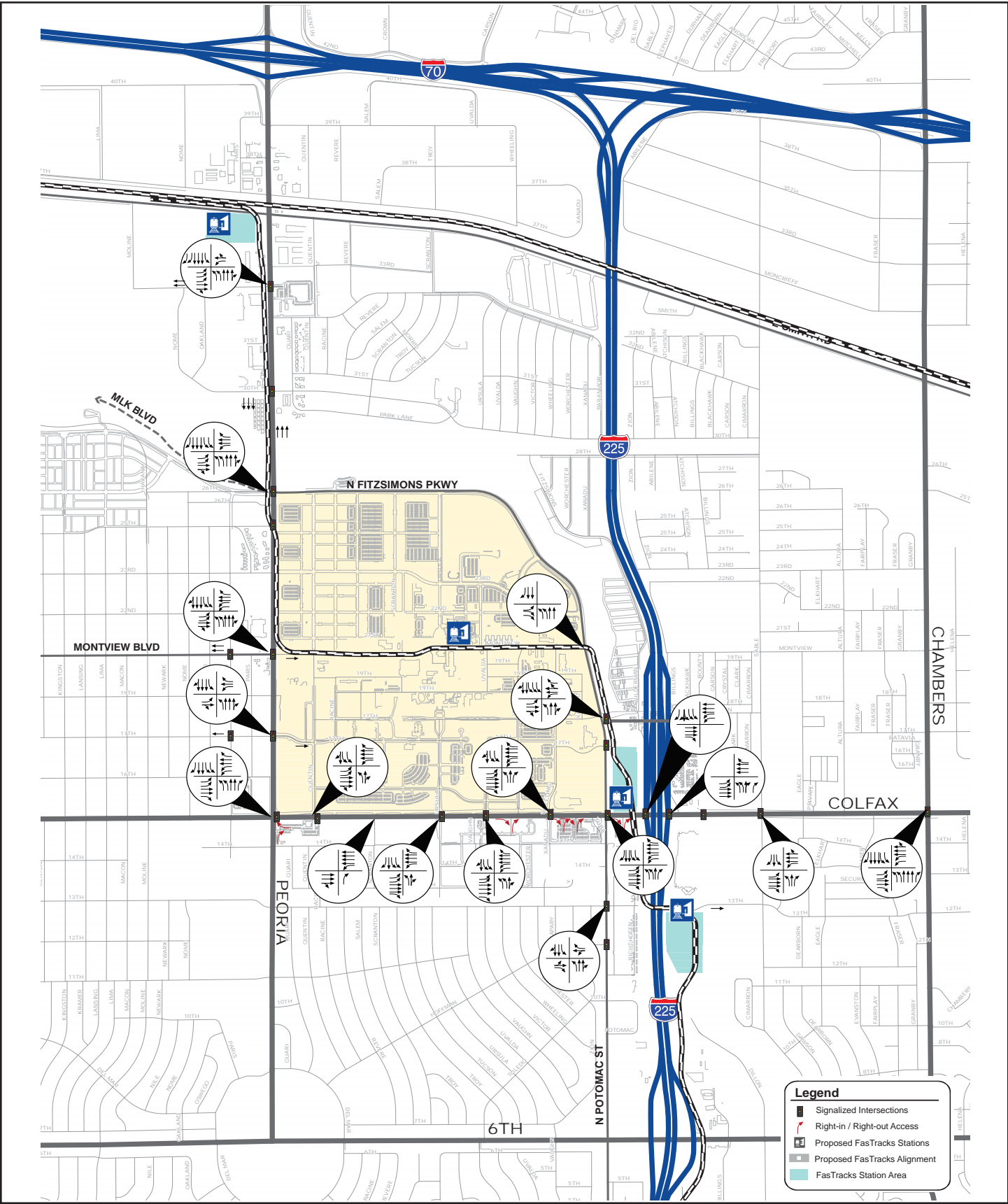
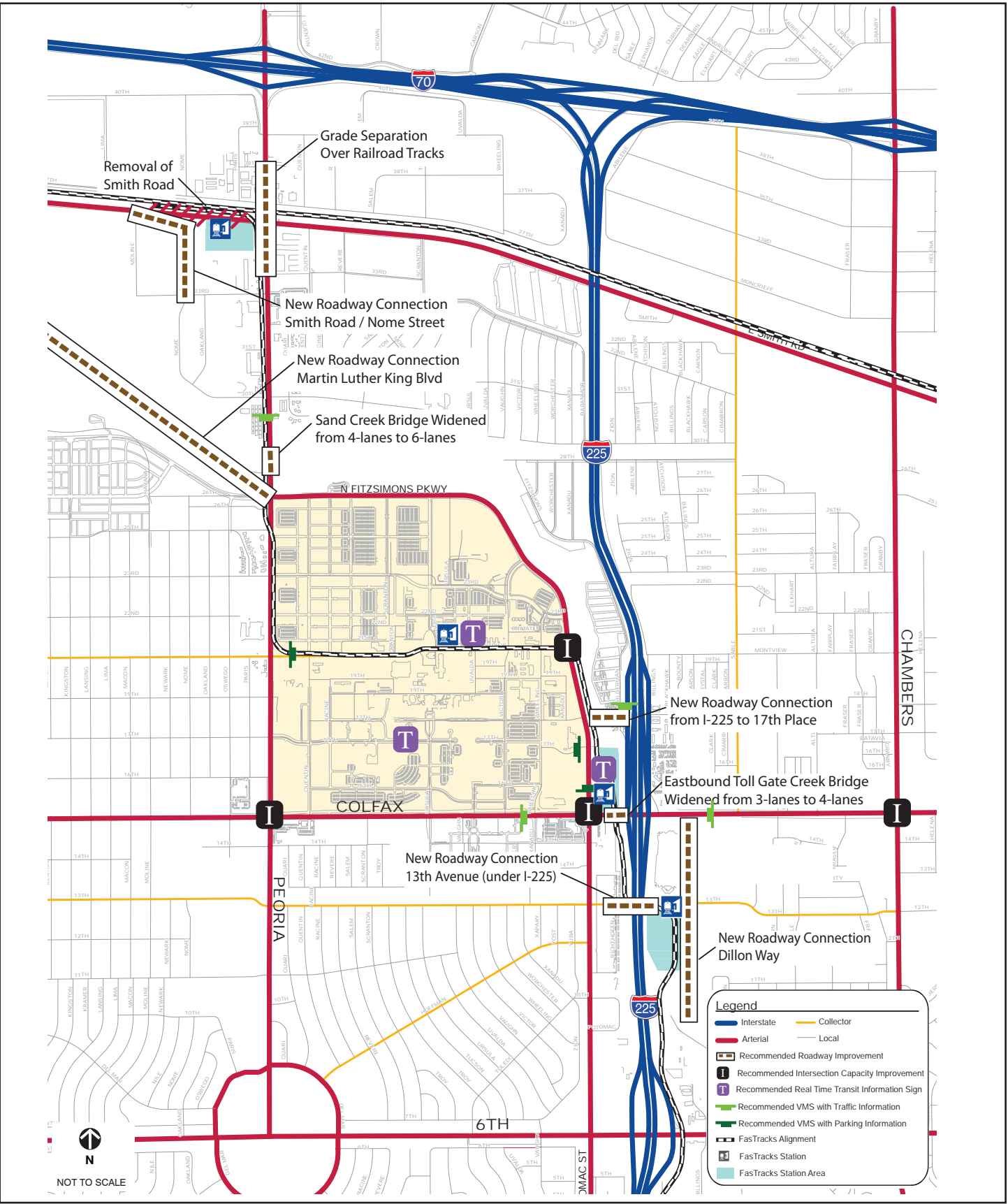


FIGURE ES.2 ROADWAY SYSTEM RECOMMENDATIONS



Chambers Road/Colfax Avenue Intersection Improvement – Add an additional westbound left turn lane resulting in dual left turn lanes, a southbound right turn lane resulting in an exclusive right turn lane, and a northbound right turn lane resulting in an exclusive right turn lane.

13th Avenue Extension – Construct a new two lane roadway with on-street bike lanes and parking lanes for 13th Avenue crossing over Tollgate Creek and under I-225 between Potomac Street and Sable Boulevard.

Dillon Way Extension – Extend Dillon Way north from 6th Avenue to Colfax Avenue, crossing Tollgate creek.

Intelligent Transportation Systems (ITS)

The following ITS projects are recommended for the Fitzsimons study area to provide travel information to the transportation system users. These projects will allow the transportation system to be used more efficiently by all users. The preliminary locations for these recommended projects are shown in Figure ES.2.

Add Variable Message Signs (VMS) on Key Roadways – Install three Variable Message Signs in the vicinity of the Fitzsimons campus, including eastbound Colfax Avenue between Ursula Street and I-225, westbound Colfax Avenue between Sable Boulevard and I-225, and Peoria Street north of Fitzsimons Parkway.

Provide Variable Message Signs (VMS) on Parking Information at Campus Entrances – Install three variable message signs at campus entrances to convey parking availability and direct drivers to appropriate areas.

Provide Signage and Kiosks for Train and Bus Arrivals – Establish an information network to provide real time transit and roadway information through VMSs, the internet, text messaging and hand-held devices, and kiosks.

Transportation Demand Management Strategies

Continue the existing efforts of the Fitzsimons TMA that promote alternative modes of travel and increased traveler information. Programs include expanding the current commuter assistance and carpooling initiatives. The TMA should promote increased bicycle travel by highlighting and encouraging use of the planned bicycle facilities and programs. In addition, the TMA should work with CDOT and RTD to provide real-time traveler information to students, employees, and visitors via the website and cell phones.

Transit

The following transit improvements are recommended:

Expand and Enhance Shuttle Connections – Expand frequency and areas served by the existing Fitzsimons shuttle system.

Improve Bus Stop Amenities and Security – Add shelters and security enhancements to the bus stops on the south side of Colfax Avenue between Potomac Street and Peoria Street.

Pedestrian

In order to make Fitzsimons a successful multi-modal environment it will be important to provide pedestrian amenities throughout the campus and on surrounding streets. The following pedestrian improvement recommendations are depicted in Figure ES.3.

Leading Pedestrian Phases at Colfax Avenue Intersections – Implement Leading Pedestrian signal phasing at key signalized intersections along Colfax Avenue by starting the pedestrian WALK indication before the vehicle signal turns green, allowing pedestrians to establish their presence in the intersection before cars begin moving.

Pedestrian Bridge over Colfax Avenue – Construct a pedestrian bridge over Colfax Avenue between Vaughn Street and Wheeling Street/Xanadu Street.

Enhanced Pedestrian Crossings along Colfax – Provide enhanced crosswalk markings with ladder striping, directional curb ramps, colored or special paving in crosswalks, and high visibility treatments such as pavement flashers along stop bars at intersections along Colfax Avenue between Peoria Street and Potomac Street. Provide a raised or textured crosswalk between right turn “pork chop” islands and the sidewalk at right turn locations along Colfax Avenue at the northeast corner of the Peoria Street and Quentin Street intersections and both northeast and northwest corners of the Ursula Street and Wheeling Street intersections with Colfax Avenue.

Median Refuge Islands along Colfax Avenue – Construct median refuge islands along Colfax Avenue between Fitzsimons Parkway and Peoria Street by extending the existing raised median on Colfax Avenue at the following locations: Fitzsimons Parkway, Wheeling Street, Vaughn Street, Ursula Street, Quentin Street, and Peoria Street.

Sidewalk and Trail Connections Enhancement North of Montview Boulevard – Provide connections across Fitzsimons Parkway to the Sand Creek trail at locations identified in ES.3. Provide multi-modal connections to the Martin Luther King Boulevard extension to promote bicycle connectivity between Stapleton and north Fitzsimons.

Sidewalk Improvements – Widen various sidewalks and provide landscaping buffers within the study area, including the sidewalks on Peoria Street from Colfax Avenue north to Fitzsimons Parkway, Montview Boulevard west of Peoria Street, Sable Boulevard south of Colfax Avenue, and Peoria Street south of Colfax Avenue.

6th Avenue Sidewalk between Potomac Street and Del Mar Circle – Upgrade the existing narrow and missing sidewalks on 6th Avenue from Potomac Street to Del Mar Circle.

Peoria Street/ 13th Avenue Intersection Improvements – Install a traffic signal at Peoria Street/13th Avenue.

Bicycle

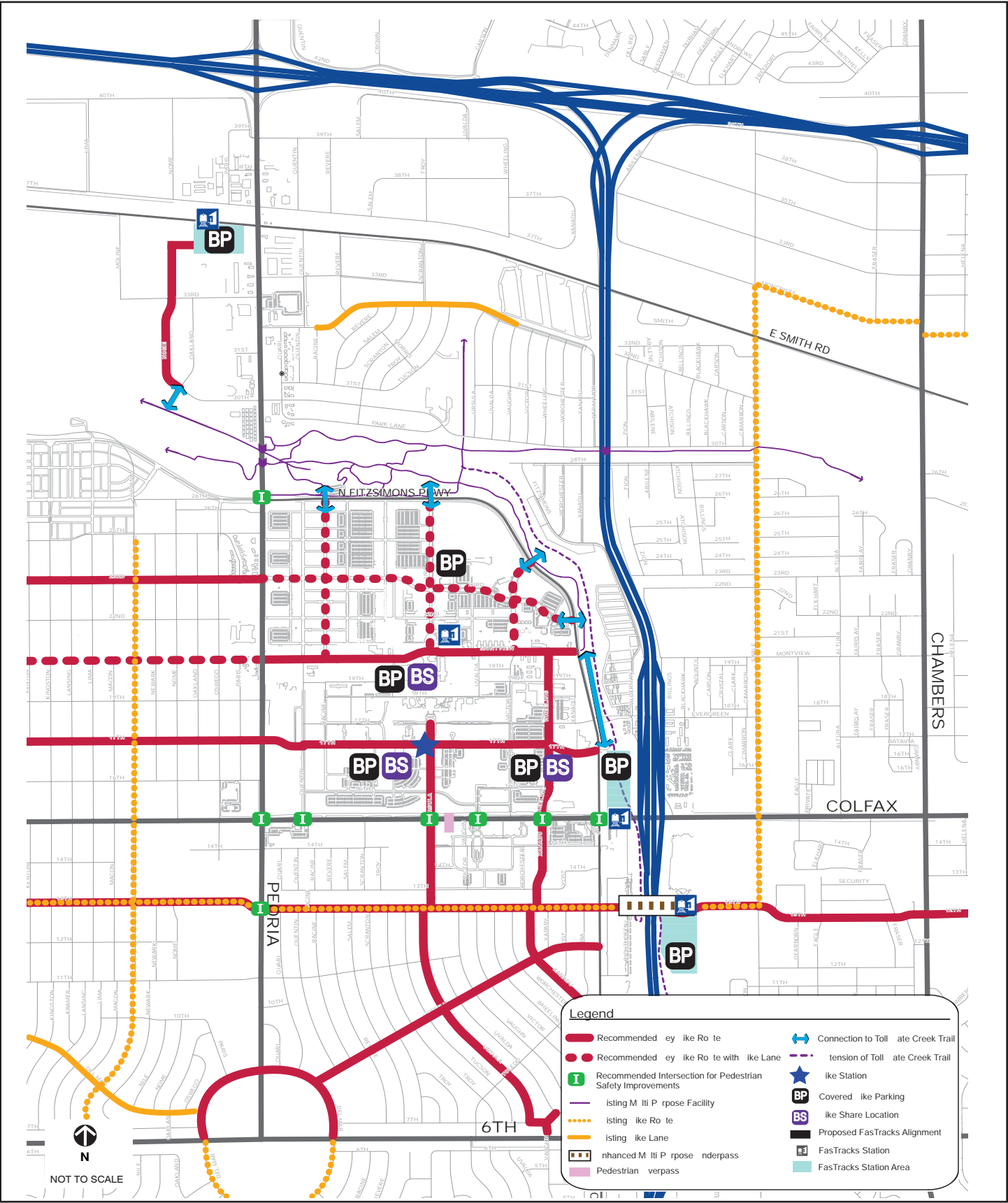
The following bicycle improvements are recommended and shown in Figure ES.3.

Provide Covered Bicycle Parking & Improve Bicycle Way-finding – Provide additional bicycle parking and bicycle lockers on the Fitzsimons campus. Install signs for existing lanes, routes, and trails, including adding signage to 13th Avenue, 17th Avenue, 23rd Avenue, Xanadu Street, and Ursula Street.

Provide Bicycle Stations at Key Locations – Construct a bicycle station in the central part of Fitzsimons campus potentially including a parking area with bicycle lockers or bicycle racks, bicycle repair and supply services and information kiosks.

Implement a Bicycle Share Program – Implement and phase in a bicycle share program for the medical campus by potentially making 15 bicycles available to students, staff or the public initially and grow to 50 bicycles if successful.

FIGURE ES.3 BICYCLE AND PEDESTRIAN SYSTEM RECOMMENDATIONS



Enhance 13th Avenue Bicycle Connection – Construct a new 13th Avenue bicycle/pedestrian bridge if the 13th Avenue roadway connection is not constructed.

Extend Toll Gate Creek Trail – Construct Tollgate Creek Trail from Alameda Avenue to Sand Creek.

Montview Boulevard Bicycle Lanes – Provide a bicycle lane connection along Montview Boulevard from Peoria Street to Yosemite Street with the following options:

- a. Remove the center turn lane and retain parking on both sides.
- b. Remove parking on one side of the street and maintain a center turn lane through the entire corridor.
- c. Remove parking on both sides also maintaining the center turn lane along the entire corridor
- d. Keep the current cross section and add 'sharrows' to the curbside lane, designating a shared space between automobiles and bicycles.

Enhance Bicycle Connections to the Fitzsimons Campus – Make the following bicycle enhancements:

- Sign the following roadway facilities as bicycle routes: 17th Avenue, 23rd Avenue (west of Peoria Street), Oswego Street (between 17th Avenue and 25th Avenue), Xanadu Street (6th Avenue north through the Fitzsimons campus), Ursula Street (6th Avenue north to 17th Place), Del Mar Circle (north of 6th Avenue), Hoffman Boulevard (Del Mar Circle north-east to Xanadu Street).
- Add bicycle lanes to the following roadways per the General Development Plan Amendment #5 for the Fitzsimons Army Medical Center: 23rd Avenue, Racine Street, Ursula Street, and Victor Street.

G. Project Implementation

The general recommendations were discussed with project stakeholders, staff, and the TAPC. These projects were prioritized and recommended in one of the following three phasing categories: Short Range, Medium Range, and Long Range. Projects that were categorized as Short Range should be implemented as soon as funding becomes available as they address immediate needs. Medium Range projects are generally tied to the 2015 projections and should be implemented upon the completion of the I-225 FasTracks corridor. Long Range projects are tied to the 2035 projections and address needs that are likely to result from the full build-out of the Fitzsimons medical campus and additional surrounding developments.

The projects and implementation time line are summarized in Figure ES.4.

FIGURE ES.4 RECOMMENDED PROJECTS TIMELINE

Project	Type of Project	Cost (estimated)	Short Range (Immediate)	Medium Range (After FasTracks)	Long Range (~ 2035)
Widen Peoria Street Sand Creek Bridge	Roadway	M			
Peoria Street Colfax Avenue Intersection Improvements	Roadway	M			
Reconstruct I-70 Colfax Avenue Interchange	Roadway	M			
Provide Variable Message Signs (VMS) for Parking Information at Camp Smith Entrances	ITS	M			
Add Variable Message Signs (VMS) on Key Roadways	ITS	M			
Improve Bus Stop Amenities and Security	Transit	k			
Peoria Street 10th Avenue Intersection Improvements	Pedestrian	k			
Enhanced Pedestrian Crossings along Colfax Avenue	Pedestrian	M			
Pedestrian Bridge over Colfax Avenue	Pedestrian	M			
Implement a Bicycle Share Program	Bicycle	k			
Provide Bicycle Stations at Key Locations	Bicycle	k			
Provide Covered Bicycle Parking Improve Bicycle Wayfinding	Bicycle	k			
Provide Montview Boulevard Bicycle Lanes	Bicycle	k			
Enhance Bicycle Connections to the Fit Simons Campuses	Bicycle	k			
10th Avenue Extension	Roadway	M			
Provide Signage and Bikes for Train and Bus Arrivals	ITS	T			
Expand Shuttle Connections	Transit	T			
Median Refuge Islands along Colfax Avenue	Pedestrian	k			
Leading Pedestrian Phases at Colfax Avenue Intersections	Pedestrian	k			
Enhance Sidewalk and Trail Connections North of Montview Boulevard	Pedestrian	k			
10th Avenue Sidewalk Improvements between Potomac Street and Del Mar Circle	Pedestrian	k			
Sidewalk Improvements	Pedestrian	Varies			
Extend Toll Gate Creek Trail	Bicycle	M			
Enhance 10th Avenue Bicycle Connection	Bicycle	k			
Million Avenue Extension	Roadway	M			
Turning Capacity Improvements Fit Simons Parkway	Roadway	M			
Chambers Road Colfax Avenue Intersection Improvements	Roadway	M			
I-70 Colfax Interchange Toll Gate Creek Bridge	Roadway	M			
Peoria Street Railroad Grade Separation	Roadway	M			
Colfax Avenue widening between Saile Boulevard and Chambers Road	Roadway	k			

1. INTRODUCTION

1.1 Background

The Fitzsimons area is rapidly changing as the Anschutz Medical Campus, The Children's Hospital and Veterans Administration (VA) and surrounding areas transform into Aurora's newest and fastest growing employment and activity center. The Fitzsimons Redevelopment Authority anticipates that employment at the Fitzsimons medical campus is expected to reach 19,000 by 2010, with jobs in patient care, teaching, basic-science research and biotechnology research and development. Mobility for these employees, visitors, and residents in the area will be critical to maximize the economic vitality of the area.

A 2006 study conducted by the University of Colorado found that 11% of campus employees walk or bike to work at least one day a week and 9% take the bus to work at least one day a week. Dense employment combined with high transit, bicycle, and pedestrian activity have created the need for and will continue to require an area wide multi-modal approach to the transportation system. Demand for alternative mode access to the campus and surrounding area is expected to grow over time, particularly with the implementation of the FasTracks light rail system.

The Fitzsimons Area Wide Multi-Modal Transportation Study (MTS) provides an update to the Site-Wide Traffic and Transportation Study done for the Fitzsimons medical campus in 2003. This updated study is needed to address the transportation impacts of recent, significant development activities and to address the transportation impacts of various alternatives proposed by the RTD I-225 FasTracks and East Corridor teams regarding station locations, track alignment, and park-n-Ride size and locations.

1.2 Study Purpose

The purpose of this study is to provide a detailed and comprehensive understanding of the multi-modal transportation needs surrounding the Fitzsimons medical campus. In addition, this study incorporates information from current studies such as I-225 FasTracks Environmental Evaluation, East Corridor Environmental Impact Statement, FasTracks Station Area Plans, and the Aurora Strategic Parking Plan and Program Study so as to maximize these proposed transportation improvements. The result is an integrated transportation plan in the Fitzsimons area which has also informed these concurrent studies as appropriate.

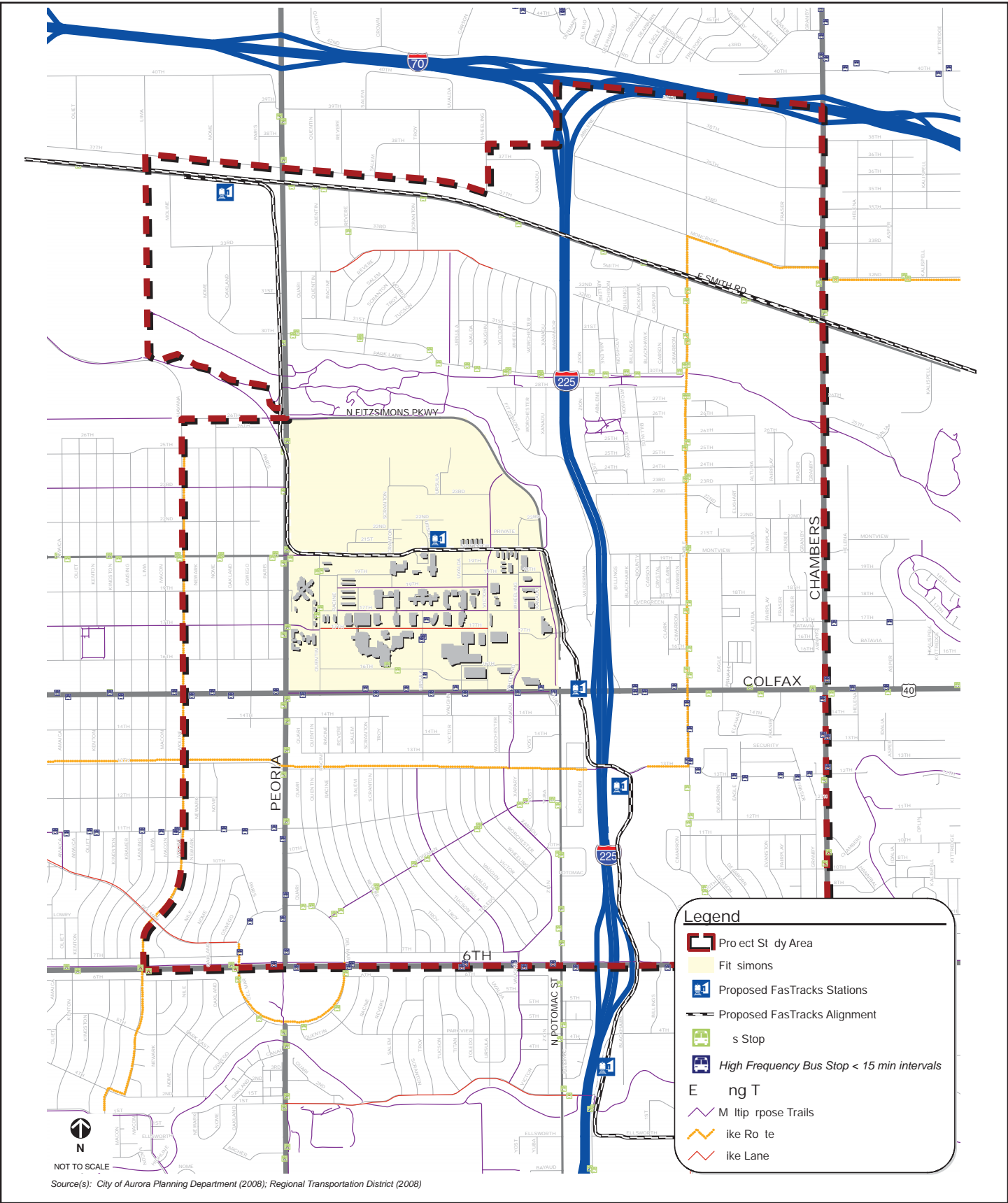
The study includes an existing multi-modal assessment, future traffic projections, and project recommendations. The future traffic projections were developed using a sub-area travel demand model for the Fitzsimons area along with traffic simulations which modeled key multi-modal interactions. Therefore, the recommendations included in this study were developed with consideration of all modes. In addition, this study provides information on conceptual cost and phasing to facilitate the implementation of the recommendations.

1.3 Study Area

Figure 1.1 shows the extent of the Fitzsimons study area. The 4,593 acre (7.2 square mile) study area is bounded by Moline Street and Havana Street to the west, 6th Avenue to the south, North Chambers Road to the east, and East 37th Avenue and Interstate 70 to the north. The study area includes a network of freeways, arterials, collectors, and local streets including 56 signalized intersections. The study area also includes a sidewalk network, a network of hard surface multipurpose trails running along eight major streets, and two soft surface multipurpose trails. Seven RTD bus routes serve the study area. While specific boundaries have been drawn for the technical analysis, the study examines multi-modal connections to Downtown Denver, Aurora City Center, and the surrounding region.

The land use in the core of the study area is composed of medical, education, and mixed-use offices; this core area houses the Anschutz Medical Campus, The Children's Hospital, and the Life Sciences District. The core of the study area is referred to as the Fitzsimons medical campus throughout this document. The area directly south of the Fitzsimons medical campus, along Colfax Avenue, is a commercial area in transition. Much of this commercial area is under utilized and is in the process of redevelopment. The land use outside the core of the study area is primarily composed of single family residential homes, along with industrial land uses near the northern border of the study area.

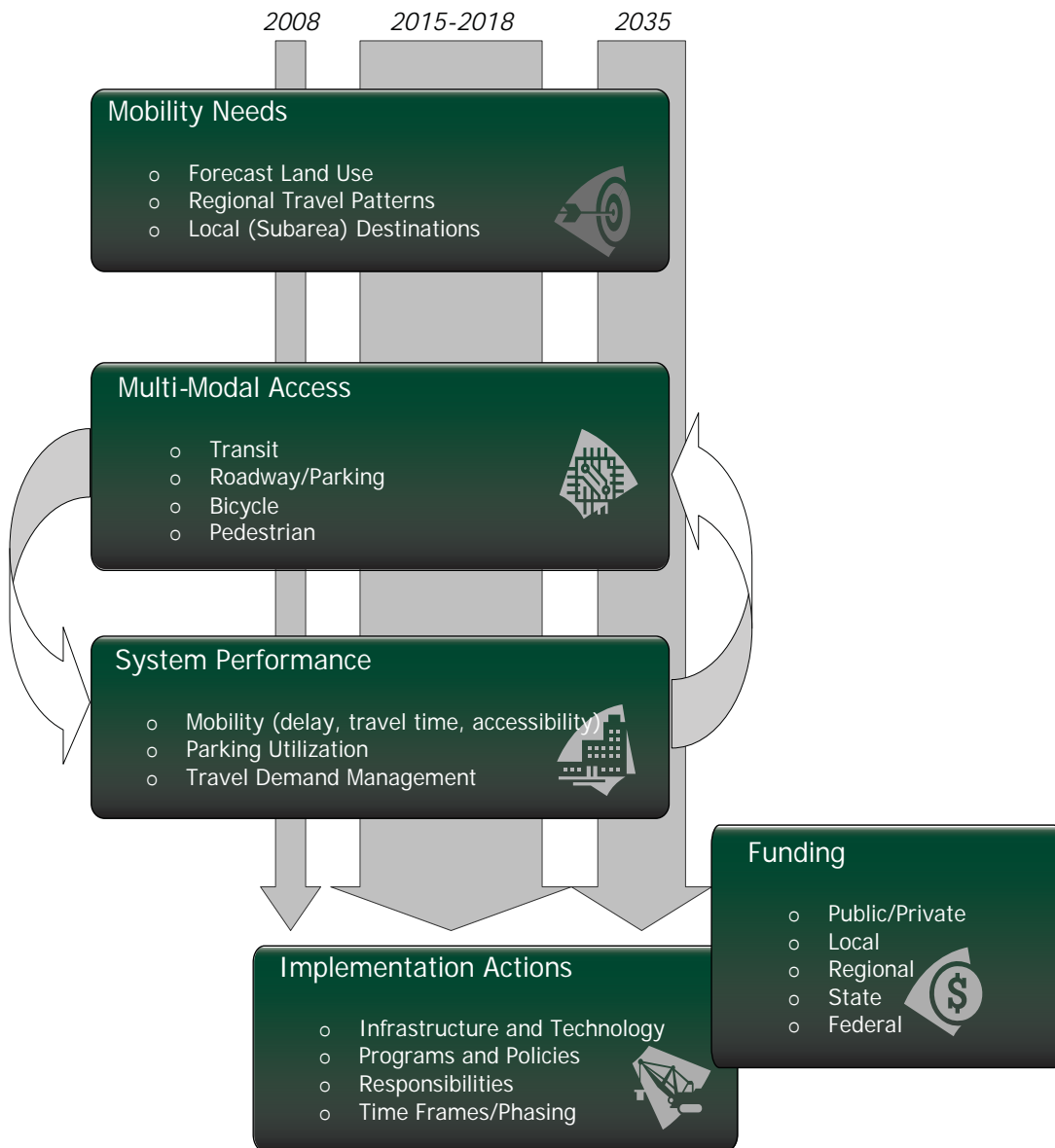
FIGURE 1.1 STUDY AREA



1.4 Study Process

Figure 1.2 shows the technical process and approach to the project. Mobility needs were determined by documenting the existing and forecast travel patterns, activities, and major origins and destinations in the project area. Forecasts were determined from the regional model with subarea refinement to accurately reflect the Fitzsimons area growth. Additional ongoing transportation infrastructure recommendations from I-225 FasTracks were included and evaluated relative to the Fitzsimons area needs.

FIGURE 1.2 TECHNICAL PROCESS



1.5 Public and Stakeholder Involvement Process

A public involvement and stakeholder involvement program consisting of a series of meetings and work sessions was designed to identify key transportation issues and provide opportunities for input at key points in the process. The stakeholders included representatives from City of Aurora, Regional Transportation District (RTD), Colorado Department of Transportation (CDOT), Fitzsimons Transportation Management Association (TMA), Anschutz Medical Campus, The Children's Hospital and the Veterans Administration (VA). Through these meetings, several concepts were presented, tested and refined. In addition, the stakeholders provided a means of coordination to the various ongoing study efforts.

The meetings associated with the study are listed below. Figure 1.3 shows public participation at the October 2008 Open House.

Project Stakeholder Meetings

- June 4, 2008
- September 9, 2008
- January 21, 2009

Public Open House

- October 8, 2008

Presentation to Transportation Management Association

- December 3, 2008

Presentation to Transportation and Airport Policy Committee (TAPC)

- October 15, 2008
- December 16, 2008
- March 25, 2009

Presentation to Fitzsimons Redevelopment Authority (FRA)

- January 28, 2009

FIGURE 1.3 PUBLIC PARTICIPATION, OCTOBER 2008



2. EXISTING CONDITIONS

This chapter provides the results of a multi-modal assessment of the existing Fitzsimons study area transportation system. Usage and performance information is provided for the roadway, transit, bicycle, and pedestrian systems. In addition, deficiencies and needs are identified for each of the networks. The Fitzsimons area is currently served by a Transportation Management Association (TMA) that provides services to residents and employees to integrate all of the transportation systems and encourage sustainable transportation choices for the area. A discussion of the current TMA tasks and initiatives is included in this existing conditions assessment.

2.1 Roadway System

2.1.1 Network

Figure 2.1 shows the street system and the location of and traffic signals in the study area. The streets are color coded by the posted speed limit. A summary of the major street facilities and their characteristics is provided in Table 2.1.

TABLE 2.1 MAJOR STREET FACILITIES IN THE STUDY AREA

Street Name	Direction	Classification	Posted Speed Limit
I-70	E/W	Freeway	55
I-225	N/S	Freeway	55
E Colfax Ave	E/W	Major Arterial	35
E 6th Ave	E/W	Major Arterial	40
N Peoria St	N/S	Major Arterial	35
N Chambers Rd	N/S	Major Arterial	40
Smith Rd	E/W	Major Arterial	40
Fitzsimons Pkwy	N/S & E/W	Minor Arterial	40
N. Potomac St.	N/S	Minor Arterial	35
E Hoffman Blvd	E/W & N/S	Collector	30
N Sable Blvd	N/S	Collector	30
E Montview Blvd	E/W	Collector	30

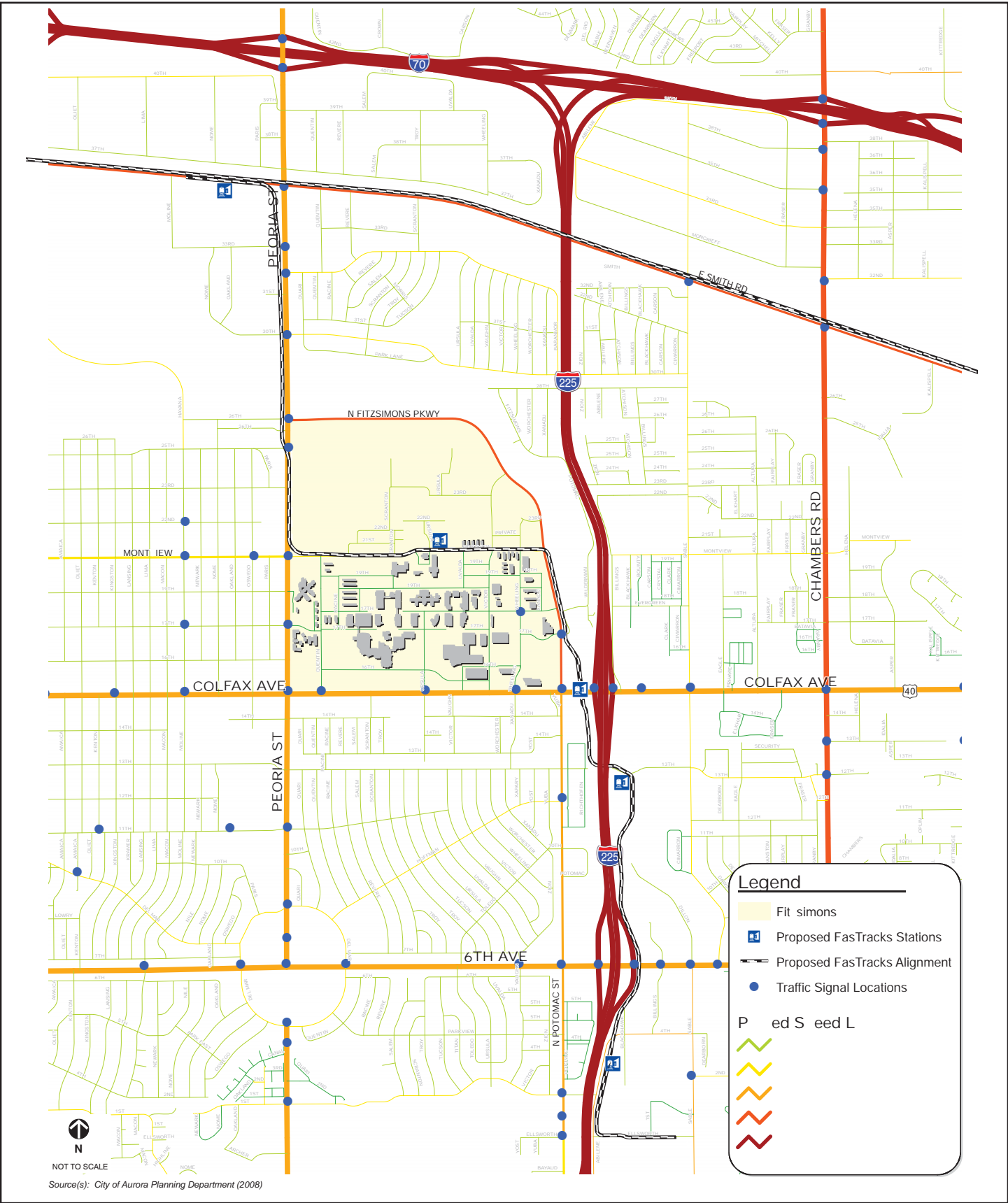
Source: City of Aurora GIS Interactive Mapping Tool (2008)

In general, on-street parking is available on local and collector streets, but is not permitted on arterial streets in the study area.

The City of Aurora typical street standards for the entire city include:

Arterials	12' travel lanes Typically no on-street parking Typically no bicycle lanes (except for 4 lane arterials, which require bike lanes) 10' landscapes (treelawns) 8'-10' sidewalks (detached)
Collectors	11' travel lanes 7' parallel parking lanes 5' minimum bicycle lanes (6-7' including the gutter pan) 8' landscapes (treelawns) 5' sidewalks (detached)

FIGURE 2.1 MAJOR STREETS AND TRAFFIC CONTROL



Locals	8'-12' travel lanes
	7'-8' parallel parking lanes
	Typically no bicycle lanes
	8' landscapes (treelawns)
	5' sidewalks (detached)

More detailed standards were developed by the City of Aurora in 2006 to guide the design, planning, and development of streets and intersections in Transit Oriented Development (TOD) sites and Urban Centers in Aurora. These standards are detailed in the Aurora Urban Street Standards in Transit Oriented Developments and Urban Centers. This document is available online at: <http://www.auroragov.org/stellent/groups/public/documents/article-publication/030275.pdf>. The Urban Street Standards increase sidewalk width, allow for pedestrian-friendly design features such as curb extensions and mid-block crossings, and provide additional street typologies such as multi-way boulevards. Adopted as a City ordinance, the Urban Street Standards can be applied to new roads or enhancements within the Fitzsimons campus and along Colfax Avenue as these areas are designated as both TODs and Urban Centers.

2.1.2 Intelligent Transportation Systems

Intelligent transportation systems (ITS) refer to programs or infrastructure projects that add information or communication technology to the transportation infrastructure. ITS can also inform motorists of traffic conditions and play a part in the decision of which route to take or the timing of the trip. A key benefit of ITS technology is the potential for the controlling agency to optimize traffic flows and maximize the use of the transportation networks..

Currently, no variable message signs (VMS) are operating in the Fitzsimons study area. However, three VMSs are located on freeway segments near the study area and could be used by CDOT to provide routing information in the study area. The location of the three VMSs are:

- I-70/Quebec Street
- I-70/Tower Road
- I-225/Iliff Avenue

At the I-225/Colfax Avenue and I-225/6th Avenue interchange locations, ramp metering signals are utilized during the peak commute hours to control the rate of vehicles entering the freeway main line.

The City of Aurora does not have a formal Traveler Information Program available via the internet or via phone except for construction information located at: http://www.auroragov.org/AuroraGov/Departments/Public_Works/Street_Services/index.htm. CDOT has a traveler information website located at <http://www.cotrip.org/> where freeway conditions can be found for I-225. No traffic cameras in the study area are available for viewing.

The City of Aurora has developed a Strategic ITS Plan that includes projects within the Fitzsimons study area. The Strategic ITS Plan proposes basic ITS components, such as mid-arterial dynamic message signs, pan-tilt-zoom cameras, weather stations, and mid-arterial detection for speed and/or volume information. The plan outlines needs and locations for these ITS components throughout the city. The Plan was submitted to City Council on March 2, 2009 and will be discussed at a later council work session.

2.1.3 Traffic Signal Timing

The City of Aurora is responsible for all traffic signal timing within the study area. Aurora also manages the traffic signal timing on CDOT facilities within the study area, including the freeway interchange ramp intersections. All traffic signal controllers are Eagle brand controllers.

The majority of the traffic signals within the study area are interconnected to the City of Aurora's traffic management center (TMC). The signal timings for these signals can be updated from the TMC if necessary. The only signals currently not on the City of Aurora's system are the traffic signals at the 17th Place/Wheeling Street intersection (within the Fitzsimons campus) and a number of mid-block pedestrian crossing locations.

The City of Aurora is in the initial phases of its regularly scheduled signal timing study for traffic signals north of Iliff Avenue. As part of this study, new traffic signal coordination plans will be developed for all roadway corridors during the AM peak, PM peak, off-peak, and weekend time frames. The re-timing project will include an update of pedestrian crossing speed from 4.0 feet per second to the 3.5 feet per second that will be included in the update to the Manual on Uniform Traffic Control Devices scheduled for release next year. This change is being adopted to accommodate a decreasing trend in average pedestrian walking speed, which requires more time for pedestrian crossing. This may result in increases in vehicular delay at large intersections and an increased need for pedestrian refuge islands.

2.1.4 Neighborhood Traffic Management

Congestion on major arterials can affect traffic patterns in the surrounding neighborhoods. As congestion increases on arterials, motorists can re-route to lower-volume through residential streets. Traffic calming can be used to discourage re-routing of traffic through neighborhoods. The City of Aurora currently has no formal Neighborhood Traffic Management plan in place; rather, traffic calming is implemented on a case by case basis.

It is possible that as the Fitzsimons campus continues to develop, the surrounding neighborhood streets could experience increases in traffic due to re-routing. Parallel streets to congested arterials in the project area were identified and considered for traffic calming measures such as speed tables, raised crosswalks, textured pavement, chicanes, mid-block medians, or mid-block narrowing.

2.1.5 Usage and Performance

Table 2.2 provides a summary of current operating conditions for the freeways and major arterials in the study area. The Levels of Service (LOS) shown in Table 2.2 were determined using the City of Aurora traffic volume thresholds. For a six lane freeway, the City of Aurora gives a daily volume threshold between 120,000 and 150,000 vehicles per day, while for a six lane arterial street, the threshold is between 52,500 and 65,500 vehicles per day. The data in Table 2.2 shows that the operation on the arterials is fair to poor, while the operation on the freeway facilities is poor or near failure. The percentage truck traffic, which can significantly impact traffic flow, is consistent with regional averages on the arterials and slightly higher than regional averages on the freeways.

TABLE 2.2 PERFORMANCE OF FREEWAYS AND MAJOR ARTERIALS IN THE STUDY AREA

Street Name	ADT	ADT Threshold for Street Type	v/c	LOS	Percent Trucks
I-70 (w/o I-225)	152,000	120,000-150,000	1.01 – 1.27	F	7.8
I-225 (n/o 6th Ave)	125,000		0.83 – 1.04	D-F	7.5
Colfax Ave (w/o I-225)	45,000	52,500-65,500	0.69 – 0.86	D	2.0
6th Ave (w/o Potomac St)	35,000		0.53 – 0.67	C-D	2.7
Peoria St (n/o Colfax Ave)	36,000		0.55 – 0.69	C-D	NA
Chambers Rd (s/o Colfax Ave)	30,000		0.46 – 0.57	C	NA
Smith Rd (e/o Peoria St)	9,000	8,000 - 10,000	0.90 - 1.13	E	NA

Sources: DRCOG and CDOT (2007)

LOS based on free-flow speed of 50 mph and 65 mph for arterials and freeways, respectively

Recent traffic impact studies conducted in the study area were referenced to determine the operating conditions at critical intersections within the study area (such studies are performed by consultants on behalf of applicants seeking land development approvals). The existing Levels of Service (LOS) at major intersections along Colfax Avenue are shown in Table 2.3. All of the intersections on Colfax Avenue adjacent to the Fitzsimons medical campus operate at a LOS B or C during the AM and PM peak hours, with the exception of the Colfax Ave/Potomac St intersection which is failing in the PM peak hour. The City of Aurora LOS

standards require that the overall intersection LOS for signalized intersections operate at LOS D or better in the peak period; thus the intersections along Colfax Avenue are operating acceptably according to this standard.

TABLE 2.3 PERFORMANCE OF MAJOR INTERSECTIONS ALONG COLFAX AVENUE

Intersection	Date of Data Collection	Intersection Type	AM/PM Peak Hour LOS
Colfax Ave/Peoria St	Jan 07	Signalized	C/C
Colfax Ave/Quentin St	Jan 07	Signalized	B/B
Colfax Ave/Ursula St	Aug 07	Signalized	B/C
Colfax Ave/Potomac St	Oct 06	Signalized	C/F*

Sources: Traffic Impact Studies published in 2007 for the Fitzsimons Hilton Garden Inn, the Fitzsimons Promenade, and the Fitzsimons Village

* Existing queuing from upstream intersections create failing operations

The I-225 and Colfax ramps are known to operate with congestion. There is a need for these ramps to be monitored as the build-out of Fitzsimons continues. The existing ramp operations at I-225 and Colfax are summarized in Table 2.4. The LOS and delay were determined using Synchro and SimTraffic traffic analysis software based on the Highway Capacity Manual procedures. The existing signal timings and traffic counts collected in August of 2008 were used for the analysis. The southbound ramps operate with more delay than the northbound ramps in both the AM and PM peak hours. The 2008 counts show that approximately 800 vehicles use the southbound approach in the AM peak hour and 1200 vehicles in the PM peak hour.

TABLE 2.4 EXISTING CONDITIONS LEVEL OF SERVICE LEVEL OF SERVICE AT COLFAX AND I-225

Intersection	Peak Hour	Delay (sec/vehicle)	LOS
Colfax/I-225 SB Off-Ramp	AM	83.5	F
	PM	59.1	E
Colfax/I-225 NB Off-Ramp	AM	45.7	D
	PM	24.3	C

Source: Fehr and Peers, 2008

2.1.6 Deficiencies and Needs

The following critical issues relating to traffic and vehicle circulation were identified at the project stakeholder kickoff meeting in June 2008.

- Vehicle access to the campus needs to be improved. Special concerns are congestion on I-225 and Peoria Street and the emerging congestion on Potomac Street.
- Internal and external wayfinding should be improved for visitors coming to the campus.
- Parking on campus needs to be improved. Specific concern was raised about access, off-site parking in neighborhoods, and inappropriate lot use.
- Emergency vehicle access to the campus should be improved.
- ITS should be expanded within the study area and used to provide information about parking availability and route/ intersection delays.

Based on the existing conditions evaluation, the following additional critical issues relating to traffic and vehicle circulation were identified.

- I-70 operates above capacity at the I-225 junction.
- Existing street cross-sections could be improved to meet the City of Aurora Urban Street Standards. This would primarily include adding landscaped medians or sidewalk buffers and increasing the width of sidewalks.

2.1.7 Planned Improvements

The City of Aurora is in the initial phases of its regularly scheduled signal timing study for traffic signals north of Iliff Avenue. In addition, the City of Aurora 2008-2012 Capital Improvement Plan identifies new traffic signals, traffic signal replacements, major intersection traffic improvements, and traffic signal timing studies. However, the exact location of these improvements has not been specified.

There are currently plans for Martin Luther King Boulevard to be extended to Peoria Street. There are also several roadway projects in the study area that are in various stages of planning or design. Two major examples include the split diamond interchange planned for I-225 at Colfax Avenue and 17th Place and the I-225 light rail corridor improvements.

A connection of 13th Avenue under I-225 is currently being considered. If this occurs, it is likely that traffic will divert from Colfax Avenue to 13th Avenue as congestion increases. If the connection is approved, the best solution for accommodating re-routing traffic will need to be determined.

2.2 Transit System

2.2.1 Network

There are eight RTD bus routes serving the study area. Figure 2.2 shows the routes and bus stop locations within the study area. A description of each route is provided below, including information regarding the route's connectivity to outside locations, the hours of operation, and the frequency of bus arrival.

Route 15, East Colfax – Route 15 runs east-west along Colfax Avenue. It provides connectivity between downtown Denver and the Fitzsimons area. Route 15 operates 24 hours a day with 30 minute headways in the study area during the work day.

Route 15L, East Colfax Limited – Route 15L is an east-west limited route along Colfax Avenue. It provides connectivity between downtown Denver and the Fitzsimons area with fewer stops than Route 15. Operating hours are from 5:00AM to 12:30AM with 10-15 minute headways during the work day.

Route 20, 20th Avenue – Route 20 runs along Montview Boulevard, Quentin Street, and East 16th Avenue in the study area. It provides connectivity between West Denver and the Fitzsimons area. Operating hours are from 5:00AM to 12:30AM with 15-35 minute headways during the work day.

Route 121, Peoria Crosstown – Route 121 runs north-south along Peoria Street. It provides connectivity between Southeast Denver, South Aurora, and the Fitzsimons area. Operating hours are from 5:00AM to 12:30AM with 15-30 minute headways during the work day.

Route 121L, Peoria Limited – Route 121L runs north-south along Peoria Street. It provides connectivity between Southeast Denver, South Aurora, and the Fitzsimons area with fewer stops than Route 121. Operating hours are from 5:00-9:00AM and 2:00-6:00PM with 15 minute headways.

FIGURE 2.2 TRANSIT SERVICE



Route 153, Chambers Crosstown – Route 153 runs north-south along Chambers Road. It provides connectivity between Arapahoe Crossing, Aurora, and the Fitzsimons area. Operating hours are from 3:00AM to 12:00AM with 15-30 minute headways during the work day.

Route DM, Boulder/Anschutz-Fitzsimons – Route DM is a Regional Route that runs along Interstate 70, Peoria Street, Fitzsimons Parkway, and Colfax Avenue in the study area. It provides connectivity between Boulder, northern Denver, and the Fitzsimons area. Operating hours are between 5:30AM and 9:00PM. It has four departures at 30 minute headways during the morning peak and five departures with 30 minute headways during the evening peak period.

Route AT, Arapahoe County/DIA – Route AT runs along Interstate 225, Colfax Avenue, and North Airport Boulevard. It provides connectivity between the City of Aurora and the Denver International Airport. Operating hours are from 3:00 AM to 10:30 PM with one hour headways. This route can be accessed at Colfax Avenue and Billings Street within the Fitzsimons MTS study area.

In addition to RTD service, there are two transit services provided by the University of Colorado Denver. The first service is the Anschutz Medical Campus Circulator. This is a two to six passenger electric cart which circulates within the medical campus between 8:00AM and 5:00PM with 5-10 minute headways. The Campus Circulator will take passengers directly to their destination, and then it will continue on its route. The electric cart service is free and available to all UCD faculty, staff and students.

The second transit service offered by the University of Colorado Denver is Van-On-Demand. This service provides the Downtown Denver Campus with shuttle service to and from the Anschutz Medical Campus and the 9th & Colorado Boulevard Campus. Those needing rides call 303-521-2968 for immediate service; or a reservation can be made up to a week in advance. The service is provided from 7:00 AM to 6:00 PM, Monday through Friday. Service is free to University of Colorado faculty, staff, and students with a University ID.

2.2.2 Bus Stop Characteristics

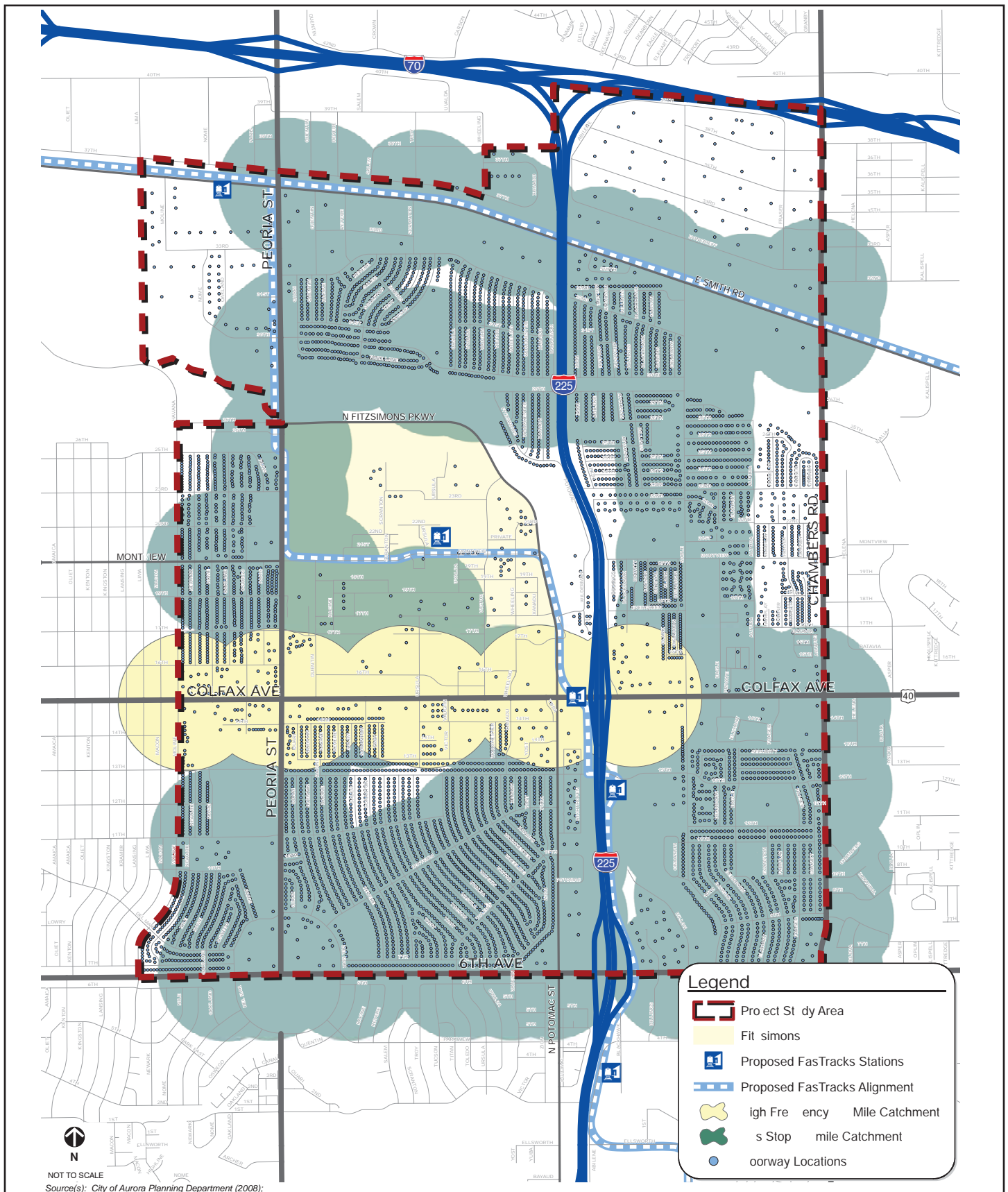
Bus stops in the study area have a range of attributes from a bus stop sign to a shelter with trash cans, newspapers, and a pay phone. In general, bus shelters are only present at the intersection of two major arterials (e.g., Colfax Avenue & Peoria Street, Colfax Avenue & Chambers Street). A bus shelter is also located at the turn-around on Ursula Street, where a majority of the medical center transit riders access transit.

Typical bus stops in the study area are not sheltered and usually consist of a bench, trash can, and newspaper box. At some locations, especially in residential areas, there is only a sign at the bus stop. The campus circulator bus stop usually consists of a sign and green flag, unless the stop is shared with RTD.

2.2.3 Accessibility

Figure 2.3 shows the spatial relationship between doorways (houses and businesses) within the study area and their location relative to transit stops. The figure shows a ¼ mile catchment around all existing bus stops and any doorway within that catchment is assumed to be within a reasonable walking distance of a bus stop. While the quality of the sidewalk connections and the walking environment varies throughout the study area, this distance is a good indicator of transit accessibility. Analysis of the data revealed that approximately 85% of doorways within the study area are within walking distance of a bus stop. Of that 85%, approximately 10% are within walking distance of high frequency (15 minute all-day headways) bus service. 15% of the doorways are currently within walking distance of a future light rail station.

FIGURE 2.3 DOORWAYS WITHIN WALKING DISTANCE OF TRANSIT



2.2.4 Usage and Performance

Table 2.5 provides the total number of weekday boardings on each bus line serving the study area. Routes 15 and 15L, which run along Colfax Avenue, are the most active bus routes in the study area and are among the most utilized routes in the region.

TABLE 2.5 AVERAGE WEEKDAY RIDERSHIP FOR BUS LINES IN STUDY AREA			
Route	Average Daily Boardings	Route	Average Daily Boardings
15	11,296	121L	675
15L	13,477	153	3,521
20	3,794	DM	271
121	4,243	AT	1,834
<i>Source: The Regional Transportation District (2008)</i>			

Table 2.6 and Figure 2.4 provide a summary of bus stop activity in the core of the study area. The high activity stops (more than 100 daily boardings or alightings) include:

- Colfax Avenue/Peoria Street
- Colfax Avenue/Ursula Street
- Colfax Avenue/Fitzsimons Parkway
- Peoria Street/Montview Boulevard

2.2.4 Deficiencies and Needs

The following critical issues relating to transit were identified at the June 2008 project stakeholder kickoff meeting:

- Lack of connection between bus route 15L and the Fitzsimons Medical Campus. Route 15L travels along Colfax Avenue which is approximately a half mile for the middle of the Fitzsimons medical campus. Also, crossing Colfax Avenue from the campus to the eastbound stops can be quite onerous for pedestrians.
- Lack of information on transit arrival and departure times at bus stops.
- Need for improved information dispersal about transit options to Fitzsimons employees.

The existing conditions evaluation highlighted additional transit deficiencies in the study area:

- Lack of shelters and other amenities at many bus stops.
- Poor image and feeling of insecurity at bus stops.
- Inadequate coordination between modes (e.g., lack of coordination between the on-street bicycle system and the transit system).

TABLE 2.6 WEEKDAY BUS STOP USAGE IN THE STUDY AREA CORE

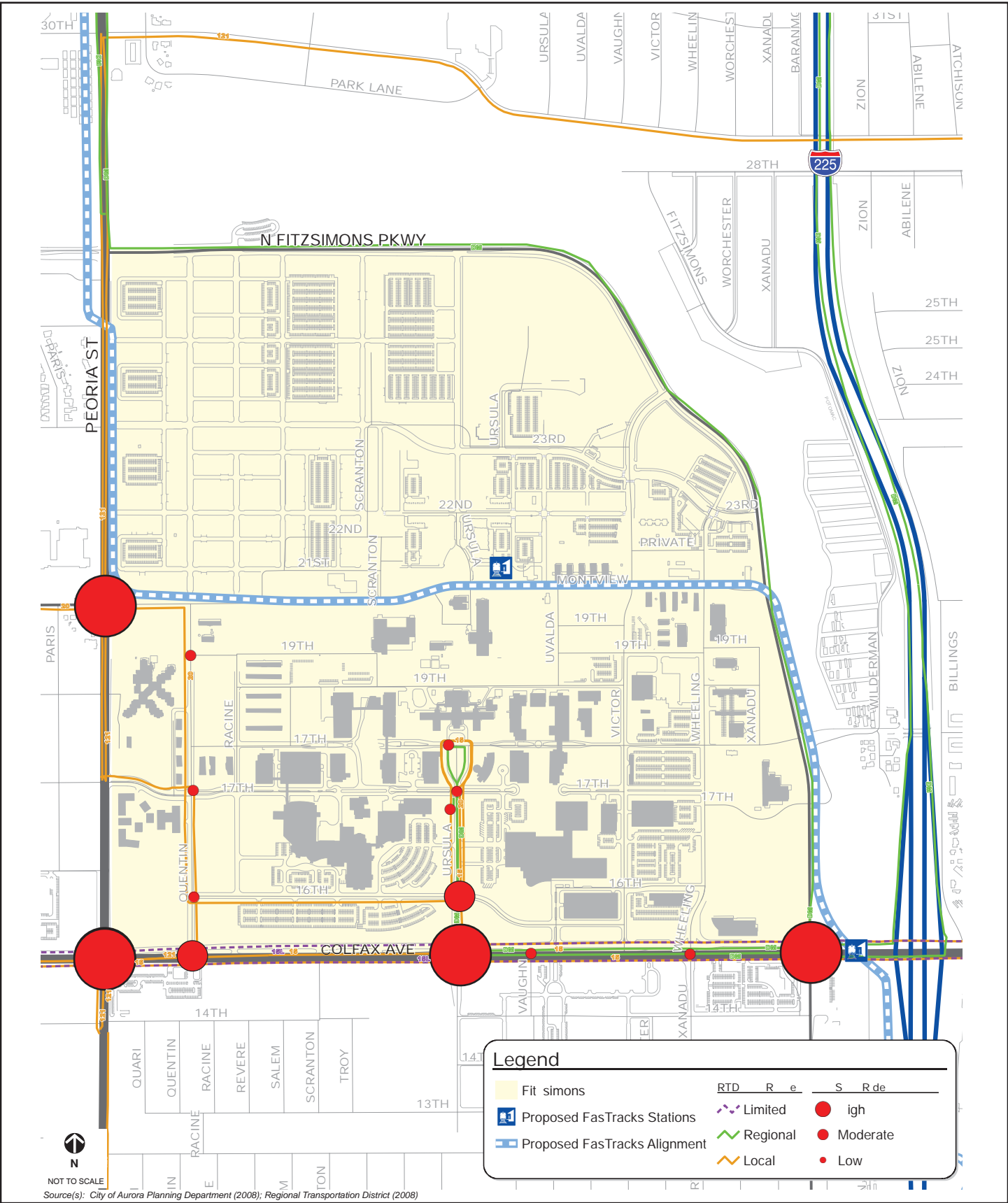
Route	Stops within Study Area Core	Average Daily Boardings	Average Daily Alightings
15	Colfax Ave/Peoria St	High	High
	Colfax Ave/Quentin St	Low	Low
	Colfax Ave/Ursula St	Moderate	Low
	Colfax Ave/Vaughn St	Low	Low
	Colfax Ave/Xanadu St	Low	Low
	CU Health Sciences at Fitzsimons	Low	Low
15L	Colfax Ave/Peoria St	High	High
	Colfax Ave/Fitzsimons Pkwy	High	High
	Colfax Ave/Ursula St	High	High
20	Montview Blvd/Peoria St	High	Moderate
	Quentin St/19th Pl	Low	Low
	Quentin St/17th Pl	Low	Low
	Quentin St/16th Ave	Low	Low
	E 16th Ave/Ursula	Moderate	Low
121	Peoria St/Colfax Ave	High	High
	Peoria St/Montview Blvd	High	High
	Quentin St/E Colfax Ave	Low	Moderate
121L	Peoria St/Colfax Ave	High	High
	Quentin St/16th Ave	Low	Low
	Quentin St/E Colfax Ave	Low	Low
DM	Colfax Ave/Vaughn St	Low	Low
	Colfax Ave/Xanadu St	Low	Low
	CU Health Sciences at Fitzsimons	Low	Low
	E Colfax Ave/Fitzsimons Pkwy	Low	Low
	Lyon's Eye Clinic Fitzsimons	Low	Low
	Quentin St/16th Ave	Low	Low
	Ursula St/E 17th Ave	Low	Low
	Ursula St/Colfax Ave	Low	Low

Low=0-50, Moderate=50-100, High=greater than 100

Source: The Regional Transportation District (2008)

Routes 153 and AT do not have stops in the core study area. The AT does stop at Colfax Avenue/Billings Street just east of I-225 and this stop experiences high level boardings and alightings.

FIGURE 2.4 BUS STOP ACTIVITY IN THE CORE OF THE STUDY AREA



2.2.5 Planned Improvements

The FasTracks I-225 Corridor project will provide the City of Aurora with connectivity to the regional rail transit system. The I-225 corridor will connect to the existing southeast light rail corridor at the Nine Mile Station and will extend 10.5 miles north along I-225 connecting to the proposed East Corridor commuter rail line at the Peoria/Smith Station. The East Corridor will provide connections to downtown Denver as well as DIA. In addition to the Peoria/Smith Station, which is located at the northern edge of the study area, three light rail stations are planned within the study area. The first is the Montview Station at Montview Boulevard and Ursula Court and the second is the Fitzsimons South/Colfax Station at Colfax Avenue and Potomac Street/Fitzsimons Parkway. The third light rail station within the study area is located at 13th Avenue and I-225. The final station locations and corridor alignment will be determined through the FasTracks I-225 environmental evaluation process, which is currently underway. Construction is slated to begin in 2011 with an opening date of 2015, but these dates may change due to funding challenges RTD is currently facing.

The DRCOG 2008-2013 Transportation Improvement Program (TIP) has reserved State SB-1 funds for transit improvements along Colfax Avenue. The project, titled Colfax Avenue – Transit Operation Enhancements, aims to improve the transit on Colfax by using traffic modeling and simulation, adding transit signal priority (Denver intersections only), adding queue jump lanes (Denver locations only), and enhancing bus stop lighting and security. The project is a joint effort between the City and County of Denver, RTD, and City of Aurora.

2.3 Pedestrian & Bicycle System

2.3.1 Pedestrian Network

Sidewalks of varying width and condition exist along most streets in the study area. There is typically an attached “Hollywood” style 32” inch sidewalk provided in the residential areas. Sidewalks are also provided along both sides of the major arterials, including Colfax Avenue, Chambers Road, 6th Avenue (some gaps), and Peoria Street. However, sidewalks are only provided on the south side of Smith Road, an east-west arterial in the northern portion of the study area. There is no landscape buffer between the sidewalk and street on most arterials, except for portions of Chambers Road, Colfax Avenue, and Vaughn Street. There is a landscaped buffer with trees on the west side of Chambers Road. In addition, on the north side of 6th Avenue west of Vaughn Street, the 8’ detached asphalt sidewalk is depressed approximately 1.5 feet from the level of the road, creating horizontal separation.

In general, crosswalks are not marked at minor intersections within the study area. At major signalized intersections, the typical treatment is a ‘zebra’ striped crosswalk and pedestrian signals attached to the signal poles. There are multiple count-down pedestrian signals within the study area, typically at major crossing points of Colfax Avenue and Peoria Street. Some unsignalized intersections with high pedestrian volumes have marked crosswalks and pedestrian crossing signs. Unsignalized pedestrian crossings are prevalent within the Fitzsimons Medical Campus.

Other pedestrian facilities within the study area include a pedestrian overpass on 6th Avenue at Vaughn Street and a mid-block pedestrian crossing on Potomac Street, just north of 6th Avenue associated with the Hospital.

2.3.2 Bicycle Network

The core of the study area is served by a network of hard surface multipurpose trails running along seven major streets and two soft surface multipurpose trails. Figure 2.5 shows the existing bicycle facilities and trails located within the core of the study area (medical campus). Although identified as trails, these facilities also serve as wide sidewalks meant for both bicycle and pedestrian use. The east-west hard surface trails are found along Montview Boulevard, 19th Avenue, 17th Avenue, and East Colfax Avenue. North-south hard surface trails are found along Racine Street, Ursula Street, Victor Street, Xanadu Street, and Fitzsimons Parkway.

There are few on-street bicycle routes and lanes in the study area. There is one bicycle route on East 13th Avenue, which runs east-west in the southern portion of the study area and one bicycle lane on 17th Avenue in the Fitzsimons Medical Complex.

There are three multi-purpose trails in the study area. The first is the Sand Creek Greenway Trail, which consists of a soft surface

trail running along the southern side of Sand Creek west of Peoria Street and along the northern side of the Creek east of Peoria Street. There is also a network of interconnecting hard surface trails in Sand Creek Park between the Sand Creek Greenway Trail and Fitzsimons Parkway.

The second multi-purpose trail is the Parklane Trail, a half mile hard surface trail extending north from the Sand Creek Greenway Trail to Baramor Parkway. The third multi-purpose trail is a hard surface segment following the alignment of 13th Avenue under I-225. This section has not yet been constructed as a roadway. The short trail segment provides bicycle and pedestrian connectivity by way of a bridge over Tollgate Creek and an underpass at I-225. 13th Avenue is signed as a bicycle route on each side of the trail.

Extension of the City's existing Toll Gate Creek Trail is planned along the Toll Gate Creek through the study area and will incorporate the short 13th Avenue trail segment under I-225 as described above. The proposed alignment of the trail is as follows:

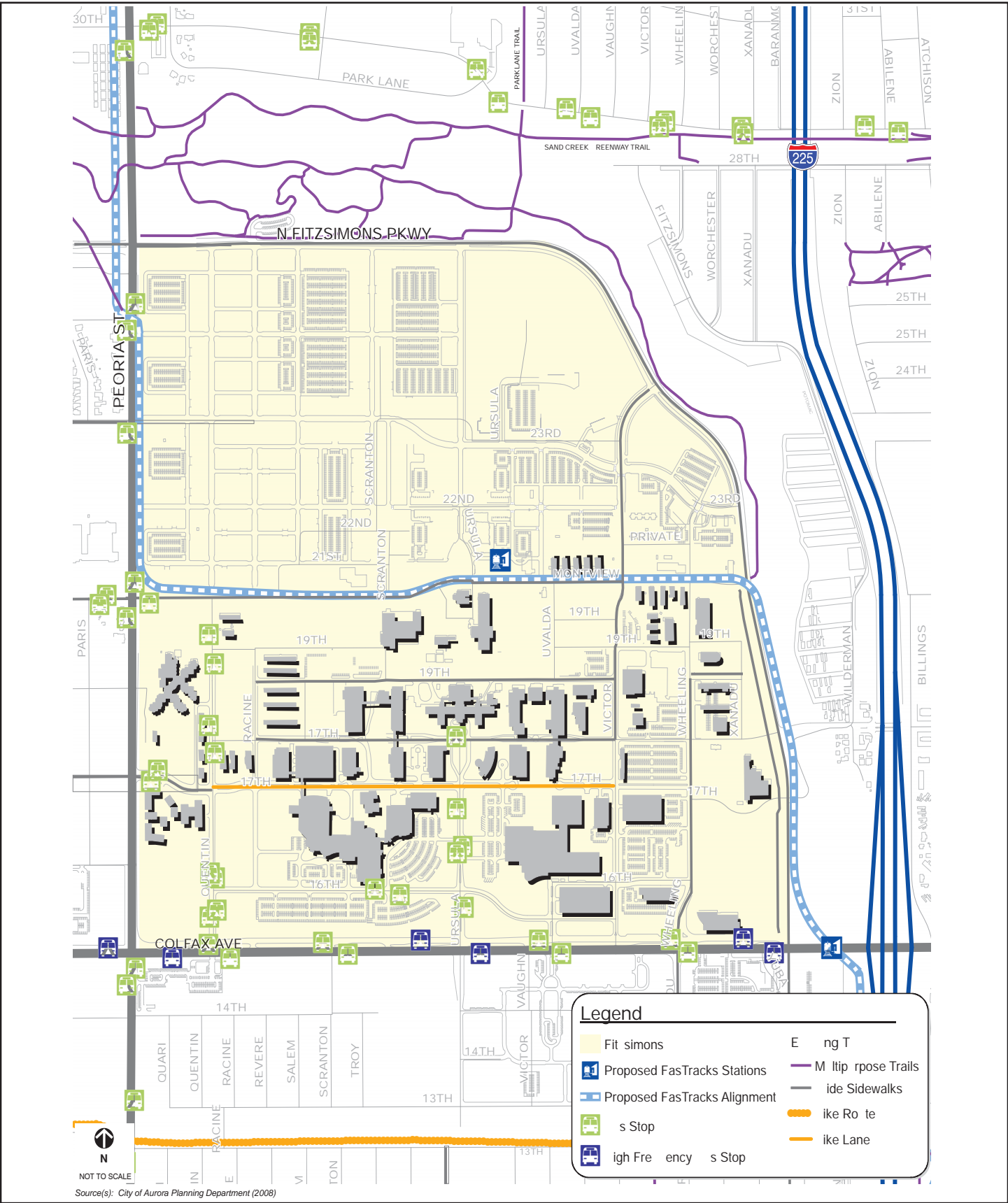
- North from Alameda Avenue to 13th Avenue: The trail will be aligned on the east side of the creek bed, passing under the new Dillon Way roadway connection and the FasTracks rail line before paralleling the I-225 right-of-way and the western side of the future TOD site. At 13th Avenue the trail will turn and pass under I-225 adjacent to 13th Avenue and then cross Toll Gate Creek using the southern side of the new 13th Avenue bridge. Once on the west side of the creek the trail will loop under 13th Avenue.
- North from 13th Avenue: The trail will follow along the west side of Toll Gate Creek. It will cross under Colfax Avenue on the west side of the creek bed and continue north to the new Potomac Street connection bridge as part of the proposed I-225 interchange. Then the trail will cross over the creek on the northern side of this bridge and continue north along the east side of Toll Gate Creek to the confluence with Sand Creek. With this said, between Colfax Avenue and Potomac Street, the trail will send off spurs to the TOD station, west into the medical campus, and north along the west side of Tollgate Creek to link to the hard surface multi-use paths associated with Sand Creek Park.

Bicycle parking is available at the south side of the Health Sciences Library building (located near the intersection of Montview Boulevard and Uvalda Court), near the turn-around on Ursula Street, and scattered throughout the Anschutz Medical Campus. In addition, the Children's Hospital offers secure parking in the basement of the hospital. Bicycle parking activity is highest near Building 500 and the Education Buildings of the University of Colorado Denver campus.

Additionally, shower facilities are available to cyclists throughout the Fitzsimons campus. Specific locations include:

- University of Colorado Hospital (UCH) – basement of the outpatient pavilion,
- University of Colorado Denver (UCD) – 4th floor of Building 500 and 1st floor of the Campus Services building, and
- The Children's Hospital (TCH) – basement of the main building.

FIGURE 2.5 TRAILS IN THE CORE OF THE STUDY AREA



2.3.4 Pedestrian Intersection Level of Service

Level of service (LOS) is the standard method of describing the operations of intersections. However, LOS analysis focuses on the motor vehicle operations and pedestrians are only considered in how they impact the vehicle operations. As part of a multi-modal assessment it is important to evaluate intersections not just for motor vehicles but for all users. As such, pedestrian LOS evaluation criteria are a growing area of research.

One of these methodologies was selected to evaluate the Potomac Street/Fitzsimons Parkway/Colfax Avenue intersection as it is one of the critical pedestrian crossings in the study area. The evaluation is based on a methodology developed and used by the City of Charlotte, North Carolina and has not been adopted by the City of Aurora.

The methodology assigns a LOS based on the crossing distance, roadway space allocation (e.g., crosswalks), the corner radius dimension, and the traffic signal characteristics. Points are assigned to the intersection based on the aforementioned characteristics. The scoring is out of 128 points and the LOS breakdown is summarized below.

- LOS A: 84+ points
- LOS B: 68-83 points
- LOS C: 52-67 points
- LOS D: 35-51 points
- LOS E: 18-34 points
- LOS F: 0-17 points

The analysis of the Colfax Avenue and Potomac Street/Fitzsimons Parkway intersection is shown in Table 2.7. The intersection currently operates with a pedestrian LOS E. The intersection receives no points in the crossing distance category as Colfax Avenue requires a pedestrian to cross more than seven lanes of traffic without a median refuge.

TABLE 2.7 PEDESTRIAN LOS CALCULATION AT COLFAX AVENUE/POTOMAC STREET

Feature	Existing Conditions	Points / Total Possible
Pedestrian Crossing Distance	Greater than 7 lanes No median or median < 4 feet	0 / 60
Signal Phasing and Timing Features	Protected left-turn phasing with pedestrian phase Conventional pedestrian signal display	10 / 17
Corner Radius	Radius of 25 to 35 feet	5 / 11
Right-Turns-On-Red	Permitted	0 / 5
Crosswalk	Painted cross walk with longitudinal markings	5 / 5
Traffic Flow Direction	Pedestrian crossing of two-way street	0 / 30
Intersection LOS		20 / 128 (E)
Source of Method: A Methodology to Assess Design Features for Pedestrian and Bicyclist Crossings at Signalized Intersections, by Norm Steinman and Keith Hines. Presented at the 2nd Urban Street Symposium (Anaheim, California) — July 28-30, 2003.		

2.3.5 Deficiencies and Needs

The following critical issues relating to the bicycle and pedestrian network were identified at the June 2008 project stakeholder kickoff meeting.

- Improve pedestrian connection across Colfax Avenue and other high volume streets. Currently Colfax Avenue acts as a barrier between the Fitzsimons Medical Complex and the new development. A pedestrian bridge is under discussion to make this connection.
- Connect the soft surface trail networks to the Fitzsimons Medical Complex.
- Bicycle trail connections to campus are needed, especially from the south.

In addition, the need for bicycle and pedestrian facility improvements was articulated in the Northwest Aurora Bicycle & Pedestrian Master Plan, adopted by Aurora City Council in August 2006. The following needs were identified in the plan.

General Needs

- Coordinate on-street bicycle system with transit system.
- Evaluate pedestrian signal cycles, especially at high volume intersections and intersections with high accident rates.
- Bring narrow sidewalks up to current standards.
- Increase weed control adjacent to off-street trails.
- Increase the amount of secure bicycle parking facilities in Northwest Aurora.
- Undertake future study of the proposed Tollgate Creek regional trail.
- Pedestrian and bicycle activated signals along designated routes at major intersections such as Vaughn Street and 6th Avenue and 13th Avenue and Peoria Street
- A comprehensive bicycle signing program

Needs Specific to Fitzsimons MTS Study Area

- Improve bicycle and pedestrian access between Fitzsimons and Stapleton and neighborhoods to the south.
- Enhance bicycle connections between Fitzsimons and Aurora City Center area.
- Increase bicycle signage along the 13th Avenue, Moline Street, 17th Avenue, 23rd Avenue, Xanadu Street, and Ursula Street bicycle routes in the study area.
- Improve pedestrian and bicycle safety at the intersection of 13th Avenue/Peoria Street and Vaughn Street/6th Avenue.
- Widen sidewalks along the east and west sides of Peoria Street between Colfax Avenue and Fitzsimons Parkway. The existing sidewalks are too narrow to accommodate future or existing pedestrian activity.
- Add bicycle lanes to Montview Boulevard west of Peoria.
- Replace sections of the 6th Avenue bicycle path between Del Mar Circle and Vaughn Street.
- Review the Tollgate Creek footbridge and I-225 underpass at 13th Avenue for maintenance and safety issues.
- Sidewalk along the south side of 6th Avenue between Potomac Street and Del Mar Circle
- Based on the evaluation of the existing conditions, there appears to be a need to add pedestrian refuges to Colfax Avenue to mitigate the long walking distance for pedestrians.

2.3.6 Planned Improvements

The City of Aurora 2008-2012 Capital Improvement Plan has identified improvements for trails such as the Sand Creek Greenway trail, construction of other trail infrastructure, sidewalk improvements, and mid-block pedestrian crossing lighting. The four-year funding for the City of Aurora sidewalk/ADA improvements and trail infrastructure is about \$1,250,000 and \$1,000,000, respectively. The exact locations of these improvements have not been specified.

2.4 Transportation Management Association (TMA)

The Fitzsimons Transportation Management Association (TMA) supports sustainable growth in the medical campus by developing and promoting coordinated transportation services designed to enhance access and mobility. The goal of the Fitzsimons TMA is to significantly reduce vehicle trips to the campus in the near term, resulting in reduced parking demand and traffic as well as enhanced recruitment and retention of employees. To achieve this goal, a number of key tasks and initiatives are planned or underway as described below.

2.4.1 Individual Commuter Assistance

Discussions with the TMA indicate that they utilize a combination of marketing and outreach techniques to inform employees and students about transportation options available in the Fitzsimons area. These programs serve to encourage employees to try commuting by other modes besides driving alone. Some of the initiatives that the TMA has to provide individual commuter assistance are described below.

Virtual Commuter Store

The TMA created a virtual web-based commuter assistance store. The store provides commuters with transportation information and products such as bus passes, bicycle gear, maps, and other necessary commuting goods. The TMA indicates that a representative from the TMA will deliver orders placed on-line, creating an opportunity for additional outreach. This innovative concept builds off best practices from other regions.

Individual Commute Plans

The TMA provides individual commute plans to a subset of Fitzsimons employees and students that detail their transit, carpool, vanpool, bicycle, walk, and telework options. These individualized plans can be distributed to employees in either a print or electronic format. Employees seeking additional commute information are offered an opportunity to utilize the resources available through the virtual commute store or to work with TMA staff on a one-on-one basis to address any concerns or questions they have about their commute plan. These commute plans include potential environmental and economic cost savings associated with the recommended transportation options. Similar commute plan efforts throughout the country have been highly successful and have received positive feedback from regional TMAs, company employees, and employers.

Incentives and Contests

The TMA has incentives and contests to assure that students, faculty and employees utilize the options provided to them in their individualized commute plans and at the virtual commuter store. The TMA has identified the incentives most likely to encourage Fitzsimons staff and students to try commuting by means other than driving alone through research and Stakeholder meetings. Incentives and awards include items such as bus passes, waived vanpool fares, bicycle helmets and maps, free meals, and gift cards for items such as movie and performing arts tickets.

2.4.2 TMA Outreach

The TMA has identified the following initiatives to increase awareness of their services to Fitzsimons employees and students.

Website and Marketing Materials

The TMA will continue to host its website at <http://www.fitzsimonstma.org>. The content will be expanded to include detailed information on transportation alternatives and spread awareness of TMA programs and services as they are implemented. Existing hardcopy marketing materials will continue to be printed, distributed, and revised as necessary as demand warrants.

Campus Events

The TMA will host or participate in campus events where there is an opportunity to promote transportation options, particularly at orientations or trainings. These events could include, but are not limited to, transportation fairs, brown bag lunches, and Bicycle to Work Day. The TMA will also work with the employees and students at institutions that are planning to move to the campus.

2.4.3 Promotion of Transit, Rideshare, and Bicycling

Transit Promotion

The TMA plans to establish a transit pass programs for campus employees, students, faculty, and staff that do not already have one. The TMA plans to work with RTD to promote transit at local orientations, trainings, fairs and events. Information specific to transit service will be provided on the TMA website in detail for everyday commuters.

Implement a Rideshare Program (carpool and vanpool)

The TMA is implementing a carpool/vanpool program on campus through the virtual commuter store which will build off of the DRCOG's RideArrangers Program. Opportunities to enhance the program will be explored with project partners as necessary.

Bicycling Promotion

The TMA plans to work with the hospitals to increase secure bicycle parking on the medical campus. The TMA plans to continue and expand its bicycle ride programs where they assist employees in finding their best bicycle commute route by hosting bicycle rides. The TMA plans to work with the City of Aurora and other entities to improve bicycle access in and around the medical campus.

2.4.4 Advocate for Alternative Transportation Improvements

The TMA will work in partnership with RTD and the Fitzsimons community to enhance the current transit and bicycle services available to commuters. A specific area of emphasis will be continuing to work with RTD to develop suitable commuter-oriented services to the Nine Mile Station of the Southeast Light Rail as well as major residential population centers. The TMA will also represent the campus stakeholders at the local and regional level on issues such as FasTracks and Aurora bicycling topics.

2.4.5 Ongoing Stakeholder Meetings and Communications

The TMA continues to host regular stakeholder meetings to discuss the progress of the projects and programs pursued by the TMA. Email and phone communications with individual project partners will be emphasized for specific subjects and issues.

2.4.6 Measure Performance

The TMA also administers surveys to measure the effectiveness of its programs. The surveys are distributed via the TMA website, email, and other communication channels as appropriate. The TMA provides reports with the results of any surveys administered. The reports include a comparison to travel behaviors identified in previous surveys.

2.5 Medical Campus Traffic Generation

Traffic counts and analysis were conducted in October 2008 to document the vehicle trip making characteristics related to the Fitzsimons medical campus. The study was undertaken to refine and validate the travel demand model at the sub-area level. The effort was also intended to show:

- The magnitude of trips being generated by current Fitzsimons users as it relates to the employment level on the campus
- The temporal distribution of trips through-out the day and their directional orientation during peak times.

The effort involved installing traffic count tubes along the access driveways and roadways leading into and out of the Fitzsimons medical campus. Figure 2.6 shows the count locations as well as the daily traffic and resulting AM and PM peak hour directional flows. All major accesses and access roads were counted. There are two relatively minor accesses that were not counted which were the drives onto Peoria Street serving the Colorado State Veterans Home. These two are not considered to be major traffic access points to Fitzsimons.

The counts were collected on October 15th and 16th of 2008. At that time, the area was categorized by the following:

- Colfax Avenue had been striped to include six through lanes in both directions along the campus' frontage plus a continuous right-turn accel/decel lane in the westbound direction.
- The intersection of Colfax Avenue and Wheeling Way was signalized.
- Much of the area south of Colfax Avenue was in a state of demolition with new development being planned.
- Sections of Montview Boulevard within the campus were intermittently closed. These closures were occurring off and on during the count period, and it is possible that the closure was in place during the count period.
- Approximately 16,000 employees were working on the Fitzsimons campus.

From Figure 2.6, the two-day average trip generation of Fitzsimons is approximately 53,000 trips per day. Realizing that two minor driveways went uncounted, an estimated 55,000 total trips per day were generated by the entire campus in October 2008. This equates to approximately 3.4 daily trips per employee. This information was used in calibrating the travel demand model for future planning horizon years.

Figure 2.7 was developed to illustrate the temporal distribution of Fitzsimons campus trips. Inbound, outbound, and total driveway trips were compiled on an hourly basis. The AM and PM peak hour traffic flows show a distinct inbound pattern in the morning and outbound pattern in the evening. The AM peak hour occurs between 7:00 and 8:00 AM in which 4,752 total vehicles were counted traveling the access points; over 70 percent of this demand was inbound. The PM peak hour occurs between 4:00 and 5:00 PM with 4,840 vehicles traveling the campus access points; slightly less than 70 percent of this demand was outbound. During the mid-day, access hourly traffic moderated to approximately 3,300 vehicle per hour which is roughly 30 percent lower than the AM and PM peak hours.

FIGURE 2.6 FITZSIMONS CAMPUS 2008 TRAFFIC GENERATION (OCT 15-16)

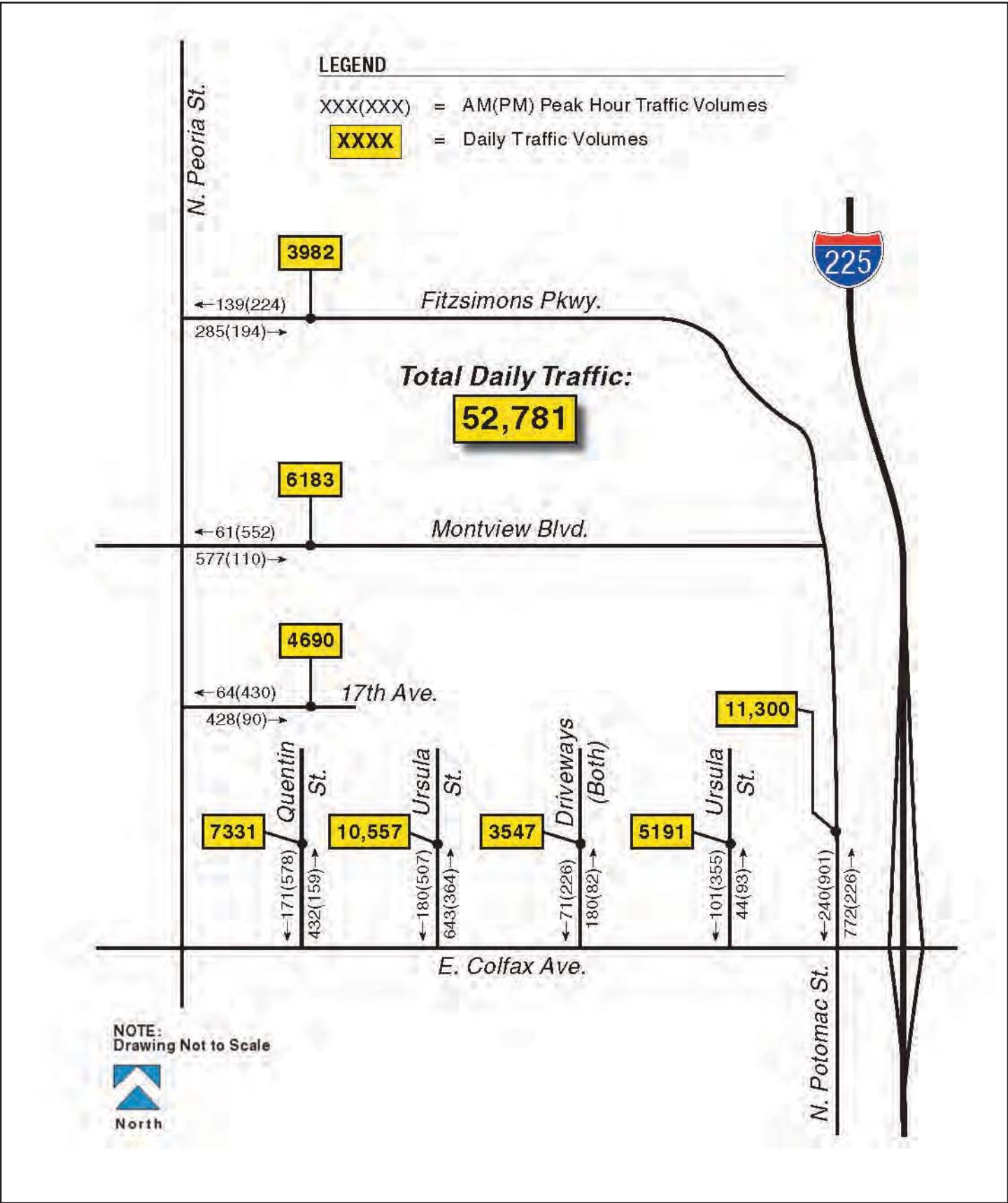
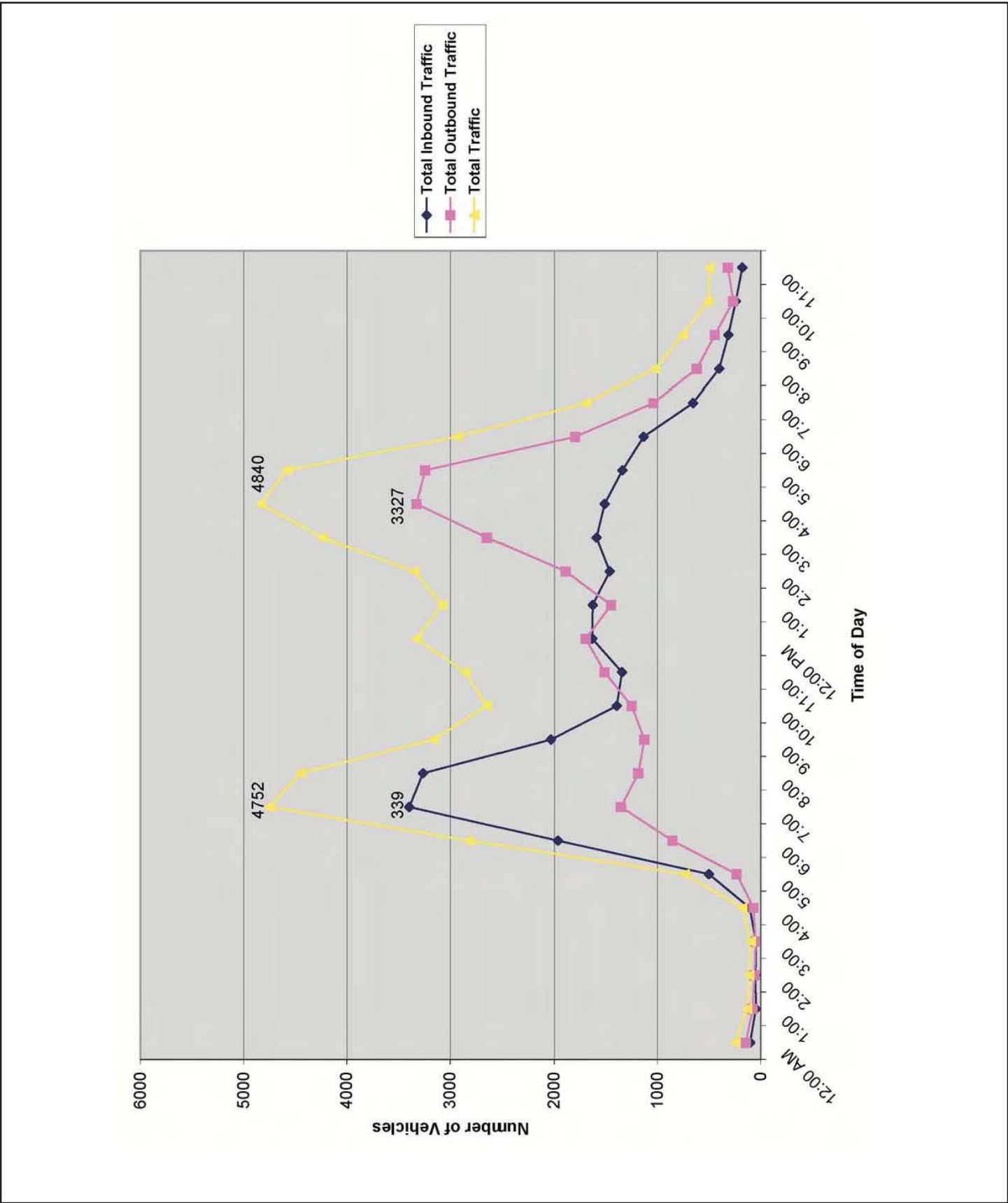


FIGURE 2.7 FITZSIMONS CAMPUS 2008 HOURLY TRAFFIC



The AM and PM peak hour traffic along the Fitzsimons perimeter streets was also reviewed to determine if one of these periods is more critical than the other for planning purposes. Turning movement counts at the three “corner” intersections of Fitzsimons were reviewed to gauge the relative magnitudes of AM and PM flows. The total traffic entering the Fitzsimons campus was recorded in recent counts:

- Colfax Avenue/Peoria Street (Eastbound and Northbound movements)
 - 3,596 entering vehicles during the AM peak hour
 - 5,751 entering vehicles during the PM peak hour, 60 percent more than AM
- Colfax Avenue/Potomac Street (Westbound and Northbound movements)
 - 4,418 entering vehicles during the AM peak hour
 - 5,172 entering vehicles during the PM peak hour, 17 percent more than AM
- Peoria Street/Fitzsimons Parkway (Eastbound and Southbound movements)
 - 2,172 entering vehicles during the AM peak hour
 - 2,881 entering vehicles during the PM peak hour, 33 percent more than AM

From these data, it is clear that the PM peak hour is more critical than the AM peak hour with respect to the campus’ perimeter arterial roads. Fitzsimons campus trips are only slightly lower during the AM peak hour than the PM peak hour, but when combined with all other traffic in the area, the PM peak hour is the clear critical time period.

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3. FUTURE GROWTH AND TRANSPORTATION PROJECTIONS

This chapter provides the methodologies and results of the technical analysis that was performed to develop a set of recommendations for the study area.

3.1 Travel Demand Model Development

3.1.1 Land Use

A key consideration in estimating travel demands is quantifying the level of development and redevelopment planned for the area. Within the Fitzsimons study area, this potential is substantial. Employment at the Fitzsimons medical campus could nearly triple by the time it builds out according to a recent economic report prepared by Sammons/Dutton, LLC. In addition, the City of Aurora is in the process of planning dense mixed use transit-oriented developments (TOD) around the future light rail stations in the area, and major redevelopment along the south side of Colfax has been planned and approved; some is currently under construction.

The land use increase is primarily related to employment. Some increase in residential uses is anticipated, but the growth in employment is projected to be nearly four times the growth in residential units. Anticipated growth trends for the area bounded by Havana Street, Chambers Road, 6th Avenue, and Smith Road are shown in Table 3.1.

TABLE 3.1 DEMOGRAPHIC GROWTH TRENDS FOR FITZSIMONS STUDY AREA

	2008 Model Assumption	2015		2035	
		Model Projection	% Increase from 2008	Model Projection	% Increase from 2008
Households	16,100	18,000	12%	23,200	44%
Employees	27,000	40,100	49%	71,900	166%

Source: DRCOG Regional Model and Development Plans

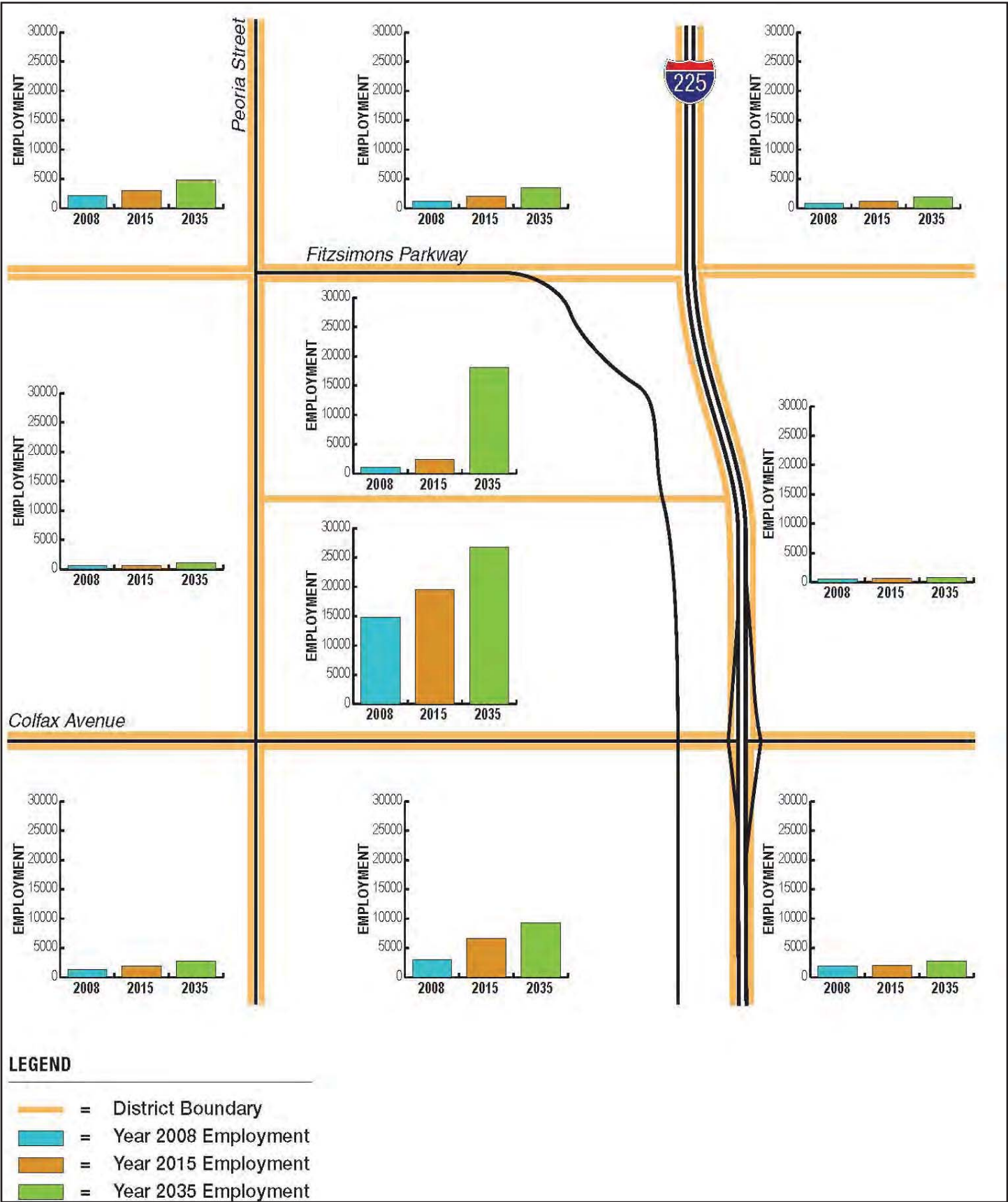
The growth in households will average approximately 1.4 percent per year to 2035, and much of this growth is spread across the study area, although the area north and east of Fitzsimons medical campus is not expected to experience much residential growth.

The employment increase for the study area is far more pronounced, projected to average approximately 3.7 percent per year to 2035. Nearly 60 percent of the 2008 to 2035 employment growth within the Study Area is attributable to development on the Fitzsimons medical campus. Figure 3.1 graphically shows the employment projections for varying zones within the study area. The Fitzsimons campus (at build out) would constitute approximately 62 percent of the total employment in the area. The area south of Colfax (directly across from the Fitzsimons campus) is also expected to see appreciable employment increase. This area, along with the Fitzsimons campus combine to comprise three-quarters of the study area's employment forecast.

The major development projects within the study area contributing to the growth include:

- New VA Hospital (NW corner of Colfax and Fitzsimons Parkway)
- Life Sciences District (Colorado Science + Technology Park) (north half of Fitzsimons campus)
- Fitzsimons Village (south side of Colfax)
- Station Area Plans (Peoria, Colfax, and 13th Avenue Stations)
- Mt. Nebo (SW of Colfax and Peoria)

FIGURE 3.1 FITZSIMONS EMPLOYMENT GROWTH



3.1.2 Dynamic Validation

Before applying DRCOG's regional model, the following sensitivity tests were conducted to dynamically validate the model and ensure that the model was behaving as expected. The sensitivity testing process is described below.

- Run the model on two different computers – Different computer processors can sometimes produce different numerical results in the modeling. The team ran the model on a second in-house computer and found that the roadway traffic results changed by 0.9 percent or less. Transit ridership results did not change at all. Using a different processor was not considered to be problematic.
- Add 10 employees to Fitzsimons– To ensure minimal modeling “noise”, a sensitivity run was conducted with 10 additional employees in the Fitzsimons TAZ. Traffic volume results change by a maximum of 0.7 percent and transit ridership results changed ever so slightly. This is not an issue.
- Add 10 households to Fitzsimons - To ensure minimal modeling “noise” relative to residential uses, a sensitivity run was conducted with 10 additional units in the Fitzsimons TAZ. Traffic volume results change by a maximum of 0.6 percent and transit ridership results changed ever so slightly. This is not an issue.
- Factor all of Fitzsimons land use number up by 20% - Realizing that land use adjustments were highly likely in the development of this model, a hefty increase was implemented to evaluate the model's behavior. Traffic volume differences were observed with one link volume increasing by 13 percent. Transit ridership also increased as expected. The model did not produce any results that were contrary to common sense.
- Maintain a four-lane Peoria bridge across Sand Creek – Long term plans call for Peoria Street to provide six through lanes of traffic, representing a widening of the existing bridge across Sand Creek. This sensitivity run narrowed the roadway to four through lanes. Results of the run showed that Peoria Street traffic decreased by 12 to 13 percent on either side of Fitzsimons Parkway. Fitzsimons Parkway north of Colfax Avenue increased by seven percent. Other variations were observed, but none of the results were out of the realm of expectation.
- Provide the 13th Avenue underpass connection of I-225 (Sable to Potomac) – This collector street connection resulted in a modest drop in Colfax Avenue traffic and a slight drop in Potomac Street traffic (south of Colfax). Various other traffic differences were observed, albeit minor. Transit activity was found to slightly increase. None of the modeling results were contrary to expectations.

The sensitivity model runs suggested that the regional model would continue to be a valid tool in developing forecasted travel demands with refinements to reflect subarea conditions.

3.1.3 Subarea Model Refinement

The land use information described in the previous section served as a key input to the regional transportation model. The Fitzsimons subarea model was created from DRCOG's regional travel demand model, and it served as the primary tool in forecasting future traffic demands and transit demands in the study area. Numerous modeling enhancements were required to better represent conditions within the study area, particularly the Fitzsimons campus area. Specific enhancements to the regional model included:

- The addition of internal campus roadways such as Montview Boulevard, Wheeling Street, Ursula Street, and Quentin Street. The unembellished FasTracks model only included one internal roadway, Fitzsimons Parkway.
- Adjustments in lane and facility type representation in the model for Colfax Avenue and the planned I-225/Colfax interchange expansion.
- Adjustments in the classification of employment for the Fitzsimons campus to develop a closer trip generation match to existing conditions.

- Land use modifications to match the land use reported in the previous section. These entailed adding 24,000 employees to the study area to better represent the current land use planning that has been taking place in the area. In addition, the location of employment within the Fitzsimons campus was redistributed to reflect build out development patterns.

Traffic volume results from the subarea model were “processed” through a post process adjustment methodology. Due to the complexity of real-world driver behavior and individual roadway characteristics, travel demand forecasting models cannot be expected to result in precise representations of traffic volumes on each roadway. A common technique used to improve the reliability of travel demand forecasts is referred to as post-processing adjustment. This technique uses comparisons of base year (2008 in this case) model predictions to actual traffic counts. These comparisons provide estimations of error associated with the model’s representation of travel conditions. The model-produced forecasts can then be adjusted to account for the error found in the model to provide more reliable forecasts. This process was applied to the Fitzsimons forecasts using a 2008 model (refined to better represent the Fitzsimons area) being used in support of the City’s parking study. Results from the 2008 model were compared against true traffic ground counts to identify the margin of error inherent in the modeling. Correction factors were developed and were then applied to 2015 and 2035 modeling results as part of the adjustment process.

3.2 Traffic Projections

Figure 3.2 shows the resulting daily traffic projections along the study area roadways for 2015 and year 2035. As part of a more focused operational analysis along Colfax Avenue, two sets of year 2015 traffic volume scenarios were developed; one without any interchange improvements at I-225 and Colfax Avenue, and one with the planned improvements. Current approvals for this interchange entail establishing a split-diamond interchange and a set of “slip ramps” to/from the south located north of Colfax Avenue. 17th Place would be extended east of Fitzsimons Parkway and serve as the northern cross-street in the new split diamond interchange configuration.

3.2.1 Year 2015 Traffic Projections

Two scenarios have been evaluated for the 2015 time period; one without any interchange enhancements at I-225 and Colfax Avenue and one with the improvements. Daily traffic volumes for the entire Fitzsimons roadway network have been developed for each scenario as well as PM peak hour turning movements for the signalized intersections along Colfax Avenue. The two sets of PM peak hour traffic projections are shown in Figures 3.3 and 3.4.

Without any interchange improvements, Colfax Avenue will continue to be the busiest roadway (not including the interstates) within the study area. The point of greatest traffic volume will be the short segment between Fitzsimons Parkway and the west ramp intersection of the I-225 interchange. By 2015, 58,000 vehicles per day are projected to utilize this segment. Daily traffic volume projections along Colfax Avenue would taper-off as one moves away (in either direction) from this busiest location. Peoria Street, north of Colfax Avenue is expected to be the next busiest arterial roadway with as much as 41,000 vehicles per day. The volume along this roadway decreases as one moves south.

At the time of this report, the planned interchange improvements were being designed. If the interchange improvements are implemented by 2015, there would be significant relief provided to Colfax Avenue, the busiest arterial segment in the study area. An approximate 25 percent drop in traffic could be expected with the interchange improvements. These improvements would greatly enhance the Fitzsimons users’ accessibility to both directions of I-225 by providing an additional connection via 17th Place. To a lesser degree, the interchange improvements will also help Fitzsimons users cross I-225 and access Colfax Avenue via the planned collector/distributor roads that will be part of the new interchange complex.

The two sets of peak hour traffic forecasts were developed from the daily projections and from recent peak hour counts. A more detailed consideration of the development and redevelopment planned (and taking place) along Colfax was factored in the derivation of the peak hour turning movement projections. In comparing the two sets of numbers, the intersection expected to experience the most dramatic decrease in peak hour traffic is Colfax Avenue and Fitzsimons Parkway in which the total PM peak hour traffic passing through this intersection would decrease by 16 percent.

FIGURE 3.2 DAILY VOLUMES

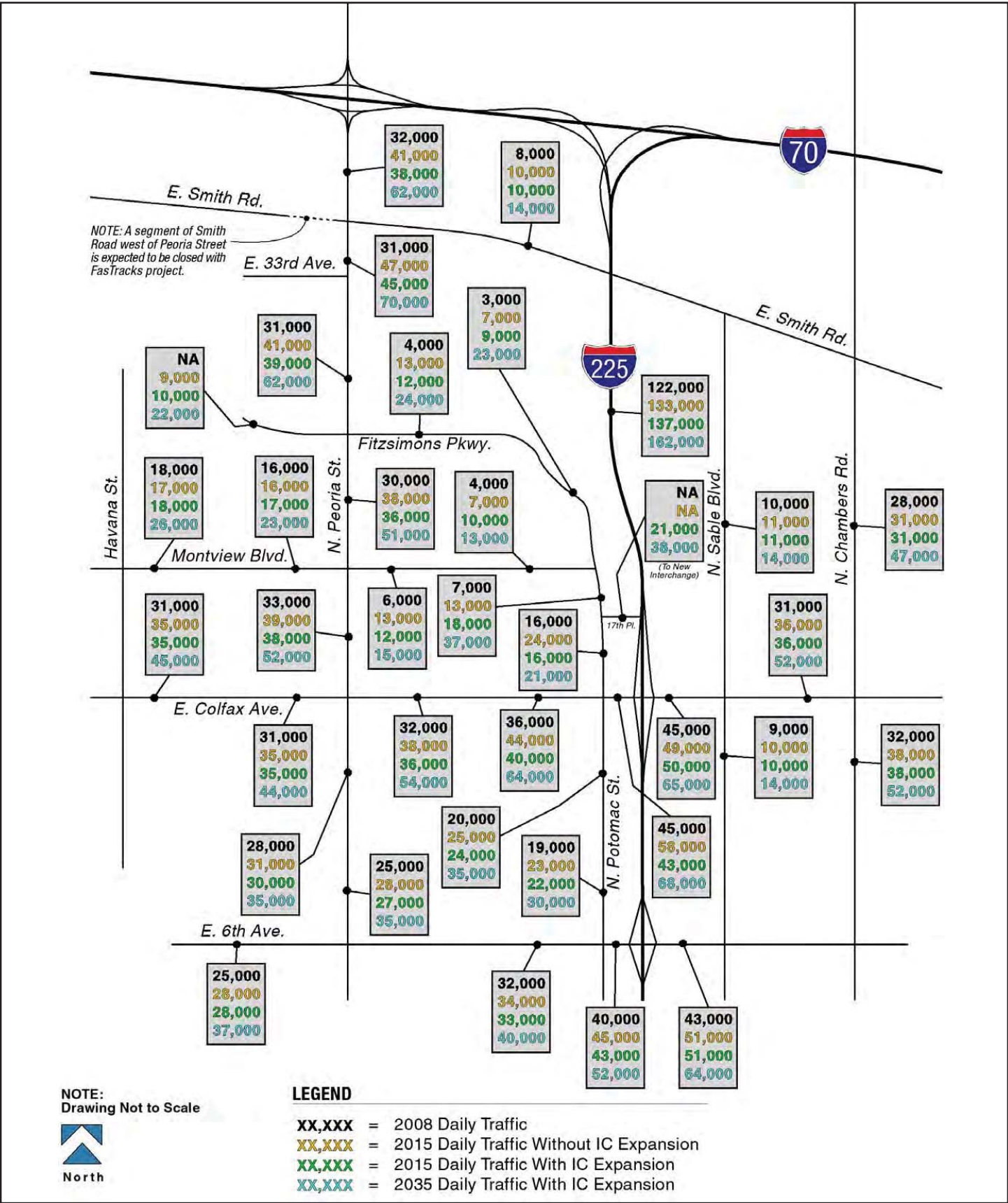


FIGURE 3.3 2015 PM PEAK HOUR TRAFFIC VOLUMES - NO NEW COLFAX INTERCHANGE

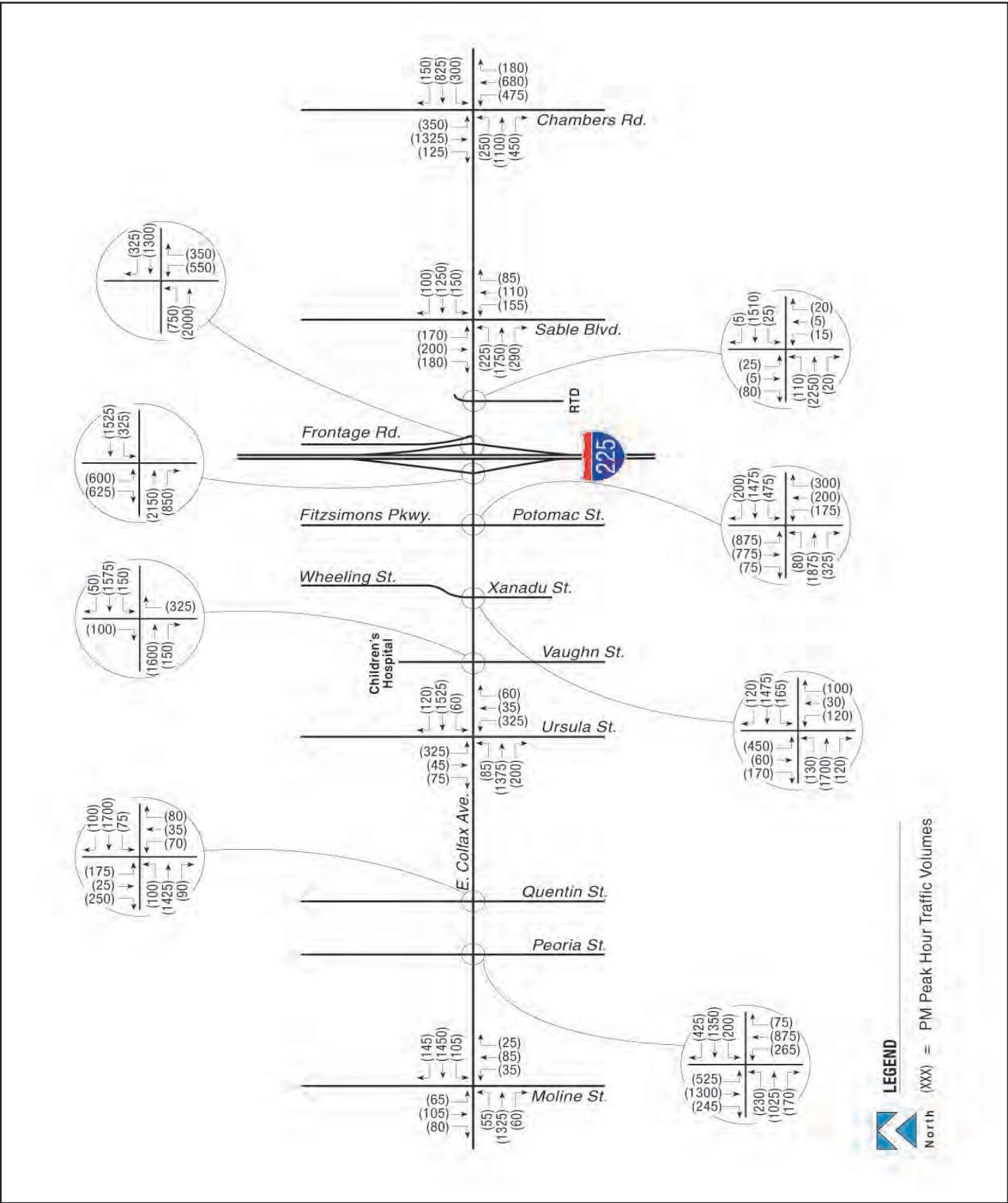
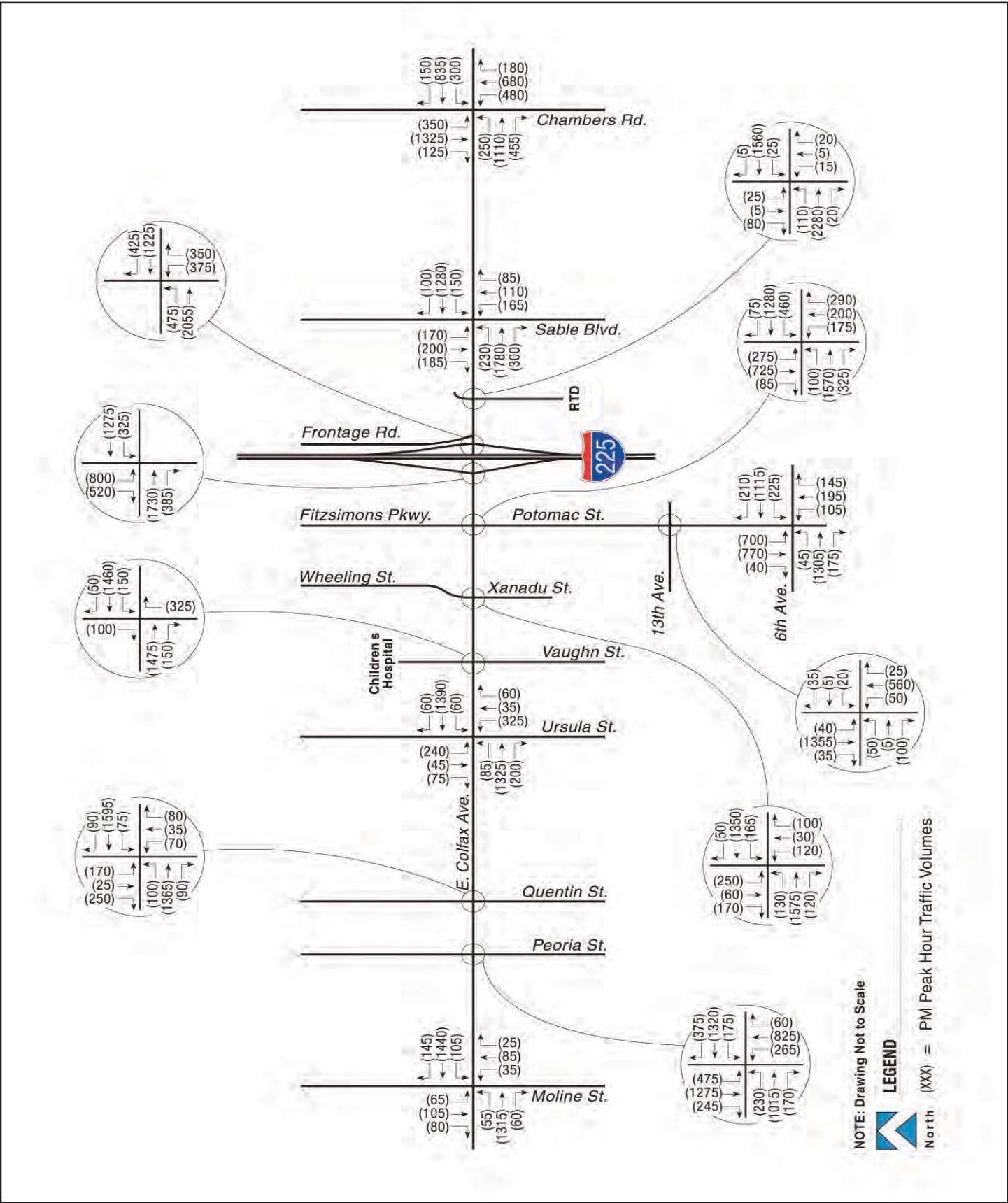


FIGURE 3.4 2015 PM PEAK HOUR TRAFFIC VOLUMES - WITH NEW COLFAX INTERCHANGE



3.2.2 Year 2035 Traffic Projections

By 2035, there is significantly more growth expected in the study area. The traffic forecasts in the area are expected to increase significantly from 2015. Depending on the roadway, increases of as much as 60 percent over the 2015 traffic projections are anticipated. The busiest arterial segment in the study area would continue to be Colfax Avenue between Fitzsimons Parkway and the West I-225 Ramps, serving 68,000 vehicles per day, even with the interchange improvements.

Many other arterial roads will also experience significant increases. Other sections of Colfax Avenue will exceed 60,000 vehicles per day, as will Peoria Street north of Fitzsimons Parkway. Roadways internal to Fitzsimons will also experience increases with Fitzsimons Parkway estimated to carry a range of 21,000 to 37,000 vehicles per day. Montview Boulevard is projected to serve as much as 16,000 vehicles per day by 2035.

3.2.3 Directional Distribution of Fitzsimons Campus Traffic

Trips from the Fitzsimons TAZ projected by the travel demand model were analyzed in detail with respect to the directionality of inbound and outbound trips. The results are shown in Figure 3.5. The largest magnitude of trips associated with the Fitzsimons campus is south along I-225 in which 20 percent of the Fitzsimons campus traffic is estimated to be headed (or coming from). Other major corridors serving Fitzsimons campus traffic includes Colfax Avenue (10 percent to/from the west and 14 percent to/from the east) and I-70 (9 percent to/from the west and 10 percent to/from the east). 6th Avenue to/from the west also serves a notable portion of Fitzsimons campus trips; many of these also make use of Alameda Avenue further west.

3.3 Traffic Operations

3.3.1 Volume-to-Capacity Analysis

Using the Fitzsimons regional transportation model, planning-level volume-to-capacity analyses were conducted to identify potential bottleneck locations as shown in Figures 3.6 through 3.8. These figures show which roadways would be serving traffic volumes below or above their intended design level. This analysis suggests that the 2015 congestion “hot spots” would be located along Colfax Avenue, east of Ursula Street. The most critical point of congestion will be the segment between Fitzsimons Parkway and the West I-225 Ramps, but over-saturated conditions could take place as far east as Chambers Road according to the raw modeling volume-capacity output.

In 2015, Peoria Street and Colfax Avenue would both be at or above their design level of traffic. The I-225/Colfax interchange area would be well over its intended design level without the benefit of the interchange improvements. Montview Boulevard, providing only two through lanes of traffic through the Fitzsimons campus, would also be at or over its design level by 2015. With the I-225/Colfax interchange improvements, the critical Colfax Avenue segment east of Fitzsimons Parkway would be greatly relieved. East of I-225, Colfax would be over-saturated with or without the new interchange improvements.

By 2035, the dramatic increase in traffic will essentially result in all of the arterial roads operating at capacity including Colfax Avenue, Peoria Street, sections of Fitzsimons Parkway, and sections of Montview Boulevard. Colfax Avenue, at the I-225 interchange, could experience a severe congestion during peak times. Previous studies of Montview Boulevard have identified this street as a major spine through the campus. Previous studies recommended that this street remain a three lane street, providing an urban multi-modal corridor character. The implementation of this street section would remain as it is today.

3.3.2 Colfax Avenue Simulation Analysis

Existing traffic conditions along with results from the travel demand forecasts show that Colfax Avenue is one of the most heavily used and congested facilities in the Fitzsimons study area. The segment of Colfax Avenue from Peoria Street to Chambers Road was evaluated in more detail to study the effects of the closely spaced intersections and multimodal transportation. Queuing from upstream intersections affects congestion along this segment of Colfax Avenue and is most effectively assessed with traffic simulation. VISSIM, a multi-modal transportation micro-simulation software, was used to analyze traffic operations along Colfax Avenue for two scenarios. The two scenarios compared were 2015 PM Peak Hour Existing Interchange Layout and 2015 PM Peak Hour with Split Diamond Interchange. VISSIM was used to account for the effect of pedestrians and buses on traffic operations

FIGURE 3.5 FITZSIMONS CAMPUS TRIP DISTRIBUTION

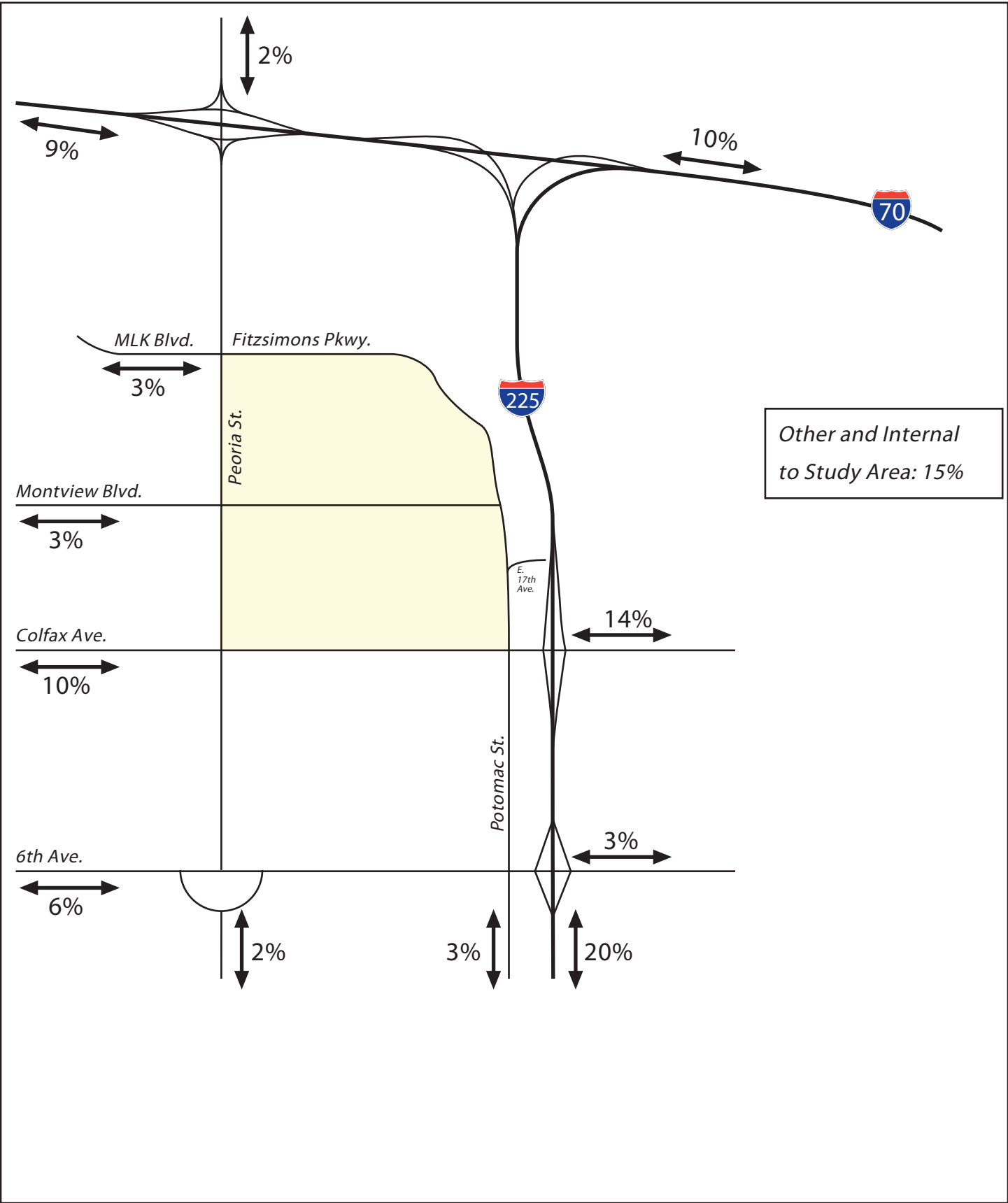


FIGURE 3.6 2015 VOLUME-TO-CAPACITY RELATIONSHIP WITH NO INTERCHANGE IMPROVEMENTS



FIGURE 3.7 2015 VOLUME-TO-CAPACITY RELATIONSHIP WITH INTERCHANGE IMPROVEMENTS



FIGURE 3.8 2035 VOLUME-TO-CAPACITY RELATIONSHIP



along Colfax Avenue and because static transportation models do not do a good job of accounting for queues spilling back through intersection when there is a high level of congestion.

The simulation area stretched from Moline Street to Chambers Road and included all signalized intersections and planned driveways for the Fitzsimons medical campus. The simulation area includes the interchange to I-225. Traffic signal timing plans were developed for the 2015 scenarios with input from City of Aurora staff. 2015 PM peak hour traffic projections were developed from the 2015 Regional Model analysis done for this project. The intersection level traffic projections are shown in Figures 3.3 and 3.4.

Ten VISSIM model runs were conducted for each scenario and the delay results were calculated as the average delay at each intersection over the 10 runs. Table 3.2 displays the LOS results for the 2015 PM Peak Hour Existing Interchange Layout scenario and Table 3.3 displays the LOS results for the 2015 PM Peak Hour with Split Diamond Interchange scenario.

TABLE 3.2 COLFAX CORRIDOR PM PEAK HOUR OPERATIONS - 2015 NO INTERCHANGE IMPROVEMENT

Intersection	Average Delay (sec/veh)	LOS
Moline St/Colfax Ave	33.0	C
Peoria St/Colfax Ave	120.0	F
Quentin St/Colfax Ave	87.9	F
Ursula St/Colfax Ave	81.5	F
Children's Way-Vaughn St/Colfax Ave	76.0	F
Wheeling St-Xanadu St/Colfax Ave	112.3	F
Fitzsimons Pkwy-Potomac St/Colfax Ave	94.3	F
I-225 SB Off Ramp-I-225 SB On Ramp/Colfax Ave	31.0	*
I-225 NB On Ramp-I-225 NB Off Ramp/Colfax Ave	28.6	*
RTD Driveway/Colfax Ave	19.1	*
Sable Blvd/Colfax Ave	33.0	*
Chambers Rd/Colfax Ave	53.3	*
Source: Fehr & Peers, 2008 - VISSIM		
Note: *LOS not reported because the intersections serve less than 100% of the demand volume due to severely congested conditions.		

TABLE 3.3 COLFAX CORRIDOR PM PEAK HOUR OPERATIONS - 2015 WITH INTERCHANGE IMPROVEMENT

Intersection	Average Delay (sec/veh)	LOS
Moline St/Colfax Ave	22.1	C
Peoria St/Colfax Ave	104.8	F
Quentin St/Colfax Ave	59.7	E
Ursula St/Colfax Ave	28.1	C
Children's Way-Vaughn St/Colfax Ave	2.4	A
Wheeling St-Xanadu St/Colfax Ave	32.8	C
Fitzsimons Pkwy-Potomac St/Colfax Ave	49.2	D
I-225 SB Off Ramp-I-225 SB On Ramp/Colfax Ave	42.9	D
I-225 NB On Ramp-I-225 NB Off Ramp/Colfax Ave	38.9	D
RTD Driveway/Colfax Ave	39.9	D
Sable Blvd/Colfax Ave	46.9	D
Chambers Rd/Colfax Ave	55.2	E
Source: Fehr & Peers, 2008 - VISSIM		

Table 3.4 compares the travel times between Peoria Street and Chambers Road for the two scenarios.

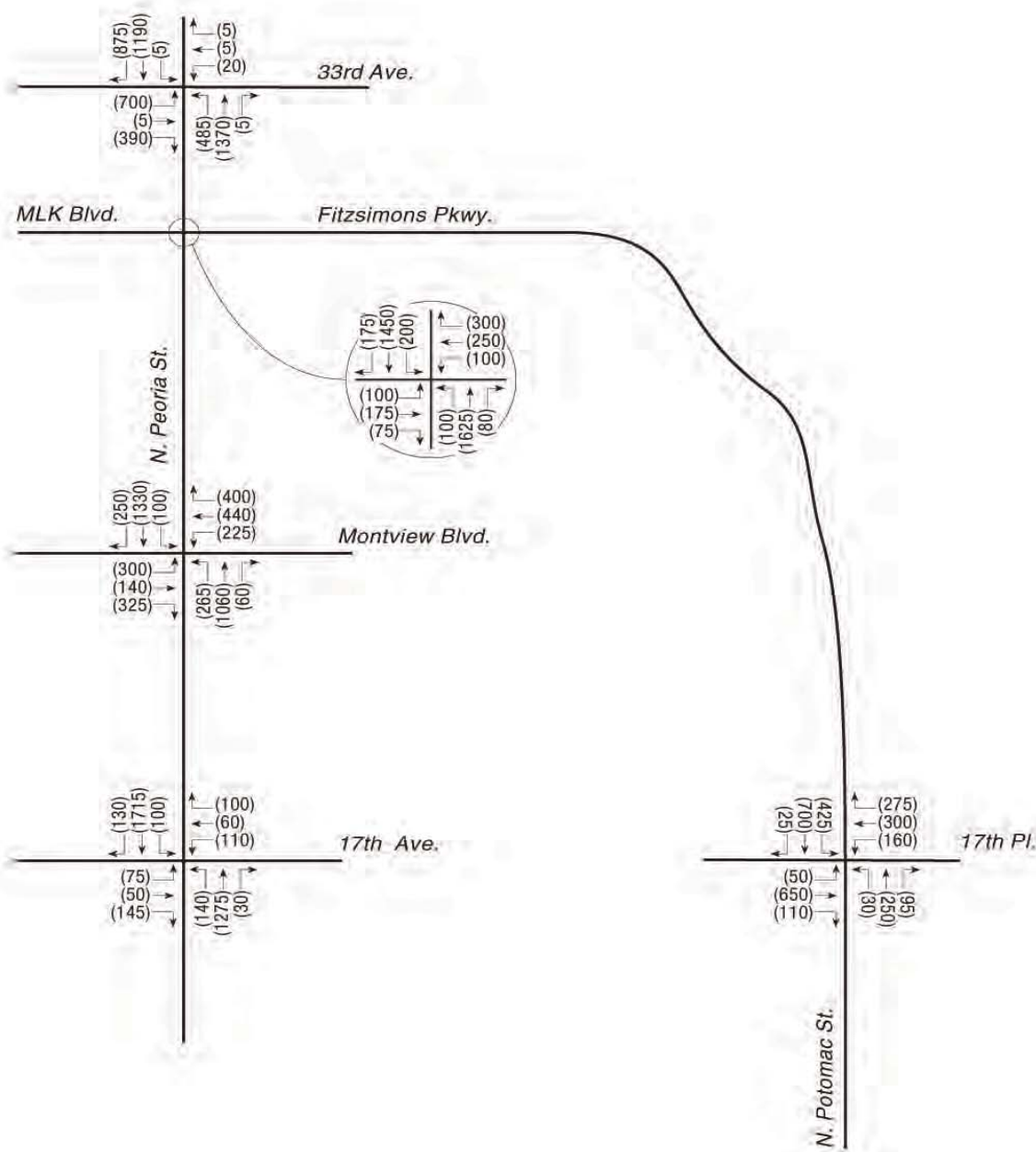
TABLE 3.4 2015 PM PEAK HOUR AVERAGE TRAVEL TIMES ALONG THE COLFAX CORRIDOR

Direction	2015 PM Peak Hour Existing Interchange Layout	2015 PM Peak Hour with Split Diamond Interchange
Westbound	7 min 50 sec	8 min 1 sec
Eastbound	14 min 26 sec	8 min 18 sec
Source: Fehr & Peers, 2008 - VISSIM		

Traffic conditions improve with the split diamond interchange. Under the 2015 PM Peak Hour Existing Interchange Layout scenario, the eastbound vehicular queue extends from the Colfax/I-225 interchange back past Peoria Street during the PM peak hour. The interchange intersections are a bottleneck location that cannot serve the 2015 PM demand. This is the reason that all signalized intersections adjacent to the Fitzsimons campus function at LOS F. As reflected in Table 3.2, intersections east of the interchange are not reported due to simulation traffic not being able to reach those intersections. Congestion at the interchange blocks traffic and prevents accurate LOS results.

The Split Diamond Interchange scenario redirects some of the demand at the I-225 interchange to the 17th Place ramps and allows the signalized intersections along Colfax Avenue to perform better.

FIGURE 3.9 2015 PM PEAK HOUR TRAFFIC VOLUMES WITH COLFAX AVENUE/I-225 INTERCHANGE IMPROVEMENTS



NOTE: Drawing Not to Scale



LEGEND

(XXX) = PM Peak Hour Traffic Volumes

FIGURE 3.10 2035 PM PEAK HOUR TRAFFIC VOLUMES SOUTH STUDY AREA

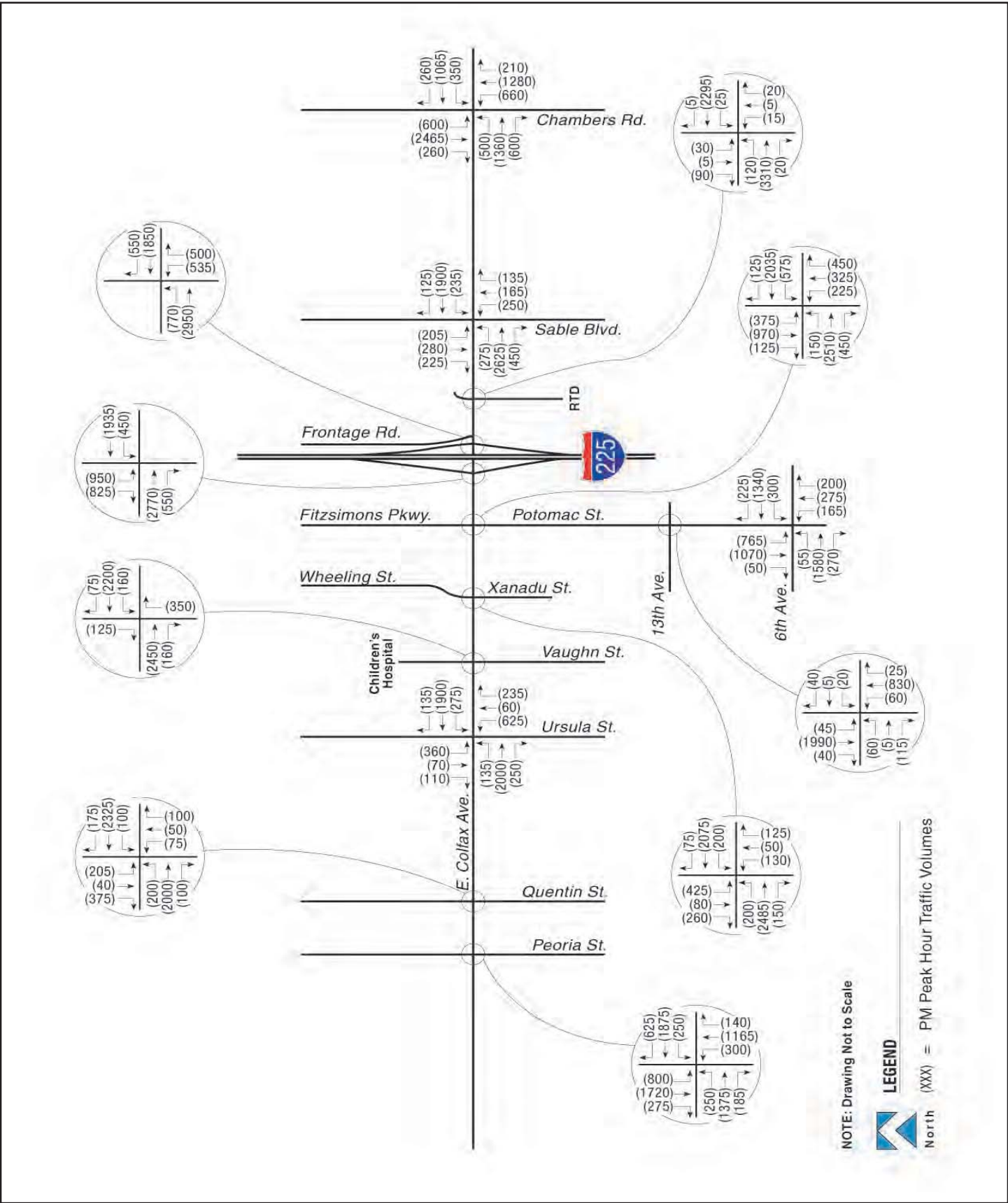
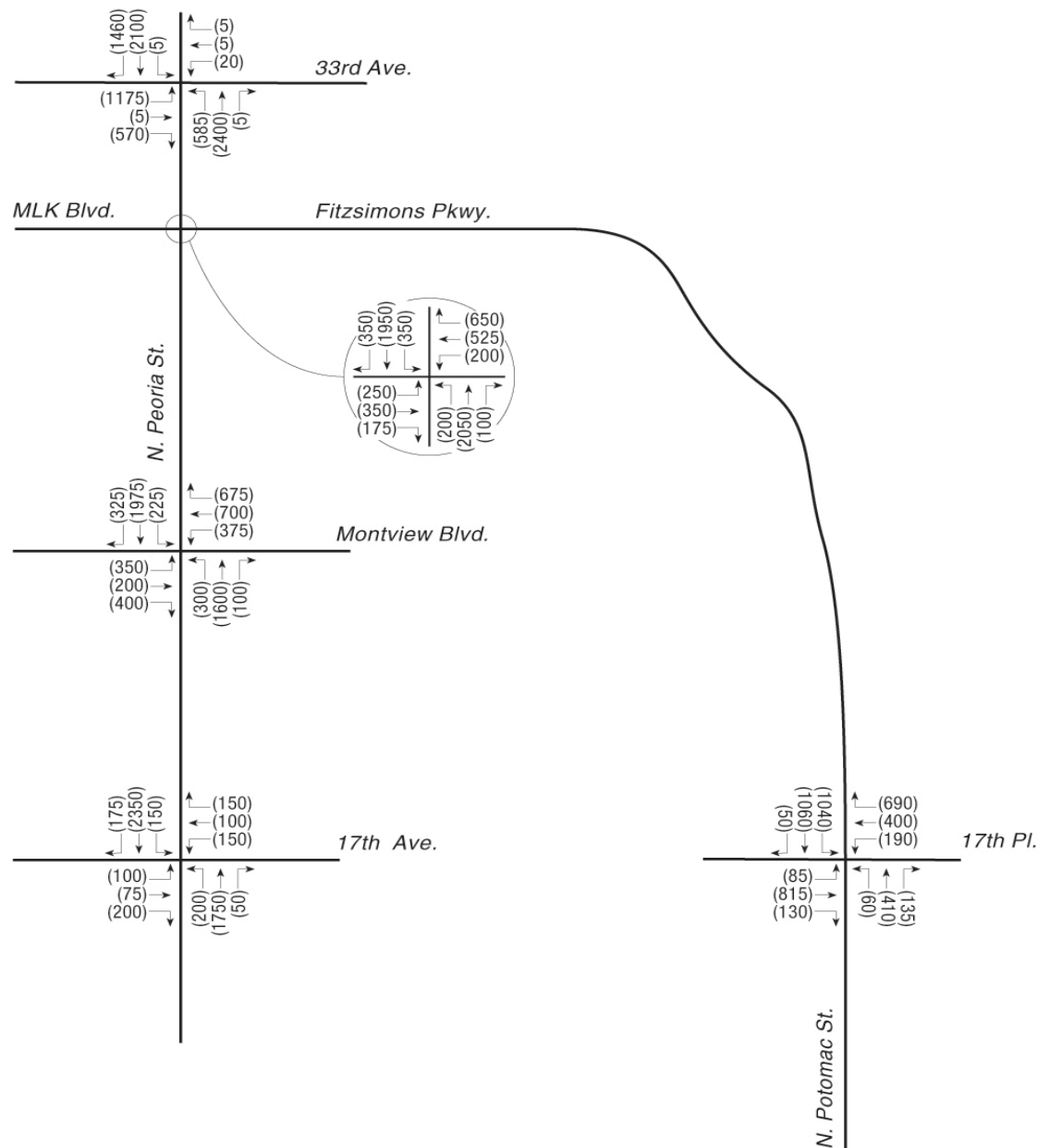


FIGURE 3.11 2035 PM PEAK HOUR TRAFFIC VOLUMES NORTH STUDY AREA



NOTE: Drawing Not to Scale



LEGEND

(XXX) = PM Peak Hour Traffic Volumes

3.3.3 Intersection Level of Service Analysis

PM peak hour intersection turning movement volumes were developed for select intersections within the study area from the 2015 and 2035 models. These volumes were used to perform intersection level operations analysis for intersections in addition to the analysis done for the Colfax corridor simulation described in section 3.3.2. Based on the results of the simulation analysis, all additional 2015 LOS analysis includes the new I-225 interchange configuration. Synchro traffic analysis software was used to determine the LOS and delay at these intersections based on the Highway Capacity Manual procedures. The PM peak hour volumes used for the 2015 and 2035 analyses are shown in Figures 3.9 through 3.11.

The 2015 LOS results are presented in Table 3.5 and include results with and without intersection capacity improvements. The capacity improvements assumed are noted in the last column of Table 3.5. Some of these improvements have been incorporated into project recommendations described in Chapter 4 while others are likely to be incorporated with improvements required by future development.

TABLE 3.5 2015 PM PEAK HOUR TRAFFIC OPERATIONS AT KEY INTERSECTIONS

Intersection ¹	No Action LOS ²	LOS ² after Capacity Improvements	Capacity Improvements ³
13th Ave/ Potomac St	F (E)	A	Signalization
17th Pl/ Fitzsimons Pkwy	F	C	SB triple LT lanes, EB RT lane, WB thru and thru-RT lane
17th Ave/ Peoria St	B	-	No capacity improvements recommended
Montview Blvd/ Peoria St	E	E	WB LT lane Dual EB thru lanes
MLK Blvd - Fitzsimons Pkwy/ Peoria St	F	C	Dual LT lanes on NB, SB, EB approaches
33rd Ave/ Peoria St	F	C	Dual LT lanes on NB, SB, EB approaches; single WB LT lane
<p>Source: Fehr & Peers, February 2009</p> <p>1. All intersections are signalized except 13th Ave/Potomac St which is currently side-street stop-control.</p> <p>2 The signalized intersection LOS is reported for the overall intersection. The unsignalized intersection results are reported for the worst case approach, with the overall intersection results in parenthesis for informational purposes.</p> <p>3 RT, LT indicates right turn, left turn</p>			

The 2035 LOS results are presented in Table 3.6 which reflects operations with and without intersection turn lane improvements. Some of these improvements are listed as recommended projects in Chapter 4 while others would be constructed at a future time with other projects or development. The Peoria Street/Colfax Avenue intersection is constrained by through laneage reductions both west and south of the intersection. Although triple left turn lanes may increase capacity, in this case, the LOS would not improve beyond LOS F.

TABLE 3.6 2035 PM PEAK HOUR TRAFFIC OPERATIONS

Intersection ¹	NO Action LOS ²	LOS ² after Capacity Improvements	Capacity Improvements ³
Moline St/Colfax Ave	C	-	No capacity improvements recommended
Peoria St/Colfax Ave	F (209 sec/veh) ³	F ⁵ (143 sec/veh) ³	NB, WB, and EB dual LT lanes, NB RT lane
Quentin St/Colfax Ave	C	-	No capacity improvements recommended
Ursula St/Colfax Ave	E	-	
Children's Way-Vaughn St/Colfax Ave	C	-	
Wheeling St-Xanadu St/Colfax Ave	C	-	
Fitzsimons Pkwy-Potomac St/Colfax Ave	E / F	E	NB free RT lane
I-225 SB Off Ramp-I-225 SB On Ramp/Colfax Ave	F	D	WB dual LT lanes SB triple LT lanes, EB and SB RT lanes,
I-225 NB On Ramp-I-225 NB Off Ramp/Colfax Ave	F	D	EB dual LT lanes, WB RT lane
RTD Driveway/Colfax Ave	A	-	No capacity improvements recommended
Sable Blvd/Colfax Ave	F	E	EB RT lane
Colfax Ave/ Chambers Rd ⁴	F	E	WB dual LT lanes, NB and SB RT lanes
13th Ave/ Potomac St	B	-	No capacity improvements recommended
17th Pl/ Fitzsimons Pkwy	F	D	SB triple LT lanes, EB RT lane, WB thru and thru-RT lane
17th Ave/ Peoria St	C	-	No capacity improvements recommended
Montview Blvd/ Peoria St	F	E	WB LT lane Dual EB thru lanes
MLK Blvd - Fitzsimons Pkwy/ Peoria St	F	D	Dual LT lanes on NB, SB, EB approaches
33rd Ave/ Peoria St	F	E	Triple EB LT Lanes Dual NB LT Lanes Single WB LT Lane Dual SB LT Lanes

Source: Fehr & Peers, February 2009

1. All intersections are signalized

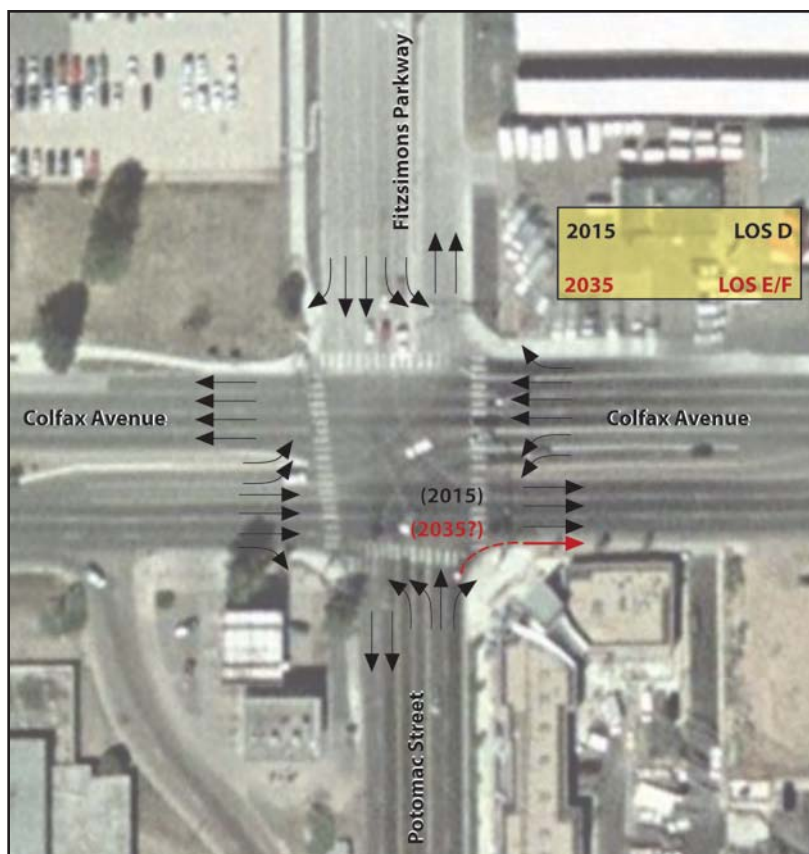
2 The signalized intersection LOS is reported for the overall intersection. The unsignalized intersection results are reported for the worst case approach, with the overall intersection results in parenthesis for informational purposes.

3. RT, LT indicates right turn, left turn

4. Intensive capacity improvements needed to meet 2035 demand

At the intersection of Fitzsimons Parkway/Colfax Avenue, the laneage configuration is evaluated in concert with the ability to provide a better pedestrian crossing environment. The current configuration would reach capacity with the projected 2035 traffic. The addition of a northbound free right turn lane in conjunction with the widening of the Colfax Avenue bridge over Toll Gate Creek would increase capacity but could negatively affect crossing pedestrians. Figure 3.12 illustrates the option of adding a northbound free right turn lane in 2035. This long range capacity need could also have significant property impacts and should be evaluated in light of these trade offs. Without this improvement the intersection would operate on the border of LOS E/F which may be deemed acceptable given the trade-offs for pedestrian crossings.

FIGURE 3.12 FITZSIMONS PARKWAY/COLFAX AVENUE INTERSECTION CONFIGURATION



3.4 Light Rail Station Area Activity

3.4.1 Ridership Projections

The DRCOG model was used to determine the future levels of ridership predicted at the future light rail stations within the study area. The ridership estimates shown in Table 3.7 were confirmed with RTD staff. These ridership projections are used for planning purposes to size park-n-Rides and other infrastructure needs at these stations.

In addition, these projections are used to determine the amount of pedestrian activity that is likely to be seen at the stations. Based on the projections, it is clear that the Montview Station will be the primary station for Fitzsimons employees. As such, bicycle and pedestrian connectivity between the station and medical buildings should be of paramount concern in the station area planning process. These projections were also used to factor pedestrian crossings of study area streets.

TABLE 3.7 PREDICTED RIDERSHIP AT RTD LIGHT RAIL STATIONS

Station	AM Peak Hour		PM Peak Hour	
	Boardings	Alightings	Boardings	Alightings
13th Ave. Station	150-200	10-25	25-50	150-200
Colfax Station	100-150	225-275	200-250	150-200
Montview Station	50-100	750-800	700-750	150-200
Peoria/Smith Station ¹	450-500	550-600	550-600	500-550

Source: DRCOG Regional Model (2035)
Notes: 1. Peoria/Smith Station includes transfers to/from the East Corridor

3.4.2 Forecasted Mode Share

The travel demand model includes a series of mode split calculations which attempt to estimate the level of activity that each mode might serve. The major modes of consideration include driving alone, carpooling, and transit. Bicycling, walking, and working at home are other legitimate options, but these have not historically been significant in serving the Fitzsimons medical campus demand. Table 3.8 shows the modal split of work-related trips to the medical campus resulting from the model and from recent employee surveys.

TABLE 3.8 FITZSIMONS WORK TRIP MODE SPLIT

Mode	Fitzsimons Campus Travel Behavior Survey	2015 Model	2035 Model	2035 Model with Parking Penalty
Drive Alone	81%	78%	77%	64%
Carpool	6%	14%	14%	19%
Transit (Bus or Rail)	9%	8%	9%	17%
Walk or Bicycle	4%	Minimal	Minimal	Minimal

Source: DRCOG Regional Model & Fitzsimons Camps Travel Survey, 2008

Table 3.8 shows that the model roughly mimics the recent survey of employees with respect to those driving alone. The model may be overestimating the percentage relative to those who carpool, but the model is not able to fully appreciate the bicycle and walk mode relative to serving trips. Also, the 2015 and 2035 models include the light-rail service planned to pass through the area as part of the FasTracks program. The results might suggest that the model is low in assigning trips onto transit and high relative to carpool usage. Relative to traffic volume forecasts, the two may approximately offset.

A sensitivity model run was conducted that introduced paid parking to Fitzsimons employees. For purposes of this run, an aggressive fee of \$10.00 per day (half of the model's Downtown Denver parking cost) was entered into the modeling to gauge mode shifts that might result. These results are shown in the last column of Table 3.8.

With higher parking costs, the model would suggest that roughly one-third of all person-trips would be served by a mode other than driving alone. Increased parking costs would significantly increase the transit mode and moderately increase carpooling. This increased parking cost sensitivity run was also reviewed with respect to impact on Fitzsimons trip-making and traffic volumes along the perimeter campus arterials. Results indicates that approximately five percent fewer trips would be generated by Fitzsimons uses and that Colfax Avenue and Peoria Street traffic volumes would be one to two percent less compared to free parking at Fitzsimons.

3.4.3 Station Area Access

Bus access to the Colfax Station would best be served with bus stops on Colfax Avenue. The Colfax Station area plan recommends that the bus-to-rail transfers would occur on both the north and south sides of Colfax Avenue between Fitzsimons Parkway and Tollgate Creek. The station area plan shows that the buses would have a dedicated lane (not a pull out) to make the stops in and an additional 14' of right-of-way for shelters. The station bridge over Colfax Avenue would provide access to the platform from the bus transfer points on both sides of Colfax Avenue.

3.5 Pedestrian Activity

With the new development, rail transit stations, and job growth taking place in the Fitzsimons study area, pedestrian activity is projected to increase significantly. New development along the south side of Colfax Avenue will increase the number of pedestrians crossing Colfax Avenue between the medical campuses and hotel, office, residential and retail activities. Several challenges need to be addressed for future pedestrian travel. Among these challenges are pedestrian trail connectivity and pedestrian crossings of Major Arterial streets such as Colfax Avenue and Fitzsimons Parkway.

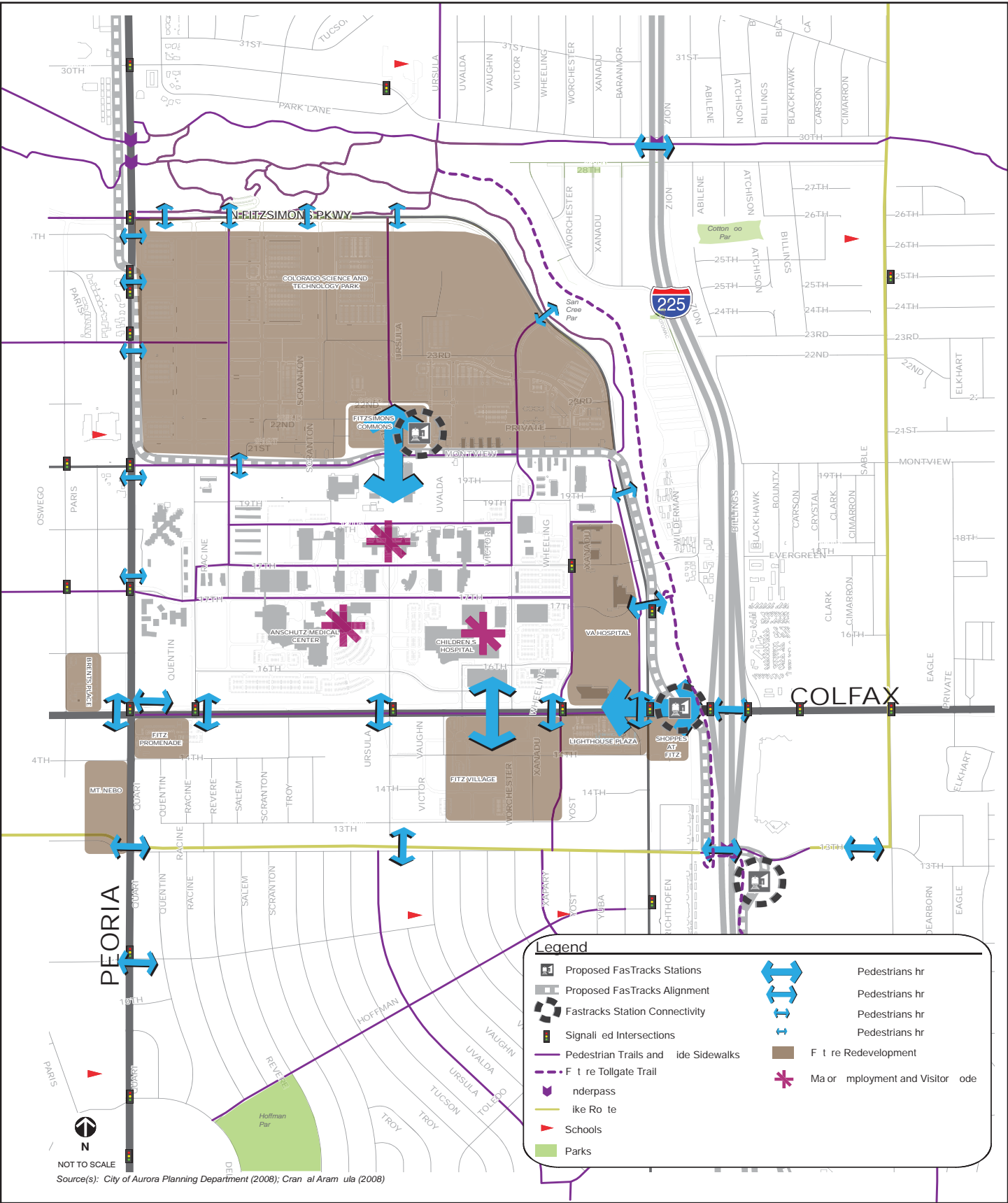
Another challenge related to pedestrian activity is the need for enhanced connections across I-225. This currently acts as a barrier between development on the east side of the freeway and the Fitzsimons medical campus. There are currently three locations to cross I-225 in the study area: the Sand Creek Trail at 30th Avenue, along Colfax Avenue, and at 13th Avenue. The 13th Avenue pedestrian connection will be enhanced with the 13th Avenue extension described in Chapter 4. In addition, the pedestrian connections along Colfax Avenue should be strengthened with the continued development of the Fitzsimons campus and the area south of Colfax Avenue. In the future, if redevelopment occurs on the east side of I-225 north of Colfax Avenue it may be necessary to consider an additional pedestrian crossing of I-225 between Colfax Avenue and the Sand Creek Trail.

Pedestrian traffic projections are not directly included in travel demand models. Alternative means of projecting pedestrian traffic must be used to determine a general level of activity. As part of this process, the majority of new pedestrian traffic anticipated to come from the new light rail stations, and from new development adjacent to the Fitzsimons medical campus was quantified on an order of magnitude basis to begin to evaluate the pedestrian crossing treatments.

Results from the travel demand model were used to determine the number of person trips that are projected between the main Fitzsimons campus Traffic Analysis Zone (TAZ) and the area south of Colfax Avenue. These trips were then factored using regional mode split and average pedestrian trip length data from DRCOG. It is projected that year 2035 pedestrian trips across Colfax Avenue will increase by approximately 200 to 300 trips during each of the morning and afternoon peak hours. This level of pedestrian activity is expected the highest in the City. Figure 3.13 shows relative pedestrian crossing activity at the major crossing locations that could be expected in 2035.

The 2015 PM peak hour VISSIM model was used to analyze the effects of adding a leading pedestrian interval to the east-west crosswalk on the north side of the Colfax Avenue/Fitzsimons Parkway intersection. A six second interval was used, thus allowing pedestrians six seconds to get into the crosswalk before the westbound traffic signal turned green. In addition, southbound and westbound right-turns on red (RTOR) were prohibited. The analysis shows that the leading pedestrian interval had a minimal effect on overall PM traffic operations as the delay per vehicle increased by just over 2 seconds. The effect may be more noticeable during the AM peak because there is a higher westbound right turn demand.

FIGURE 3.13 PEDESTRIAN ACTIVITY



3.6 Bicycle Activity

Colorado has a great climate for bicycling. However, the percentage of people that reported bicycling to work was less than 1% in Colorado according to the 2000 Census. A survey published by the Colorado Department of Transportation (CDOT) showed just over 2% of Coloradoans bike to work. In 2006, a study conducted by the University of Colorado found that 11% of campus employees walk or bike to work at the Fitzsimons campus at least one day a week. This suggests that bicycling is a viable mode of transportation to the Fitzsimons medical campus with existing demand that far exceeds the local averages.

Bicycle access to the Fitzsimons area will continue to be very important, especially as traffic conditions worsen. With demonstrated existing demand and projected growth on campus, improved connections to campus from the surrounding off-street trail network and transit stops and stations will be needed in addition to the on-street network to enhance bicycle access and safety.

4. PROJECT RECOMMENDATIONS

This section provides a list of projects that are recommended to improve transportation around the Fitzsimons medical campus for all modes. A summary of each project is provided which includes the purpose, location, description, priority, and estimated cost. The projects are grouped by mode. The projects are prioritized in three categories; short range, medium range, and long range. The short range projects are immediate needs that should be completed as soon as funding is available. The medium range projects are generally recommendations that are necessary and tied to the construction of the I-225 FasTracks corridor. As such, these should be planned to occur in conjunction with FasTracks. Long range projects will most likely be necessary to meet the transportation demands around 2035. Some of these improvements may be completed by private developers, or other jurisdictions.

Given the area wide growth and density, the focus of these recommendations was on expanding transportation options for all modes that would help to shift the mode share away from the single occupancy vehicle. As congestion increases, it is expected that this shift could become more pronounced. Although not specifically recommended as a project, parking cost strategies should also be considered for the Fitzsimons campus as these have been shown to be effective tools in reducing congestion both in the model and case studies.

4.1 Roadway

Roadway and street improvements are essential to the accessibility of the Fitzsimons campus as well as to the surrounding areas. Several roadway projects were studied and considered to determine a final set of roadway recommendations for the study area. The final roadway project recommendations are described in the section below and summarized in Figures 4.1 and 4.2. Figure 4.1 provides the laneage configurations that are anticipated to be necessary to serve the 2035 vehicular traffic volumes.

Widen Peoria Street/Sand Creek Bridge

Purpose:	Alleviate a current bottleneck location on Peoria Street, which is the primary north/south arterial used to access the Fitzsimons medical campus. The existing ADT volumes indicate that this improvement would be beneficial now and will be critical by 2015.
Location:	Peoria Street, just north of Fitzsimons Parkway
Description:	Reconstruct and widen bridge from four lanes to six lanes. The 52' wide Peoria Street Sand Creek Bridge is currently a four lane cross section which creates a bottleneck for the six lane street section north and south of the bridge. Projected daily 2015 traffic along Peoria Street is approximately 40,000 vehicles per day which is well above the typical planning level capacity of 30,000 to 32,000 vehicles per day for four lane roadways. A preliminary layout of this improvement is shown in Figure 4.3
Priority:	Short Range
Estimated Cost:	\$22.3 Million

Peoria Street Railroad Grade Separation

Purpose:	Increase safety and reduce vehicular delay by removing the at-grade railroad crossing on Peoria Street.
Location:	Peoria Street, just north of Smith Road
Description:	Provide a grade separation for Peoria Street over the Railroad tracks. Relocate the Smith Road intersection with Peoria Street to a point south of the railroad tracks. Currently the Peoria Station area planning process is evaluating the railroad grade separation in conjunction with the station area planning and access. This would eliminate lengthy delay from the existing freight trains. In addition, the FasTracks East Corridor team has also evaluated the need for the grade separation. The grade separation would benefit the City and County of Denver and could be a shared funding project. In addition, Smith Road is planned to be realigned with the opening of the Peoria-Smith Station. This re-alignment is shown in Figure 4.2.
Priority:	Long Range
Estimated Cost:	\$60 Million (East Corridor estimate) or \$27 Million (TOD Station Area Estimate, Hartwig & Associates)

FIGURE 4.1 PROPOSED 2035 INTERSECTION AND ROADWAY LANEAGE

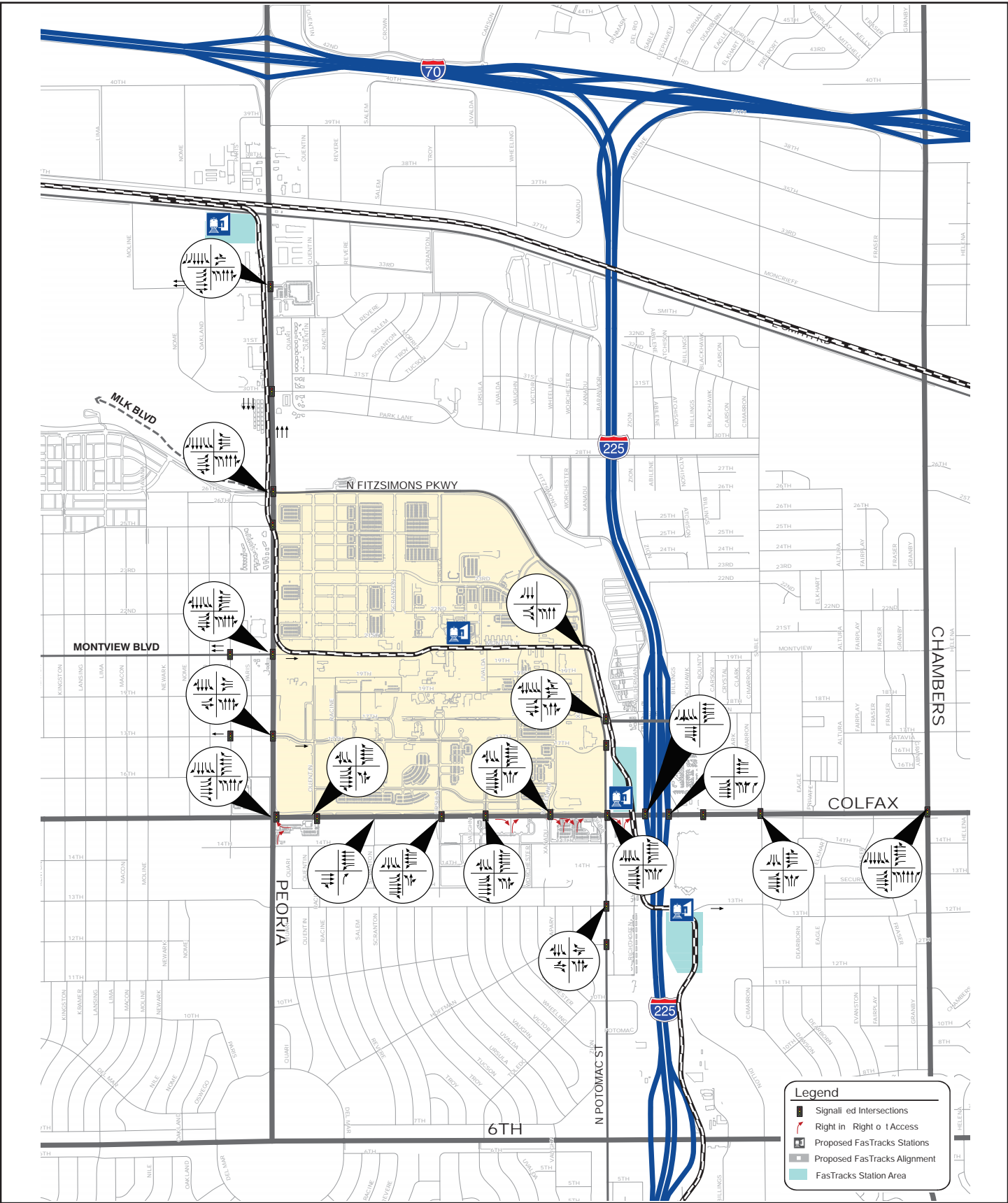


FIGURE 4.2 ROADWAY SYSTEM RECOMMENDATIONS

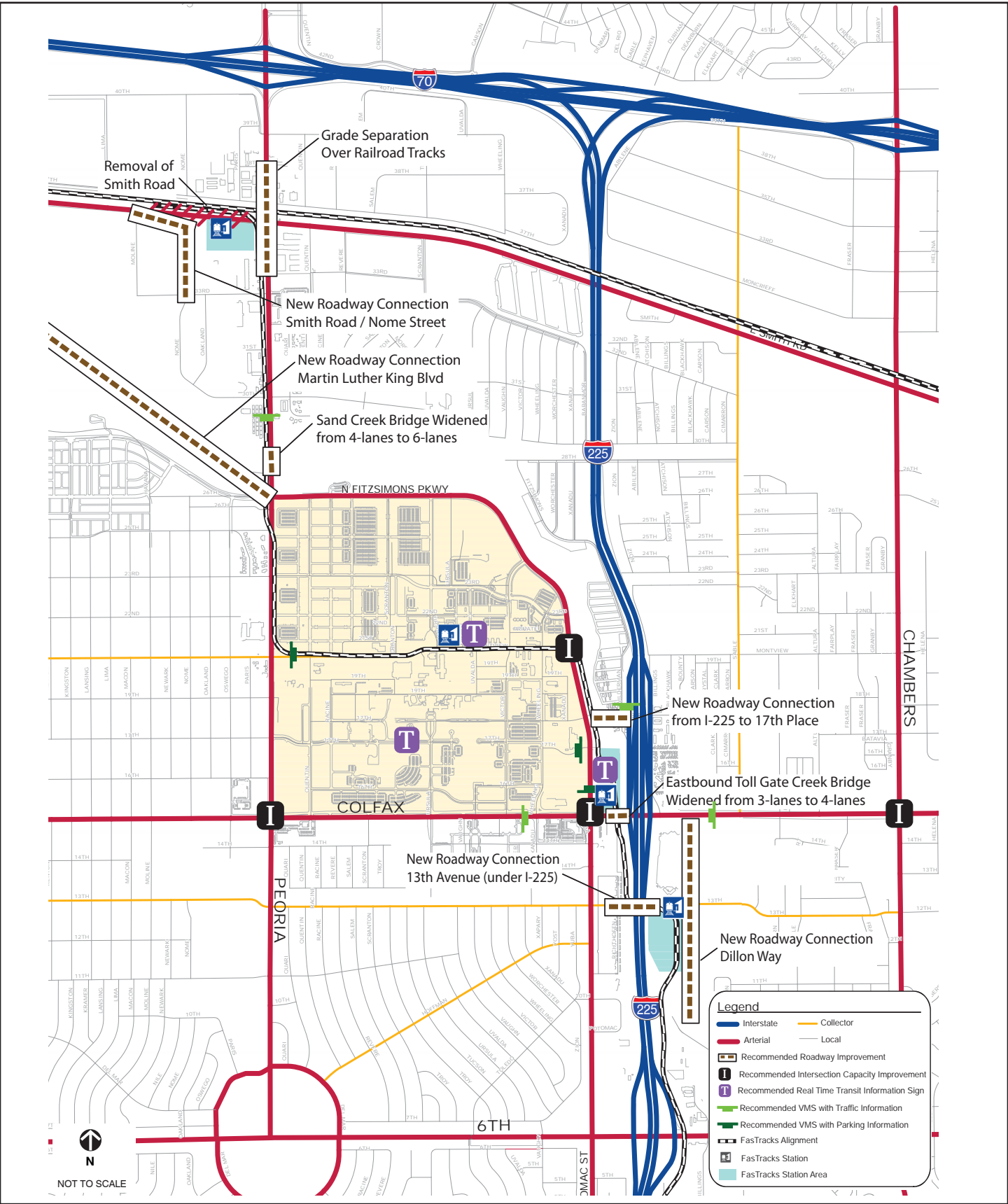


FIGURE 4.3 PEORIA STREET/SAND CREEK BRIDGE



Reconstruct I-225/Colfax Avenue Interchange

- Purpose:** Relieve existing congestion on the I-225 ramps and at surrounding intersections on Colfax Avenue. This will greatly improve access to the Fitzsimons medical campus and surrounding areas.
- Location:** Colfax Avenue and I-225
- Description:** Reconfigure the existing interchange to include ramps and structures to 17th Place at the Fitzsimons campus. The interchange is currently a standard diamond interchange with failing operations due to increased traffic related to the medical campus and surrounding development. The proposed reconstruction shown in Figure 4.4 is a split diamond interchange which would provide access from I-225 directly to 17th Place in addition to Colfax Avenue. This would reduce the traffic demand on Colfax Avenue by providing a second access point to the medical campus from I-225 on 17th Place.
- Priority:** Short Range
- Estimated Cost:** \$45 Million

I-225/Colfax Interchange/Toll Gate Creek Bridge

- Purpose:** Provide long range capacity improvements to the interchange for traffic getting on to I-225.
- Location:** Colfax Avenue, under I-225 and at the bridge over Toll Gate Creek just west of I-225
- Description:** Increase left turn laneage from single to dual left turn lanes under I-225. Widen the existing bridge to provide a right turn lane from Colfax Avenue to the southbound I-225 on-ramp. The widening of this bridge could provide additional laneage across Toll Gate Creek. Although approximately 15,000 fewer daily trips on Colfax Avenue are projected for 2015 with the reconstruction of the I-225/Colfax Avenue interchange, by 2035, increased traffic and failing operations would require improvements on Colfax Avenue. These improvements would include dual left turn lanes onto the northbound and southbound on ramps under the existing bridge and a widening / replacement of the Colfax Avenue bridge over Toll Gate Creek to accommodate a right turn lane onto the southbound I-225 on ramp. The southbound off-ramp would also be expanded to include triple left turn lanes. The resulting improvements are projected to increase the operations to LOS D at the ramp terminals. The proposed configuration is shown in Figure 4.5.
- Priority:** Long Range
- Estimated Cost:** \$3 Million for Toll Gate Creek Bridge widening

Widen Colfax Avenue between Sable Boulevard and Chambers Road

- Purpose:** Provide long range capacity improvements for the east bound traffic on Colfax Avenue.
- Location:** Colfax Avenue between Sable Boulevard and Chambers Road
- Description:** Add one additional east bound through lane resulting in three east bound through lanes. Currently, this segment of Colfax Avenue has three west bound through lanes and two east bound through lanes.
- Priority:** Long Range
- Estimated Cost:** \$486,000

FIGURE 4.4 PROPOSED I-225/COLFAX AVENUE INTERCHANGE

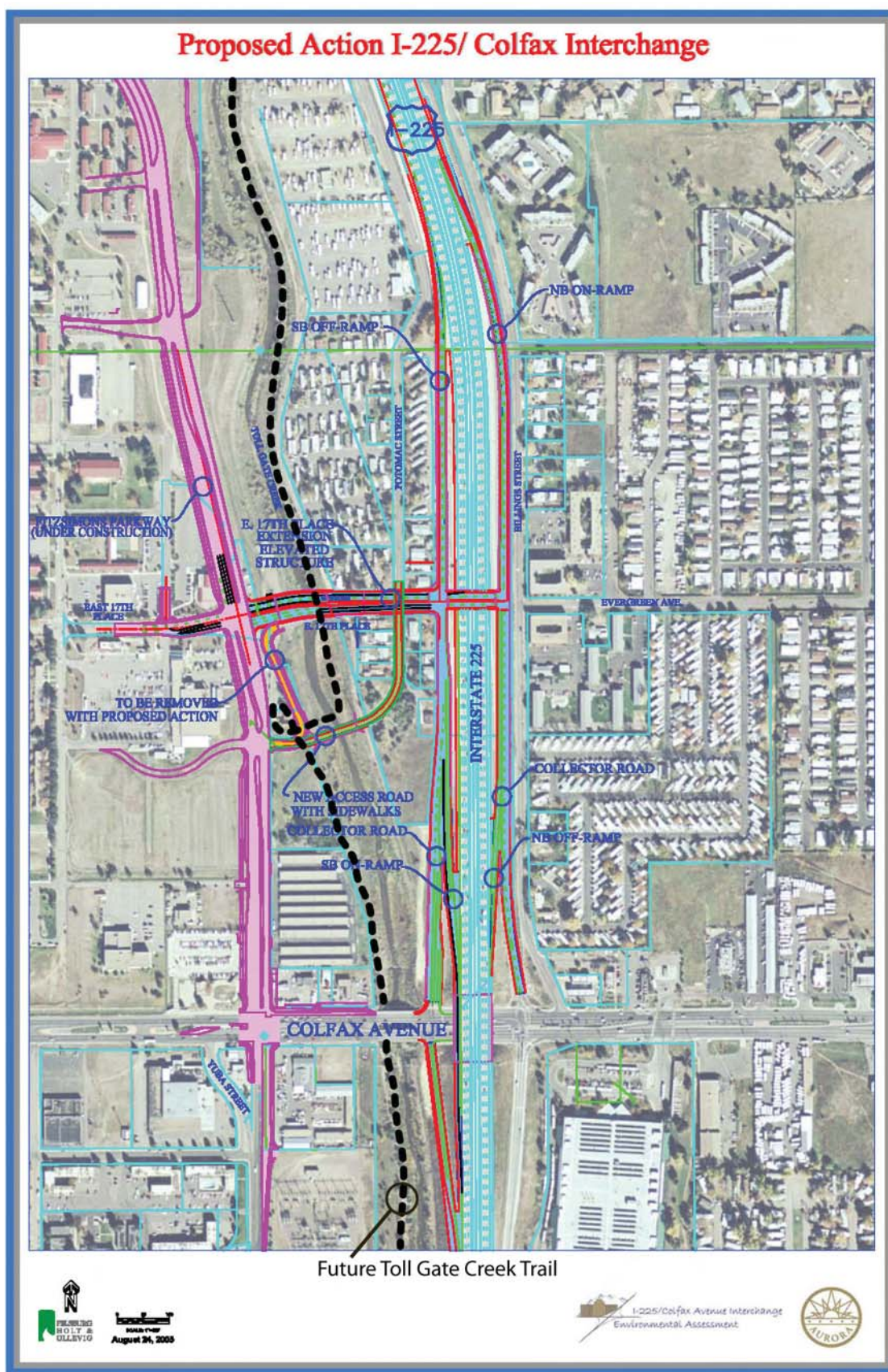
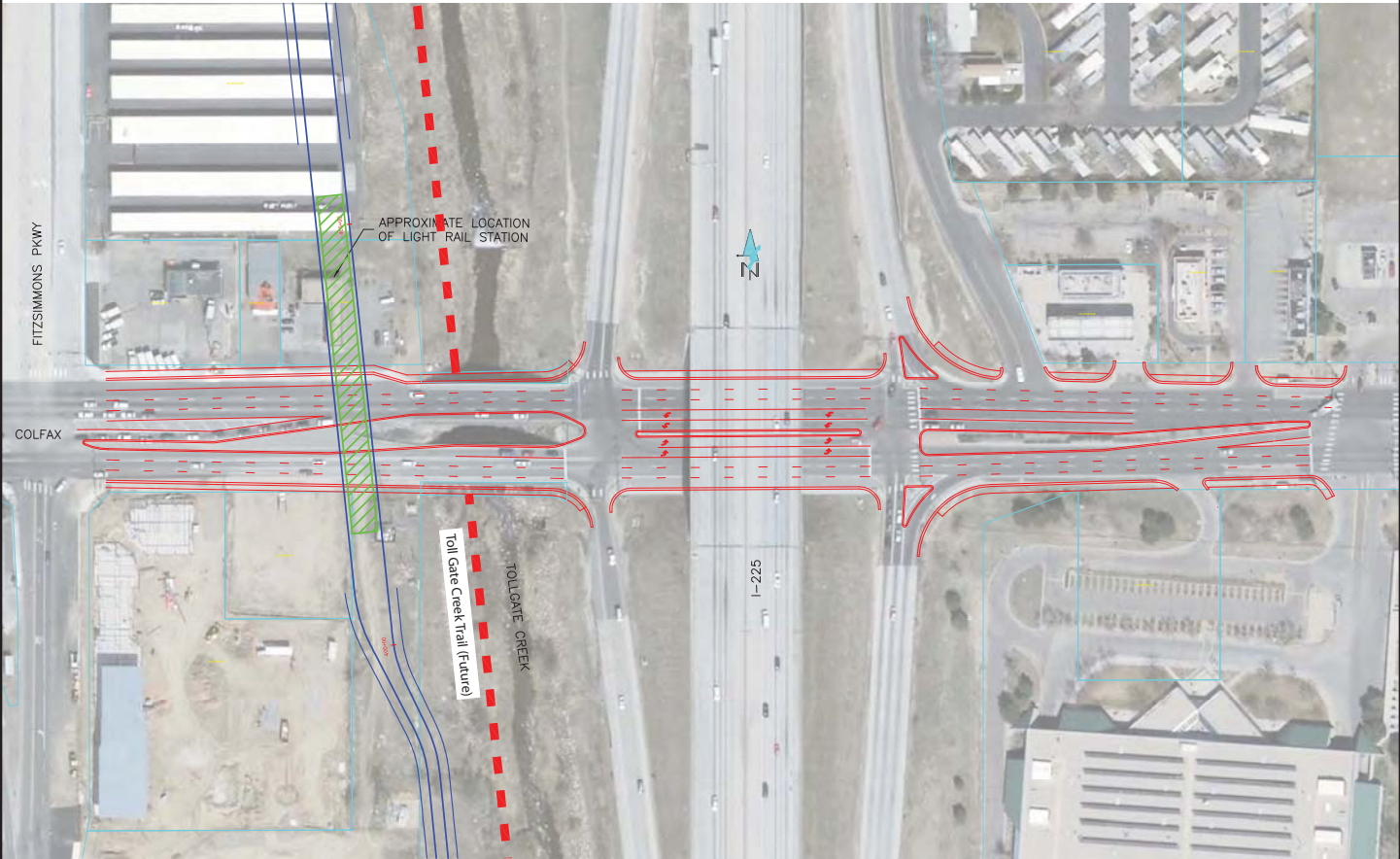


FIGURE 4.5 PROPOSED COLFAX AVENUE/TOLL GATE CREEK BRIDGE



Turning Capacity Improvements on Fitzsimons Parkway

Purpose:	Provide additional turning capacity on Fitzsimons Parkway to meet the future demand created by the new Colfax Avenue/I-225 Interchange.
Location:	Fitzsimons Parkway/Montview Boulevard and Fitzsimons Parkway/17th Place Intersections
Description:	<p>Provide a right turn lane and a shared/thru right lane for westbound to northbound traffic at Fitzsimons Parkway and 17th Place. Add dual right turn lanes eastbound to southbound at Fitzsimons Parkway and Montview Boulevard. The construction of the I-225/Colfax Interchange would increase traffic on Fitzsimons Parkway between 17th Place and Montview Boulevard. By 2035, traffic is anticipated to approach the threshold of a four lane arterial. Additional laneage could be needed at the Fitzsimons Parkway/Montview Boulevard and Fitzsimons Parkway/17th Place intersections. Options include:</p> <ul style="list-style-type: none"> • Fitzsimons Parkway/Montview Boulevard – eastbound double right turn lanes • Fitzsimons Parkway/17th Place – westbound double right turn lanes, and re-striping of the southbound to eastbound left turn lanes to triple left turn lanes. These improvements should be considered for implementation with the construction of the Colfax Avenue/I-225 Interchange
Priority:	Long Range
Estimated Cost:	\$0.5 Million

Peoria Street/Colfax Avenue Intersection Improvements

Purpose:	Provide additional left turn capacity at the Peoria Street/Colfax Avenue intersection per Figure 4.6. This is a critical intersection for access to the Fitzsimons medical campus by all modes. The intersection is anticipated to operate at LOS E or F by 2015 without improvements.
Location:	Peoria Street/Colfax Avenue Intersection
Description:	This project includes the addition of a northbound left turn lane resulting in dual left turn lanes , a westbound left turn lane resulting in dual left turn lanes, and the addition of a northbound right turn lane resulting in an exclusive right turn lane. A conceptual design of the proposed intersection configuration is shown in Figure 4.6. Although not shown in Figure 4.6, a right turn island could enhance pedestrian crossings and should be considered with this design.
Priority:	Short Range
Estimated Cost:	\$0.5 Million

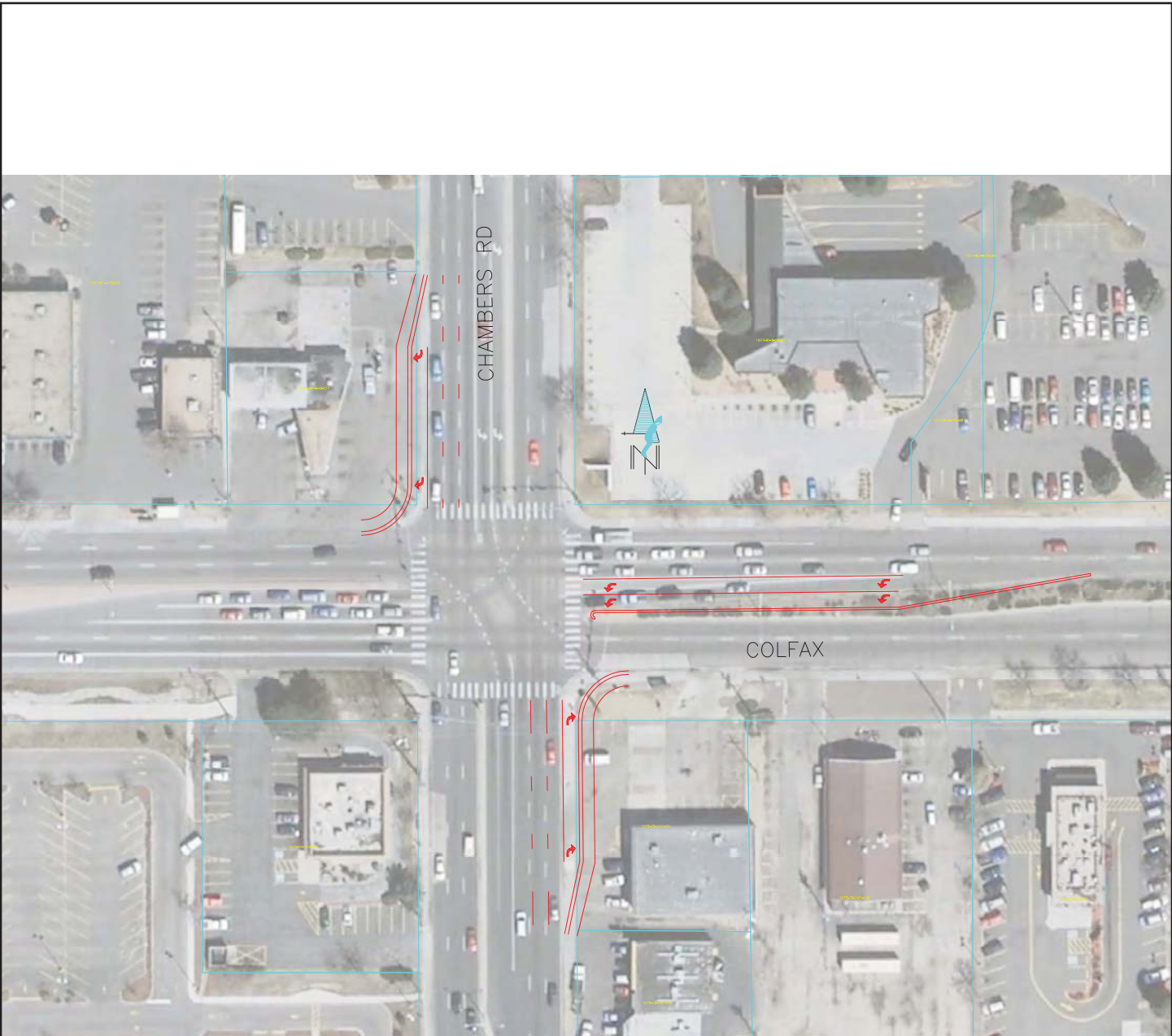
Chambers Road/Colfax Avenue Intersection Improvements

Purpose:	Provide additional capacity at the Chambers Road/Colfax Avenue intersection which is a critical intersection for accessing the Fitzsimons medical campus from the east. The intersection is anticipated to operate at LOS E or F by 2035 without improvements.
Location:	Chambers Road/Colfax Avenue Intersection
Description:	Additional capacity at this intersection could be added through the addition of a westbound left turn lane resulting in dual left turn lanes, a southbound right turn lane resulting in an exclusive right turn lane, and a northbound right turn lane resulting in an exclusive right turn lane. A conceptual design of the proposed intersection configuration is shown in Figure 4.7.
Priority:	Long Range
Estimated Cost:	\$0.5 Million

FIGURE 4.6 PROPOSED PEORIA STREET/COLFAX AVENUE INTERSECTION IMPROVEMENTS



FIGURE 4.7 PROPOSED CHAMBERS ROAD/COLFAX AVENUE INTERSECTION IMPROVEMENTS



13th Avenue Extension

- Purpose:** Provide a local east/west connection across I-225. This would connect the neighborhoods west of I-225 and south of Colfax Avenue to the future 13th Avenue light rail station.
- Location:** 13th Avenue between Potomac Street and Sable Boulevard
- Description:** Extend 13th Avenue from east of Potomac Street to Sable Boulevard. The recent reconstruction of I-225 included the provision of an “opening” to accommodate a future connection in the 13th Avenue alignment under I-225. The FasTracks project is also planning to make use of this opening under I-225, and the rail line will pass through the portion north of the columns that is partially filled-in by an angled wing-wall. A preliminary alignment for the 13th Avenue extension is shown in Figure 4.8. This alignment would also include bicycle lanes and sidewalk. Figure 4.9 shows a recommended cross-section for the 13th Avenue extension.

If constructed, this connection under I-225 is projected to serve approximately 10,000 vehicles per day in 2035, given build out of the area and the park-n-ride facility at the planned 13th Avenue Station. This level of traffic can adequately be served by a two-lane facility, and turn lanes should be considered at the major cross-streets such as Potomac Street and Sable Boulevard based on peak hour volume projections. In addition, this connection would provide flexibility in RTD bus routing (or any other shuttle service) within the area to better connect nearby neighborhoods to the planned I-225 FasTracks station.

Furthermore, this connection underpass should be enhanced to accommodate and foster pedestrian and bicycle activity crossing I-225 to the 13th Avenue Station. This could be achieved with a physically separated wide sidewalk (12' min.) that would serve as a two-way multi-use path on the south side of the street, or two seven foot sidewalks along 13th Avenue that would widen under the bridge where parking is not needed. In either case, a similar design treatment should be extended across the future bridge at Toll Gate Creek.

While the 13th Avenue connection enhances badly needed local connectivity across I-225, a vehicular connection also has the potential of attracting traffic through the nearby residential area. Of particular concern is the 13th Avenue segment from Peoria Street to Potomac Street. This roadway segment is designed as a local street relative to its cross-section, and there are many homes that front directly onto this local roadway. Further, this road is adjacent to Vaughn Elementary School. Current traffic counts along 13th Avenue show that the roadway carries as much as 2,100 vehicles per day, which is at the upper limit for a local road's appropriate level of traffic. With the I-225 underpass and given the 2035 growth conditions in the area, this roadway is projected to experience an increase of 1,500 vehicles per day from non station area traffic utilizing this new connection. This increase in volume will result in a level of traffic greater than that associated with a typical local road service level.

As a means of reducing the loading that this roadway is projected to experience, traffic calming measures should be considered to reduce the volume along this street and to ensure speeds are kept in check near the elementary school. Traffic calming will also make 13th Avenue more conducive for bicycling activity. Traffic calming could include such measures as turn restrictions at Potomac Street or at Peoria Street. More detailed discussion is needed with City staff before a final traffic calming plan for 13th Avenue is developed, but this analysis indicates that there is the need.

Priority: Medium Range (with FasTracks)

Estimated Cost: \$3.2 Million

FIGURE 4.8 PROPOSED 13TH AVENUE EXTENSION

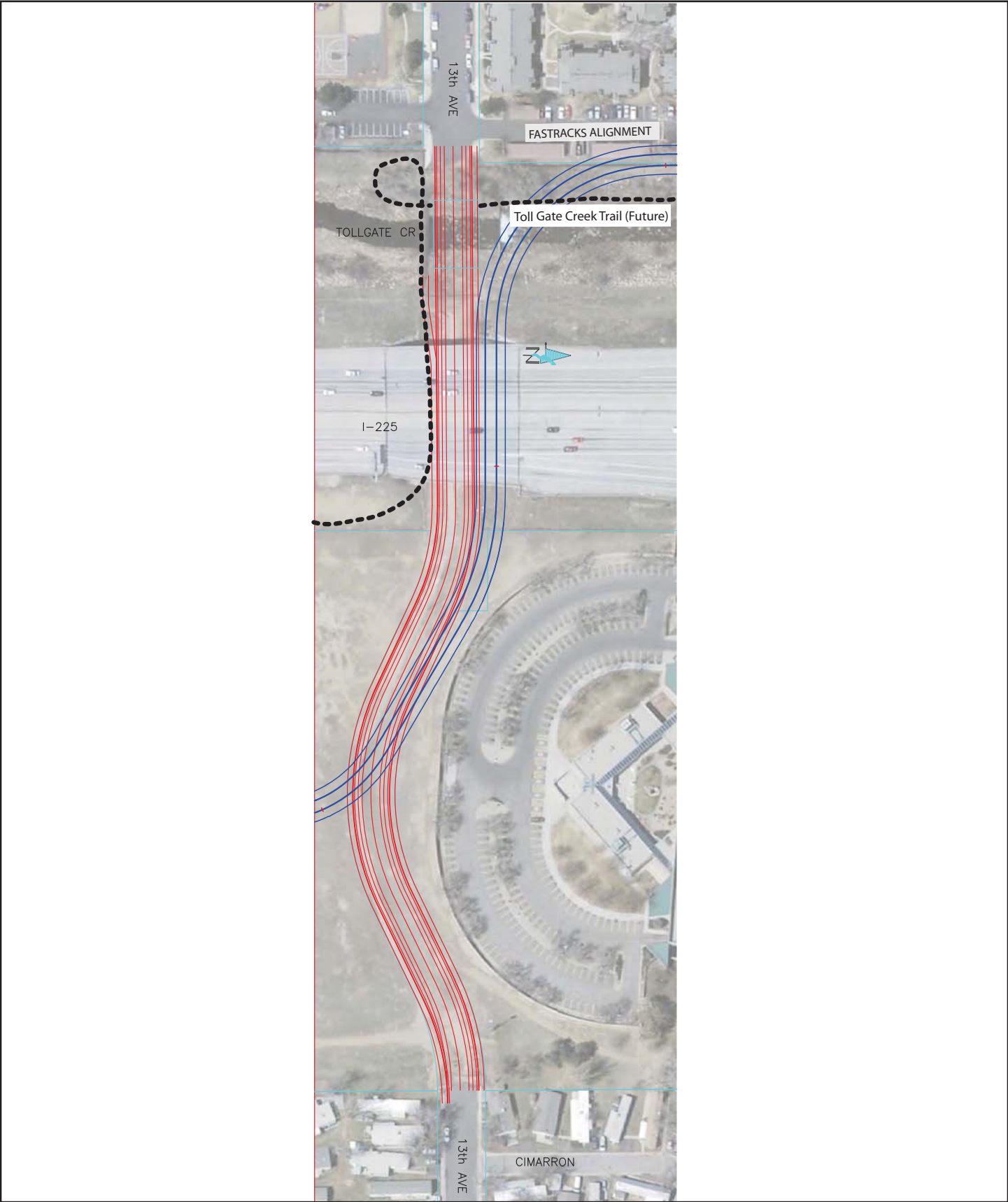
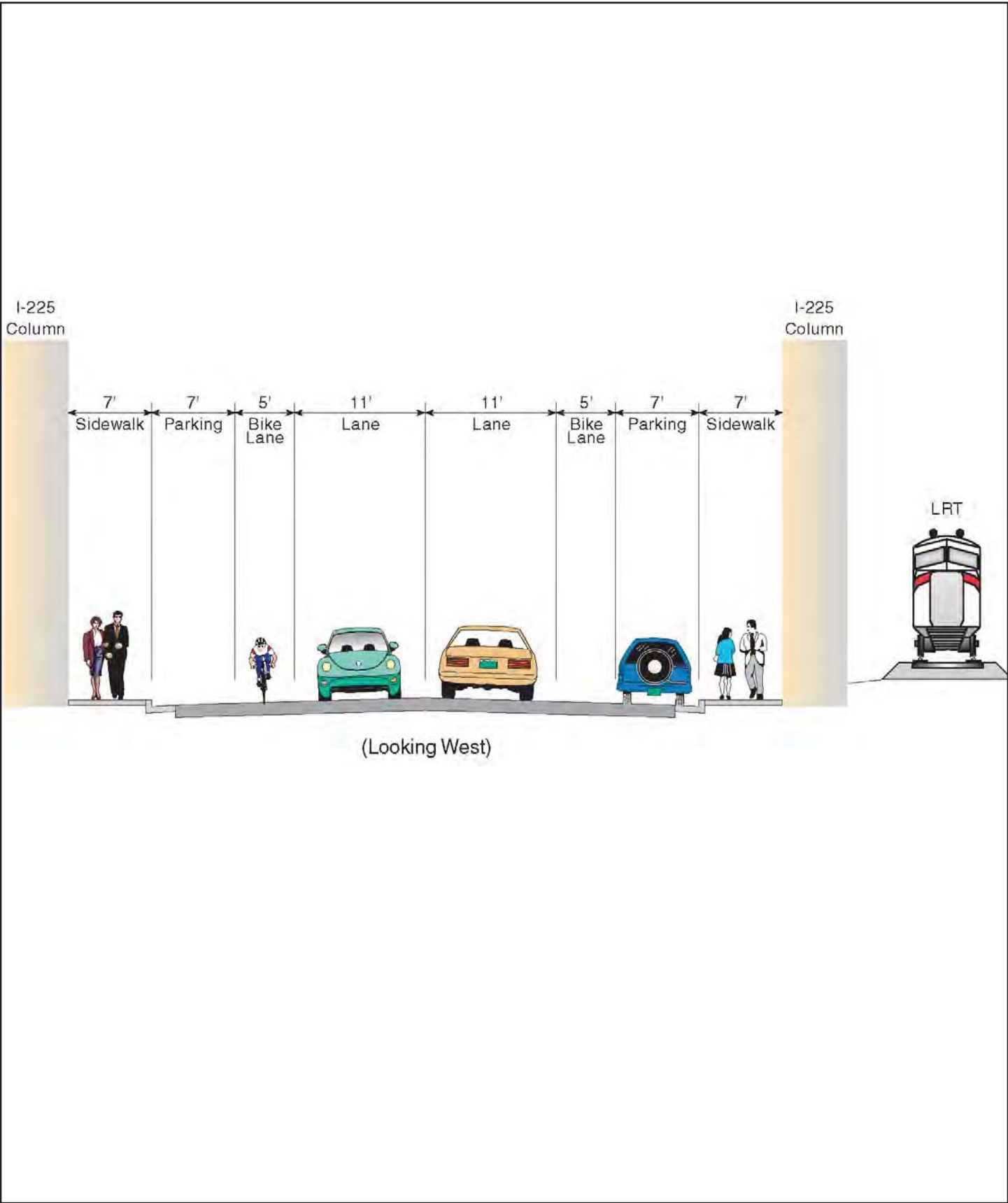


FIGURE 4.9 PROPOSED 13TH AVENUE CROSS-SECTION



Dillon Way Extension

Purpose:	Provide an additional north/south connection between 6th Avenue and Colfax Avenue which provides access to the 13th Avenue Station.
Location:	Dillon Way from existing cul-de-sac north of 6th Avenue to Colfax Avenue
Description:	Extend Dillon Way north from 6th Avenue to Colfax Avenue. This two lane street extension will primarily provide access to the 13th Avenue station and will also provide an additional local north/south connection just east of I-225. Projected traffic volume along this route is estimated to be 8,000 daily trips in the year 2035. The suggested alignment for this extension is discussed in detail in the Fitzsimons-Colfax and 13th Avenue Station Area Plan and is shown in Figure 4.10.
Priority:	Long Range
Estimated Cost:	\$8 Million

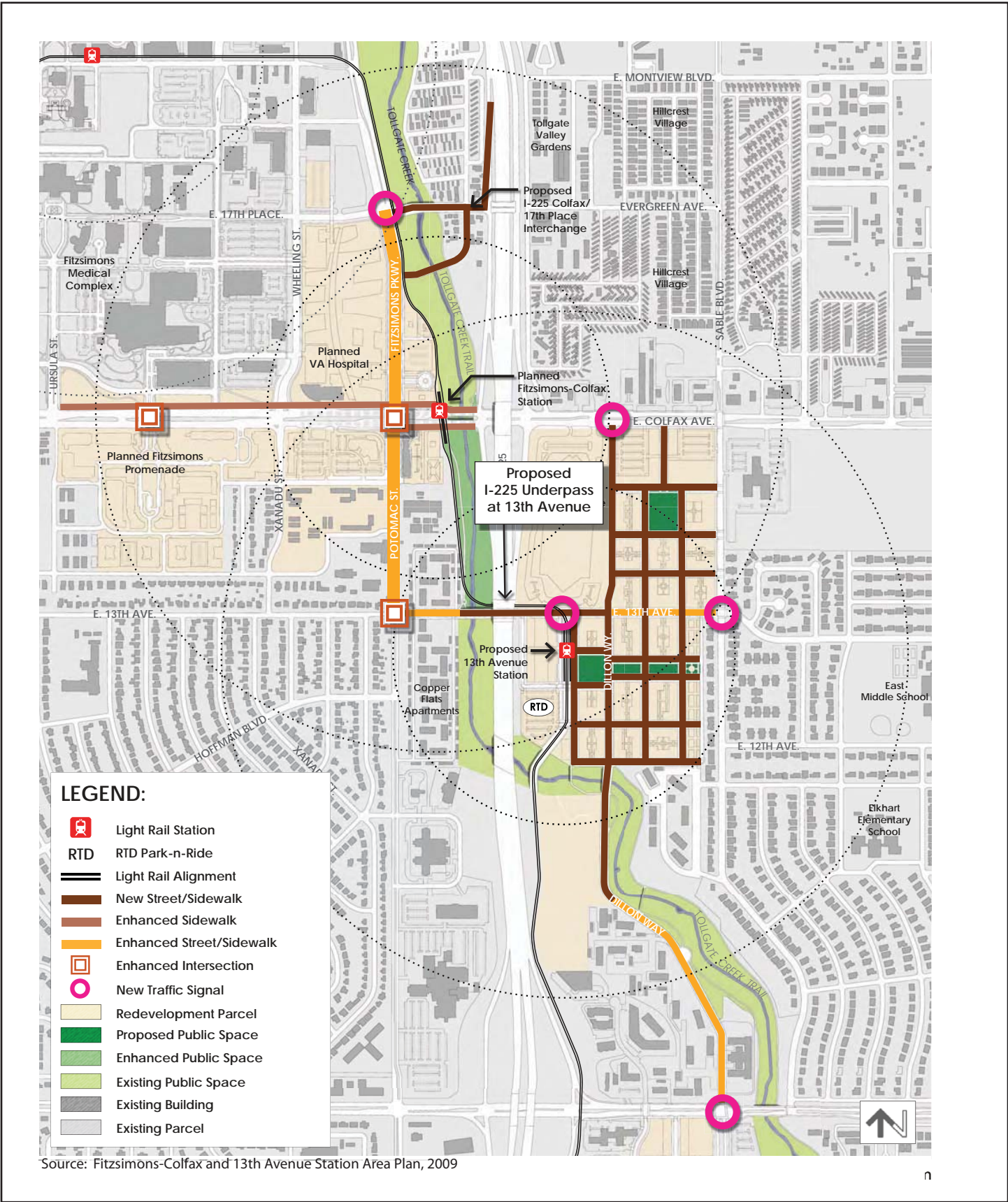
4.2 Intelligent Transportation Systems (ITS)

The City has recently completed and approved the Aurora ITS Strategic Plan. Within the plan, cameras and Variable Message Signs (VMS) have also been recommended along Colfax Avenue and I-225 at similar locations to this study's recommendations. The following ITS projects are recommended for the Fitzsimons study area to provide additional information to the transportation system users. These projects will allow the transportation system to be used more efficiently by all users. The preliminary locations for these recommendations are shown in Figure 4.2.

Add Variable Message Signs (VMS) on Key Roadways

Purpose:	VMS could be used to alert travelers of traffic conditions along major roadways in the study area. With a well connected street network this kind of information can help to reroute traffic and better utilize the transportation system.
Location:	Colfax Avenue and Peoria
Description:	Install three Variable Message Signs in the vicinity of the Fitzsimons Campus. VMS are currently located at various locations on I-225. VMS should also be installed on major roadways near the Fitzsimons campus, including eastbound Colfax Avenue between Ursula Street and I-225, westbound Colfax Avenue between Sable Boulevard and I-225, and Peoria Street north of Fitzsimons Parkway to provide real-time traffic information to travelers on heavily traveled corridors. Partnering with CDOT to assess I-225 variable message signs and to implement new signs will be necessary. ITS improvements to I-225 and the Colfax Avenue/I-225 interchange should be implemented with the reconstruction of the interchange. An additional location along the southbound off-ramp to 17th Place would need to be coordinated with CDOT. Other VMS in the study area such as along Colfax Avenue and Peoria should be considered medium range priorities.
Priority:	Short Range
Estimated Cost:	\$0.6 Million

FIGURE 4.10 PROPOSED DILLON WAY EXTENSION



Provide Variable Message Signs (VMS) for Parking Information at Campus Entrances

Purpose:	VMS could be used to inform employees and visitors about parking availability as they enter the Fitzsimons medical campus. VMS with parking information can help reduce circling in search of a parking space.
Location:	17th Place/Fitzsimons Parkway, Fitzsimons Parkway/Colfax Avenue, and Peoria Street/Montview Boulevard intersections.
Description:	Install three variable message signs at campus entrances to convey parking availability and direct drivers to appropriate areas. VMS should be installed at major intersections used to access the Fitzsimons medical campus. These signs should be used to display parking location and availability information. Additionally, information should be provided about where the nearest overflow parking area is located to help reduce illegal parking.
Priority:	Short Range
Estimated Cost:	\$0.4 Million

Provide Signage and Kiosks for Train and Bus Arrivals

Purpose:	Increase transit usage by making schedule information readily available and easily understandable.
Location:	Future light rail stations, bus stops with high usage, kiosks around the Fitzsimons medical campus
Description:	Install an information network to provide real time transit and transportation information. VMS should be installed at the future light rail stations and bus stops with high usage to alert transit riders as to when the next bus or train will arrive. Additionally, information about transit schedules and delays should be available on the internet, by text messaging, and on hand held devices such as a PDA. RTD bus and shuttle schedule information and train arrivals should be posted at the Colfax station and the Montview station, as well as centrally located kiosks throughout the Fitzsimons medical campus.
Priority:	Medium Range (with FasTracks)
Estimated Cost:	To be determined upon further study

4.3 Transportation Demand Management Strategies

Purpose:	Provide programs that reduce peak period single occupant vehicle travel.
Description:	Continue the existing efforts of the Fitzsimons TMA that promote alternative modes of travel and increased traveler information. Programs include expanding the current commuter assistance and carpooling initiatives. The TMA should promote increased bicycle travel by highlighting and encouraging use of the planned bicycle facilities and programs. In addition, the TMA should work with CDOT and RTD to provide real time traveler information to Fitzsimons students, employees, and visitors via the website and cell phones.
Priority:	Short Range
Estimated Cost:	Variable

4.4 Transit

The addition of the I-225 FasTracks line and the East Corridor line will provide excellent transit opportunities to the Fitzsimons area via four light rail stations. Connectivity to these stations will be critical to maximizing transit opportunities. Colfax Avenue is one of the best served transit corridors in the City. The 15 and 15L run with peak headways of 10 to 15 minutes. This service can provide excellent connectivity to the Colfax Station to further destinations and to the Fitzsimons campus itself. In addition, service along Peoria Street provides a major bus transit gateway to the Fitzsimons campus at Montview Boulevard.

Expand Shuttle Connections

Purpose:	Increase transit usage by expanding shuttle connections between the Fitzsimons medical campus and key destinations such as new development and light rail stations.
Location:	Route between Fitzsimons campus and future light rail stations, route between Fitzsimons campus and future development south of Colfax Avenue
Description:	Expand frequency and areas served by the existing shuttle system. The TMA should explore possibilities to partner with RTD to expand shuttle services to the campus. The possibility of serving these shuttle routes with expansions to existing RTD routes could also be considered. These projects will require a feasibility study to be conducted in coordination with RTD.
Priority:	Medium Range (with FasTracks)
Estimated Cost:	To be determined upon further study

Improve Bus Stop Amenities and Security

Purpose:	Increase transit usage by providing shelters and benches at stops and enhance the appearance and character of transit stops to be an asset to the neighborhood and surrounding businesses.
Location:	Bus stops along Colfax Avenue
Description:	Add shelters and security enhancements to bus stops on the south side of Colfax Avenue between Potomac Street and Peoria Street. Recommended locations for added shelters include the bus stops at: Colfax Avenue/Ursula Street and Colfax Avenue/Potomac Street. Bus stops on the north side of Colfax Avenue do not need enhancements as they are located on campus side-streets just off Colfax Avenue and adequate security and amenities are provided.
Priority:	Short Range
Estimated Cost:	\$100,000 - \$200,000

4.5 Pedestrian

In order to make Fitzsimons a successful multi-modal environment it will be important to provide pedestrian amenities throughout the campus and on surrounding streets. Colfax Avenue is one of the most inhospitable environments for pedestrians to cross. With three through lanes, continuous right turn lanes and double left turn lanes at key intersections, people must cross up to 10 lanes of traffic. On the other hand, the accommodation of pedestrian traffic can mean trade-offs in operations for auto and other modes. For facilities such as Colfax Avenue, the decrease in vehicular capacity would have profound effects upon the mobility in this area of Aurora. Options that can facilitate pedestrian crossing without extreme decreases in street vehicular capacity are recommended below. Figure 4.11 shows the locations of the pedestrian improvement recommendations. In addition to the specific projects listed below, a pedestrian bridge over Fitzsimons Parkway should be considered if the design can be coordinated with the plans for the Veterans Administration Hospital and a direct connection can be made to the light rail platform.

Leading Pedestrian Phases at Colfax Avenue Intersections

Purpose:	Facilitate safe pedestrian crossings of Colfax Avenue.
Location:	Fitzsimons Parkway, Wheeling Street, Quentin Street, Ursula Street, and Peoria Street intersections with Colfax Avenue
Description:	Implement Leading Pedestrian signal phasing at key signalized intersections along Colfax Avenue following the I-225 interchange improvements. Leading pedestrian phasing starts the pedestrian WALK indication before the vehicle signal turns green, allowing pedestrians to establish their presence in the intersection before cars begin moving. Studies have shown that it can also be beneficial to prohibit right turns on red and use protected left-turn phasing with these timing options. A right turn overlap phase that occurs with a non-conflicting left turn phase could also provide capacity benefits. Leading pedestrian phases should be implemented for the north/south crossings of Colfax Avenue at the above mentioned intersections due to high volumes of pedestrians anticipated to be crossing Colfax Avenue between the medical campus and future development on the south side of the street. In addition, a leading pedestrian phase is recommended for the east/west crossing of the Colfax Avenue/ Fitzsimons Parkway intersection as this crossing provides the most direct pedestrian connection between the future Colfax Station and the Fitzsimons medical campus.
Priority:	Medium Range (with FasTracks)
Estimated Cost:	< \$50,000

Pedestrian Bridge over Colfax Avenue

Purpose:	Provide a safe pedestrian crossing of Colfax Avenue between The Children's Hospital and future development on the south side of Colfax Avenue.
Location:	Colfax Avenue, 150' west of Vaughn Street
Description:	Construct a pedestrian overpass with the development of Fitzsimons Village on the south side of Colfax Avenue between Vaughn Street and Wheeling Street/Xanadu Street. The addition of escalators is under consideration with the development plan.
Priority:	Medium to Long Range
Estimated Cost:	\$5.7 Million

Enhanced Pedestrian Crossings along Colfax Avenue

- Purpose:** Slow traffic and increase driver awareness of and safety for pedestrians at signalized intersections.
- Location:** Peoria Street, Quentin Street, Ursula Street, Wheeling Street, and Fitzsimons Parkway intersections with Colfax Avenue
- Description:** Provide enhanced crosswalk markings with ladder striping, directional curb ramps, colored or special paving in crosswalks, and high visibility treatments such as in pavement flashers along stop bars. Provide a raised or textured crosswalk between right turn “pork chop” islands and the sidewalk at right turn locations along Colfax Avenue. Discussion should occur with the Fire Department about how much vertical clearance, if any, would be acceptable at the crosswalk. These locations include the northeast corner of the Peoria Street and Quentin Street intersections and both northeast and northwest corners of the Ursula Street and Wheeling Street intersections with Colfax Avenue.
- Priority:** Short Range
- Estimated Cost:** \$1.1 Million

Median Refuge Islands along Colfax Avenue

- Purpose:** Increase safety of pedestrian crossings of Colfax Avenue.
- Location:** Colfax Avenue between Peoria Street and Potomac Street
- Description:** Construct median refuge islands along Colfax Avenue between Fitzsimons Parkway and Peoria Street. The existing raised median on Colfax Avenue could be extended to provide a refuge for pedestrians. This would allow for a more protected two stage pedestrian crossing of the roadway. The Colfax Avenue median should be extended at the following locations: Fitzsimons Parkway, Wheeling Street, Vaughn Street, Ursula Street, Quentin Street, and Peoria Street.
- Priority:** Short Range
- Estimated Cost:** \$150,000

Enhance Sidewalk and Trail Connections North of Montview Boulevard

- Purpose:** Improve multi-modal regional connectivity with the development of the Life Sciences District north of Montview Boulevard.
- Location:** North Fitzsimons campus
- Description:** Provide connections across Fitzsimons Parkway to the Sand Creek trail. The development of the north side of the Fitzsimons campus provides several opportunities to connect the medical campus with the regional trail system. The north campus area provides direct access to the Sand Creek Greenway regional trail. As this section of the campus is developed special consideration should be given to the sidewalk network especially regarding connections to the Sand Creek and Toll Gate Creek Trails. Figure 3.13 identifies major pedestrian street crossings on the perimeter of the campus. These locations should be noted when identifying locations for enhanced pedestrian environments. In addition, multi-modal connections to the Martin Luther King Boulevard extension should be a priority to promote bicycle connectivity between Stapleton and north Fitzsimons.
- Priority:** Medium Range
- Estimated Cost:** \$100,000 - \$200,000

Sidewalk Improvements

- Purpose:** Upgrade narrow sidewalks to meet current City standards.
- Location:** Various roadways in the study area.
- Description:** As discussed in the existing conditions, many of the sidewalks within the study area are narrower than the current City standards highlighted on pages 9 and 11. In addition, many of the sidewalks are not separated from the roadway with a tree lawn or buffer which is also part of the current City standards. These sidewalks should be upgraded as new development occurs or as repairs are necessary. The first priority should be to widen the sidewalks on Peoria Street from Colfax Avenue north to Fitzsimons Parkway as there is significant pedestrian activity here and it will increase as Fitzsimons develops. The second priority should be improvements on other key streets such as Montview Boulevard west of Peoria Street, Sable Boulevard south of Colfax Avenue, and Peoria St south of Colfax Avenue.
- Priority:** Medium Range
- Estimated Cost:** \$15 per linear foot (does not include cost associated with Right of Way acquisition)

6th Avenue Sidewalk Improvements between Potomac Street and Del Mar Circle

- Purpose:** Upgrade narrow and missing sidewalks to meet current City standards.
- Location:** 6th Avenue from Potomac Street to Del Mar Circle.
- Description:** 6th Avenue is currently missing a continuous sidewalk on the south side of 6th Avenue from Potomac Street west to Del Mar Circle. As redevelopment has occurred a few sections of sidewalk have been constructed. However, most of this stretch is missing a sidewalk and based on the City standards there should be a continuous sidewalk on both sides of the street. In addition, there are sections of the multi-use path on the north side of 6th Avenue that should be replaced due to maintenance issues.
- Priority:** Medium Range
- Estimated Cost:** \$200,000

Peoria Street/13th Avenue Intersection Improvements

- Purpose:** Improve the 13th Avenue and Peoria Street intersection for pedestrians.
- Location:** Intersection of 13th Avenue and Peoria Street
- Description:** The 13th Avenue and Peoria Street intersection is currently a difficult intersection for pedestrians to cross as it is an unsignalized intersection without pedestrian treatments. The RTD bus stop on the west side of Peoria Street generates some pedestrian traffic and pedestrian activity is expected to increase at this location with the Mt. Nebo development. As development occurs, this location should be monitored and studied to determine if and when a signal should be installed to improve the vehicular, bicycle, and pedestrian operations.
- The installation of a traffic signal would be the best pedestrian treatment for this intersection as typical guidance does not recommend unsignalized pedestrian treatments at such Arterial Street crossings.
- Priority:** Short Range
- Estimated Cost:** \$300,000

4.6 Bicycle

In order to make Fitzsimons a successful multi-modal environment it will be important to provide bicycle amenities throughout the campus and on surrounding streets. Options that can improve bicycle access and safety in the study area described below. These recommendations are shown in Figure 4.11 in addition to the existing and proposed bicycle lanes, routes, and trails.

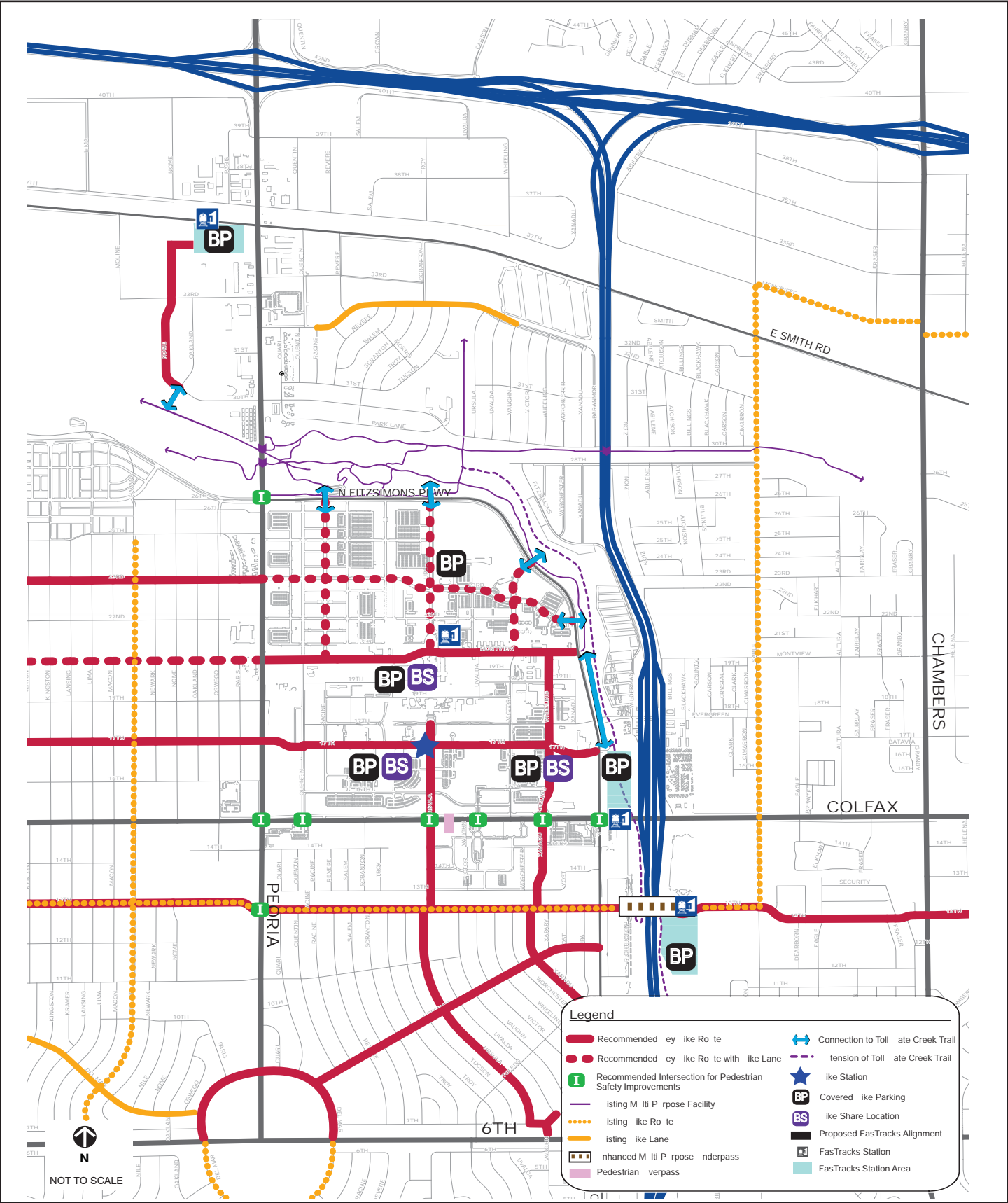
Provide Covered Bicycle Parking & Improve Bicycle Wayfinding

Purpose:	Promote bicycle commuting to the Fitzsimons campus by improving bicycle parking options and improve wayfinding to external bicycle facilities.
Location:	Throughout the campus
Description:	<p>Provide additional bicycle parking and bicycle lockers on the Fitzsimons campus. One of the most common requests to the Fitzsimons Transportation Management Association (TMA) is for covered, secure bicycle parking. While The Children's Hospital is already providing this for their employees, covered and secure parking should be available for all campus students, employees, and visitors. Bicycle lockers should be placed in areas with high bicycle activity throughout the campus. Rental of the lockers could be coordinated through the TMA. Additionally, under-utilized areas of campus buildings or parking structures could be used as bicycle parking facilities. Access to these facilities could also be coordinated through the TMA.</p> <p>Providing good access and wayfinding to and from the campus is essential to increasing bicycle usage. Signs and connections to existing lanes, routes, and trails should be strengthened through increased signage throughout the study area and information distributed by the TMA. The top priority should be placed on adding wayfinding signage to 13th Avenue, 17th Avenue, 23rd Avenue, Xanadu Street, and Ursula Street as these roadways are key bicycle connections to the Fitzsimons medical campus.</p>
Priority:	Short Range
Estimated Cost:	< \$50,000

Provide Bicycle Stations at Key Locations

Purpose:	Promote bicycle commuting to the Fitzsimons campus by providing bicycle services at bicycle stations.
Location:	Throughout the Fitzsimons medical campus
Description:	<p>Construct a bicycle station in the central part of Fitzsimons campus. To strengthen and encourage bicycling to work, bicycle stations could be located near existing shower locations. Bicycle stations could include a parking area with either bicycle lockers or bicycle racks, a bicycle repair station, or a bicycle supply shop. Bicycle stations could also house information kiosks. These kiosks would provide information about alternative travel to the Fitzsimons area. Information could be provided about transit routes, bicycle paths, routes, and lanes in the area, vanpools and carpools. The campus should coordinate with the Fitzsimons Transportation Management Association (TMA) to ensure that the kiosks are providing appropriate and up to date information. The University of Colorado Boulder has a bicycle station that offers services such as bicycle registration, cruiser bicycle rental, free minor maintenance, mobile mechanics, transit schedules & maps, bicycle and pedestrian path maps and information, and laptop registration. This is a successful example that could be followed in the Fitzsimons study area. It is recommended that an initial smaller structure and station be installed first with future expansion occurring when FasTracks is opened. The initial station would include a staff person, bicycle parking, a prefab structure and a computer.</p>
Priority:	Short Range
Estimated Cost:	\$100,000

FIGURE 4.11 BICYCLE AND PEDESTRIAN SYSTEM RECOMMENDATIONS



Implement a Bicycle Share Program

Purpose:	Promote bicycle commuting to the Fitzsimons campus by implementing a bicycle share program. This program would provide employees with access to a bicycle.
Location:	At three locations throughout the campus, University Hospital (Building 500), Anschutz, and Children's Hospital
Description:	Implement and phase in the bicycle share program for the medical campus. Many campuses across the nation are making bicycles available to students, staff or the public. They can be rented or borrowed depending upon the budget of the management agency. In this case, the TMA would manage the program. It is anticipated that this program would start as a pilot program with 15 bicycles; five at each of the locations. The program could grow to as many as 50 if successful in the short range.
Priority:	Short Range
Estimated Cost:	\$25,000 - \$75,000

Enhance 13th Avenue Bicycle Connection

Purpose:	Provide a safe and comfortable bicycle crossing of I-225.
Location:	13th Avenue at I-225
Description:	If the 13th Avenue street connection is not constructed as referenced above in section 4.1, the existing bicycle underpass at 13th Avenue should be enhanced to provide a safe and comfortable biking environment between new development on the west side of I-225 and the proposed 13th Avenue Station. When 13th Avenue is extended below I-225 as a full street, consideration of bicycles should be an integral component of developing the cross-section and final design of the roadway. The condition of the existing bridge may require replacement or enhancement.
Priority:	Medium Range (with FasTracks)
Estimated Cost:	\$200,000 - \$400,000

Extend Toll Gate Creek Trail

Purpose:	Provide off-street bicycle and trail connection between the Fitzsimons campus and the future 13th Avenue Station.
Location:	Toll Gate Creek between Alameda Avenue and the confluence with the Sand Creek Trail
Description:	Construct Toll Gate Creek Trail from Alameda Avenue to Sand Creek. As described in the Northwest Aurora Bicycle & Pedestrian Master Plan, there is a 2.5 mile gap in the Toll Gate Creek Trail from Delaney Farm north to the trails confluence with the Sand Creek Greenway Trail. It is recommended that the trail at least be extended from its current terminus and completed as a continuous corridor through the study area to the Sand Creek Greenway Trail. This trail extension would be an asset to Fitzsimons study area transportation system as it would connect the medical campus to the area south of Colfax Avenue as well as regional destinations served by the existing Toll Gate Creek Trail
Priority:	Short Range
Estimated Cost:	\$1.76 Million for the segment between 13th Avenue and Colfax Avenue

Provide Montview Boulevard Bicycle Lanes

- Purpose:** Promote bicycle connectivity between the Fitzsimons medical campus and the Stapleton neighborhood and the City of Denver
- Location:** Montview Boulevard between the Fitzsimons campus and the City of Denver boundary at Yosemite Street/Central Park Boulevard.
- Description:** Provide a bicycle lane connection along Montview Boulevard from Peoria Street to Yosemite Street. Montview Boulevard provides a connection between Stapleton and the Fitzsimons medical campus. There are bicycle lanes in Denver but they stop at the border of Aurora at Yosemite Street/Central Park Boulevard. The Aurora Parks Department previously applied for and received DRCOG funding to build bicycle lanes on Montview Boulevard. However, a solution for adding the bicycle lanes could not be agreed upon due to the issues with removing a travel lane or parking. Therefore, the project was never completed and the money was returned to DRCOG. A re-evaluation of this idea is recommended as both the Stapleton neighborhood and Fitzsimons medical campus continue to grow.
- There are several options of possible cross-sections that could be considered to add bicycle lanes to this corridor. One alternative would be to remove the center turn lane and retain parking on both sides. The bicycle lane would have to shift at intersections where turn pockets are necessary. This alternative could be problematic due to the shifting of striping at locations transitioning from 5 lanes to 4 lanes. A second option would be to remove parking on one side of the street and maintain a center turn lane through the entire corridor. A third alternative would be to remove parking on both sides also maintaining the center turn lane along the entire corridor. It should be noted that parking is currently restricted at several locations along the corridor due to driveways and bus stops and is rarely fully utilized. A fourth alternative would be to leave the current cross section and add 'sharrows' to the curbside lane, designating a shared space between automobiles and bicycles. 'Sharrows' are being implemented in the City of Denver on grid bicycle routes. Further study is recommended to determine a cross-section that meets the vehicular and bicycle needs of this corridor. Final design for the corridor should consider the City street standards which state that there is typically no parking on arterial streets and 4 lane arterials are required to have bicycle lanes. Montview Boulevard functions as a minor arterial.
- Priority:** Medium Range
- Estimated Cost:** \$50,000 - \$100,000

Enhance Bicycle Connections to the Fitzsimons Campus

- Purpose:** Improve bicycle connections to the medical campus with additional bicycle lanes and routes.
- Location:** Various roadways in the study area.
- Description:** Add multimodal connections to Fitzsimons Parkway and the Martin Luther King Boulevard extension to promote bicycle connectivity between Stapleton and north Fitzsimons.
- The following roadways will have on-street bike lanes per the General Development Plan Amendment #5 for the Fitzsimons Army Medical Center: 23rd Avenue, Racine Street, Ursula Street, and Victor Street
- The following roadways should be signed as bicycle routes based on the Northwest Aurora Bicycle & Pedestrian Master Plan: 17th Avenue, 23rd Avenue (west of Peoria Street), Oswego Street (between 17th Avenue and 25th Avenue), Xanadu Street (6th Avenue north through the Fitzsimons campus), Ursula Street (6th Avenue north to Colfax Avenue), Del Mar Circle (north of 6th Avenue), Hoffman Boulevard (Del Mar Circle north-east to Xanadu Street).
- Priority:** Short Range
- Estimated Cost:** < \$100,000

4.7 Alternatives Evaluated But Not Recommended

This study included analysis and consideration of several project alternatives. Not all of the considerations are included as recommendations. The following projects are not recommended for implementation as they were not determined to be appropriate solutions for the Fitzsimons study area.

- Reversible Lanes on Potomac Street - Although some directionality in traffic exists, the implementation of reversible lanes on Potomac Street would be difficult to implement due to intermediate street intersections between Colfax Avenue and 6th Avenue.
- Transit Signal Priority (TSP) along Colfax Avenue – Although Colfax Avenue is a good candidate for TSP further west, in the Fitzsimons area congestion at the Peoria Street/Colfax Avenue intersection could make this improvement problematic.
- Mid-Block Crossing of Fitzsimons Parkway between Colfax Avenue and 17th Place - Instead of a pedestrian bridge, another option to improve pedestrian accessibility could be a mid-block signalized crossing. The feasibility of this option is dependent upon such factors as adequate signal progression and operations.

Fehr & Peers analyzed the major pedestrian crossing location across Fitzsimons Parkway between Colfax Avenue and 17th Place. If this location were a mid-block pedestrian crossing it would need to be located at such a location where vehicular queues from downstream signalized intersections would not back up to. There is approximately 1,500 feet between Colfax Avenue and 17th Place, and approximately 1,000 feet between Colfax Avenue and North Potomac Street/Evergreen Avenue.

The logical location for a mid-block crossing would be approximately 700 feet north of Colfax Avenue. However, this location does not provide direct access to the light rail station platform and possibly would not provide direct access to much of the Fitzsimons medical campus. The most recent configuration of the VA buildings does not allow for access from Fitzsimons Parkway or Colfax Avenue. This crossing location would serve some of the TOD buildings. Traffic analysis shows that southbound 2030 vehicular queues at the Colfax Avenue/Fitzsimons Parkway will back up past this location, possibly blocking the pedestrian crossing.

- Colfax Avenue/Fitzsimons Parkway Intersection Improvements – Previous studies have identified the need for southbound triple left turn lanes. With the reconstruction of the Colfax Avenue/I-225 interchange, double left turn lanes southbound would be adequate.
- Queue Jump Lanes or a Bus Lane on Colfax Avenue – This option could be restricted for the PM peak utilizing existing right turn lanes. Right turn traffic into Fitzsimons campus is lower during the PM peak hour making this shared lane a possibility. The construction of the I-225/Colfax Avenue interchange could make this option more attractive. This option was found to conflict with pedestrian enhancements and would not provide a long enough distance or delay gain to benefit transit.
- Transit Prioritization to the 13th Avenue Station – Transit signal priority on Sable Boulevard and Chambers Road for buses entering the 13th Avenue Station was considered. Due to the traffic volumes and other design considerations, transit priority would only be viable for short roadway segments and would not significantly improve transit travel times. Therefore, transit priority would not be worth the trade-offs of delay to other modes and is not recommended.

5. IMPLEMENTATION

The general recommendations discussed in Chapter 4 were used to develop a list of projects for the Fitzsimons area. These projects were prioritized and recommended in one of the following three phasing categories: Short Range, Medium Range, and Long Range. Projects that were categorized as Short Range should be implemented as soon as funding becomes available as they address immediate needs. Medium Range projects are generally tied to the 2015 projections and should be implemented upon the completion of the I-225 FasTracks corridor. Long Range projects are tied to the 2035 projections and address needs that are likely to result from the full build-out of the Fitzsimons medical campus and additional surrounding developments.

The projects and implementation time line are summarized in Figure 5.1.

FIGURE 5.1 RECOMMENDED PROJECTS TIMELINE

Project	Type of Project	Cost (estimated)	Short Range (Immediate)	Medium Range (After FasTracks)	Long Range (~ 2035)
Widen Peoria Street Sand Creek Bridge	Roadway	M			
Peoria Street Colfax Avenue Intersection Improvements	Roadway	M			
Reconstruct I-225 Colfax Avenue Interchange	Roadway	M			
Provide Variable Message Signs VMS for Parking Information at Campuses Entrances	ITS	M			
Add Variable Message Signs VMS on Key Roadways	ITS	M			
Improve Bus Stop Amenities and Security	Transit	k			
Peoria Street 14th Avenue Intersection Improvements	Pedestrian	k			
Enhanced Pedestrian Crossings along Colfax Avenue	Pedestrian	M			
Pedestrian Bridge over Colfax Avenue	Pedestrian	M			
Implement a Bicycle Share Program	Bicycle	k			
Provide Bicycle Stations at Key Locations	Bicycle	k			
Provide Covered Bicycle Parking Improve Bicycle Wayfinding	Bicycle	k			
Provide Montview Boulevard Bicycle Lanes	Bicycle	k			
Enhance Bicycle Connections to the Fitzsimons Campuses	Bicycle	k			
14th Avenue Extension	Roadway	M			
Provide Signage and Bioskops for Train and Bus Arrivals	ITS	T			
Expand Shuttle Connections	Transit	T			
Median Refuge Islands along Colfax Avenue	Pedestrian	k			
Leading Pedestrian Phases at Colfax Avenue Intersections	Pedestrian	k			
Enhance Sidewalk and Trail Connections North of Montview Boulevard	Pedestrian	k			
14th Avenue Sidewalk Improvements between Potomac Street and Del Mar Circle	Pedestrian	k			
Sidewalk Improvements	Pedestrian	Varies			
Extend Toll Gate Creek Trail	Bicycle	M			
Enhance 14th Avenue Bicycle Connection	Bicycle	k			
Million Day Extension	Roadway	M			
Turning Capacity Improvements Fitzsimons Parkway	Roadway	M			
Chambers Road Colfax Avenue Intersection Improvements	Roadway	M			
I-225 Colfax Interchange Toll Gate Creek Bridge	Roadway	M			
Peoria Street Railroad Grade Separation	Roadway	M			
Colfax Avenue widening between Saile Boulevard and Chambers Road	Roadway	k			

