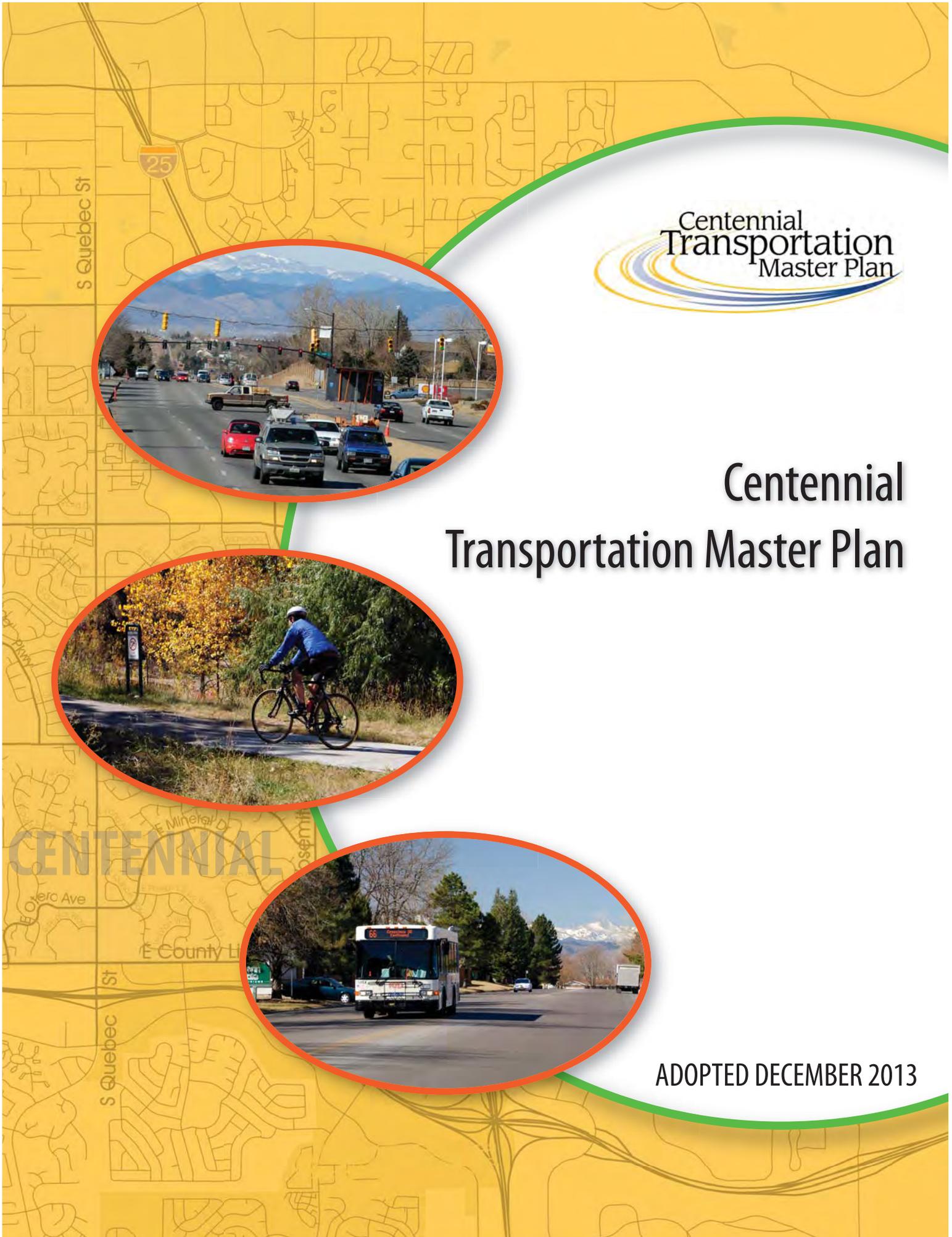




# Centennial Transportation Master Plan



ADOPTED DECEMBER 2013



**CITY OF CENTENNIAL, COLORADO**

**PLANNING AND ZONING COMMISSION  
RESOLUTION 2013-PZ-R-18**

**A RESOLUTION OF THE CITY OF CENTENNIAL PLANNING AND ZONING  
COMMISSION ADOPTING THE CENTENNIAL TRANSPORTATION MASTER PLAN  
AS A COMPONENT OF THE 2004 CITY OF CENTENNIAL COMPREHENSIVE PLAN**

WHEREAS, the City of Centennial, acting through its Planning and Zoning Commission, is empowered pursuant to C.R.S. §§ 31-23-201, *et seq.*, to make, adopt, amend, and/or supplement a master or comprehensive plan for the physical development of the municipality, including any areas outside its boundaries; and

WHEREAS, in November of 2004, the City of Centennial Planning and Zoning Commission adopted, and the Centennial City Council ratified, a Comprehensive Plan (“Comprehensive Plan”) to serve as the framework document that guides the City’s future growth and development; and

WHEREAS, one of the express goals of the Comprehensive Plan is to serve as the framework document that will be implemented “through the adoption of corridor plans, sub-area plans, and other specific planning efforts in order to achieve the City’s vision for the future;” and

WHEREAS, in furtherance of the goals of the Comprehensive Plan, the City initiated a planning effort involving City planning staff, City consultants, City elected and appointed officials, property owners, citizens and other stakeholders, to complete the City’s first transportation master plan, which is intended to be utilized as a tool to prioritize both short and long term transportation investments within the City, to provide policy guidance with respect to transportation system implementation and design, and to establish the City’s transportation vision and priorities as they relate to the Denver Metropolitan Region and the City’s Comprehensive Plan; and

WHEREAS, through this planning effort, the City’s planning team conducted stakeholder interviews, public meetings, open houses, and maintained a project website to receive community and stakeholder input on said plan and to develop the transportation master plan; and

WHEREAS, a copy of the Centennial Master Transportation Plan (the “Plan”) has been presented to the Planning and Zoning Commission, is available for inspection at the City Clerk’s Office, and is incorporated herein by reference; and

WHEREAS, in accordance with C.R.S. § 31-23-208, the Planning and Zoning Commission held a public hearing to consider the adoption of the Plan, which public hearing was conducted on November 20, 2013, following publication of notice of the public hearing as required by law; and

**NOW THEREFORE, BE IT RESOLVED BY THE PLANNING AND ZONING COMMISSION FOR THE CITY OF CENTENNIAL, COLORADO, THAT:**

**Section 1.** The Centennial Master Transportation Plan is hereby adopted by the Planning and Zoning Commission, and the Plan shall be referred to as the "Transportation Master Plan". Copies of the Transportation Master Plan have been and will be made available for public inspection at the Centennial Civic Center, 13133 E. Arapahoe Road, Centennial, Colorado 80112 during regular business hours. The Plan expressly includes figures, maps and descriptive matter intended by the Commission to form the whole of the Plan, all of which materials are contained within the Plan.

**Section 2.** Following the effective date of this Resolution, but prior to the date on which a certified and attested copy of the Plan is delivered to the Clerk and Recorder of Arapahoe County pursuant to Section 4 of this Resolution below and C.R.S. § 31-23-208, City Staff shall be authorized to make minor corrections or edits to the Transportation Master Plan to correct nonmaterial errors or language in the Plan.

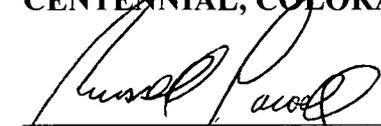
**Section 3.** In accordance with § 31-23-208, C.R.S., this Resolution, when attached to the plan, shall serve to document the Transportation Master Plan's approval by the Planning and Zoning Commission and the identifying signatures of the Chairman and Secretary of the Planning and Zoning Commission.

**Section 4.** Following ratification and approval of the Transportation Master Plan by the City Council as required by C.R.S. § 31-23-206(1) and Section 12-14-204 of the 2011 Land Development Code, the City Clerk shall file a certified and attested copy of the Transportation Master Plan with the Clerk and Recorder of Arapahoe County, Colorado. Attachment by the City Clerk of a certified copy of this Resolution and a copy of the City Council resolution ratifying said Transportation Master Plan shall constitute certification and attestation of the Plan.

**Section 5.** **Effective Date.** This Resolution shall take effect upon its approval by the City of Centennial Planning and Zoning Commission.

ADOPTED BY THE PLANNING AND ZONING COMMISSION OF THE CITY OF CENTENNIAL, COLORADO, BY AN AFFIRMATIVE VOTE OF NOT LESS THAN TWO-THIRDS OF THE ENTIRE MEMBERSHIP OF THE COMMISSION ON THIS 20<sup>th</sup> DAY OF November, 2013.

**PLANNING AND ZONING  
COMMISSION FOR THE CITY OF  
CENTENNIAL, COLORADO**

  
\_\_\_\_\_  
Russell Powell, Chair Pro Tem

ATTEST:



Secretary  
Planning and Zoning Commission

Approved As To Form:

By:   
For City Attorney's Office

CITY OF CENTENNIAL,  
COLORADO

RESOLUTION NO. 2013-R-88

A RESOLUTION OF THE CITY COUNCIL OF THE  
CITY OF CENTENNIAL, COLORADO RATIFYING THE  
PLANNING AND ZONING COMMISSION'S APPROVAL  
OF THE CENTENNIAL TRANSPORTATION  
MASTER PLAN

WHEREAS, the City of Centennial, acting through its Planning and Zoning Commission, is empowered pursuant to C.R.S. §§ 31-23-201, *et seq.*, to make, adopt, amend, and/or supplement a master or comprehensive plan for the physical development of the municipality, including any areas outside its boundaries; and

WHEREAS, following the conclusion of a duly noticed public hearing conducted on November 20, 2013, the Planning and Zoning Commission approved the Centennial Transportation Master Plan pursuant to Resolution 2013-PZ-R-18; and

WHEREAS, pursuant to and in accordance with the procedure set forth in Section 12-14-204 of the 2011 Land Development Code and C.R.S. § 31-23-206(1), the City Council desires to ratify the Planning and Zoning Commission's approval of the Transportation Master Plan.

**NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Centennial, Colorado as follows:**

**Section 1.** The City Council hereby ratifies and approves the decision of the Planning and Zoning Commission adopting the Centennial Transportation Master Plan, as more particularly set forth in Resolution 2013-PZ-R-18.

**Section 2. Effective Date.** This Resolution shall be effective immediately upon adoption.

ADOPTED by a vote of 9 in favor and 0 against this 9<sup>th</sup> day of December, 2013.

By: Cathy A. Noon  
Cathy A. Noon, Mayor

Approved as to Form:

By: [Signature]  
For City Attorney's Office

ATTEST

By: [Signature]  
City Clerk or Deputy City Clerk



## **Centennial Transportation Plan**

*Prepared for:*

City of Centennial  
13133 E. Arapahoe Road  
Centennial, CO 80112

*Prepared by:*



Felsburg Holt & Ullevig  
6300 South Syracuse Way, Suite 600  
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*In association with:*

Fehr & Peers  
UrbanTrans  
TwoHundred

November 2013  
FHU Reference No. 09-135-01

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# 1 Introduction

## 1.1 City's First Transportation Plan

The City of Centennial officially became a city in February 2001 and is the newest large community in Colorado. It is also the largest city incorporation in U.S. history. During the first decade, Centennial experienced many "firsts." This Transportation Plan is the first effort to prepare a comprehensive master plan for transportation.



Centennial is Colorado's newest large City

Centennial has a population of over 100,000 residents in approximately 38,000 residences, encompassing a land area of over 28 square miles. Centennial is located in the rapidly growing Denver-metro area, southeast of Denver. The City is surrounded by the communities of Greenwood Village, Aurora, Foxfield, Parker, Lone Tree, and Littleton. It is located in Arapahoe County and is adjacent to Douglas County. The community is approximately 14.2 miles from east to west but only 4.5 miles north to south at its largest extent.

While there are a number of arterials that traverse Centennial in the north-south direction, only Arapahoe Road is continuous throughout the community in the east-west direction. Major region-wide transportation elements that service Centennial include the Regional Transportation District's (RTD) Southeast light rail transit line, I-25, State Highway (SH) 83 (Parker Road), Arapahoe Road (portions are SH 88), and SH 177 (University Boulevard).

## 1.2 How the Plan is Used

The Transportation Master Plan is intended to be utilized as a tool to prioritize both short and long term transportation investments within the City. The Plan provides policies on implementation and design, and establishes the City's transportation vision and priorities as they relate to the Denver Region. The Plan also provides a basis for moving forward on regional improvements such as on the State Highway System or improvements that require Federal Funding. The Plan will also inform the City's Capital Improvement Plan. The Plan is not a design document for the capital improvements; actual design and engineering occurs once a decision has been made to fund specific projects.

The transportation network is a system of planned and improved vehicular, transit, bicycle, and pedestrian facilities that will assure citizens and businesses high-quality access for all of their travel needs. The plan will help citizens, staff and elected officials make many decisions about future land use and transportation for the City:

- ▶ What improvements are needed to foster and maintain a balanced and sustainable community?

- ▶ How can the requirements of all modes of travel (vehicles, transit, bicycles, and pedestrians) best be accommodated?
- ▶ When and where will transportation improvements be needed?
- ▶ What locations have inadequate capacity, experience congestion, and/or exhibit poor safety records?
- ▶ How much will improvements cost and what are the benefits so that limited financial resources can be best invested?
- ▶ Who will be affected by and benefit from these investments?

### 1.3 Planning Basis

Development of the Transportation Master Plan has relied on a number of documents that Centennial has prepared during its short history. First and foremost is the *City of Centennial Comprehensive Plan* which was adopted in November 2004. The mission statement for the Comprehensive Plan states that "The Comprehensive Plan is a framework to guide public policy and implement the vision for the City of Centennial. The vision for Centennial is a community that is sustainable and cohesive, inspires pride, and produces remarkable places." To further this vision, eight plan elements (including transportation) provide goals and objectives for the City.

In 2008, Centennial completed a community visioning process and published *Our Voice. Our Vision. Centennial 2030*. The purpose was "to develop a visioning process that would not only capture the voice of the current citizenship, but would also inspire direction for Centennial's future population for the next 20 years." This report also provided input to the refinement of the transportation vision.

Several other documents more closely tied to transportation also provided background information. In 2002, Arapahoe County adopted the *Arapahoe County Transportation Plan*. The County recently updated their plan in 2010. Until now, Centennial has used this document to provide recommendations for roadway classifications (freeway, expressway, major principal arterials, and minor arterials), future lane requirements, and roadway cross sections. In addition, potential transit, bicycle and pedestrian facility improvements were identified. Centennial refined elements of this document with the *Centennial Parks, Open Space, Trails and Recreation Master Plan* in 2007. This plan includes recommendations for a trails system that will connect the community and promote bicycling and walking as a mode of transportation as well as recreation. The City has also completed several subarea and corridor plans that provide area-specific recommendations including:

- ▶ Central Centennial Boundary Area Plan

- ▶ Arapahoe Urban Center Sub-Area Plan
- ▶ SouthGlenn Area Plan
- ▶ I-25 Corridor Plan

The current *Ten Year Capital Improvement Program (CIP)*, adopted in 2010, sets the general schedule within which public improvements are proposed to be undertaken. The goal of the Ten Year Capital Improvement Program is to assist the City with near- and mid-range planning and to help anticipate our future needs. The 10-year projection is used as a guideline for the City's decision makers rather than a literal schedule as unforeseen events will influence the City's budget levels and priorities. Centennial has developed the *Neighborhood Traffic Management Program (NTMP)*, revised 2013, in response to requests for traffic calming in neighborhoods. The program seeks to improve traffic safety on neighborhood streets by involving residents in developing solutions to neighborhood traffic problems.



Four public meetings were held to obtain public input

### 1.4 Public Outreach and Coordination Program

This Transportation Master Plan was developed based on a community-driven process. It is vitally important that residents, business owners, and property owners help shape the future of the City. The plan is based on frequent meetings with the public, elected and appointed officials, and City and agency staff. There were four sets of formal public meetings where those attending could provide their thoughts about current transportation issues, problems, and needs in open-ended discussions with City staff and the planning team. Each set of public meetings involved two meetings: one in the western part of the City and a complementary session in the eastern part. This citizen feedback enabled staff and the consultant team to build on this information for further detailed planning.



Citizen talked about transportation at Centennial Under the Stars event in August 2010

A project website was maintained throughout the planning process. It was accessed directly from Centennial's home page, and provided all the material that was presented at the public meetings for those who were unable to attend. Surveys that were conducted at the public meetings were also placed on the website. The most frequently used feature of the website was a map of the community that was accessed through Google Earth<sup>®</sup> that allowed visitors to make specific comments and tie them to a specific location. These comments could subsequently be viewed by all visitors to the site. During the two years that the site was operating, over 300 specific comments were received and logged. A complete listing of the public comments is included in Appendix A.

In addition to the public meetings and website, input was received through a number of other forums. There were seven meetings of the Citizens Advisory Committee (CAC), which consisted of 18 members: residents from all areas of the City, business owners, and a member of the Planning Commission. In addition, there were four stakeholders

meetings with representatives of emergency response, law enforcement, business organizations, school districts, metro districts, and parks and recreation districts that serve and/or reside in Centennial. Four joint workshops were held with the City Council and Planning and Zoning Commission. Finally, there were frequent meetings with City staff that involved individuals from different City departments; including the City Manager's Office, Community Development, and Public Works.

## **1.5 Document Organization**

The document is organized in 5 chapters:

- ▶ Introduction
- ▶ Chapter 2. Guiding Vision - This chapter provides the overall vision, goals and objectives as they relate to Centennial's transportation system.
- ▶ Chapter 3. Transportation Master Plan - This chapter provides detailed projects relating to roadway, bicycle, pedestrian, and transit improvements needed within the City to achieve and maintain an efficient multi-modal transportation network. The Plan contains both short-term projects to correct deficiencies based upon existing conditions, as well as long-term priorities needed to accommodate local and regional growth.
- ▶ Chapter 4. Plan Implementation - This chapter provides information on design considerations when projects are ready for implementation, prioritization of projects, and potential funding sources.
- ▶ Chapter 5. Conditions on which the Plan was Developed - This chapter provides detailed information on existing conditions, roadway inventories, data, analysis and long-term growth projections utilized to inform the plan.
- ▶ Appendices - The appendices contain detailed data and documentation on public outreach and technical analysis performed with the plan.

## 2 Guiding Vision

The *Centennial Comprehensive Plan* provides the basis for all planning efforts in the City. The purpose of the Comprehensive Plan is to provide “the framework document that sets the stage for the City’s future growth and development. It describes the Centennial of today and articulates the vision for the Centennial of tomorrow. The Plan stems from a basic understanding of the City’s current form and function and provides a base from which progress can be measured. In order to effectively and efficiently identify resources and funnel change to reach its stated vision, the Plan provides the basis from which implementation strategies can be crafted, adopted, and pursued over time. In essence, the Comprehensive Plan is Centennial’s blue print for the future.”

Transportation is certainly one of the most visible elements that must be considered in creating a sustainable community. As a growing and dynamic community, the City of Centennial already has a transportation system that encourages all modes of travel throughout the City as well as the region. The *Comprehensive Plan* identifies eight plan elements, each with vision goals that support and reinforce the plan elements. Transportation has eight specific goals and makes the statement that “To reduce congestion, the City must focus on improving the transportation system through expanded mobility options and greater connectivity.”

These eight transportation goals were modified and expanded during the process for preparing the Transportation Master Plan based on discussions with City Council, the Planning and Zoning Commission, stakeholders, and citizens. Citizen input summarized in *Our Voice. Our Vision. Centennial 2030.* was also an input to the process. These goals and objectives for Centennial’s transportation system focus on improving congested conditions, efficiency, and safety.

### 2.1 Goals and Objectives

**Goal 1: Provide a Balanced, Connected, and Sustainable Multi-Modal Transportation System**

- ▶ Provide diverse transportation options, including transit, carpooling, walking, and bicycling for a more sustainable multi-modal transportation system and to reduce fossil fuel consumption
- ▶ Identify critical connections between different modes of transportation and ensure that these connections are well maintained and provide amenities that promote modal transfers



The Southeast Light Rail Line serves Centennial



This section of Arapahoe Road, just west of Holly Street, was recently reconstructed.

- ▶ Identify and prioritize missing connections for each mode of transportation
- ▶ Encourage public/private cooperation in transportation plans, transit providers, and systems
- ▶ Promote sustainability by encouraging land use patterns that capitalize on the efficient use of the transportation system to reduce vehicular trip-making, using recycled materials in transportation improvement projects, and encouraging the use of renewable energy sources for transportation

**Goal 2:**

**Develop a safe and convenient roadway system that balanced mobility and accessibility needs with community preservation**

- ▶ Accommodate all modes of travel within public roadway rights-of-way
- ▶ Preserve right-of-way for future capacity enhancements, particularly on the east side of the City where new development is likely to occur
- ▶ Define the function/character of streets and the desired cross-section based on their role in the roadway network and adjacent land use and promote the appropriate use of the street system based on designated functional classification
- ▶ Develop and implement access control standards to improve the safety and efficiency of roadway corridors

**Goal 3:**

**Develop Strategies to use the Transportation System More Efficiently**

- ▶ Implement transportation demand management (TDM) programs, strategies, and services
- ▶ Join and support appropriate transportation management organizations or associations (TMO/TMA) and encourage the establishment of additional TMO/TMAs in Centennial where appropriate
- ▶ Require transportation demand management programs be developed at designated and future activity centers as they develop and redevelop through the planning and implementation process
- ▶ Support public education and information to reduce travel demand

**Goal 4: Improve and Expand Public Transit Access and Service**

- ▶ Promote the use of transit, both bus and rail
- ▶ Influence the choices available for public transit to increase usage and viability of the existing and future system
- ▶ Identify and prioritize major transportation corridors that could benefit from transit improvements
- ▶ Develop and foster relationships with regional agencies that provide transit planning, including RTD, CDOT, and DRCOG
- ▶ Work with RTD and other transit service providers to consider local bus routes to improve access to regional transit service and enhance mobility options within the City

**Goal 5: Provide safe, convenient and enjoyable facilities to encourage walking and bicycling**

- ▶ Provide continuous, unobstructed sidewalks that meet the City's standards along major streets
- ▶ Support the use of traffic calming devices, pedestrian refuges, etc., to improve the walking environment in Centennial where appropriate
- ▶ Identify areas of the City where pedestrian facilities and amenities should be enhanced, particularly near schools, shopping districts, parks, etc.
- ▶ Identify preferred bicycle routes and develop standards for bike lanes, shared lanes, signing and bicycle parking
- ▶ Encourage walking and bicycling to and from work and school as a form of transportation as well as recreation
- ▶ Promote mixed-use developments that provide pedestrian and bicycle infrastructure



Pedestrian and bicyclists often cross streets at-grade

**Goal 6: Support Denver's Regional Transportation System**

- ▶ Work with adjacent municipalities, counties, the Park and Recreation Districts, RTD, and CDOT, to identify, improve, and mitigate the regional



Small improvements, like a right turn lane, can often make a big difference

transportation patterns affecting the City of Centennial

- ▶ Develop a partnership with DRCOG to implement the Metro Vision Plan and influence future planning efforts to positively affect regional transportation issues in the southeast area

**Goal 7:**

**Maintain and Improve the Existing Transportation System**

- ▶ Maintain the existing streets, sidewalks, and trails that comprise the transportation system
- ▶ Use the Capital Improvement Plan (CIP) to guide and prioritize improvements to the transportation system
- ▶ Develop feasible funding strategies to maintain the transportation system
- ▶ Increase operational efficiency through intelligent transportation systems (ITS) infrastructure

**Goal 8:**

**Improve the appearance of Streets and Public Rights-of-Way**

- ▶ Use the Transportation Master Plan and street standards to meet the functional and planning requirements for the City of Centennial
- ▶ Develop engineering and transportation standards appropriate for the City of Centennial
- ▶ Establish and foster a sidewalk completion/maintenance program
- ▶ Develop streetscape design and lighting standards appropriate for the City of Centennial
- ▶ Protect desired transportation connections through easements or right-of-way dedication

**Goal 9:**

**Encourage Development that Supports and Enhances the Transportation System**

- ▶ Use planning standards for identified Activity Centers to require transportation infrastructure supportive of the uses in each area
- ▶ Focus multiple transportation mode connections and transportation infrastructure improvements towards designated and future Activity Centers

- ▶ Encourage transit-oriented development as a framework for future development in designated and future Activity Centers
- ▶ Promote pedestrian and bicycle facilities/amenities with all new development particularly at identified nodes/Activity Centers
- ▶ Promote the use of transportation/traffic studies that consider impacts to all modes of transportation to a proposed development

## 3 Transportation Master Plan

This *Transportation Master Plan* identifies a large number of improvement projects so that the City's elected leadership and staff can anticipate the changes that need to occur as the City continues to grow. The Plan includes both short-term projects that are based upon existing needs and long-term projects that are a result of regional growth and development over the next 20 years.

Short-term priorities include a significant backlog of projects that address existing deficiencies. Long-term priorities identify opportunities that the City should consider in future years that will provide City residents and businesses additional relief for the overburdened roadway network and the connectivity necessary for viable alternatives to driving within the community.

Identification of short-term projects primarily relied on assessments of current conditions. It is therefore easier to analyze these conditions as well as compare and prioritize projects. Determining priorities for longer range improvements is fraught with more uncertainties, and thus no ordering is realistically possible.

The complete plan and its suggested improvements should be considered as a guideline, and all projects should be reviewed in detail each year when the City's Capital Improvement Plan (CIP) is updated. This provides the opportunity for other non-transportation factors to be considered. These factors can include economic development priorities, the pace of development along a corridor, relative project costs and available funding levels, and the ability to leverage City funds.

The Transportation Master Plan is divided into five categories: roadway improvements, bicycle and pedestrian improvements, transit improvements, transportation demand management, and general recommendations.

### 3.1 Short-term Roadway Plan

The short term roadway plan has been developed to address the existing deficiencies of the roadway network. The inventory of existing conditions, public comment, and previously identified improvements (by the City and/or Arapahoe County) have been the primary sources for developing the short term plan. Detailed information on existing conditions including existing traffic volumes, roadway capacity, and accident data is located in Chapter 5, Conditions on which the Plan was Developed.

#### Short Term Improvement Projects

Short term roadway improvement needs have been identified to address the deficiencies of the existing roadway system. These

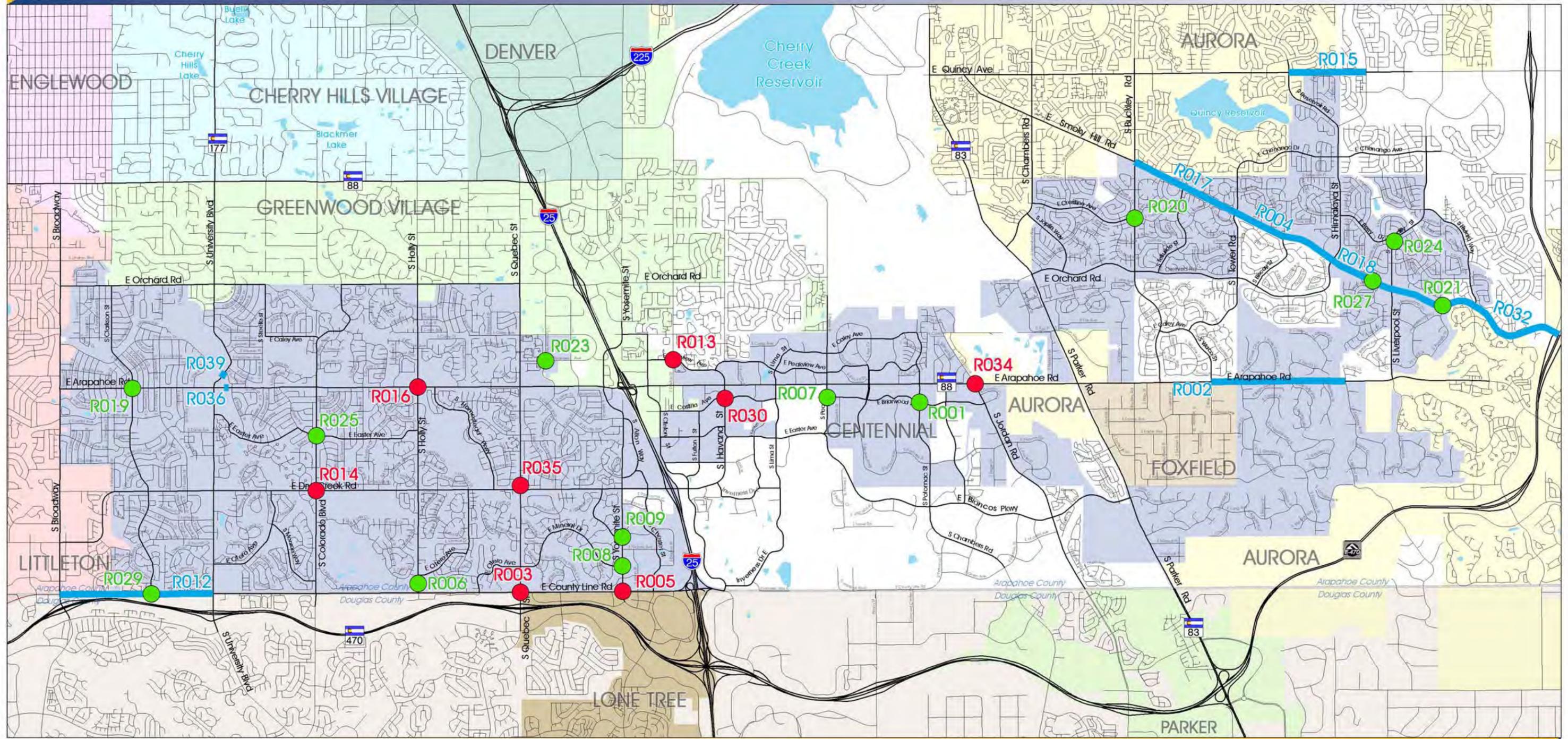


East Arapahoe Road was mentioned most often as needing improvements

projects are depicted on Figure 1 and are listed in Table 1. (Projects are grouped into three general categories: corridor improvements (roadway widening and/or reconstruction), traffic signal installation, and intersection improvements (e.g., dedicated turn lanes).

As described in the inventory of existing conditions (Chapter 3), Centennial's roadway network lacks options for east-west travel. With Arapahoe Road providing the only continuous east-west connection across the City, the travel demand is high, and on several sections of Arapahoe Road, the demand exceeds the road's capacity. In particular, the segment of Arapahoe Road between Waco and Himalaya streets is currently two-lanes wide and needs to be widened to four and then six lanes in the foreseeable future. This improvement received the highest score in the ranking process. Likewise, the travel demand on the segment of County Line Road between University Boulevard and Broadway exceeds the current roadway capacity. This is the only section of County Line Road that hasn't been widened from two lanes to four travel lanes and was the second ranked project. Current plans for C-470 improvements adjacent to County Line Road may provide congestion relief in the immediate future. The two improvement projects met with overwhelming agreement from elected officials and residents as the two highest priorities for the City.

Unfortunately, the projects listed in Table 1 will be very expensive to construct. The City may not be able to implement all of these projects in the short term but may be able to implement other, lower cost projects. With a limited CIP budget available each year, roadway projects that would provide considerable relief to currently congested roadways, like intersection and spot roadway widening projects, may tend to be favored in the annual CIP review process. To assist in prioritization, these projects are ranked based upon various criteria. Prioritization is discussed in Chapter 4.



**LEGEND**

- RXXX Project ID
- Intersection Improvements
- Traffic Signal
- ~ Roadway Improvements



Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
This map is for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map. FHU shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document.



Table 1: Short Term Roadway Project Needs

Project ID#	Location	Description
R001	Briarwood Ave & Potomac St Intersection	Signalize intersection
R002	Arapahoe Road from Waco to Himalaya	Roadway widening and reconstruction (likely includes B018 and P022)
R003	County Line Road & Quebec Street Intersection	New southbound to westbound right turn lane
R004	Smoky Hill Road from Tower Road to Orchard Road	Roadway reconstruction and widening to 6 lanes
R005	County Line Road & Yosemite Street Intersection	New southbound to westbound right turn lane
R006	Holly Street & Foxridge Plaza Intersection	Signalize intersection
R007	Briarwood Ave & Peoria St Intersection	Signalize intersection
R008	Yosemite Street & Mineral Drive Intersection	Signalize intersection
R009	Yosemite Street & Willow Way Intersection	Signalize intersection
R012	County Line Road from University to Broadway	Reconstruction and widening to 4 lanes
R013	Peakview Avenue & Dayton Street Intersection	Intersection reconstruction and signal upgrade
R014	Dry Creek Road & Colorado Blvd Intersection	Intersection reconstruction and auxiliary lanes
R015	Quincy Avenue from Reservoir Road to Himalaya	Widen to 6 lanes
R016	Arapahoe Road & Holly Street Intersection	Add dedicated right turn lanes on all approaches
R017	Smoky Hill Road from Buckley to Tower	Reconstruction and widening to 6 lanes
R018	Smoky Hill Road from Orchard to Picadilly	Reconstruction and widening to 6 lanes
R019	Arapahoe Road & Clarkson St Intersection	Signalize intersection
R020	Buckley Road & Crestline Ave Intersection	Signalize intersection
R021	Smoky Hill Road & Picadilly Street Intersection	Signalize intersection
R023	Peakview Ave & Syracuse Way Intersection	Signalize intersection / roundabout
R024	Picadilly Street & Berry Drive Intersection	Signalize intersection / roundabout
R025	Colorado Blvd & Easter Ave/Nobles Road Intersection	Signalize intersection / roundabout
R027	Smoky Hill Road & Kirk Street Intersection	Signalize intersection
R029	County Line Rd & Clarkson St Intersection	Signalize intersection
R030	Havana St & Briarwood Ave/Costilla Ave Intersection	New eastbound to southbound right turn lane
R032	Smoky Hill Rd from Liverpool St to E-470	Widen to 6 lanes
R034	Arapahoe Rd & Jordan Rd Intersection	Safety improvements to signal heads and timing
R035	Quebec Street & Hinsdale Place Intersection	Modify access to Quebec Street
R036	Arapahoe Rd Structure over Big Dry Creek (e/o University)	Replace or widen structure
R039	University Blvd Structure over Big Dry Creek (n/o Arapahoe)	Replace or widen structure

### 3.2 Long-Term Roadway Plan

In the future, Centennial will need to improve the effectiveness of its transportation system as there is continued growth in the community. This will involve utilizing existing roadways to their full potential through selective widenings, innovative intersection treatments, and strategic new links to increase connectivity and efficiency. The Long Term Roadway Plan includes a number of the considerations that are discussed in Chapter 5. The Plan will also upgrade the roadway classifications of several facilities in recognition of their importance to the community and connections to the regional transportation network. Figure 2 highlights the different types of changes (widening, classification, new treatments, etc.) to the roadway network that are envisioned for the long term.

Table 2: System Performance Comparison

	2010 Existing Conditions	2035 No Build	2035 Long Term Roadway Plan	Percent Change (2035 No Build vs. 2035 LT Projects)
Total Lane Miles	354	354	386	+9.0%
Vehicle Miles of Travel (VMT)	2.02 Million	2.87 Million	3.00 Million	+4.7%
Lane Miles at LOS F (V/C $\geq$ 1.0)	70	171	146	-14.8%
Average V/C (weighted by lane miles)	0.75	1.08	1.00	-7.2%

The Long Term Roadway Plan identifies a list of recommended considerations that may have a cost considerably beyond the financing capability of the City, based on existing funding mechanisms. The Plan prioritizes considerations into short-, medium- and long-range considerations. When implementation is being considered, it should be remembered that these priorities represent information available during the development of the Transportation Master Plan. These priorities should be considered as a guideline with the flexibility to adjust priorities due to the inherent uncertainty of future conditions and funding availability. Before proceeding, there should be opportunities to consider other non-transportation factors which might include economic development priorities, the pace of development along a corridor, and the ability of the City to leverage funds from other sources.

Projects located within the Short Term Roadway Plan analyzed and ranked a number of corridor, intersection, and traffic signal improvement projects for implementation. In developing the Long Term Roadway Plan, these previous efforts guided the determination of the level of urgency of these considerations. The two highest ranked projects in the Short Term Transportation Plan are felt to have an immediate need for implementation (within five years). Further

into the future, there are mid-term needs (5 to 15 years) and long range needs (likely 10 year or more). The following considerations have been included in the Long Range Roadway Plan:

### Immediate Needs

- ▶ **Arapahoe Road Widening** – This consideration would widen the 1.8 mile section of Arapahoe Road between Waco Street and Liverpool Street from two lanes to four lanes initially and six lanes at some later time. This would address current (and forecasted future) congestion, as the current volume far exceeds the normal capacity of a two lane road. Throughout the public involvement process for the plan, this consideration was mentioned the most frequently by residents. Arapahoe Road currently has six lanes west of Waco Street, four lanes between Himalaya Way and Liverpool Street, and six lanes east of Liverpool Street. This consideration has a very high cost, and there will likely be two phases of construction. The first phase would widen the two lane section from two lanes (Waco to Himalaya) to four lanes and later widen the entire segment between Waco Street and Liverpool Street to six lanes as future growth and congestion occur. Funding for the initial widening to four-lanes has been approved, and final design has begun.
- ▶ **County Line Road Widening (West)** – Widening the current two-lane segment of County Line Road between Broadway and University Boulevard to four-lanes will complete the widening of this arterial to at least four-lanes between Santa Fe Drive and I-25. Douglas County and the City of Littleton will contribute their proportionate shares to the cost of this widening. The planned improvements on C-470 may effect the level of congestion on this segment. As such, the City may choose to wait to see what the effects are to the C-470 improvements, which may reduce the urgency of this project.



Smoky Hill Road would be widened in segments from Buckley to Versailles

### Mid-Term Needs

- ▶ **Smoky Hill Road Widening** – Widening the current four-lane segment of Smoky Hill Road between Buckley Road and Versailles Parkway to six-lanes would relieve forecasted future congestion. Smoky Hill Road is already six-lanes at each end, and the widening would likely be accomplished in segments. To reduce the need for additional right-of-way, the need for auxiliary right-turn lanes should be evaluated individually at each intersection. Additionally, because of constrained right-of-way, particularly between S. Tower Road and Buckley Road, this project may not be physically feasible without impacts to the adjacent neighborhood that need to be taken into consideration at the time of project evaluation.



Briarwood Avenue currently ends at Lima Street



Westbound County Line Road may need to be widened to three lanes between Yosemite and Quebec Streets, depending on future conditions and other regional improvements.



A Continuous Flow Intersection (CFI) is recommended at Arapahoe Road and Lima Street

- ▶ Broncos Parkway – This would improve the connectivity of Broncos Parkway and increase its attractiveness for drivers as a viable alternative to using Arapahoe Road for east-west travel. Although it is not a “silver bullet” that eliminates congestion on Arapahoe Road, 93% of the traffic would have at least one “trip end” in the Centennial area between I-25 and Parker Road. It utilizes existing infrastructure that has been an on-going priority for Arapahoe County and the Dove Valley Metro District. It improves the efficiency of Easter Avenue as a vital connection between Havana Street and Broncos Parkway.
- ▶ Peakview Avenue and Briarwood Avenue – These two roadways parallel Arapahoe Road on the north and south, respectively. These considerations would improve existing major collectors to provide continuous four-lane minor arterials on each side of Arapahoe Road. Along Peakview Avenue, the segment between Euclid Drive and Revere Parkway would be straightened and widened to enhance east-west continuity. Enhancing Peakview Avenue is the consideration that would likely be implemented first since it north of Arapahoe Road and doesn’t have any gaps. The segment of Briarwood Avenue between Lima Street and Peoria Street is currently occupied by a golf course. Briarwood Avenue should be considered after Broncos Parkway in upgraded in conjunction with possible redevelopment of the golf course. The segment between Peoria Street and Jordan Road is a priority for the Dove Valley Metro District.
- ▶ Quincy Street – This would widen the short segment of Quincy Avenue east of Reservoir Road that is in Centennial to six lanes. This would maintain width continuity along Quincy Avenue with future six-lane sections in Aurora and Arapahoe County. This is a multi-jurisdictional project, as the majority of ROW, traffic, and existing improvements are located or originate within Aurora. At a minimum, Quincy Street could be widened to four lanes completely within the City of Aurora. This would not be a project that is initiated by the Centennial.

### Long Range Needs

- ▶ County Line Road Widening (East) – This would widen the two miles of County Line Road between Holly Street and Yosemite Street from four/five lanes to six. While the construction of this project is long range, the need is dependent on widening C-470, which is currently being studied. More lanes on C-470 could delay the need for this widening further into the future.
- ▶ Orchard Road Widening – This would widen the one-mile section of Orchard Road between East Ida Drive and Buckley Road from four lanes to six. This would address current (and forecasted future) congestion, as well as anticipate potential construction of an interchange at the intersection with Parker Road. In addition, the classification of Orchard Road, as well as the contiguous segment of Himalaya Street, would be

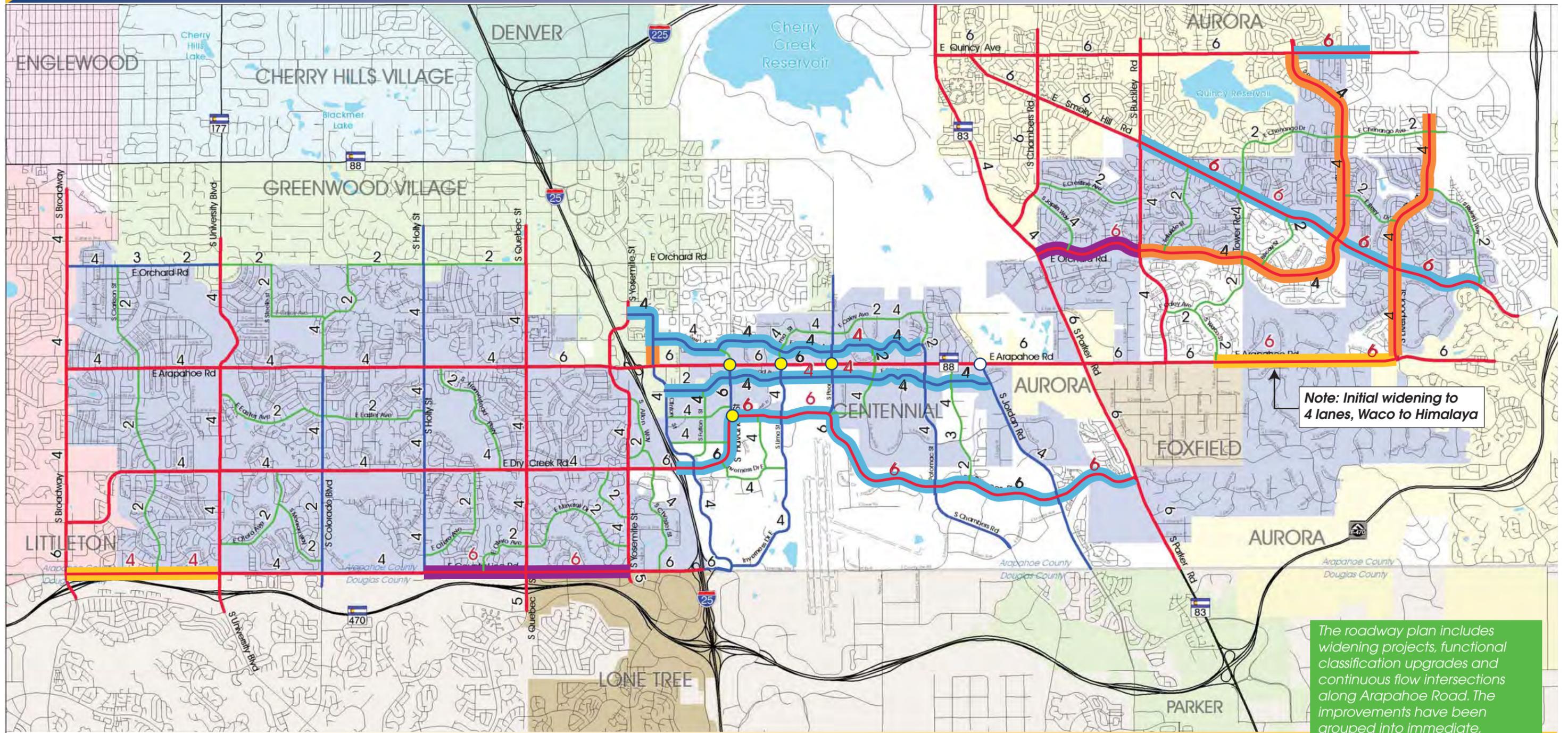
upgraded from its current minor arterial status to major arterial. No additional physical improvements east of Buckley Road are anticipated.

- ▶ Continuous Flow Intersections and other intersection improvements on Arapahoe Road – Continuous flow intersections (CFI) are a relatively new concept to improve the efficiency of high-volume intersections. As explained in more detail in Appendix F-3, CFIs should be considered along Arapahoe Road at Havana Street, Lima Street, and Peoria Street. These concepts would improve travel times and delays at each of these three intersections. Extensive coordination will be required with adjacent land owners and CDOT as well as some right-of-way acquisitions and access changes. Additionally, other intersections, particularly Jordan Road, need improving to take advantage efficiencies of other improvements along Arapahoe Road. Further study of the Jordan Road intersection is required to settle on the most appropriate intersection treatment.

These improvements will have a considerable benefit to the roadway network as congestion continues to increase in the future. Table 2 compares network capacity (expressed as lane-miles) and congested operating conditions (level of service F). There is significant improvement in these measures between the No Build condition and the recommended Roadway Plan.

### **Regional Improvements**

The Long Term Roadway Plan can also provide a basis for moving forward on regional improvements such as on the state highway system or improvements with Federal Funding. As a first step, it becomes necessary for the City to submit a plan amendment to the DRCOG Regional Transportation Plan. An example of this would be along the Arapahoe Road corridor between I-25 and Parker Road. This segment would need to include the support of multiple jurisdictions and require analysis that shows the long term need.



Note: Initial widening to 4 lanes, Waco to Himalaya

The roadway plan includes widening projects, functional classification upgrades and continuous flow intersections along Arapahoe Road. The improvements have been grouped into immediate, mid-term, and long-range needs.

LEGEND

- Change in Roadway Classification Only
- Immediate Needs
- Mid-Term Needs
- Long-Range Needs
- Roadway Widening
- Continuous Flow Intersection
- Other Intersection Improvement
- Major Arterial
- Minor Arterial
- Major Collector
- Local Streets
- Through Lanes
- City Limits
- Lakes

### 3.3 Bicycle and Pedestrian Plan

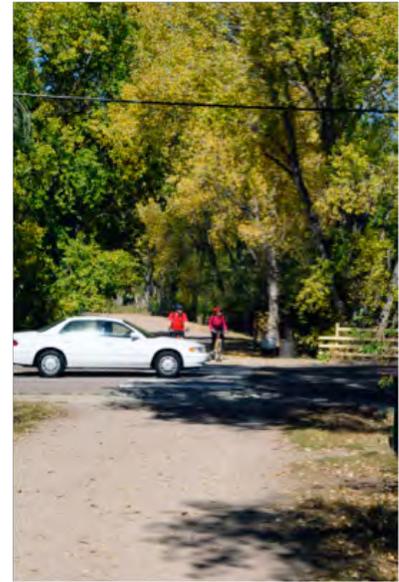
The following recommendations were based upon public input and the City's desire to provide a multi-modal roadway network. The pedestrian recommendations include specific improvements as well as policy direction and a toolbox to help the City determine the most appropriate treatment at intersections and along roadways. The bicycle recommendations include a series of proposed on- and off-street improvements, which would result in a connected bicycle network throughout the City. Centennial's Parks, Open Space, Trails, and Recreation Master Plan 2007 is a companion document that should be consulted for additional projects, prioritization, and design considerations. Coordination with affected neighborhoods will be required for all facilities in residential areas in order to gauge support for both the need and design of the improvement.

#### Identification of Deficiencies

The identification of deficiencies in the bicycle and pedestrian system was closely tied to a robust public involvement process that resulted in hundreds of public comments. Many of these comments were specific to bicycle and pedestrian needs and included sidewalks to complete continuity, intersection crossing enhancements, connectivity from sidewalk to multi-use trail facilities, and bike lanes along collector and arterial streets. Figure A-1 in Appendix A illustrates general locations of needs identified through public comments. These needs were then investigated to determine the appropriate recommendation and action.

In addition to the general public meetings, meetings with various stakeholders included the Cherry Creek and Littleton School Districts, South Suburban and Arapahoe Parks and Recreation Districts, Aurora and South Metro Denver Chambers of Commerce. Key points included:

- ▶ School Districts are interested in more Middle School and High School accessibility to bike/pedestrian facilities
- ▶ Provide bike facilities, lockers and showers near activity employment centers
- ▶ Contact citizens bicycle group and establish a Bicycle Advisory Committee that includes such groups as Bicycle Colorado
- ▶ More bike / pedestrian underpass or grade separations are desired
- ▶ Better connectivity to Light Rail stations is needed
- ▶ More pedestrian and bicycle connections are needed throughout the City
- ▶ Different classes of bicycle rider should be recognized and infrastructure should be provided for each class of rider



Highline Canal Crossing at Orchard Road



Not all arterials have adequate sidewalks like Smoky Hill Road

- ▶ Provide for equestrian and other vehicle types, such as neighborhood electric vehicles (NEVs)
- ▶ GOCO, State, Open Space, Safe Routes to School can be funding Sources
- ▶ Bicycle friendly entrances and exits are needed to get in and out of the Cherry Creek Reservoir area
- ▶ More bicycle connections are needed to other cities
- ▶ Trails, routes, and sidewalks all need maintenance



Liverpool Street has a sidewalk on the west side, but not on the east.

### **Pedestrian Projects**

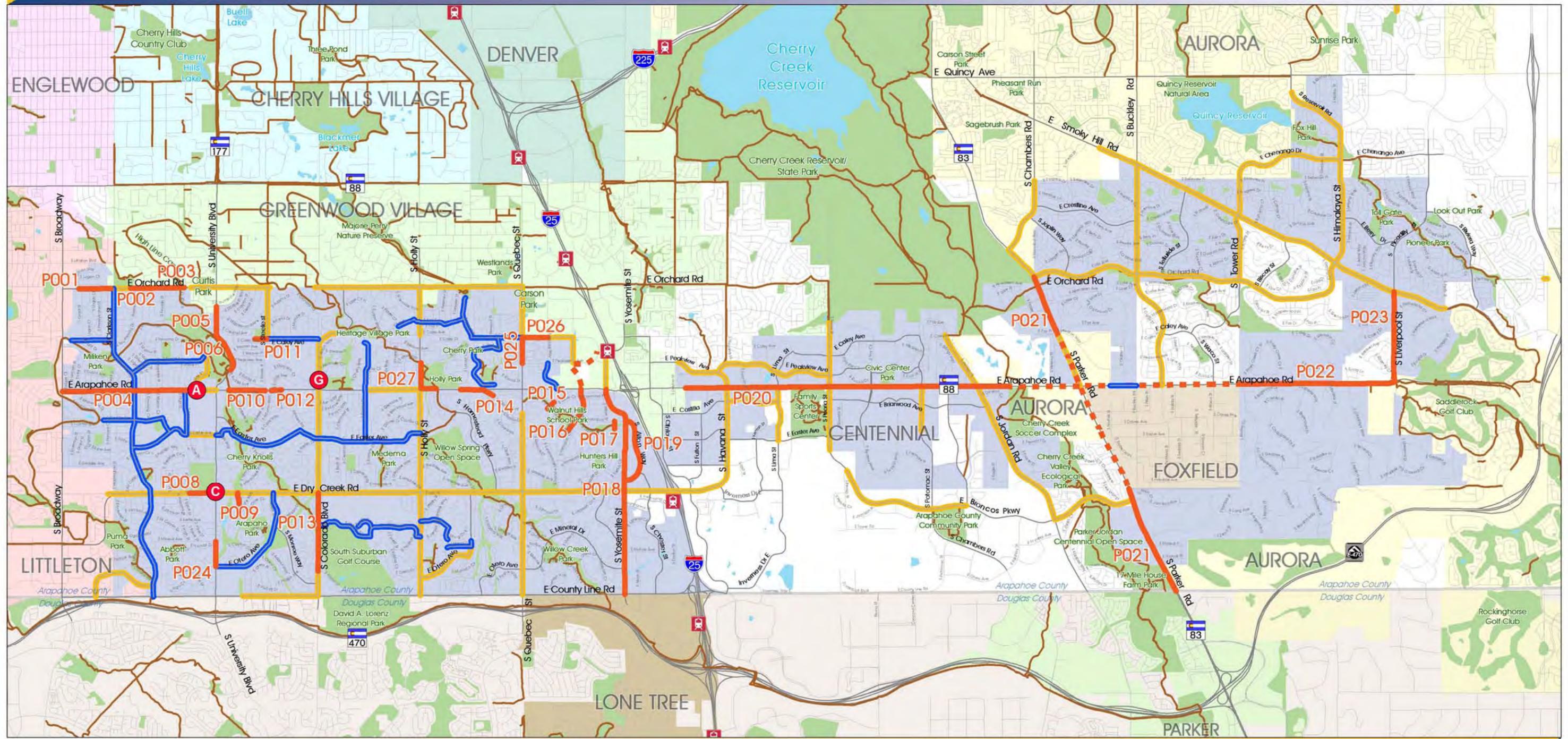
A list of pedestrian improvement needs has been developed based on public comments, the inventory of existing conditions, and projects previously identified by the City. The list of pedestrian improvements reflects projects that provide good value and leverage much of the existing system. The primary focus of the recommendations is to increase connectivity, both between existing trail systems and sidewalk connections to pedestrian destinations. The project locations are shown on Figure 3, and are listed in Table 3. These projects are also color coded to reflect intersection or connectivity projects. Also, recommendations for easy fixes or low cost solutions that may not need to be formal projects are included.

### **Pedestrian Plan Policy Direction**

In order to provide safe, continuous, and effective pedestrian accommodations, the following policy directives should be implemented:

- ▶ Sidewalks shall be constructed on both sides of the roadway
- ▶ Local and Collector Streets should have minimum 5' wide detached walks and arterial roadways should have minimum 6' detached walks subject to modification based upon field conditions.
- ▶ Sidewalks should be free of any obstruction, including landscaping, utilities, and any other obstruction that may hinder pedestrian movement.
- ▶ Sidewalks should be continuous and uninterrupted
- ▶ Ramps shall be constructed at all crossing points and intersections and should meet the most current ADA requirements
- ▶ Crosswalks and other treatments shall be installed at all legs of every intersection unless otherwise determined by Public Works.

The Pedestrian Safety Toolbox in Appendix C provides guidance and detail to help determine the most appropriate pedestrian application to an intersection and roadway within the limits of Centennial.



LEGEND

- PXXX Project ID
- Pedestrian Project
- Pedestrian Project Outside Centennial
- Intersection/Safety Improvements

- Wide/Seperated Sidewalk
- Narrow Sidewalk
- Trails
- Major Street Network

- Parks
- RTD Light Rail Station
- City Limits

Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
This map is for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map. FHU shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document.



Table 3: Pedestrian Projects

Project ID#	Location	Description
P001	Orchard Rd from Clarkson St to Sherman Way	Install 5' minimum sidewalk on south side
P002	Orchard Rd from Highline Canal Trail to Ogden St	Install 5' minimum sidewalk on south side
P003	Highline Canal trail at Orchard Rd (1800 ft w/o University Blvd)	Emphasize crosswalk, consider HAWK or flashing signs
P004	Arapahoe Rd from Vine St to Broadway	Widen to minimum 5' attached sidewalk
P005	University Blvd from Columbine Way to Euclid Pl	Add 5' or 8' sidewalk
P006	University Blvd from Josephine Way to 250 ft s/o Crabtree Dr	Widen / Install sidewalk on east side. Provide wayfinding signs for trail connection
P008	Dry Creek Rd from University Blvd to Franklin St	Widen and detach sidewalk on north side near school
P009	Detroit St from Dry Creek Rd to Detroit	Enhance crossing with flashing sign or better signage and marking
P010	Arapahoe Rd from Steele St to 200 ft w/o Elizabeth St	Add 5' minimum sidewalk on north side
P011	Caley Ave from Steele St to St. Paul Wy (around Peabody Elementary)	Recommend 5' walks on all residential roadways. Additionally, connect Caley via a multi-use trail between Steel St and St. Paul Way on south side of school
P012	Arapahoe Rd from Adams Way to Nobles Rd	Widen sidewalk to 5' minimum on south side through segment
P013	Colorado Blvd from Dry Creek Rd to Otero	Add 5' minimum (detach or 8' attached) sidewalk to east side with retaining wall
P014	Little Dry Crk Trail from Krameria Way to Briarwood Cir (s/o Quebec and Arapahoe)	Widen walk on north side of Arapahoe Rd from Krameria to new Arapahoe Rd underpass
P015	Spruce St s/o Arapahoe and e/o Quebec (at Little Dry Creek Trail)	Connect trails with way finding signs and road markings
P016	Uinta St from Costilla Blvd to Arapahoe Rd (near Walnut Hills Elementary School)	Widen to 5-6' attached sw or provide traffic calming measures along street to maintain slow vehicle speeds and install bicycle signage/ sharrow or a bicycle blvd
P017	Xanthia St Trail at Briarwood Blvd	Install curb that meets ADA standards for trail crossing
P018	Yosemite St from Arapahoe Rd to County Line Rd	Add 5' minimum sidewalks in missing areas
P019	Alton Way from Yosemite St to I-25	Add 5' minimum sidewalks
P020	Arapahoe Rd from I-25 to Parker Rd	Add 8' sidewalk in phases w roadway improvements
P021	Parker Rd from Orchard Rd to Valley High Dr (B020)	Add Multi-use path on one side and minimum 8' sidewalk on remaining side both bike/ped travel
P022	Arapahoe Rd from Liverpool St to Jordan Rd	Add Multi-use path on one side and sidewalk on the remaining side - Recommend a phased approach with multi-use path constructed in short term
P023	Liverpool St from Arapahoe Rd to Smoky Hill Rd	Add 8' minimum sidewalk and retaining wall on east side
P024	University Blvd from Mineral to Otero	Add 5' minimum sidewalks in missing areas
P025	Quebec St from Caley Ave to Peakview Ave	Add 5' minimum sidewalk on east side
P026	Caley Ave east of Quebec St	Add 5' minimum sidewalk on south side
P027	Arapahoe Rd & Holly St	Add 5' minimum sidewalk on NE corner
A	Arapahoe Rd & Vine St intersection	Replace signal head and verify timing
C	Dry Creek Rd and University Blvd SE of Arapahoe HS	Raised crosswalk at RT lane
G	Colorado Blvd & Euclid intersection	Review for Ped signal or other pedestrian crossing enhancement

## Bicycle Projects

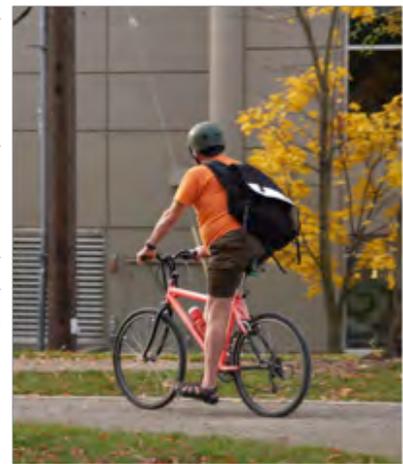
The recommended bicycle improvements consist of addressing the public comment information, resolving existing deficiencies revealed through the data collection, and developing a comprehensive system of bicycle facilities to accommodate all types of riders. Both the Transportation Plan and the City’s 2007 Parks, Trails, Open Space and Recreation Master Plan rely on rider classifications as defined within the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*, there are three bicycle user types which include:

- ▶ **A** – Advanced or experienced riders. They are generally using their bicycles as they would a motor vehicle. They are riding for convenience and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with motor vehicle traffic; however, they need sufficient operating space on the traveled way or shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position.
- ▶ **B** – Basic or less confident adult riders may also be using their bicycles for transportation purposes, e.g., to get to the store or to visit friends, but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared use paths and prefer designated facilities such as bike lanes or wide shoulders lanes on busier streets.
- ▶ **C** – Children, riding on their own or with adults, may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores, and recreational facilities. Residential streets with low motor vehicle speeds, linked with shared use paths and busier streets with well, defined pavement markings between bicycles and motor vehicles, can accommodate children without encourage them to ride in the travel lane of major arterials.

While the proposed plan could include the use of multi-use paths adjacent to roadways, bicycle lanes on roadways, shared roadways along neighborhood streets or within districts, and sidewalk connections when necessary, the majority of project recommendations are striped bike lanes. These facilities fill in the gap in providing more bike lane facilities in general. The projects shown in Figure 4 are recommended for connectivity purposes and would help round out a comprehensive system of bicycle facilities. The 2007 Parks, Trails, Open Space and Recreation Master Plan should also be consulted for additional connectivity projects.



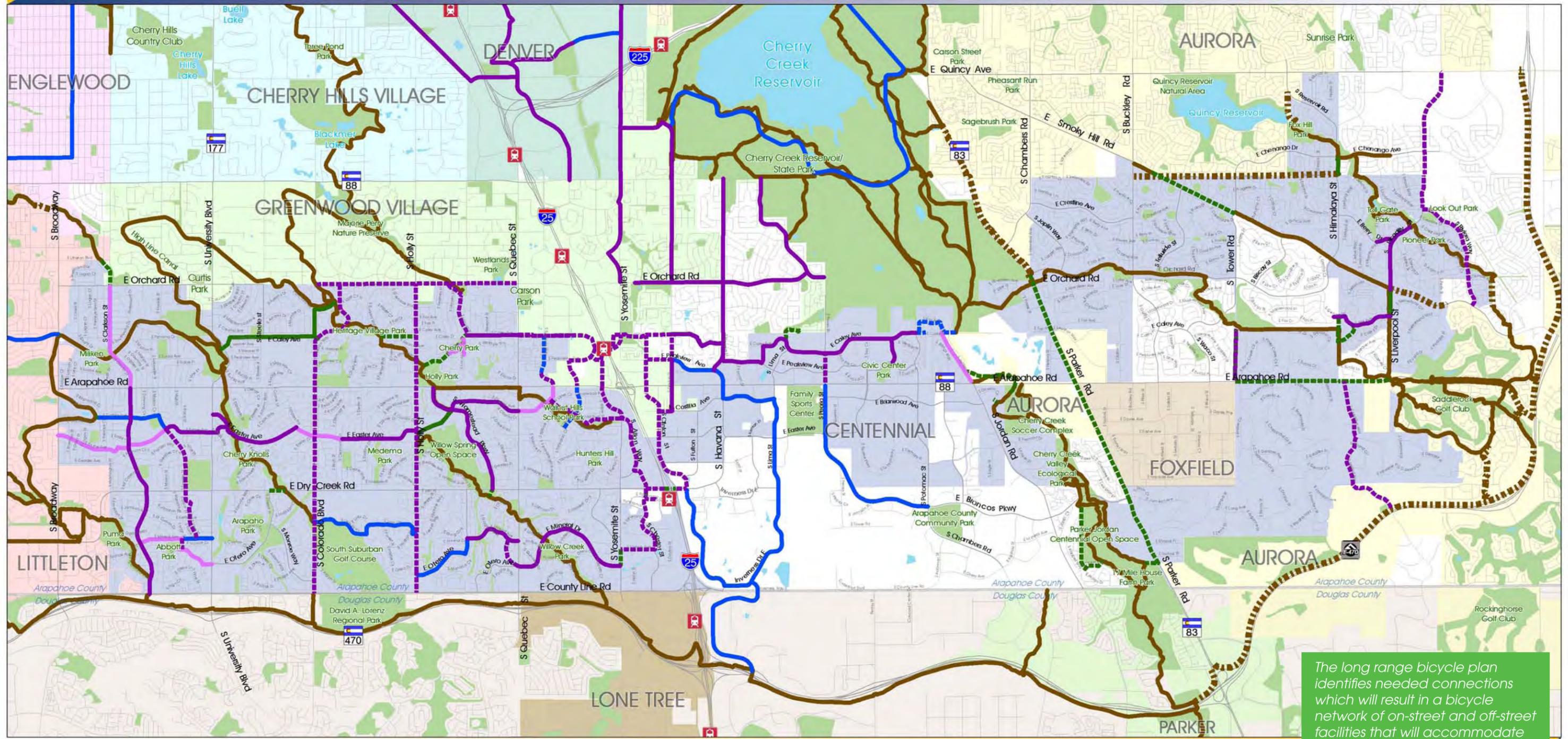
Typical Type A Bicycle User



Typical Type B Bicycle User



Typical Type C Bicycle User



The long range bicycle plan identifies needed connections which will result in a bicycle network of on-street and off-street facilities that will accommodate all user groups.



FEHR & PEERS

LEGEND

- Bike Lane
- Proposed Bike Lane
- Bike Route
- Proposed Bike Route
- Regional Trails
- Proposed Regional Trail
- Multi-use Path
- Proposed Multi-use Path
- RTD Light Rail Station
- Parks
- City Limits

Coordination with affected neighborhoods will be required for all facilities in residential areas to gauge support for both the need and design.



## **Bicycle and Pedestrian Accommodation**

When new developments are being planned, adequate provisions for bicycles and pedestrians need to be included in the designs for all streets, as identified in the City's street cross sections (see Appendix B). Wherever possible, off street facilities should be coordinated with the guidance provided in the *Centennial Parks, Open Space, Trails and Recreational Master Plan* to improve continuity as much as possible. The City utilizes two publications from the American Association of State Highway and Transportation Officials (AASHTO) for design guidance for pedestrian and bicycle facilities: *Guide for the Development of Bicycle Facilities*, 2012 and *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, 2004.

Coordination with affected neighborhoods will be required for all facilities in residential areas in order to gauge support for both the need and design of the improvement.

The Cherry Creek and Littleton School Districts should consider partnering with the City of Centennial to develop a Safe Routes to Schools (SRTS) program for all public schools in Centennial. SRTS programs include complementary elements of engineering, education, enforcement, and encouragement to enable more children to walk and bicycle safely to school.



RTD Provides call-n-ride service in parts of Centennial

### 3.5 Transit Plan

The Transit Plan supports the overall transportation plan goals, which emphasize the importance of a balanced and sustainable multi-modal transportation system. Improving the quality of transit service will help the City of Centennial reach its goal of increasing the number of residents and employees who use transit. In turn, increased transit ridership can help Centennial achieve its goals of promoting sustainability and reducing dependence on fossil fuels. The following transit recommendations are long term in nature, and significant coordination with RTD will be required to evaluate and implement these recommendations as RTD will be the implementing agency for these recommendations.

#### Service Coverage

Transit service coverage recommendations are shown on Figure 5 and include the following components:

- ▶ Two new call-n-Ride (demand responsive) areas:
  - West Centennial (Broadway to Holly Street)
  - East Centennial (east of Tower Road)
- ▶ Bus Rapid Transit (BRT) along Arapahoe Road. There is a broad range of potential BRT services; for Arapahoe Road, BRT service could include high frequency service (10 minute service in peak periods and 20 minute service during off-peak periods) with stops approximately every half mile. Transit priority treatments such as transit signal priority and queue jump lanes at key intersections could also be included to improve travel time and reliability. This service could enhance transit accessibility to two of Centennial's urban centers: the Arapahoe Urban Center (AUC) and the Streets at SouthGlenn mixed use area.
- ▶ New local bus service along Orchard Road east of Parker Road would support BRT service along Arapahoe Road and the park-n-Ride facility at Smoky Hill Road and Picadilly Street.

#### Facilities and Amenities

To support transit service and encourage ridership, the following facilities and amenities are recommended:

- ▶ New park-n-Rides:
  - University Boulevard and Arapahoe Road (potential for shared parking at the Streets at SouthGlenn)
  - Arapahoe Road and Parker Road
- ▶ Improved passenger amenities including shelters, trash cans, lighting and benches at transit stops

## **Development and Redevelopment**

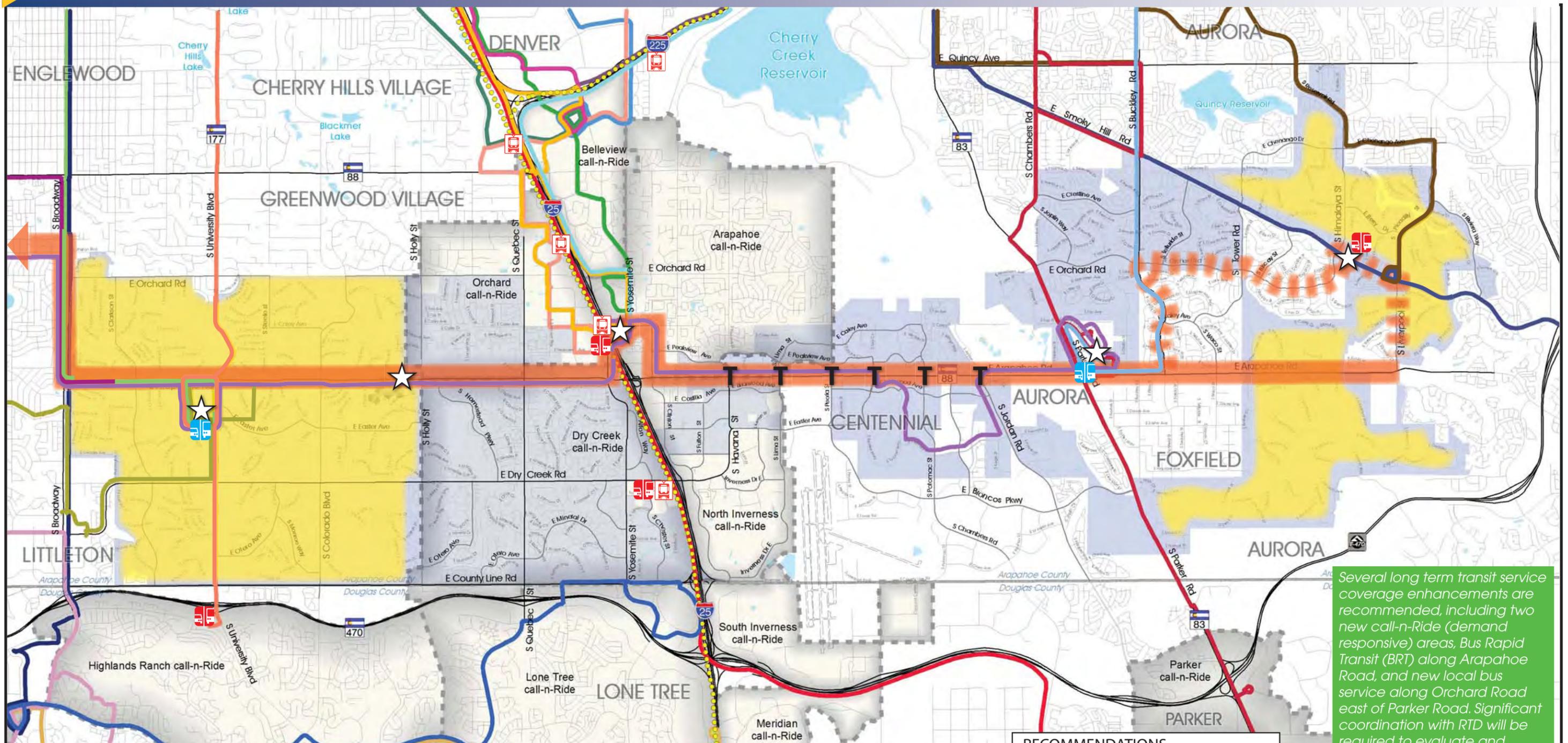
Development and redevelopment in the area provides opportunities to improve transit services. As residential or commercial developments are initiated, the City should contact RTD to ensure that development plans accommodate and enhance transit services.

It is also recommended that transit become an integral element of the City's development review process. Multi-modal transportation studies should be required as a part of a developer's submittal package to the City. The City should establish guidelines for multi-modal studies.

## **Marketing and Education**

Educating Centennial citizens and employees about the services available will help bolster ridership in the area. The following items are recommended to promote transit as an alternative travel mode for the residents, employees and visitors of the City of Centennial:

- ▶ Work with RTD to develop a marketing campaign to better inform people about the existing services and how to use them
- ▶ Encourage employers to participate in RTD's eco pass program
- ▶ Continue to participate in and support Southeast Connections TMA and the Southeast Business Partnership



Several long term transit service coverage enhancements are recommended, including two new call-n-Ride (demand responsive) areas, Bus Rapid Transit (BRT) along Arapahoe Road, and new local bus service along Orchard Road east of Parker Road. Significant coordination with RTD will be required to evaluate and implement these recommendations.

LEGEND Existing Service

- |                                      |                                  |                           |                               |                   |
|--------------------------------------|----------------------------------|---------------------------|-------------------------------|-------------------|
| — Arapahoe County / DIA - AT         | — Highlands Ranch Parkway - 402L | — Quebec Street - 73      | — South Broadway Limited - 0L | — Light Rail      |
| — Arapahoe Road - 66                 | — Lincoln Ave / Parker - 410     | — Quincy Avenue - 139     | — South Dahlia - 46           | — RTD Call N Ride |
| — Boulder / Greenwood Plaza - T      | — Monaco Parkway - 65            | — Ranches Crosstown - 401 | — University Blvd - 24        | — City Limits     |
| — Buckley / Tower DIA Limited - 169L | — Parker / Denver - P            | — Ridge Road - 67         | — Wildcat Crosstown - 403     |                   |
| — Chambers Road - 153                | — Pathways West - PTHW           | — Smoky Hill Road - 135   | — Yale Avenue - 27            |                   |
| — Havana Street - 105                | — Peoria Street - 121            | — South Broadway - 0      |                               |                   |

RECOMMENDATIONS

- call-n-Ride
- Arapahoe Road BRT
- Potential New park-n-Ride
- Timed Transfer
- Modified Route 66
- Transit Priority
- park-n-Ride
- Light Rail Station

## 3.6 Transportation Demand Management

Transportation demand management (TDM) is a diverse host of actions that are employed to improve the efficiency of the transportation system. These actions alter transportation system demand by reducing single occupancy vehicle trips, encouraging off peak travel, and/or reducing trip time or length. In short, TDM helps travelers use the transportation system more efficiently by providing information, a diversity of modal choices, and making that system more accessible, predictable, and reliable.

Traditionally communities have implemented TDM programs that encourage employee commuters who normally drive alone to choose higher occupancy modes or other non-motorized modes. These can be programs that increase use of transit, implement carpool and vanpool programs, encourage bicycling and walking, or formalize telework and alternative work schedules.

Today, the definition of TDM has broadened to include all users of the transportation system (not just employed commuters) and includes a broader spectrum of measures that influence demand, including intelligent transportation systems (ITS), congestion pricing, and parking pricing and management. When applied with the goal of increasing the use transportation alternatives such as transit or ridesharing, these additional financial and information-related measures can have significant impact.

### TDM Goals and Objectives for Centennial

As part of the Transportation Master Plan process, the City of Centennial developed nine goals and objectives for the transportation system (see Chapter 2). Goal 3 and Goal 4 and their objectives are TDM-related. The purpose of this section is to identify supporting TDM strategies and programs that can help implement the TDM-related goals and objectives.

One of the Goals of TDM is to reduce peak hour demand and congestion.

#### Transportation Master Plan Goal 3: Develop Strategies to use the Transportation System More Efficiently

TDM is a diverse set of actions and measures that are employed to increase the efficiency of the transportation system. Increasing the efficiency of the transportation system is also a priority for the City of Centennial as reflected in Goal 3 of the Guiding Vision. This goal is the main TDM-related goal for the Transportation Master Plan and its supporting objectives are listed below.

##### Goal 3 TDM-Related Objectives

- ▶ Implement transportation demand management (TDM) programs, strategies, and services
- ▶ Join and support appropriate transportation management organizations or associations (TMO/TMA) and encourage the

establishment of additional TMO/TMAs in Centennial where appropriate

- ▶ Require transportation demand management programs be developed at designated and future activity centers as they develop and redevelop through the planning and implementation process
- ▶ Support public education and information to reduce travel demand

### Goal 3 TDM Recommendations

TDM recommendations to implement these objectives include development of an online TDM toolkit, employer education, parking management, and assessing the potential for more formalized approaches to TDM implementation along corridors and at activity centers. More details on these recommendations are included below:



RTD Provides call-n-ride service in parts of Centennial

- ▶ **City of Centennial TDM Toolkit.** As a first step towards educating major employers (over 50 employees) and other large organizations in Centennial, the City should consider developing an online TDM toolkit. An online toolkit is really a series of web pages with information provided about TDM strategies supplemented with local case examples and testimonials from participants and/or employers. Some content examples include:
  - Telework program policies
  - Parking management techniques, including bike parking, high occupancy vehicle preferential parking, and parking pricing
  - Pre-tax transit benefit programs
  - Description of RTD's new *FlexPass* monthly employee transit pass program
  - Ridesharing services, including carpooling, vanpooling, and schoolpooling.
- ▶ **Employer education.** Coordinated with the release of the online TDM toolkit, the City of Centennial could also sponsor workshops, webinars, and individual employer consultation to educate on the benefits of TDM. Employers in the Arapahoe Urban Center (AUC) and near the light rail stations along I-25 are potential candidates for targeted outreach. These meetings could include discussion of:
  - Transit benefits. Presentations regarding pre-tax transit and vanpool benefit programs and use of RTD's *FlexPass*. The City should coordinate with RTD marketing staff to augment the promotion of these products at key employers in Centennial. This is also an opportunity to

- promote and educate employers about the DRCOG Guaranteed Ride Home program.
- Telework workshops. Telework is an easy concept to understand, but the application of a fair and equitable telework policy that protects employees as well as the employer is important. Example policies and programs could be shared in a collaborative workshop with Centennial employers.
  - Parking Management workshops. Several employers in Centennial are likely providing bike parking, high occupancy vehicle (HOV) preferential parking spaces, and regulating the use of parking through reservation systems, permitting, or pricing. These elements of parking management can all influence the use of transportation alternatives. National best practices of parking management in large suburban office developments could be compiled and presented during these workshops to bring new ideas and innovation in parking management practices.
- ▶ **Future Transportation Management Associations.** The Arapahoe Road corridor should be assessed for the initiation of a transportation management association. Modeled after the South I-25 TMA, this organization could coordinate the planning, financing, and promotion of transportation infrastructure and services along Arapahoe Road for all modes of travel. While these organizations typically implement many of their own TDM programs they could also help coordinate implementation of TDM programs between Centennial and other jurisdictions, agencies, and private property owners.
- ▶ **TDM implementation for developments at congested locations.** At congested locations (e.g., corridors, intersections, subareas), Centennial should consider requiring TDM-related elements to help mitigate congestion as part of final development approvals for new construction or reconstruction. These elements could be infrastructure related, such as providing bike parking, transit shelters, or HOV parking, as well as programmatic elements like implementing telework, transit pass benefit programs, and incentives for ridesharing. These elements can be monitored for effectiveness by site-specific surveys and developers held accountable for implementation and/or construction of the negotiated TDM elements. Development in the City's urban centers (e.g., AUC, the Streets at SouthGlenn, and the Dry Creek station area) could be used for initial TDM program implementation.

### Transportation Master Plan Goal 4: Improve and Expand Public Transit Access and Service

The promotion of transit services is typically a core component of TDM programs. Because the Centennial area is fortunate to have both light rail and bus transit services, these services should be coordinated and promoted to travelers through several TDM strategies. Goal 4 of the Transportation Master Plan recognizes this need as reflected by the following objectives.

#### Goal 4 TDM-Related Objectives

- ▶ Promote the use of transit, both bus and rail
- ▶ Influence the choices available for public transit to increase usage and viability of the existing and future system
- ▶ Identify and prioritize major transportation corridors that could benefit from transit improvements
- ▶ Develop and foster relationships with regional agencies that provide transit planning, including RTD, CDOT, and DRCOG
- ▶ Work with RTD and other transit service providers to consider local bus routes to improve access to regional transit service and enhance mobility options within the City

#### Goal 4 TDM Recommendations



Bus stops close to LRT stations can increase ridership for both

Several actions can be implemented by the City of Centennial and other partners to promote the use of transit. These actions include timed transfers, branding and promotion of circulator services, and transit incentive campaigns. These strategies are described in more detail below.

- ▶ **Timed transfer between local bus routes and light rail stations.** RTD already provides local bus service at some light rail stations in the Centennial area. Ridership and user surveys (onboard or other) should be reviewed by Centennial and RTD to find areas that need improvement, if applicable.
- ▶ **Location-specific branding and promotion of RTD service.** As mentioned above, RTD currently operates a circulator service (branded as call-n-Ride service) that is timed to transfer with light rail service. The City of Centennial should consider branding this service in partnership with RTD and promote it locally. Some promotion ideas include:
  - Enhanced bus stop amenities such as covered shelters and lighting
  - A custom circulator bus map mounted in transit shelters displaying the route and destinations within walking distance

- Real-time schedule monitors displaying estimated arrival time. This element is a future strategy that should be enabled as RTD implements real-time information technology.
- ▶ **Implement transit incentive campaigns.** Commuters in the Centennial area have shown a strong interest in trying transit and changing their travel behavior after taking part in incentive campaigns. The success of the *TRIP to Work* program delivered by the South I-25 TMA in 2008 is an example of strong demand for these programs. Centennial should consider partnering with groups like the South I-25 TMA to develop these campaigns in the future. Funding is available through the DRCOG TDM Pool, which is a part of the Transportation Improvement Program (TIP) funding allocation process for the Denver region.

### **3.7 General Recommendations**

The following sections provide general guidance on elements of the transportation system that are not specifically addressed within other sections of the *Transportation Master Plan*.

#### **Traffic Calming**

Traffic calming is a term used to describe techniques aimed at reducing vehicular speeds, promoting safety for motorists, bicyclists, and pedestrians, and discouraging cut through traffic. The City adopted a *Neighborhood Traffic Management Program Manual* in 2007 and updated it in 2013. Residents interested in requesting traffic calming measures in their neighborhood are encouraged to refer to this manual to understand the requirements and options that are available. The Manual identifies a procedure for evaluating and remediating problems that have been identified by residents. After a project is initiated and the problem identified, education and enforcement tools are utilized as first steps before structural measures are considered. These measures are usually physical in nature (examples include speed humps, traffic circles, chicanes and bulb-outs), and are typically applied to residential streets. Specific locations are often initiated by citizen requests.

#### **Signal Timing**

The City of Centennial maintains and operates 72 traffic signals throughout the City. Traffic signals require frequent evaluation to ensure that: 1) the signal timing and phasing of an individual signal appropriately handles the traffic demands at the intersection, and 2) the signal progression along the corridor(s) is appropriate for traffic conditions. While the City implements the signal timing on its own 72 traffic signals, many of the local signals are located on regional corridors with signals controlled by other agencies (e.g., CDOT, Arapahoe County, etc.). DRCOG studies the signal timing and progression along regional corridors on a three- to four-year cycle and adjusts the timing based on current traffic demands. CDOT Region 6 is responsible for the signal timing along Arapahoe Road (from I-25 to Parker Road, where it is designated as SH 88), Parker Road (SH 83 – in conjunction with CDOT Region 1), and University Boulevard (SH 177).

## 4 Plan Implementation

This Plan recommends a variety of roadway, bicycle, pedestrian, and transit improvement projects. Because Centennial has limited fiscal resources, it is essential that the highest priority projects be identified and pursued. The priorities identified for these projects reflect information available during the development of the *Transportation Master Plan*. These priorities should be reconsidered in light of changed conditions that likely will arise more frequently than the suggested cycle for updating the *Transportation Master Plan* (at least every five years). Thus, the lists of project priorities should be considered as a guideline. Actual implementation will be analyzed in detail each year when the City's Capital Improvement Plan (CIP) is updated. This provides the opportunity for other non-transportation factors to be considered. These factors can include economic development priorities, the pace of development along a corridor, relative project costs and available funding levels, and the ability to leverage City funds.

This chapter provides an initial process to determine roadway, bicycle, and pedestrian priorities. In addition, strategies are provided that the City can implement to help achieve the Transportation Plan goals.

### 4.1 Design Considerations

This Plan is not intended to provide detailed design of proposed projects, nor does it contain detailed analysis of the feasibility of projects. Many factors will determine whether or not a project is desired or possible. The following are design considerations that should be taken into account when a project is being studied or implemented.

#### Preferred Street Design and Design Prioritization

On the basis of a roadway's functional classification, typical cross sections give guidance about how the roadway will actually be constructed. This document contains right-of-way cross sections (See Appendix B) that will guide roadway improvement design. Depending on the roadway classification, the preferred cross-sections contain a variety of design features including sidewalks, tree-lawns, medians, and bike lanes.

While the Plan proposes certain improvements in various locations, lack of right-of-way, funding or other constraints will preclude an particular design element or improvement from being possible or modification from preferred design widths relating to sidewalk improvements.

Because of the possibility of project constraints the following is a prioritization of design elements preferred by the City:

- ▶ Travel Lanes
- ▶ Medians required for traffic separation/access control
- ▶ Detached Sidewalks with Tree Lawn
- ▶ Attached Sidewalks
- ▶ Bike Lanes
- ▶ Medians desired for aesthetic reasons

### **Alternative Right-of-Way Design**

Per adopted sub-area plans, such as the Arapahoe Urban Center Sub-Area Plan and the I-25 Corridor Plan, several areas within Centennial are expected to develop or redevelop with a more urban character. These include areas adjacent to light rail or mixed-use developments. As such, the City's typical street design might not be appropriate and the need for location specific alternative street design may be appropriate.

Centennial has developed general guidelines for roadways, sidewalks, and bicycle facilities and trails that can be found in the Urban Center Zone District of the *Land Development Code, 2011*.

Additionally, the Institute of Transportation Engineers (ITE) has developed alternative street standards entitled *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, 2010*. This document provides concepts and principles related to improving both mobility choices and community character through a commitment to creating and enhancing walkable communities.

Either of these documents provide alternative design standards that may be appropriate in limited application within the City.

## **4.2 Project Prioritization**

The prioritization process for the *Short Term Transportation Plan* provided an objective methodology for ranking future roadway, bicycle, and pedestrian improvement projects within Centennial. The prioritization process is intended to address how well a project addresses the goals and objectives included in Chapter 2.

Each project was given a score ranging from zero to three (with three being the best) based on how well it addresses each of ten evaluation criteria. Scoring guidelines are included in Appendix D. Each of the evaluation criteria has been given a weight (which varies depending upon travel mode) based on input from the Community Advisory Committee. A total score for each project was calculated by multiplying the evaluation criterion weight by the given score for each of the ten criteria. The maximum overall score attainable for any project is 300.

The following is a description of the evaluation criteria:

- ▶ **Safety Enhancement**
  - Is the accident rate higher than would be expected?
  - Would the project specifically address a safety issues?
- ▶ **Congestion Mitigation**
  - Is there congestion currently and/or is it anticipated in the future?
  - Would the project significantly reduce congestion?
- ▶ **Continuity**
  - Does the project complete a missing gap in the system?
  - Does the project bring an inadequate roadway segment up to standard?
- ▶ **Economic Development**
  - Is the project within an identified Activity Center?
  - Would the project support economic development?
- ▶ **Multi-Modal Enhancements**
  - Would the project accommodate and/or encourage other modes of transportation?
  - Would the project improve access to a transit station?
- ▶ **Improved Use of Existing Infrastructure**
  - Would the project enhance the efficiency of the existing transportation system?
  - Would the project reduce demands on the transportation system?
- ▶ **Community Benefits**
  - Is the project in a heavily populated area?
  - Is the project with ½ mile of shopping, employment, recreational opportunities or a school?
- ▶ **Regional and Citywide Importance**
  - Does the subject roadway have significant regional continuity and extend beyond the City Limits?
  - Has the project been identified in a regional plan, City plan and/or in that of an adjacent jurisdiction?
- ▶ **Implementation**

- Are there funds (federal, state or other non-local) currently earmarked for the project or are there an opportunities to leverage City funds with other funding sources?
- Are there any major roadblocks (e.g., environmental clearances or right of way) that might delay implementation of the project?
- ▶ **Community Vision**
  - Does the project have significant support from the community (residents and/or businesses or other stakeholders)?

All projects contained within the short-term roadway plan (Figure 1), Pedestrian Plan (Figure 3) and Bicycle Plan (Figure 4) were given a score for each evaluation criteria. The criteria weights (which vary by mode, as shown on Table 4) were applied to the scores, and the total scores were calculated for each project. These scores are provided in Appendix E. As shown in Table 4, the evaluation criteria with the highest weight for roadway projects are Congestion Mitigation and Safety Enhancement, whereas the highest weighted criteria for bicycle and pedestrian projects are Safety Enhancement and Continuity.

Table 4. Evaluation Criteria and Weights

Evaluation Criteria	Weight for Roadway Projects <sup>1</sup>	Weight for Bicycle/Pedestrian Projects <sup>1</sup>
Safety Enhancement	16	25
Congestion Mitigation	20	5
Continuity	9	14
Economic Development	8	4
Multi-Modal Enhancements	7	10
Improved Use of Existing Infrastructure	7	8
Community Benefits	7	9
Regional and Citywide Importance	9	6
Implementation	10	12
Community Support	7	7
Total	100	100

<sup>1</sup> As recommended by the Community Advisory Committee.

### 4.3 Short Term Prioritized Projects

Short-term roadway, bicycle, and pedestrian projects have been prioritized based on the process described above. The resulting High Priority projects are shown on Figure 6. A description of the prioritization results by mode is provided in the following sections.

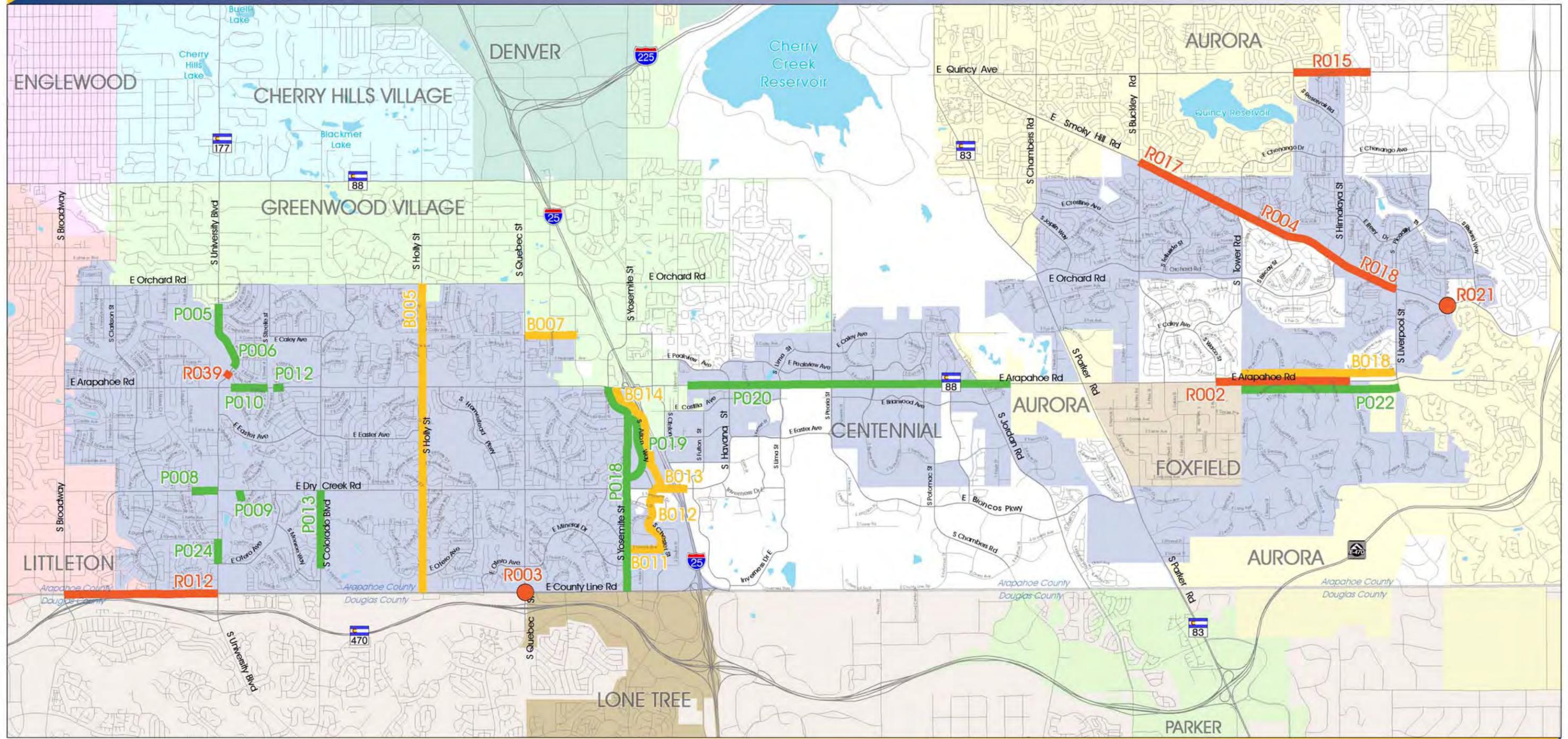
#### Roadway

The prioritized list of short term roadway improvement needs is shown in Table 5. A separate spreadsheet showing the scoring of each project by criteria is included in the Appendix E. Projects have been grouped into high, medium, and low priority based on their overall score. This list is based strictly on how well each project meets the evaluation criteria previously described, and does not consider fiscal constraints. With a limited CIP budget available each year, the City will not be able to implement all of the desired projects in the short term. Because Congestion Mitigation is emphasized in the scoring process, roadway projects that would provide considerable relief to currently congested roadways, like roadway widening projects, tend to be favored in the ranking. Such projects, however, tend to be very expensive, and the City may not be able to implement these projects very soon but may be able to implement other, lower cost projects.

Table 5: Short-Term Roadway Project Prioritization

Project ID#	Location	Description	Score (Out of 300)	Rank
<b>High Priority Roadway Projects</b>				
R002	Arapahoe Road from Waco to Himalaya	Roadway widening and reconstruction	228	1
R012	County Line Road from University to Broadway	Reconstruction and widening to 4 lanes	214	2
R003	County Line Road & Quebec Street Intersection	New southbound to westbound right turn lane	202	3
R017	Smoky Hill Road from Buckley to Tower	Reconstruction and widening to 6 lanes	190	6
R039	University Blvd Structure over Big Dry Creek (n/o Arapahoe)	Replace or widen structure	185	7
R004	Smoky Hill Road from Tower Road to Orchard Road	Roadway reconstruction and widening to 6 lanes	168	9
R018	Smoky Hill Road from Orchard to Picadilly	Reconstruction and widening to 6 lanes	168	9
R021	Smoky Hill Road & Picadilly Street Intersection	Signalize intersection	166	11

Project ID#	Location	Description	Score (Out of 300)	Rank
<b>Medium Priority Roadway Projects</b>				
R016	Arapahoe Road & Holly Street Intersection	New southbound to westbound right turn lane	158	12
R014	Dry Creek Road & Colorado Blvd Intersection	Intersection reconstruction and auxiliary lanes	156	13
R032	Smoky Hill Rd from Liverpool St to E-470	Widen to 6 lanes	155	14
R034	Arapahoe Rd & Jordan Rd Intersection	Safety improvements to signal heads and timing	152	15
R005	County Line Road & Yosemite Street Intersection	New southbound to westbound right turn lane	150	16
R019	Arapahoe Road & Clarkson St Intersection	Signalize intersection	140	17
R001	Briarwood Ave & Potomac St Intersection	Signalize intersection	139	18
R036	Arapahoe Rd Structure over Big Dry Creek (e/o University)	Replace or widen structure	139	19
R007	Briarwood Ave & Peoria St Intersection	Signalize intersection	137	20
R030	Havana St & Briarwood Ave/Costilla Ave Intersection	New eastbound to southbound right turn lane	137	21
R023	Peakview Ave & Syracuse Way Intersection	Signalize intersection / roundabout	129	22
R008	Yosemite Street & Mineral Drive Intersection	Signalize intersection	127	23
R035	Quebec Street & Hinsdale Place Intersection	Modify access to Quebec Street	123	24
R009	Yosemite Street & Willow Way Intersection	Signalize intersection	120	25
R024	Piccadilly Street & Berry Drive Intersection	Signalize intersection / roundabout	120	25
R013	Peakview Avenue & Dayton Street Intersection	Intersection reconstruction and signal upgrade	115	27
R006	Holly Street & Foxridge Plaza Intersection	Signalize intersection	113	28
R020	Buckley Road & Crestline Ave Intersection	Signalize intersection	113	28
R025	Colorado Blvd & Easter Ave/Nobles Road Intersection	Signalize intersection / roundabout	104	30
R027	Smoky Hill Road & Kirk Street Intersection	Signalize intersection	96	31
R029	County Line Rd & Clarkson St Intersection	Signalize intersection	96	32
<b>Low Priority Roadway Projects</b>				
R023	Peakview Ave & Syracuse Way Intersection	Signalize intersection / roundabout	129	22
R008	Yosemite Street & Mineral Drive Intersection	Signalize intersection	127	23
R035	Quebec Street & Hinsdale Place Intersection	Modify access to Quebec Street	123	24
R009	Yosemite Street & Willow Way Intersection	Signalize intersection	120	25
R024	Piccadilly Street & Berry Drive Intersection	Signalize intersection / roundabout	120	25
R013	Peakview Avenue & Dayton Street Intersection	Intersection reconstruction and signal upgrade	115	27
R006	Holly Street & Foxridge Plaza Intersection	Signalize intersection	113	28
R020	Buckley Road & Crestline Ave Intersection	Signalize intersection	113	28
R025	Colorado Blvd & Easter Ave/Nobles Road Intersection	Signalize intersection / roundabout	104	30
R027	Smoky Hill Road & Kirk Street Intersection	Signalize intersection	96	31
R029	County Line Rd & Clarkson St Intersection	Signalize intersection	96	32



- LEGEND**
- XXX Project ID
  - Roadway Projects
  - Bicycle Projects
  - Pedestrian Projects
  - City Limits
  - Streets

Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
 This map is for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map. FHU shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document.

## **Bicycle and Pedestrian**

The prioritized list of bicycle and pedestrian projects is shown in Table 6. Projects IDs that begin with B represent bicycle projects. Projects that begin with P represent pedestrian improvements. A separate spreadsheet showing the scoring of each project by criteria is included in the Appendix E. Projects have been grouped into high, medium, and low priority based on their overall score.

While similar factors were applied to both pedestrian and bicycle projects, safety was the highest weighted factor for both modes. Slightly different approaches to factors such as safety were used in calculations for bicycle and pedestrian modes. For bicycle projects, safety was based upon vehicular speed, volumes, and width of roadway shoulders as they exist today. For pedestrian projects, safety was based upon vehicular speeds, width of sidewalk and buffer, and number of adjacent traffic lanes.

Pedestrian projects that scored well are those that provide safety benefits and in many cases, are along arterial streets where speeds and population are greater. Projects that provide access to transit or other modes also scored well. The recommended short term plan also includes some high scoring projects that may be best implemented in the longer range with funding opportunities yet to be defined. Projects along the eastern segment of Arapahoe Road would be an example of this type of project.

In general, the highest ranking bicycle projects were those along high speed arterial roadways. Because Centennial has such a well developed system of trails, most bicycle projects are recommended to be on-street facilities that connect neighborhoods to the trail system or provide enhanced north-south and east-west continuity. However, in addition to on-street routes, multi-use paths adjacent to roadways (sidepaths) should be considered along major arterial roadways that have limited driveways and intersections. The multi-use paths should have a minimum width of 10 feet.

In addition to the projects that scored high, projects that are simple signing and striping projects which can be completed quickly and efficiently, should be considered in the short term.

Table 6: Bicycle and Pedestrian Projects

Project ID#	Location	Description	Score (Out of 300)	Rank
<b>High Priority Bicycle and Pedestrian Projects</b>				
B013	Dry Creek Rd at I-25 crossing	Add multi-use path for crossing	246	1
P008	Dry Creek Rd from University Blvd to Franklin St	Widen and detach sidewalk on north side near school	243	2
P018	Yosemite St from Arapahoe Rd to County Line Rd	Add 5' minimum sidewalks in missing areas	243	2
P012	Arapahoe Rd from Adams Way to Nobles Rd	Widen sidewalk to 5' minimum on south side through segment	243	2
P027	Arapahoe Rd & Holly St	Add 5' minimum sidewalks on NE corner	243	2
B012	E Panorama Cir/Panorama Dr e/o Yosemite St	Add flashing sign or HAWK at parking garage entrance on Panorama Ci & stripe bike lanes on Panorama	239	6
P010	Arapahoe Rd from Steele St to 200 ft w/o Elizabeth St	Add 5' minimum sidewalk on north side	238	7
P019	Alton Way from Yosemite St to I-25	Add 5' minimum sidewalks	236	8
P024	University Blvd from Mineral to Otero	Add 5' minimum sidewalks in missing areas	233	9
P006	University Blvd from Josephine Way to 250 ft s/o Crabtree Dr	Widen / Install sidewalk on east side. Provide wayfinding signs for trail connection	230	10
P005	University Blvd from Columbine Way to Euclid Pl	Add 5' or 8' sidewalk	230	10
C	Dry Creek Rd and University Blvd SE of Arapahoe HS	Raised crosswalk at RT lane	226	12
B014	Alton Way from Yosemite St to I-25	Stripe bike lanes	225	13
B018	Arapahoe Rd from Liverpool St to Jordan Rd	Add Multi-use path on one side and sidewalk on the remaining side - Recommend a phased approach with multi-use path constructed in short term	222	14
P013	Colorado Blvd from Dry Creek Rd to Otero	Add 5' minimum (detach or 8' attached) sidewalk to east side with retaining wall	218	15
P009	Detroit St from Dry Creek Rd to Detroit	Enhance crossing with flashing sign or better signage and marking	217	16
B007	Caley Ave from Quebec St to Arapahoe LRT Station	Stripe bike lanes	215	17
P020	Arapahoe Rd from I-25 to Parker Rd	Add 8' sidewalk in phases w roadway improvements	214	18
P022	Arapahoe Rd from Liverpool St to Jordan Rd	Add Multi-use path on one side and sidewalk on the remaining side - Recommend a phased approach with multi-use path constructed in short term	214	18
B011	Yosemite St, Nichols Ave, and Chester St from Mineral Dr to Dry Creek LRT Station	Provide multi-use path connection along Yosemite St (Mineral Dr to Nichols Ave) and stripe on-street bike lanes along Nichols and Chester	211	20
B005	Holly St from County Line Road to Orchard Rd	Complete corridor analysis to remove a travel lane and stripe on street bike lanes in both directions; tie into C-470 trail to the south and Orchard Road	211	20

Project ID#	Location	Description	Score (Out of 300)	Rank
Medium Priority Bicycle and Pedestrian Projects				
B015	Clinton St from I-25 to Peakview Ave	Add bike lanes along corridor	208	22
P026	Caley Ave east of Quebec St	Add detached 5' sidewalk on south side	206	23
B003	Colorado Blvd from Orchard Rd to County Line Rd	Add bike lanes	205	24
P011	Caley Ave from Steele St to St. Paul Wy (around Peabody Elementary)	Recommend 5' walks on all residential roadways. Additionally, connect Caley via a multi-use trail between Steel St and St. Paul Way on south side of school	205	25
P025	Quebec St from Caley Ave to Peakview Ave	Add detached 5' sidewalk on west side	203	26
P001	Orchard Rd from Clarkson St to Sherman Way	Install 5' minimum sidewalk on south side	201	27
P002	Orchard Rd from Highline Canal Trail to Ogden St	Install 5' minimum sidewalk on south side	201	27
P015	Spruce St s/o Arapahoe and e/o Quebec (at Little Dry Creek Trail)	Connect trails with way finding signs and road markings	200	29
P004	Arapahoe Rd from Vine St to Broadway	Widen to minimum 5' attached sidewalk	198	30
P014	Little Dry Crk Trail from Krameria Way to Briarwood Cir (s/o Quebec and Arapahoe)	Widen walk on Krameria and connect to new connection on North side of Arapahoe	198	30
P016	Uinta St from Costilla Blvd to Arapahoe Rd (near Walnut Hills Elementary School)	Widen to 5-6' attached sw or provide traffic calming measures along street to maintain slow vehicle speeds and install bicycle signage/ sharrow or a bicycle blvd	190	32
P021	Parker Rd from Orchard Rd to Valley High Dr (B020)	Add Multi-use path on one side and minimum 8' sidewalk on remaining side both bike/ped travel	190	32
B020	Parker Rd from Orchard Rd to Valley High Dr (P021)	Add Multi-use path on one side and minimum 8' sidewalk on remaining side both bike / ped travel	190	32
P023	Liverpool St from Arapahoe Rd to Smoky Hill Rd	Add 8' minimum sidewalk and retaining wall on east side	189	35
B017	Orchard Rd & Telluride intersection	Add crossing via flashing crosswalk to get to trail	187	36
B006	Locust St & Caley Ave (w/o Quebec)	Sign for bicycles	187	36
P017	Xanthia St Trail at Briarwood Blvd	Install curb that meets ADA standards for trail crossing	186	38

Project ID#	Location	Description	Score (Out of 300)	Rank
Low Priority Bicycle and Pedestrian Projects				
B008	Greenwood Plaza Blvd from Arapahoe Rd to Fiddlers Green to LRT Station (in Greenwood Village)	Add bike lanes	185	39
B010	Willow Creek from Mineral Ave to Mineral Dr	Connect existing bike lanes from E Mineral Ave to E Mineral Dr	185	39
B001	County Line Rd and Clarkson St intersection	Signalize intersection (Refer to R029)	182	41
B004	Orchard Rd from Colorado Blvd to Quebec St	Sign for bicycles and stripe bike lane	180	42
P003	Highline Canal trail at Orchard Rd (1800 ft w/o University Blvd)	Emphasize crosswalk, consider HAWK or flashing signs	177	43
B016	Fair Ave - Caley Ave Trail Extension	Connect Caley Ave Trail Extension to Cherry Creek Trail. Provide clear signage and shorten gate to allow bicycle access	173	44
B002	Franklin St from Dry Creek Rd to Easter Pl (w/o Arapahoe HS)	Strip bike lanes connecting Arapahoe HS to E Easter Pl	169	45
B009	Uinta St from Costilla Blvd to Arapahoe Rd (near Walnut Hills Elementary School)	Widen to 5-6' attached sw or provide traffic calming measures along street to maintain slow vehicle speeds and install bicycle signage/ sharrow or a bicycle blvd	169	45
G	Colorado Blvd & Euclid intersection	Review for Ped signal or other pedestrian crossing enhancement	167	47
A	Arapahoe Rd & Vine St intersection	Replace signal head and verify timing	149	48

## 4.3 Funding

The list of recommended transportation improvement projects included in this Plan have a cost considerably beyond the financing capability of Centennial based on existing funding mechanisms. This plan groups the improvement projects into high-, medium-, and low-priority, yet maintains flexibility to adjust to inherent uncertainties in funding availability.

The basic mechanism for funding new transportation facilities or improvements to existing ones is through the City's Capital Improvement Plan (CIP). The CIP is prepared for five- and ten-year periods and is updated annually. This plan is intended to provide the City Council and City departments with a guide for planning capital expenditures beyond the annual budget year. The CIP and its projects are primarily funded from sales and use tax revenue.

### Basic Funding Mechanisms

There are only two basic alternatives for funding capital projects. They can be financed on a "pay as you go" basis, when funding is paid out of revenues received, or funds can be borrowed with an annual repayment schedule made over a number of years. There are a number of variations to these two basic financing alternatives. The "pay as you go" method can be strictly a determination of an annual appropriation restricted for only a one-year period. A second alternative is the annual appropriation of cash to be placed in a "sinking fund" for a specified number of years, in order to fully fund a project.

There are also a number of methods of structuring long-term debt financing. There are different types of bonds that can be paid back through a variety of tax and use fee sources. In all cases, bond underwriters require the pledging of dedicated funding sources for repayment. The more reliable the source of funds and the more coverage provided (ratio of revenue to debt payment), the better the credit rating and the lower the interest to be paid. For example, General Obligation bonds are the most secure debt instrument, since the full faith and credit of the city is pledged to repaying the debt, resulting in the lowest interest rate.

Following is a summary of other sources of funds that can assist Centennial in funding CIP projects.

### Federal and State Funding

There are a wide variety of federal and state funding programs for surface transportation, most of which are administered by DRCOG, CDOT or RTD. Programs range from broadly applicable ones like the Surface Transportation Program (STP) Metro to the more specific programs targeting safety, bridge, congestion mitigation/air quality and a host of other objectives. The current federal surface

transportation funding program, Moving Ahead for Progress in the 21st Century (MAP-21).

In 2009, the Colorado General Assembly passed the Funding Advancements for Surface Transportation and Economic Recovery (FASTER) bill which changed the way transportation funding works in Colorado. As of December 2010, FASTER funds have been used to design and/or construct nearly 80 transportation projects, including bridge, safety, and transit projects.

Federally funded and administered by CDOT, the Safe Routes to Schools (SRTS) program allows any political subdivision of the state to apply for funds to construct or modify transportation infrastructure aimed at making routes to local schools safer. Projects may include but are not limited to: installing bicycle parking facilities, facilities to slow traffic, striping, installing or improving sidewalks and developing off-street bicycle and pedestrian facilities. Projects must range in cost from \$50,000 to \$250,000.

### Development Fees

Different communities in Colorado and throughout the US have various means to ensure that new development contributes its fair share of the cost of transportation infrastructure improvement needed to accommodate that development. Centennial, like nearly all jurisdictions, requires development to finance the street network within new developments and to contribute toward needed improvements immediately adjacent to new developments. Currently, new development in areas of Centennial east of Parker Road (SH8 83) is subject to the Regional Transportation Infrastructure Fee (RTIF). The RTIF is collected when building permits are issued.

### Improvement Districts

A variety of improvement district types can be formed to finance transportation infrastructure, including: Special Improvement Districts, General Improvement Districts, Tax Increment Districts, Urban Renewal Districts, Transit Districts, or Regional Transportation Authorities. Such districts can be funded through various tax and fee mechanisms. Districts can range in size from small subareas of a municipality established to fund a specific improvement or set of improvements all the way to multi-jurisdictional authorities or districts.



Arapahoe Road is the only east-west street that spans Centennial

## 5 Conditions on which the Plan was Developed

This chapter provides details of the existing conditions, data analysis, growth projections and modeling utilized to develop recommendations and improvements within the Plan.

To understand how the transportation system operates in the Centennial area today, an inventory of those elements comprising the existing transportation system was conducted. This inventory is an integral step of the planning process in order to identify areas in need of improvement. Based on available data bases such as Centennial's Geographic Information System (GIS), additional information was compiled through field data collection efforts. Among the data obtained were items such as traffic counts, high accident locations, bicycle and pedestrian facilities, transit routes and services, and street laneage and classification. Like most suburban cities in Colorado and across the country, the automobile is the predominant means of transportation in Centennial. However, with RTD's Southeast light rail line providing service to the City and the community's increasing desire for active transportation, alternative travel modes are an important element of the City's overall transportation system.

### 5.1 Existing Roadway Information

This section provides information on the City's existing street network. It includes descriptions of the functional classification of the network, existing traffic volumes, roadway capacities, signalization information, and crash data. This data is important as it informed the creation of the short-term roadway improvement plan.

#### Functional Classification

All modes of travel (automobiles, trucks, transit, bicycles, and pedestrians) rely on the roadway network to varying degrees for basic mobility. Centennial's roadway network can be categorized as suburban with major roadways generally on the one-mile section lines that bound curvilinear streets within residential neighborhoods and commercial areas. With major physical barriers located immediately north and south of Centennial (Cherry Creek State Park and Centennial Airport, respectively), Arapahoe Road is the only street that extends the full 14-mile east-west span of the City.

The following sections describe the physical characteristics and the use patterns of the roadway system.

Within a roadway system, each road can be classified by the relative functional levels of mobility and access it provides. These two functions, mobility (where higher speeds occur and direct land access is restricted) and accessibility (where speeds are lower and

direct land access is allowed), must be weighed in determining the proper classification for each individual roadway. The more access allowed by a facility, the more its capability to provide mobility is reduced. Freeways and tollways have the highest levels of mobility and as a result, have the greatest restrictions on access. Collectors and local streets better serve access needs and have less capability for traffic movement.

The primary determinants of functional classification are length of trip, average travel speed, frequency of access points, and continuity. Traffic volume is not the sole criterion that determines roadway function. It is possible, and frequently the case, that more accessible roadways carry relatively high traffic volumes (e.g., access to major office parks, regional shopping centers, etc.) and require multiple traffic lanes to accommodate the demand.

The current functional classifications of the roadways in Centennial are shown on Figure 7. The number of through travel lanes on each roadway classified as major collector or higher is also depicted.

The following descriptions of roadway types further clarify the distinction between the mobility and the accessibility functions. Table 7 provides direct comparison between the differing street types.

### Freeways and Tollways

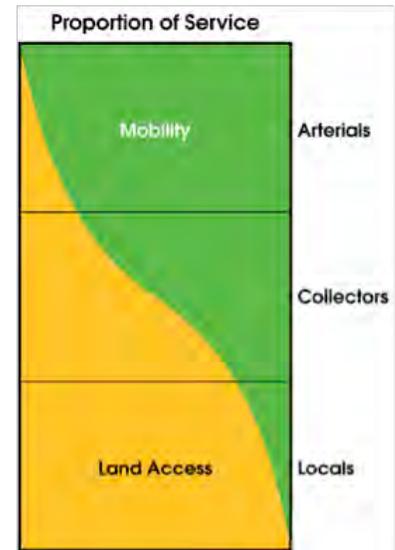
These facilities have the highest level of access control. Access is allowed only at grade-separated interchanges; no at-grade intersections are allowed. Interchanges are typically spaced at one mile or greater. Freeways and tollways allow the highest level of mobility, providing unimpeded, high speed, high volume (including high truck volumes) regional and interstate connections. While I-25 is the only freeway within Centennials boundaries, C-470 (freeway) and E-470 (tollway) are located immediately south of Centennial and therefore serve the community.

### Major Arterials

Major arterials generally have limited access, typically via signalized or unsignalized, at-grade intersections at one-half mile spacing. Major arterials provide relatively high speed, unimpeded, city-wide connections. There may be direct access where they pass by existing homes and businesses, but future development should provide internal street systems and limit or prohibit individual direct access to the arterial. Arapahoe Road, University Boulevard, and Smoky Hill Road are among the numerous examples of major arterials in Centennial.

### Minor Arterials

Minor arterials also have limited access, but may provide direct access to properties if no other reasonable form of access exists. Intersections are at-grade and may be signalized. Minor arterials provide relatively unimpeded connections within the community and distribute traffic to higher classification roadways. Orchard



Relationship of functional classification in serving traffic mobility and land access



Interstate 25 bisects Centennial

Road, Holly Street, and Himalaya Street are examples of minor arterials in Centennial.



Centennial has many attractive residential streets

### Collectors

Collectors provide connections between local streets and arterials and usually retain continuity through neighborhoods. While they may provide direct access to abutting properties, residential driveway access is typically discouraged. Intersections are at-grade and have some form of traffic control (stop signs).

Collector streets are typically identified through development plans and thus are not specifically identified in the Roadway Plan other than those that already exist. The City should work with developers to identify these future road alignments and to encourage developers to provide a system of collectors that enhance the grid network and minimizes discontinuous, curvilinear alignments. Collectors within developing areas should be located opposite each other at arterial intersections, to minimize the number of offset T-intersections along an arterial corridor.

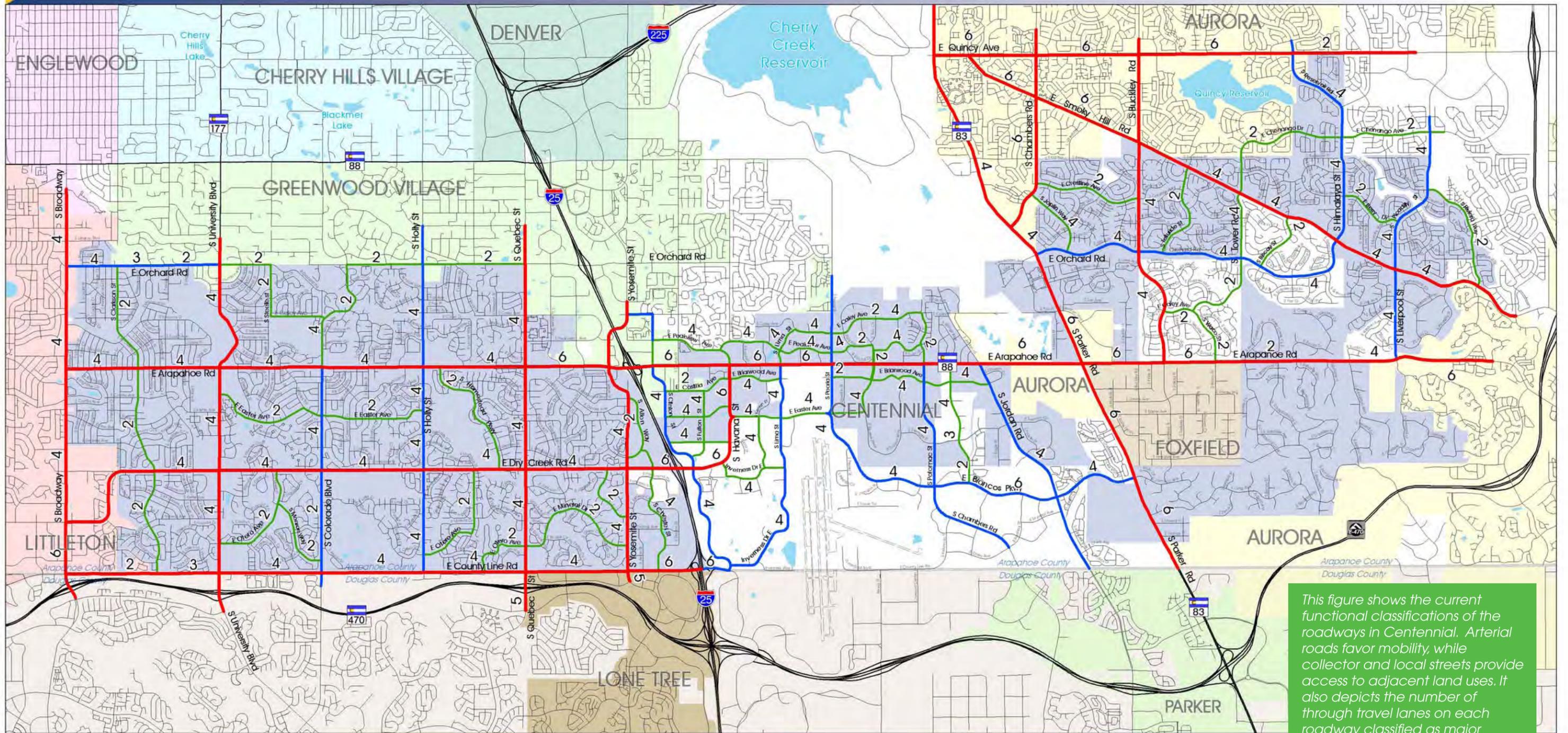
### Local Streets

Local streets serve the highest level of access, providing direct driveway access to adjacent properties and carrying traffic to the collectors. Local streets can be of limited continuity and may be designed to discourage through traffic.

Table 7. Table: Functional Classification Design Characteristics

Characteristics	Functional Priority			
	Expressways (Mobility Only)	Arterials (Mobility Primary, Accessibility Secondary)	Collectors (Accessibility Primary, Mobility Secondary)	Locals (Accessibility Only)
Service Performed	Traffic movement, highest speed, no direct land use	Traffic movement, relatively high speed, minimal land access	More frequent land access, relatively low speeds	Direct land access, lowest speeds
Typical Trip Lengths	Interstate and between major regions of metro area	Within major regions of metro area and between communities	Within communities	Within neighborhoods and business centers
Continuity	Totally interconnected and continuous over an entire metro area	Interconnected and continuous within major regions of metro area	Interconnected and continuous within communities	Limited continuity. Discourage through traffic
Access Type and Spacing	Interchanges at 1 to 1 ½ mile spacing and at-grade intersections at ½ to 1 mile spacing. No private access	At-grade intersections at ½ mile spacing. Private access usually restricted	Signalized and stop controlled intersections at 1/8 mile spacing. Some restrictions on private access	Stop sign controlled or uncontrolled intersections. Unrestricted private access
Facility Spacing				
Urban	1 to 3 Miles	1 Mile	¼ to ½ Mile	As needed
Rural	5± Miles	1 to 2 Miles	1± Mile	As needed
% System Mileage*	5-10%	5-20%	5-10%	65-80%
% Vehicle Miles of Travel Carried*	40-55%	20-35%	5-10%	15-30%

\* National averages



This figure shows the current functional classifications of the roadways in Centennial. Arterial roads favor mobility, while collector and local streets provide access to adjacent land uses. It also depicts the number of through travel lanes on each roadway classified as major collector or higher.

LEGEND

- Major Arterial
- Minor Arterial
- Major Collector
- Local Streets
- Through Lanes
- City Limits
- Lakes



Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
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### Traffic Signals

All traffic signals within the City are shown on Figure 8. The City of Centennial operates and maintains 72 of these signals, while the remaining signals are under the jurisdiction of other agencies (e.g., the Colorado Department of Transportation [CDOT], Arapahoe County, Greenwood Village, etc.). The City’s Public Works Department is responsible for the signal timing and progression along the major arterial corridors in Centennial. It proactively works with the Denver Regional Council of Governments (DRCOG) and neighboring jurisdictions to coordinate signal timing across jurisdictional boundaries.

### Traffic Volumes

Daily traffic counts on the roadway system from 2008 or 2009 were collected from a variety of sources including the City’s annual count program, CDOT, Arapahoe County, Aurora, Littleton, and Greenwood Village. Figure 9 depicts these traffic volumes. As would be expected, I-25 and C-470 carry the heaviest traffic volumes in the area. Arapahoe Road and Parker Road carry the highest traffic volumes (as high as 66,000 vehicles per day [vpd] and 56,000 vpd, respectively) of the arterial street system. Other major arterials in Centennial generally carry from 20,000 to 40,000 vpd.



Arapahoe Road from Waco Street to Himalaya Way is a high volume two-lane arterial

### Volume to Capacity Ratios

One measure that is used to define operational characteristics is volume to capacity ratio (v/c). This analysis compares the capacity of the street as it is designed and constructed to the volume of traffic it carries or is projected to carry in the future. The planning level daily capacity thresholds shown in Table 8 are the basis for the v/c ratios used in this transportation plan. Roads with lower functional classification and fewer lanes would be expected to accommodate fewer vehicles per day, while roads with higher functional classifications would be expected to accommodate more vehicles.

Table 8: Planning Level Roadway Capacities

Functional Classification	Number of Lanes	Maximum Capacity
Major Arterial	2-Lane	16,000 vpd
	4-Lane	32,000 vpd
	6-Lane	48,000 vpd
Minor Arterial	2-Lane	12,000 vpd
	4-Lane	24,000 vpd
Major Collector	2-Lane	10,000 vpd
	4-Lane	20,000 vpd

The v/c ratios have been calculated on Centennial’s roadway network based and are depicted graphically on Figure 10. These ratios have been calculated using the existing traffic volumes shown

on Figure 9 and the maximum roadway capacities provided in Table 8. The red segments represent roadways that currently carry traffic volumes in excess of the planning level roadway capacity ( $v/c \geq 1.0$ ), representing level of service (LOS) F. The yellow segments represent roadways that operate at near capacity conditions ( $v/c$  between 0.8 and 1.0), generally corresponding to LOS D or E. These are segments that the City should monitor closely for further deterioration in the future. The green segments represent a  $v/c$  ratio less than 0.8, corresponding to LOS A-C.

The  $v/c$  ratios indicate that several roadway segments in Centennial currently carry volumes exceeding their capacity including sections of Arapahoe Road, Parker Road, Broadway, University Boulevard, Colorado Boulevard, County Line Road, Orchard Road, and Smoky Hill Road. These roadway deficiencies help to identify potential short term roadway improvement needs. However, more analysis is necessary to determine the most appropriate improvements. Since most congestion on arterial segments occurs at intersections, detailed peak hour analysis will help determine through and auxiliary turn lane needs at intersections as well as along the segment.

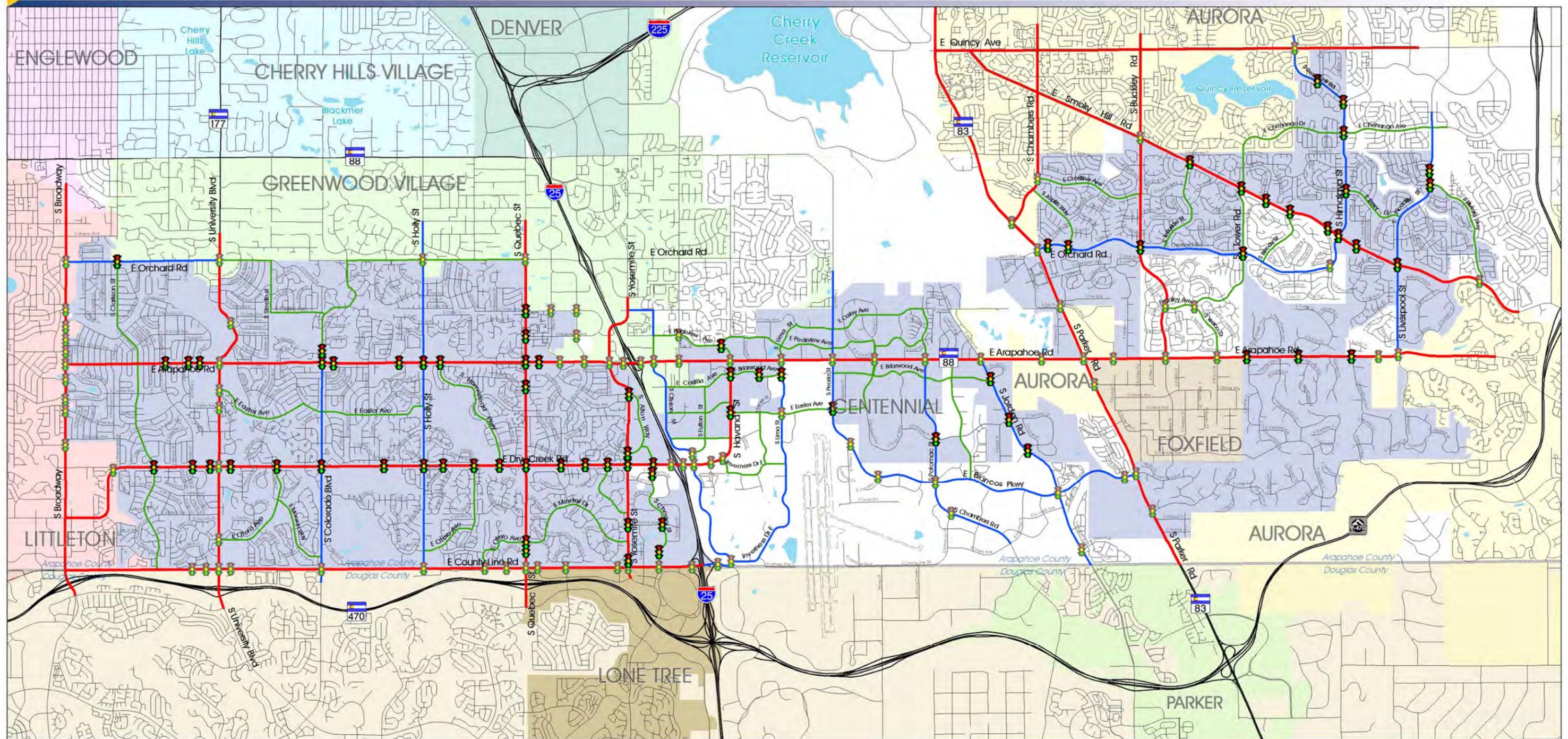
### **Crash History**

The 25 locations that have the highest number of crashes within the City were identified (as shown on Figure 11) during a three-year study period (01/01/2007-12/31/2009). An analysis of crash rates (which includes a factor for traffic volumes using the intersection) was completed to determine the relative ranking of the intersections. Four of the high crash rate intersections (shown in green) were excluded from this analysis because they have been recently modified or reconstructed resulting in crash data no longer being applicable.

Next, a crash pattern analysis procedure was used to compare the observed crashes for each intersection with other similar intersections in the state to determine if any crash types occurred more frequently than should be expected. The crash pattern analysis determined that eight intersections (shown in red) experienced significant crash patterns. The remaining 13 intersections (shown in blue) generally followed the expected crash profiles based on similar types of intersections. This analysis can be used to help identify specific safety improvements for those intersections with a significant crash pattern.

### **Street Maintenance**

The City performs annual maintenance and reconstruction of its pavement through the annual Street Rehabilitation Program. The City Council has set a policy to fund the program in perpetuity so that the pavement network condition will be maintained at its current level. The current program funding is \$6.6 million.



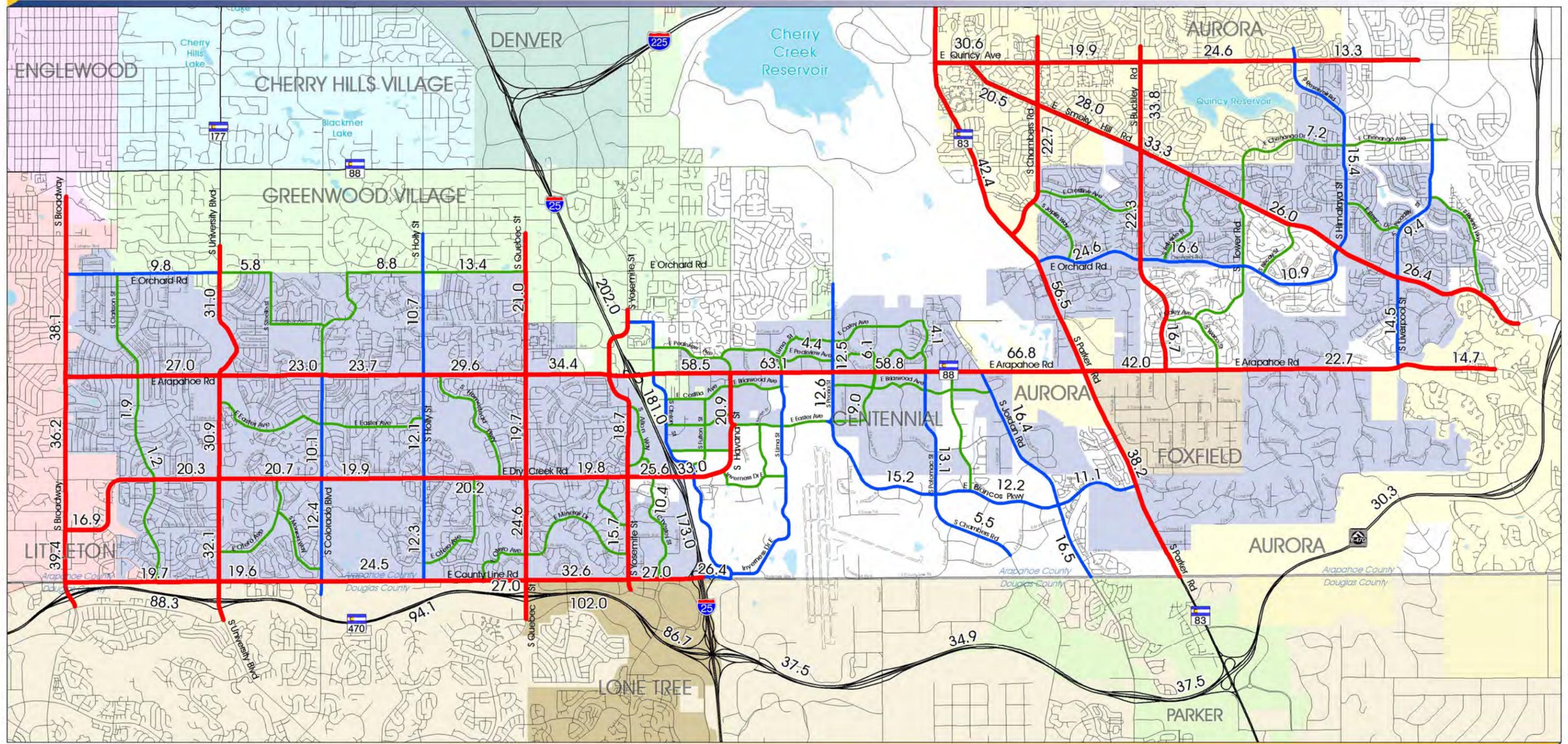
LEGEND

-  Centennial Traffic Signals
-  Other Jurisdiction Traffic Signals
-  Major Arterial
-  Minor Arterial
-  Major Collector
-  Local Streets
-  City Limits
-  Lakes



Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
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Figure 9  
Existing Traffic Volumes



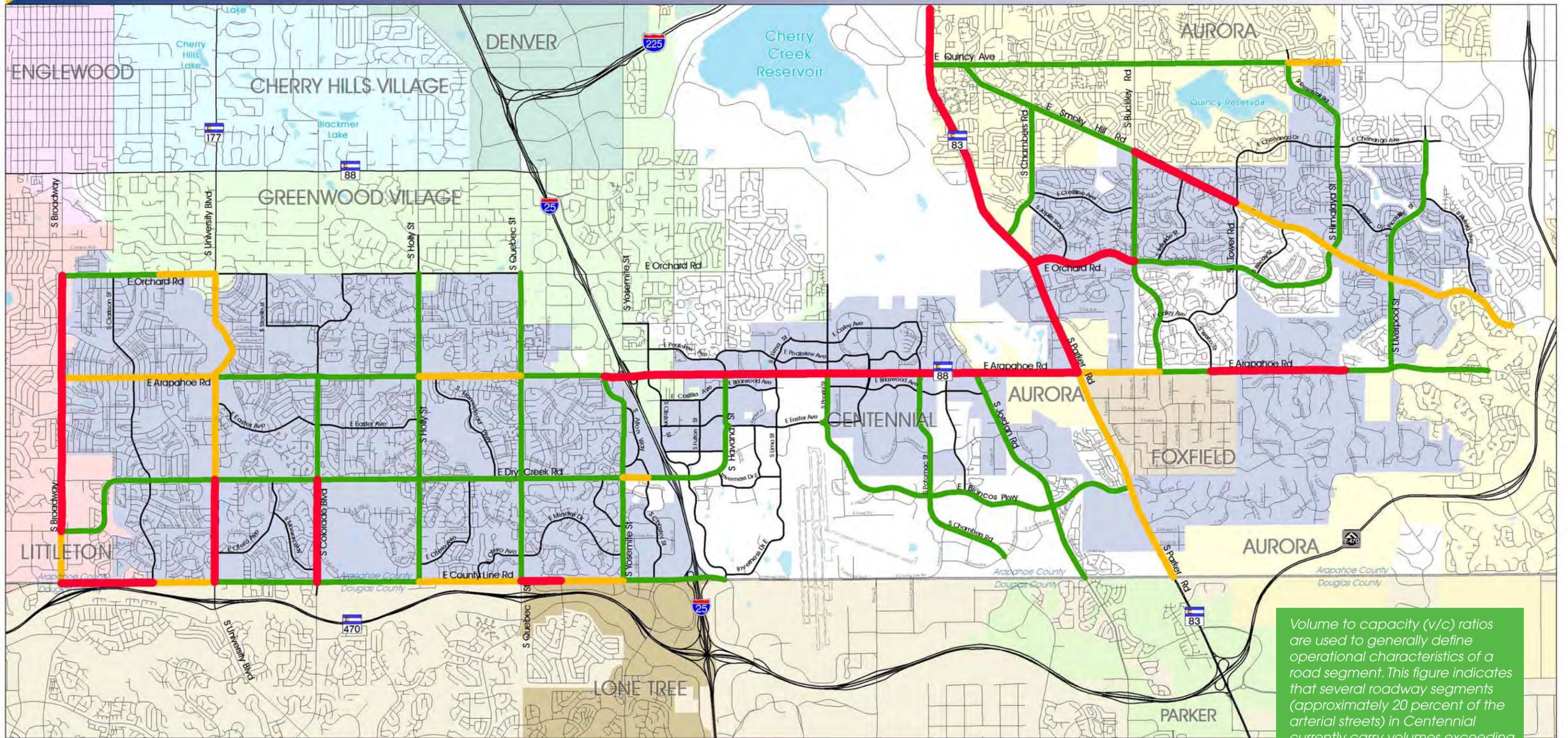
**LEGEND**

- XX.X 2008/2009 Daily Traffic Volumes (In Thousands)
- Major Arterial
- Minor Arterial
- Major Collector
- Local Streets
- City Limits
- Lakes



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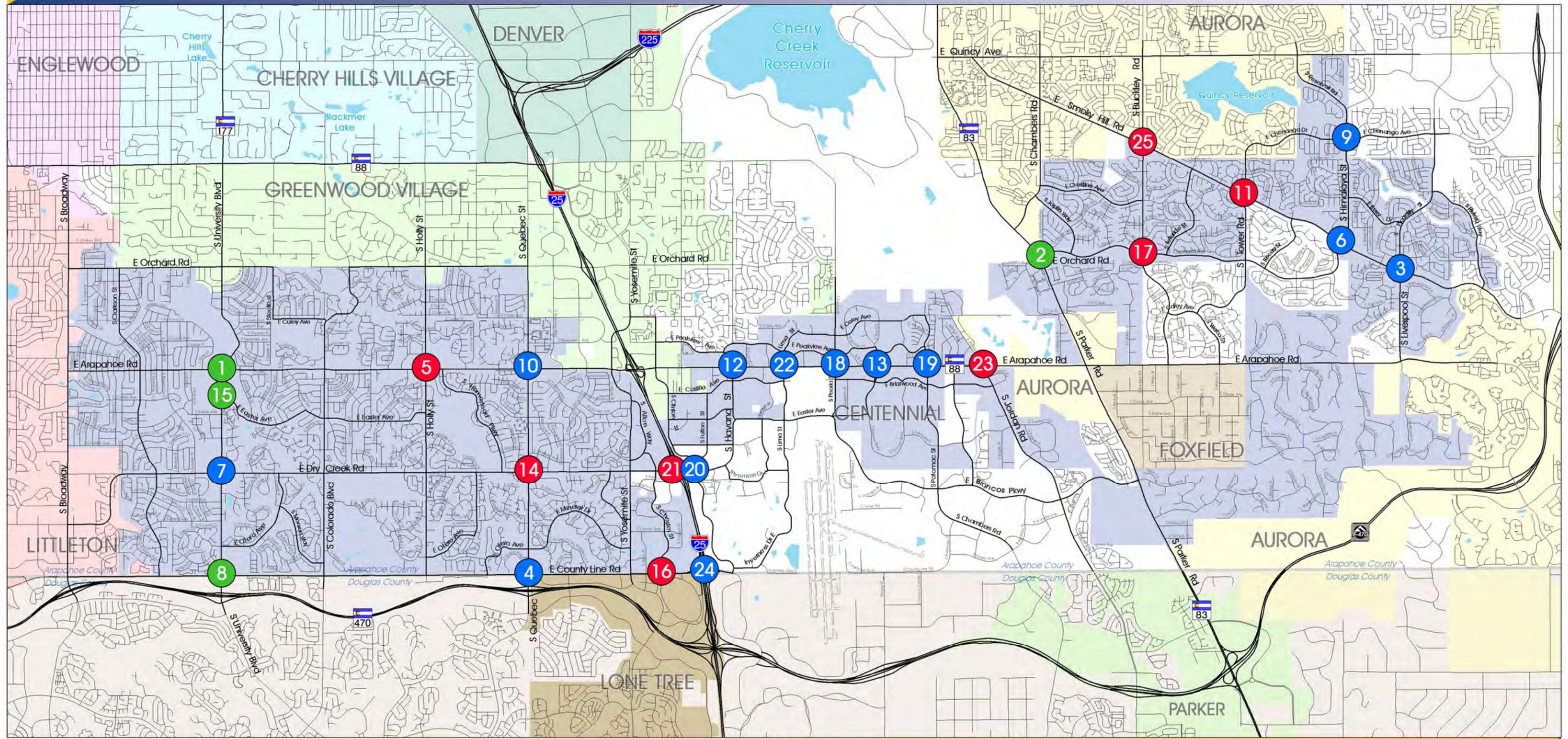




Volume to capacity (v/c) ratios are used to generally define operational characteristics of a road segment. This figure indicates that several roadway segments (approximately 20 percent of the arterial streets) in Centennial currently carry volumes exceeding their capacity (shown in red).

**LEGEND**

- Below Capacity ( V/C Ratio < 0.80 )
- Near Capacity ( V/C Ratio 0.80 - 0.99 )
- Above Capacity ( V/C Ratio ≥ 1.0 )
- City Limits
- Lakes



LEGEND

- Rank by Crash Rate
- Intersections that have been recently reconstructed
- Intersections with expected crash profiles
- Intersections with a significant crash pattern



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Big Dry Creek Trail near University Boulevard

## 5.2 Existing Bicycle and Pedestrian Network

An inventory of existing bicycle and pedestrian facilities is shown on Figures 12 and 13, respectively. Regional and multi-use trails are shown on both figures. Centennial’s roadway cross-section standards include on-street bicycle lanes and sidewalks on all collectors and arterials.

### Bicycle Facilities

The existing bicycle system for the City of Centennial is a mix of bicycle routes that were previously designated by Arapahoe County, trails that have been improved over the years, and improvements that have recently been made by the City, as specified in the City’s 2007 *Parks, Open Space, Trails, and Recreation Master Plan*. Figure 12 shows the existing bicycle system including recreational trails, designated bicycle routes, and bicycle lanes in the Centennial area.



Arapahoe Road at I-25 is very busy and difficult for bicyclists to traverse

The trail system is extensive in the Centennial area with much of the trail system maintained by the South Suburban Parks and Recreation District and Arapahoe County Parks and Recreation District. The on-street bicycle route system and infrastructure is not as extensive and is disconnected.

Specific streets such as Arapahoe Road on the eastern side of the City lack both sidewalk and bike facilities. In general, there is a need for better east / west connectivity for bicyclists. I-25 creates a barrier for bicycle travel between the east side and the west side of the City. Within Centennial, the only roadways that cross I-25 are Arapahoe Road, Dry Creek Road, and County Line Road. Each of these is an arterial roadway that has an interchange with I-25, making it difficult for a cyclist to safely travel across the City.

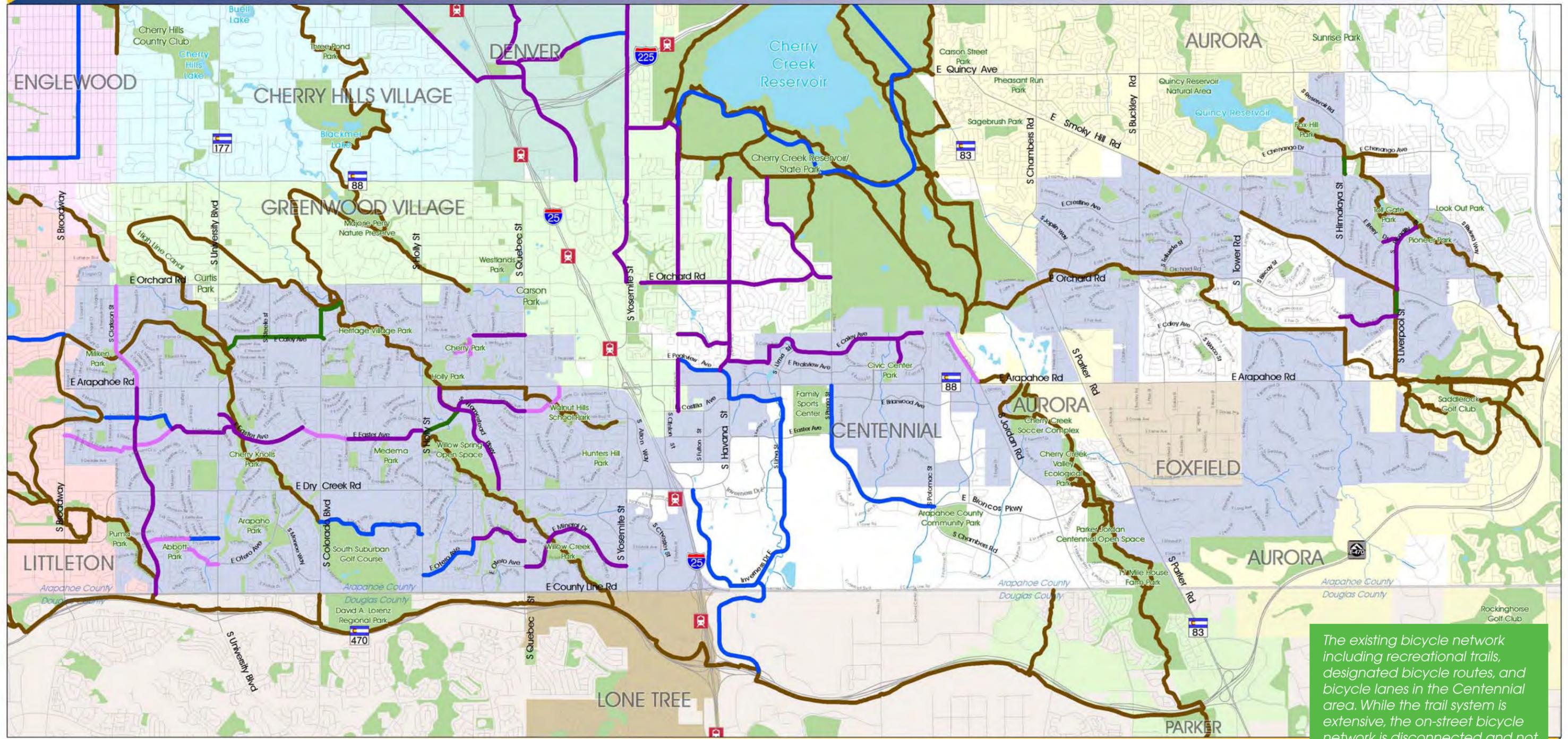
### Pedestrian Facilities



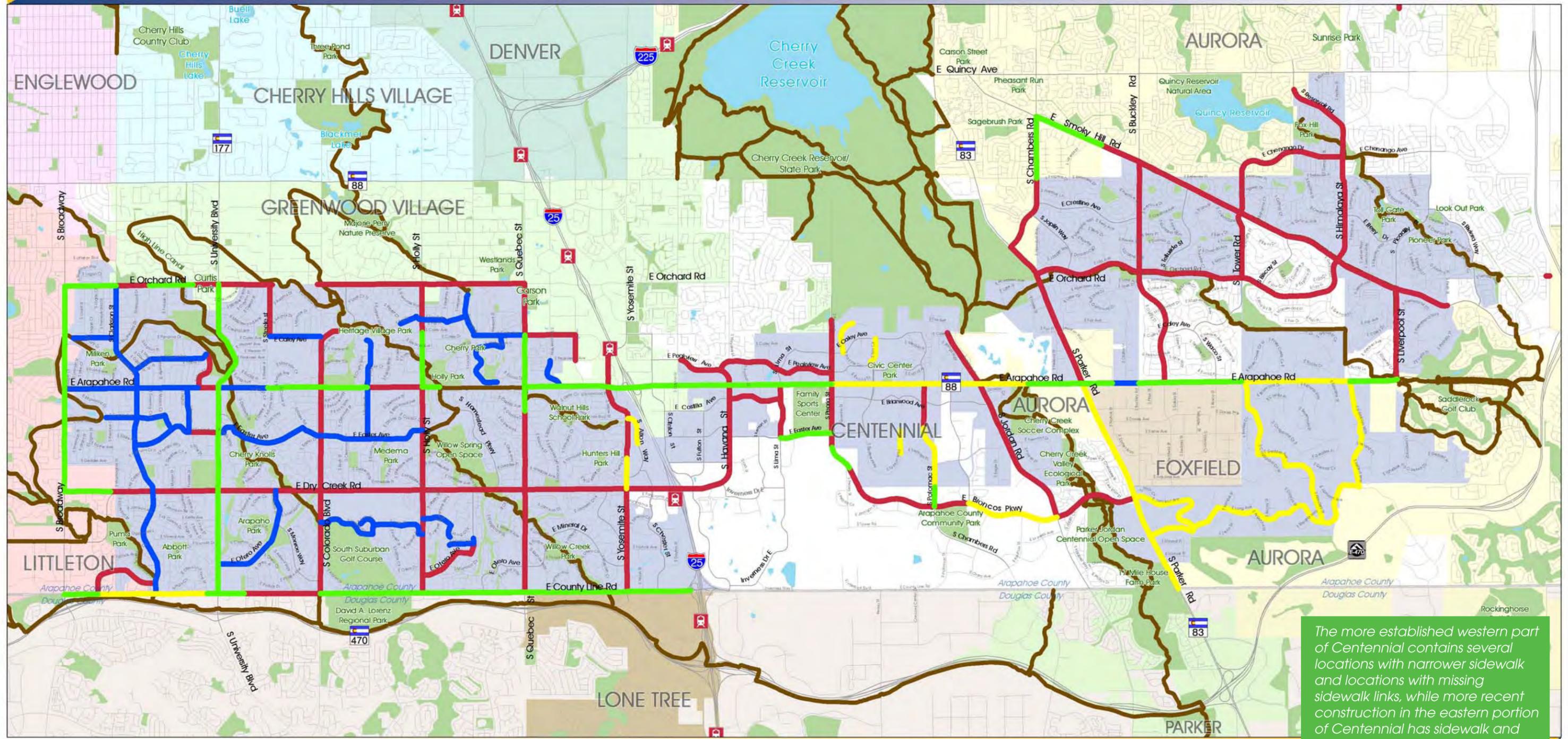
Rural character along E. Long Avenue

While the more established western part of Centennial contains several locations with narrower sidewalk and locations with missing sidewalk links, more recent construction in the eastern portion of Centennial has sidewalk and facilities that conform to current standards. Some specific gaps in pedestrian connectivity include Arapahoe Road near Grandview High School and between Peoria Street and Jordan Road, Alton Way, and within the Antelope neighborhood south and east of Foxfield (see Figure 13). Sidewalk improvements may not be feasible or appropriate in the latter areas which are rural in character. Major streets that have sidewalks on one side only include Yosemite St between Dry Creek and Arapahoe Road, Quebec Street south of Caley Avenue and Caley Avenue east of Quebec Street.

Figure 12  
Existing Bicycle Facilities



The existing bicycle network including recreational trails, designated bicycle routes, and bicycle lanes in the Centennial area. While the trail system is extensive, the on-street bicycle network is disconnected and not as extensive.



The more established western part of Centennial contains several locations with narrower sidewalk and locations with missing sidewalk links, while more recent construction in the eastern portion of Centennial has sidewalk and facilities that conform to, or exceed, current standards.

LEGEND

- Wide/Separated Sidewalk
- Narrow Sidewalk
- No Sidewalk
- Regional Trails
- Adequate Sidewalk
- RTD Light Rail Station
- Parks
- City Limits

Note: Sidewalks along arterials that currently comply with City standards are not shown.

### 5.3 Existing Transit Services

The City of Centennial is currently served by the Regional Transportation District (RTD) transit services. These services are funded by a one cent sales tax collected throughout the district.

RTD operates seven local bus routes, six suburban bus routes, two regional bus routes, one skyRide route, a light rail line, and four call-n-Rides within the City of Centennial. These routes provide Centennial residents and businesses with access to downtown Denver, Cherry Creek, University of Denver, Porter Adventist Hospital, Swedish Medical Center, Parker Adventists Hospital, Denver Tech Center, Stapleton, Englewood City Center, Streets at SouthGlenn, Arapahoe Community College, Littleton, Denver International Airport, and Boulder.

RTD has a number of park-n-Rides in or adjacent to Centennial including the one at Smoky Hill and Picadilly, four locations along the Southeast light rail line (Orchard Station, Arapahoe at Village Center Station, Dry Creek Station, and County Line Station), and one at C-470 and South University Boulevard.

Table 9 lists the bus routes serving Centennial and performance measures developed and used by RTD to determine the vitality of a transit route. Two key measures are boardings per hour and subsidy per boarding. As shown in the table, local routes (generally operated in higher density urban areas) typically have the highest number of boardings per hour and the lowest subsidy per boarding. Suburban and regional routes both have a somewhat lower number of boardings per hour and a higher subsidy per boarding because they operate in lower density, suburban locations that are more difficult to serve efficiently with transit.

Most of the routes that serve the City of Centennial operate relatively well when compared with other similar types of services provided by RTD. It is worth noting however, that routes 67 and 77 both have lower than average boardings per hour and higher than average subsidies per boarding and RTD ceased operating Route 77 in 2011 while the Transportation Plan was being developed.



RTD provides transit service to Centennial and the Denver region

Table 9: Summary of Bus Transit Performance Measures

Route	Service Type	Peak Frequency	Total Boardings	Boardings per Hour	Subsidy per Boarding
0	CBD Local	<10 min	2,452,940	33.5	\$2.71
0L	CBD Local	<10 min	425,984	56.5	\$4.04
24	Urban Local	20 min	437,275	19.0	\$5.37
27	Urban Local	30 min	470,970	16.6	\$5.85
65	Urban Local	30 min	534,372	26.1	\$5.81
73	Urban Local	30 min	475,429	27.3	\$3.65
153	Urban Local	15 min	991,100	27.1	\$3.38
66	Suburban Local	15 min	455,666	18.8	\$5.54
67	Suburban Local	30 min	85,522	8.4	\$13.83
77*	Suburban Local	30 min <sup>2</sup>	76,412	10.4	\$13.06
135	Suburban Local	30 min	157,154	19.9	\$7.93
139	Suburban Local	30 min	222,990	27.8	\$5.19
169L	Suburban Local	60 min <sup>2</sup>	120,616	27.2	\$7.68
P	Regional	30 min <sup>2</sup>	132,004	37.4	\$7.49
T	Regional	30 min <sup>2</sup>	39,558	13.1	\$13.46
AT	SkyRide		565,837	27.9	\$2.18
Arapahoe	call-n-Ride	On Demand	18,224	4.7	\$11.15
Dry Creek	call-n-Ride	On Demand	15,361	3.9	\$12.72
N. Inverness	call-n-Ride	On Demand	51,343	6.6	\$6.95
Orchard	call-n-Ride	On Demand	44,181	7.6	\$5.16
PATHW <sup>3</sup>	Human Service	1 roundtrip per day	N/A	N/A	N/A

<sup>1</sup> Performance measures are for the entire route, not just within Centennial.

<sup>2</sup> Peak period only

<sup>3</sup> Pathways West is operated by Developmental Pathways for individuals with developmental disabilities.

\* This route has been discontinued by RTD in 2011

Note: RTD also operates complementary ADA paratransit service within most of Centennial.

Source: RTD 2009

## 5.4 Forecasted Growth

A travel demand model for the City of Centennial was developed as a part of the long-term transportation planning process. This travel demand model is a planning tool for assessing alternative improvements to a transportation system, given projected future demand. It provides output in the form of estimated traffic volumes on the roadway system and ridership on the transit system.

The Centennial travel demand model was developed for the 2035 planning horizon. The most current version of the DRCOG regional travel demand forecasting model, Compass 4.0 (Cycle 2, 2009), was used as a basis for forecasts. The DRCOG Traffic Analysis Zone (TAZ) system was refined to provide more detailed zonal definition for the study area as well as to incorporate zone boundary changes made during the Arapahoe Road Corridor Study, Parker Road Corridor Study, and the I-25/Arapahoe Road Interchange Environmental Assessment.

### Land Use Forecasts

Travel forecasts are based on the DRCOG travel demand model using the base year 2010 model and the 2035 model. The DRCOG land use totals for Centennial have been maintained, see Table 10. Some 2010 land use was reallocated to better match existing conditions, while maintaining the DRCOG totals for Centennial TAZs. Likewise, the 2035 land use forecasts were slightly reallocated by TAZ to better reflect likely growth patterns, while maintaining DRCOG totals. Between 2010 and 2035, DRCOG projects approximately 13,000 additional households and over 20,000 new jobs in and immediately adjacent to Centennial, mostly in undeveloped Aurora and unincorporated Arapahoe County. Centennial proper is not expected to experience significant growth as the majority of the City is built out. Vacant land within the City is primarily zoned for non-residential development.

Table 10. Household and Employment Forecasts for Centennial and Surrounding Areas

	Households	Employment
2010	46,568	64,623
2035	59,496	84,918
Growth	+12,928	+20,295
% Growth	+28%	+31%

Figure 14 shows areas of the City that are expected to be stable (no or minimal residential growth), others that have some infill residential development, or others that are expected to have substantial new residential development. The highest concentrations of household growth are adjacent to the eastern-most portions of the City. Other

high growth areas (e.g., near Broadway and Dry Creek Road) are immediately outside of the City boundaries.

Figure 15 shows stable, infill and developing employment areas of the City. The highest growth in employment is expected in the central portion of the City, between I-25 and Parker Road.

### 2035 Traffic Forecasts

The Baseline 2035 model used DRCOG’s Fiscally Constrained transportation network, which includes improvements throughout the Denver region that are included in the DRCOG’s Fiscally Constrained Plan. Roadway network refinements in the Centennial area were added to the model to better represent the current system. Centennial’s roadway network in this Baseline model generally represents existing conditions, since no major roadway improvements in Centennial have identified and committed funding sources. However, two planned improvements are included in the baseline 2035 model:

- ▶ Widening Arapahoe Road to six lanes from Waco Street to Himalaya Way (Widening Arapahoe Road from two lanes to four lanes is currently being designed, and construction is expected to proceed in 2013)
- ▶ Widening County Line Road to four lanes from Broadway to University

These widening projects were identified in the Roadway Plan as the top two priorities for roadway improvements, and the City is currently pursuing funding options for both projects. For the long range transportation planning process, it is assumed that these two high priority projects would be completed prior to pursuit of other, higher cost roadway infrastructure improvements. The Baseline model represents the travel demand forecasts for 2035 if no improvements, beyond these two high priority planned improvements, were made to Centennial’s transportation system. The 2035 Baseline traffic forecasts and a comparison to the existing traffic volumes are shown on Figure 16.

### Identification of Deficiencies, Constraints and Considerations

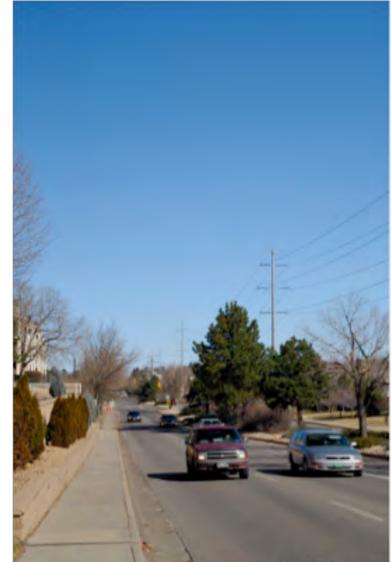
The future volume to capacity (v/c) ratios can be used to assess the level of congestion expected on the roadway network in the future. The 2035 v/c ratios calculated for the Baseline roadway network are depicted graphically on Figure 17. As before, the red segments represent roadways with traffic forecasts in excess of the planning level roadway capacity ( $v/c \geq 1.0$ ), representing level of service (LOS) F. The yellow segments represent roadways that are forecast to operate at near capacity conditions (v/c between 0.8 and 1.0), generally corresponding to LOS D or E. The green segments represent a v/c ratio less than 0.8, corresponding to LOS A-C.



Widening County Line Road to four lanes west of University is a high priority

Following are general observations about forecasted traffic growth on different parts of the City's roadway network:

- ▶ Many roadways, particularly in the established western portion of the City, are forecast to experience moderate growth (20 to 40 percent) in travel demand over the 25-year time period. However, several of these roads (e.g., portions of County Line Road and Colorado Boulevard) are currently over capacity and congestion is expected to worsen in the future.
- ▶ Opportunities for east-west travel through the central portion of Centennial (I-25 to Parker Road) are highly constrained by Cherry Creek State Park to the north and the Centennial Airport to the south. Arapahoe Road is the only continuous east-west roadway between E-470 and I-225. With considerable land use growth expected within this central portion of the City, compounded by regional growth to the east, travel demand on this stretch of Arapahoe Road is forecast to range from 60,000 to over 80,000 vpd, well over existing capacity.
- ▶ Due to the forecasted land use growth in the eastern portion of the City and particularly growth in neighboring communities, several roadway segments east of Parker Road are expected to be over capacity by 2035. Even with the planned widening of Arapahoe Road (Waco to Himalaya), much of Arapahoe Road is expected to be over capacity.



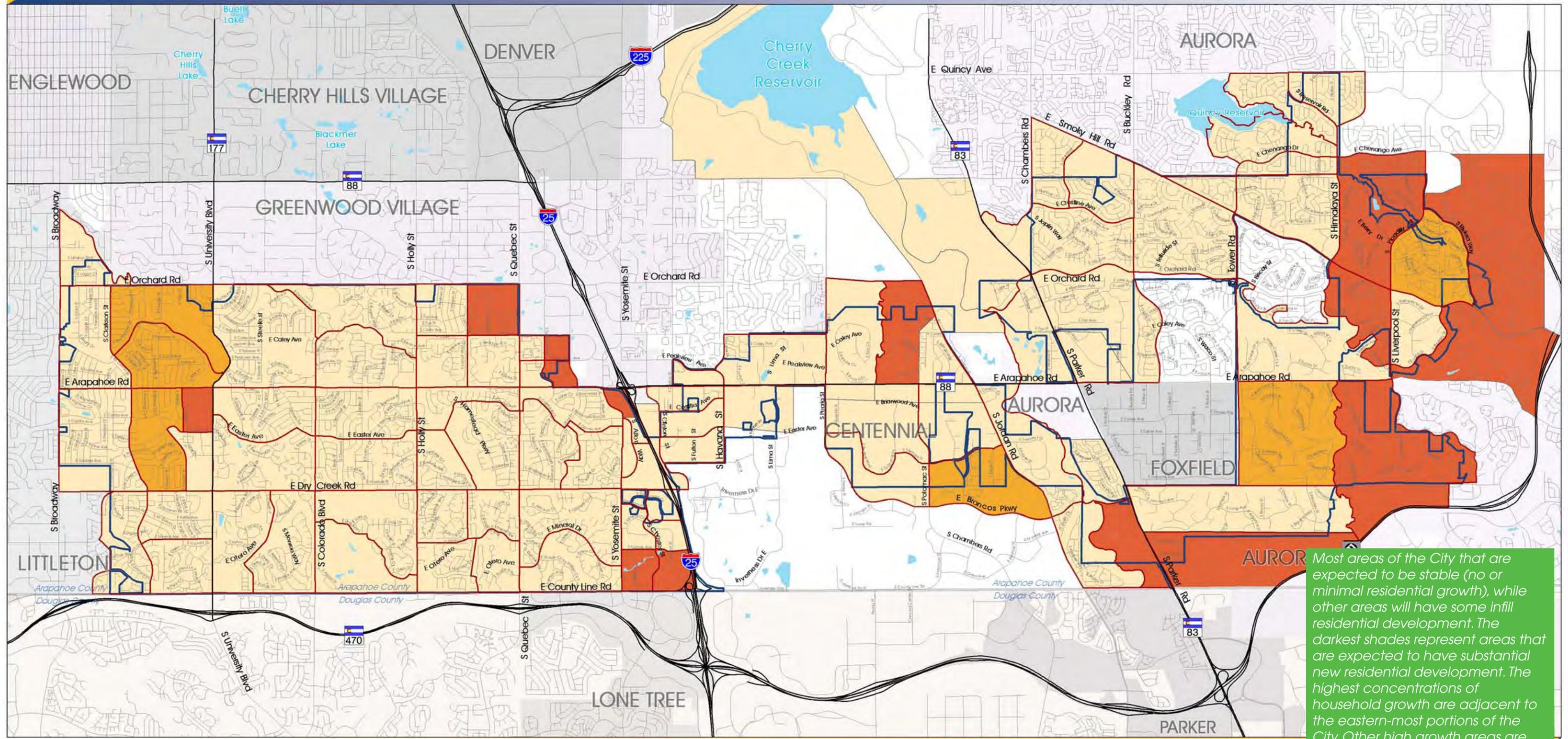
Holly Street should have adequate capacity in the future

To address the existing and future travel demands on the City's roadway network, a series of roadway improvement "considerations" were developed and evaluated. These considerations were developed through technical analyses; discussions with the City Council, Planning and Zoning Commission, and the Community Advisory Committee, and public input.

The roadway improvement considerations were then evaluated based on several measures:

- ▶ Ability to achieve the intended purpose (e.g., relieve Arapahoe Road)
- ▶ Origins and destination of facility users (where are potential users coming from and going to in relation to the Centennial area)
- ▶ Operational characteristics (volume, v/c ratios, etc.)
- ▶ Potential construction cost and right of way impacts
- ▶ Public sentiment

Figure 18 shows the considerations that are recommended for inclusion in the Long Range Roadway Plan. A detailed description of all considerations, the evaluation process, and results is included in Appendix F.

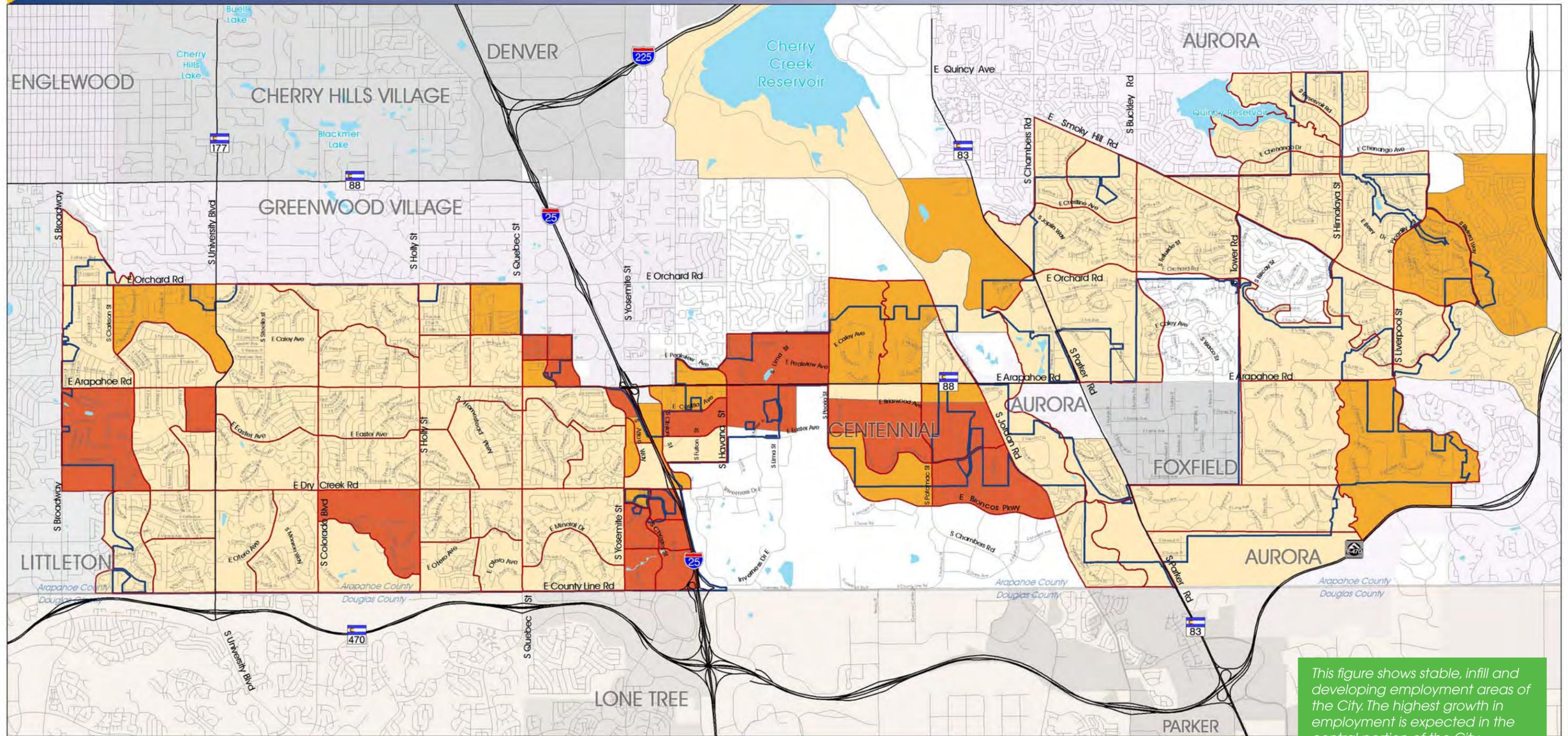


Most areas of the City that are expected to be stable (no or minimal residential growth), while other areas will have some infill residential development. The darkest shades represent areas that are expected to have substantial new residential development. The highest concentrations of household growth are adjacent to the eastern-most portions of the City. Other high growth areas are immediately outside of the City boundaries.

LEGEND

- Centennial's 2035 Household Growth
- Stable
- In-fill
- New Development
- City Limits
- TAZ Boundary

Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
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This figure shows stable, infill and developing employment areas of the City. The highest growth in employment is expected in the central portion of the City, between I-25 and Parker Road.

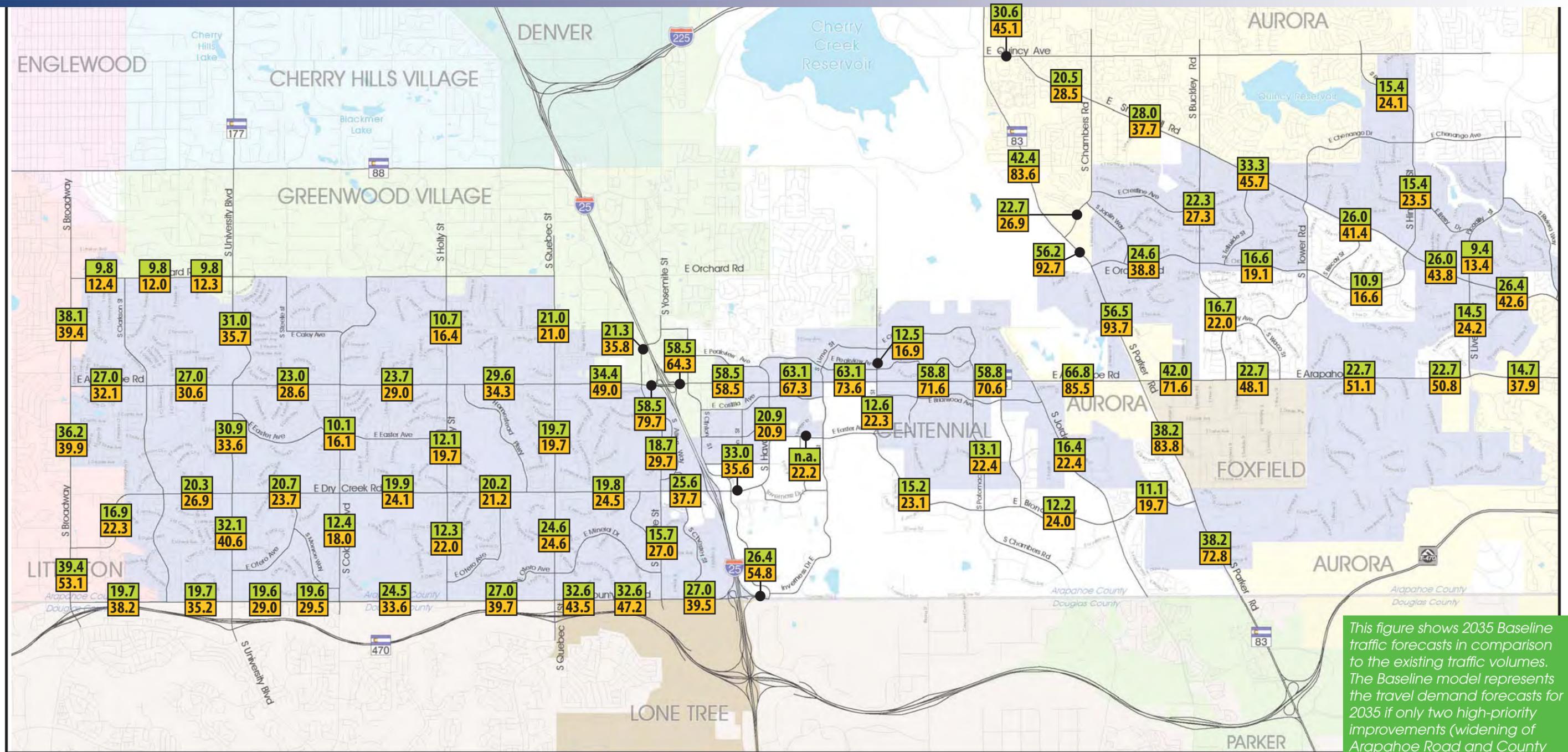
LEGEND

- Centennial's 2035 Employment Growth
  - In-Fill
  - Stable
  - New Development
  - City Limits
  - TAZ Boundary

Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)

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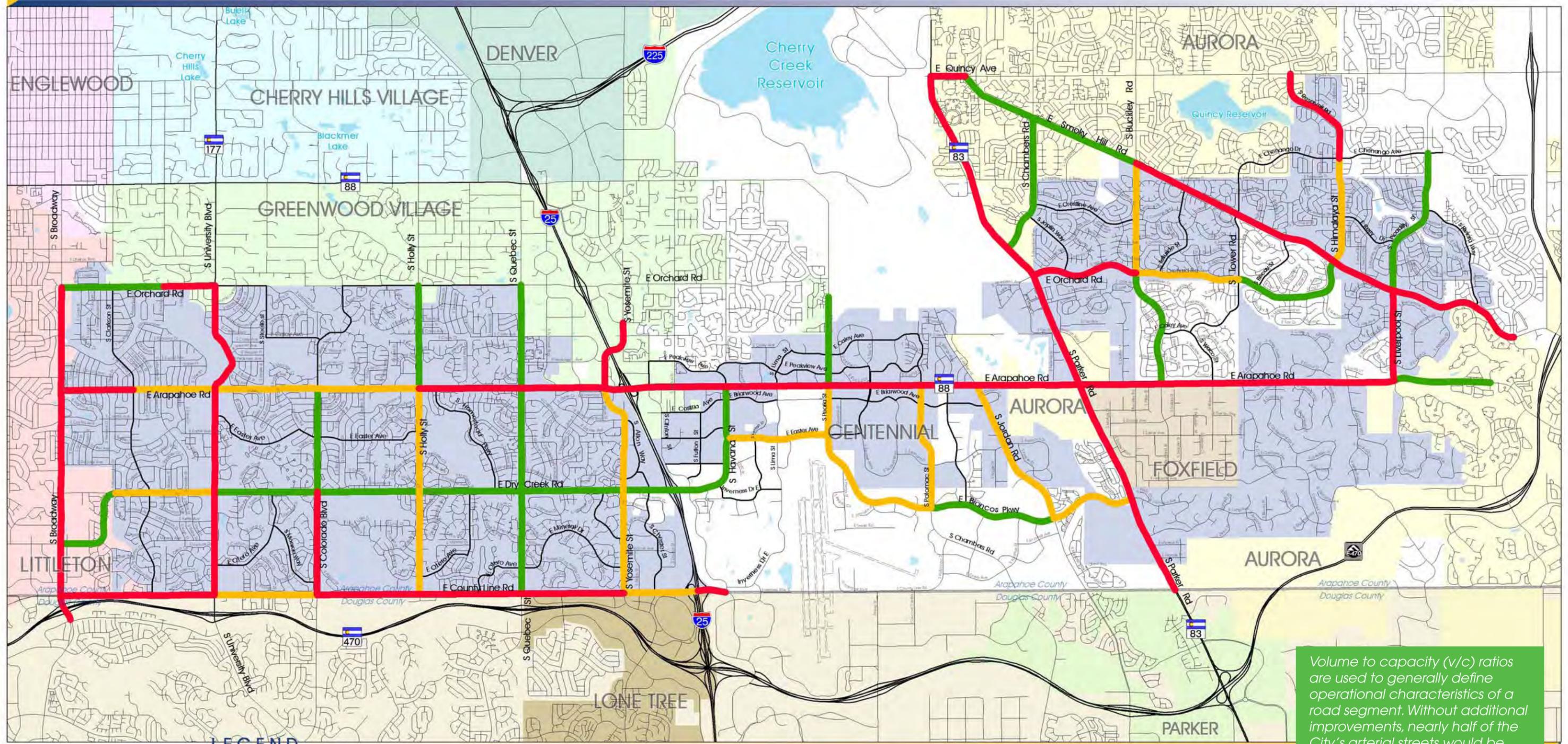
This figure shows 2035 Baseline traffic forecasts in comparison to the existing traffic volumes. The Baseline model represents the travel demand forecasts for 2035 if only two high-priority improvements (widening of Arapahoe Road and County Line Road) are made to the system.

LEGEND

- XX.X Existing Average Daily Traffic (x1,000 vpd)
- YY.Y 2035 Daily Traffic Baseline\* (x1,000 vpd)

\*Planned Improvements include:

- Arapahoe Road from Waco to Himalaya - widening to 6 lanes
- County Line Road from Broadway to University - widening to 4 lanes



LEGEND

- ~ Below Capacity (V/C Ratio < 0.80)
- ~ Near Capacity (V/C Ratio 0.80 - 0.99)
- ~ Above Capacity (V/C Ratio > 1.0)
- Centennial\_Boundary

- \*Planned Improvements Include:
- Arapahoe Road from Waco to Himalaya - widening to 6 lanes
  - County Line Road from Broadway to University - widening to 4 lanes

Volume to capacity (v/c) ratios are used to generally define operational characteristics of a road segment. Without additional improvements, nearly half of the City's arterial streets would be over capacity in 2035.



Coordinate System: NAD 1983 StatePlane Colorado Central FIPS 0502 (feet)  
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# **Appendix A      Public Comment**

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A001	Website	Bicycle Pedestrian	Complete the missing link of the Little Dry Creek Trail for regional pedestrian and bicycle access. The trail in Walnut Hills dead-ends at Quebec. Connect this segment to the new underpass at Arapahoe. If money presents itself, ideally build an underpa	Little Dry Creek west of Quebec Street
A002	Website	Bicycle Pedestrian	Stripe Bicycle Lanes from the end of the Big Dry Creek Trail at Palos Verdes Park to the Arapahoe Light Rail Station. Run the lanes along E Orchard Dr, S Locust St, and E Caley Ave. These Bike Lanes will also serve to connect the Big Dry Creek Trail to	Caley Avenue & Locust Street
A003	Website	Bicycle Pedestrian	Stripe Bike Lanes and widen sidewalks on Uinta St from Walnut Hills Elementary School to the Arapahoe Road Light Rail Station. This will serve 3 purposes: (1) give kids a safer route from Walnut Hills Elementary to the Castlewood Library; (2) Give a vis	Uinta Street (Walnut Hills)
A004	Website	Roadway	Provide a non-interchange crossing of I-25 south of Arapahoe Road for pedestrians/bicyclists. The Arapahoe Road Interchange is very un-pedestrian and bicyclist friendly. The speeds and the focus of the drivers are completely intent on getting onto and o	I-25 south of Arapahoe Road
A005	Website	Bicycle Pedestrian	Connect the Local and Regional Trail System to the Dry Creek Light Rail Station. This can be accomplished by striping bike lanes on E Panorama Dr and E Panorama Cir and by providing either a grade separated crossing of Yosemite or a pedestrian signal at	Panorama Drive and Panorama Circle
A006	Website	Roadway	Use a half cycle length at this signal during off peak times so that left turning traffic does not have to wait so long.	Dry Creek Road & Homestead Parkway intersection
A007	Website	Roadway	I feel the speeds here are too fast.	Colorado Boulevard in the vicinity of Dry Creek Road
A008	Website	Roadway	This easter stretch of Arap. Rd. is an embarrassment. The road is too narrow and dark and extremely dangerous, especially when heavily travelled by newly-minted drivers from the high school at Liverpool. This road urgently needs safety (width & street light) improvements!	Arapahoe Road - Waco to Himalaya
A009	Website	Roadway	We need a stoplight. It is getting more and more unsafe to turn in any direction at the intersection of Clarkson and County Line.	County Line Road & Clarkson Street intersection
A010	Website	Roadway	I think the traffic signal (RED) for East/West Dry Creek traffic is to long during morning hours (5:00am-5:30am)	Dry Creek Road & University Street intersection
A011	Website	Roadway	Cut thru traffic that comes straight across from Broncos Pky is a serious concern for a street that has no sidewalks. Speed is also a concern.	Jamison Avenue east of Parker Road
A012	Website	Roadway	The perception of cut thru traffic on Briarwood and parallel Davies Ave. is very high. 2,000 VTD is a very high number for a neighborhood street (Davies). It's often dangerous to walk across either of these streets. I would remove the traffic signal at Briarwood if the Costilla underpass comes into being.	Briarwood Blvd (Walnut Hills)
A013	Website	Roadway	This is another cut-thru location for avoiding Arap/Quebec. It's very easy to get to Quebec from Spruce and speeds seem high.	Costilla Avenue/Spruce Street (SE of Arapahoe & Quebec)
A014	Website	Roadway	Peakview is a nice east/west reliever for Arap. Rd. It's too bad Greenwood Vill. doesn't make it easier to get to it from Yosemite going east.	Peakview Avenue (east of I-25)
A015	Website	Roadway	Dry Creek Rd. seems to be in really rough condition. It needs a lot of help from Yosemite to University.	Dry Creek Road from Yosemite to University
A016	Website	Bicycle Pedestrian	Sidewalks must be completed along Yosemite, and it would be nice to see them at least on one side of Alton Wy.	Yosemite south of Arapahoe, Alton Way
A017	Website	Roadway	AM peak travel time, eastbound Dry Creek between Colorado to I-25 is less travel time then Arapahoe Rd. and County Line. I question why since there is approximately the same amount of signals and only 4 lanes versus the 6 on Arapahoe Rd. Thank you.	Dry Creek between Colorado and I-25

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A018	Website	Roadway	The designated left turn signal at the stoplight was removed at niagara and county line a few years back. Now that the 24 hour fitness has been located near this intersection, it is horrendous. It is almost impossible to turn left onto niagara from county line when going east on county line. The landscaping is such that you can not turn west (right turn on red) on a red light from niagara except when the light is greenlight. the traffic from the 24 hour fitness often makes it impossible to turn east from niagara to county line during the short duration of the light. It was awful when the designated left turn signal light was removed, it is now much worse with the increased traffic.	County Line Road & Niagara Street intersection
A019	Email	Roadway	One of the major improvements when rebuilding Arapahoe Road was the addition of a 'right turn lane' on Colorado Blvd. heading north at Arapahoe Road by Isaac Newton Middle School. Originally there were just three lanes which included a left turn lane plus two straight through lanes. Many drivers would be stuck in the right lane waiting to turn right but couldn't because the first car was going straight. (Sometimes that straight car was us). I can only imagine the cost savings in reduced fuel usage from cars not having to waste gas while idling waiting to turn right. My only suggestion for the master plan is to consider right turn lanes at traffic light intersections wherever possible.	City-wide
A020	Voicemail	Bicycle Pedestrian	Lives near Arapahoe and Colorado and used to do a lot of bicycle commuting and would like to discuss this. He sees a need for more bike lanes in the City like other cities have, especially along Colorado Boulevard.	Colorado Boulevard
A021	Public Mtg-May 2010	Roadway	When the Arapahoe/I-25 & Arapahoe/Parker is completed, the flow will be improved.	Arapahoe/I-25 & Arapahoe/Parker
A022	Public Mtg-May 2010	Bicycle Pedestrian	The bike lanes need to be maintained, i.e., swept and weeds cut so the bikes can use the paths or bike lanes free of glass, rocks and gravel.	Arapahoe Road bike lanes/paths
A023	Public Mtg-May 2010	Bicycle Pedestrian	We need sidewalks along Arapahoe Road, especially between I-25 and Parker Road.	Arapahoe/I-25 & Arapahoe/Parker
A024	Public Mtg-May 2010	Bicycle Pedestrian	We need bike paths and the bike paths we have need to be maintained in a condition that they can be used. Please clean the paths and remove the erosion, debris & trash, and plant/weed materials.	Arapahoe Road bike lanes/paths
A025	Public Mtg-May 2010	Roadway	The light signals on Arapahoe Road and Dry Creek Road need to be timed better.	Arapahoe Road & Drry Creek Road
A026	Public Mtg-May 2010	Roadway	Over-the-road tractor/trailer traffic, during the day, on Smoky Hill Road	Smokey Hill Road
A027	Public Mtg-May 2010	Bicycle Pedestrian	Bike connectivity, with other cities	
A028	Public Mtg-May 2010	Bicycle Pedestrian	Safe sidewalk access for school children.	
A029	Public Mtg-May 2010	Roadway	Traffic signals could be better – as in longer turn arrows maybe. Realize especially Arapahoe Rod is CDOT but utilize 2 turn lanes where possible.	Arapahoe Road signals
A030	Public Mtg-May 2010	Roadway	Maybe there should be more cameras for ticketing cars from entering an intersection after the signal turns red. More patrolling at intersections?	
A031	Public Mtg-May 2010	Roadway	Lots of heavy truck traffic on Smoky Hill Road, creating lots of potholes in the street.	Smokey Hill Road
A032	Public Mtg-May 2010	Roadway	Broncos Parkway now 6 lanes east of Potomac	Broncos Pkwy
A033	Public Mtg-May 2010	Roadway	Signal progression on Arapahoe Road doesn't work very well.	Arapahoe Road signals
A034	Public Mtg-May 2010	Roadway	New signals on Chambers s/o Broncos Parkway, Chenango/Liverpool, and Broncos/Jameson	Chambers, Chenango/Liverpool, and Broncos/Jameson
A035	Public Mtg-May 2010	Roadway	When will C-470 be widened (should add volumes & v/c on C-470 to map)	C-470

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A036	Public Mtg-May 2010	Roadway	Dry Creek Road needs capacity improvements	Dry Creek Road
A037	Public Mtg-May 2010	Roadway	Widening needed on Arapahoe (current 2 lane section)	Arapahoe Road
A038	Public Mtg-May 2010	Roadway	There are a lot of heavy trucks on Peoria north of Arapahoe; that stretch of road is in disrepair because of all the truck traffic.	Peoria north of Arapahoe Road
A039	Public Mtg-May 2010	Bicycle Pedestrian	The Peoria/Peakview intersection is difficult to cross for both vehicles and pedestrians/bicyclists.	Peoria/Peakview
A040	Public Mtg-May 2010	Roadway	Traffic backs up on northbound Parker Road approaching the Arapahoe Road intersection in the afternoon; sometimes it takes 3-4 cycles to get through the intersection.	Parker Road & Arapahoe Road
A041	Public Mtg-May 2010	Roadway	Smoky Hill/Wagon Trail intersection is dangerous for vehicles and pedestrians.	Smokey Hill Road & Wagon Trail
A042	Public Mtg-May 2010	Roadway	The Dry Creek/Holly and Arapahoe/University intersections are unsafe because people do not stop on red.	Dry Creek/Holly and Arapahoe/University
A043	Public Mtg-May 2010	Roadway	The third through lane on southbound Quebec at County Line that was recently removed is needed.	Quebec and County Line
A044	Public Mtg-May 2010	Roadway	The signal timing along Arapahoe Road is bad; vehicles have to stop an every block.	Arapahoe Road signals
A045	Public Mtg-May 2010	Roadway	Dry Creek Rd. seems to be in really rough condition. It needs a lot of help from Yosemite to University.	Dry Creek Road from Yosemite to University
A046	Public Mtg-May 2010	Roadway	Arapahoe/Jordan – are Aurora accidents included in accident analysis?	Arapahoe/Jordan
A047	Public Mtg-May 2010	Roadway	Smoky Hill & Riviera is a hazardous intersection – multiple jurisdictions involved	Smokey Hill/Riviera
A048	Public Mtg-May 2010	Roadway	Why isn't Arapahoe/Yosemite in highest 25 for accidents?	Arapahoe/Yosemite
A049	Public Mtg-May 2010	Bicycle Pedestrian	No good trail system in middle of Centennial (I-25 to Parker) – some north/south trails by patchy for east/west trails	Trail system from I-25 to Parker
A050	Public Mtg-May 2010	Bicycle Pedestrian	Jordan Road is a major bike route – entrance to Cherry Creek State Park along Cherry Creek to Platte to C-470 and back to Jordan – 68 mile loop	Jordan Road bike lane
A051	Public Mtg-May 2010	Bicycle Pedestrian	Jordan Road – bike lane not maintained (gravel & trash) south of Arapahoe. South of Fremont, thistles cover wide sidewalk	Jordan Road bike lane
A052	Public Mtg-May 2010	Bicycle Pedestrian	Bike path between Parker and Jordan is not continuous	Parker/Jordan
A053	Public Mtg-May 2010	Roadway	Speeding on Jordan Road north of Arapahoe - drivers going to country club	Arapahoe/Jordan
A054	Public Mtg-May 2010	Bicycle Pedestrian	Bike riders can't get from Dry Creek Station (LRT) to Centennial Promenade and Park Meadows Mall. Hard to walk/bike to Centennial Promenade from anywhere	Bike paths from Dry Creek to Park Meadows
A055	Public Mtg-May 2010	Bicycle Pedestrian	Centennial is a suburban area that should have better access for bikes & pedestrians	Bike paths
A056	Public Mtg-May 2010	Bicycle Pedestrian	Centennial should think about forming a citizen's bicycle group to give on-going input to the City.	
A057	Public Mtg-May 2010	Bicycle Pedestrian	Difference in bicycles for transportation and for recreation	
A058	Public Mtg-May 2010	Roadway	The roads leading in and out of Cherry Creek State Park should all be bike friendly.	Cherry Creek State Park bike paths
A059	Public Mtg-May 2010	Bicycle Pedestrian	Bike lanes should be added on Orchard east of Parker.	Orchard/Parker bike lanes
A060	Public Mtg-May 2010	Bicycle Pedestrian	Buckley needs continuous bike lanes.	Buckley bike lanes
A061	Public Mtg-May 2010	Bicycle Pedestrian	Bicycle Colorado is a non-profit organization that should be contacted as part of this transportation planning effort.	
A062	Public Mtg-May 2010	Bicycle Pedestrian	Bicycle access to Nine Mile needs to be improved.	Bike access to Nine Mile
A063	Public Mtg-May 2010	Bicycle Pedestrian	There are gaps in the bicycle route system between Cherry Creek State Park and the Town of Parker.	
A064	Public Mtg-May 2010	Bicycle Pedestrian	The Southlands development (in Aurora) provides an example of a good bike lane network.	
A065	Public Mtg-May 2010	Bicycle Pedestrian	There are no sidewalks on Parker Road south of Quincy	Parker Road/Quincy

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A066	Public Mtg-May 2010	Bicycle Pedestrian	Bike lanes are needed in the middle section of Centennial (e.g., Havana, Lima).	Central Centennial
A067	Public Mtg-May 2010	Bicycle Pedestrian	Provide better bicycle access to the retail area at Arapahoe/Parker.	Arapahoe/Parker bike access
A068	Public Mtg-May 2010	Bicycle Pedestrian	There is a gap (about 200 yards) in the bike trail near Broncos Parkway east of Jordan Road.	Broncos Pkwy/Jordan
A069	Public Mtg-May 2010	Bicycle Pedestrian	Sidewalks must be completed along Yosemite, and it would be nice to see them at least on one side of Alton Wy.	Yosemite/Alton sidewalks
A070	Public Mtg-May 2010	Bicycle Pedestrian	East/west bicycle route connections are needed NOT on Arapahoe Road.	Arapahoe Road bike route connections
A071	Public Mtg-May 2010	Bicycle Pedestrian	A lot of bicyclists use Jordan Road to access the C-470/E-470 trail. There is often broken glass on the bike lanes and the sidewalks are overgrown with shrubs.	Jordan Road/C-470&E-470
A072	Public Mtg-May 2010	Bicycle Pedestrian	Buffalo Tails elementary school is located in Aurora, and along with the City of Aurora recently implemented crosswalk and signage changes. These moves helped to ensure student safety without compromise to the motoring public. The way in which it was accomplished merited note.	
A073	Public Mtg-May 2010	Bicycle Pedestrian	Sidewalks & bike paths are discontinuous around Parker & Arapahoe.	Arapahoe/Parker
A074	Public Mtg-May 2010	Bicycle Pedestrian	Need good pedestrian crossings of Arapahoe Road	Arapahoe Road
A075	Public Mtg-May 2010	Bicycle Pedestrian	Hard to walk to a lot of places in Centennial (particularly on west side between I-25 and Yosemite).	I-25/Yosemite
A076	Public Mtg-May 2010	Bicycle Pedestrian	Snow removal on sidewalks is a problem (Mayor said that Centennial has no requirement).	
A077	Public Mtg-May 2010	Transit	LRT – better access for cars than pedestrians – the last ½ mile is a problem	
A078	Public Mtg-May 2010	Roadway	Add planned improvements in County near City: Parker/Arapahoe & Broncos Parkway	Parker/Arapahoe & Broncos Pkwy
A079	Public Mtg-May 2010	Roadway	Short-cut Broncos Parkway to Richfield – will be resolved when Arapahoe/Parker interchange is built.	Broncos Pkwy
A080	Public Mtg-May 2010	Roadway	There's a second cut-through route in Foxfield – Richfield & Jameson	Richfield/Jameson
A081	Public Mtg-May 2010	Roadway	Cut thru traffic that comes straight across from Broncos Pky is a serious concern for a street that has no sidewalks. Speed is also a concern.	Broncos Pkwy
A082	Public Mtg-May 2010	Roadway	The perception of cut thru traffic on Briarwood and parallel Davies Ave. is very high.	Briarwood Blvd & Davies Ave.
A083	Public Mtg-May 2010	Roadway	2,000 VTD is a very high number for a neighborhood street (Davies). It's often dangerous to walk across either of these streets. I would remove the traffic signal at Briarwood if the Costilla underpass comes into being.	Briarwood Blvd & Davies Ave.
A084	Website	Pedestrian	We live close enough for our kids to walk to Grandview HS, but the school is fenced all around the fields and there are no sidewalks on the south side of Arapahoe Rd. Since the two lane stretch up to Grandview is too dangergous to walk on we drive our kids to school. This is a sad commentary.	Himalaya/Briarwood
A085	Website	Roadway	This section of Arapahoe Rd is a two lane road that needs to be widened. The traffic during rush hours causes this road to become overcrowded and dangerous due to Grandview High School traffic, Creekside Elementary traffic, and the normal morning and evening rush hour traffic. Aurora continues to allow new housing development that creates traffic issues for this area. Shouldn't they help Centennial with road costs?	Arapahoe Rd - Waco to Himalaya
A086	Website	Roadway	Arapahoe Road between Liverpool and Himalaya is dangerous where the road abruptly changes from two to one lane	Arapahoe Rd - Liverpool to Himalaya
A087	Website	Roadway	Street surface here has been bad for 1+ year (or more). It makes my car skip and bounce every time I drive it (which is daily)	Yosemite St south of Arapahoe Rd
A088	Website	Roadway	Arapahoe needs widening in the section that is now one lane each way. Traffic backs up terribly during rush hours and someday emergency vehicles will not be able to arrive in time.	Arapahoe - Waco to Himalaya

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A089	Website	Roadway	Arapahoe and Himalaya signal has too long a cycle. Just try turning left from westbound Arapahoe onto Himalaya between 4 and 7 on a weekday!	Arapahoe Rd & Himalaya Wy intersection
A090	Website	Roadway	Antelope has had a major cloud hanging over us, as Aurora views Ireland Way/Himalaya Way as a major access route when the property to the south of us (formerly referred to as Kingspoint) is to be developed. They are not designed as through streets, and people walk and children play on them. It's terrible with the school traffic from Creekside Elementary. It will be impossible if a high density development starts using it as a shortcut.	Ireland Way/Himalaya Way
A091	Website	Pedestrian	Liverpool and Smoky Hill intersection needs major street lights. There are many walkers in the area, and I'm always afraid after dark that I will not spot someone in the crosswalk when I am turning.	Smoky Hill Rd & Liverpool St intersection
A092	Website	Roadway	That new signal you were so proud of is poorly timed and has lowered by commute gas mileage by at least .5 m per gallon. In the morning, the bulk of traffic is flowing north, but from Smoky Hill north on Himalaya, I typically have to stop at 2/3 of the si	Reservoir Rd & Flanders St intersection
A093	Website	Roadway	Any time you need a little more cash for the budget, set up in the morning and afternoon and nab a few speeders - there are always plenty to choose from. Speed limit is 25, most go 35, and many run the stop signs as well.	Himalaya Way south of Arapahoe Rd
A094	Website	Bicycle Pedestrian	There are no sidewalks nor bike lanes along the eastern portion of Arapahoe Road and therefore road bikes must ride on Arapahoe along with auto traffic and walkers must truge through the weeds. This is extremely dangerous for the bikers since they have no choice other than to block traffic as they ride since there's no room to safely accomodate both a vehicle and a bike side by side. Drivers get very frusterated and react aggressively at times. Walkers risk running into snakes and other dangers as they walk through the weeds alongside the road. The integration of the trail systems throughout the Denver area would encourage less road traffic and safety for all.	Eastern portion of Arapahoe Road
A095	Website	Roadway	The intersection at Mineral & Yosemite needs a traffic signal.	Yosemite St & Mineral Dr intersection
A096	Email	Roadway	Each work day at 0600 I wait for up to 2 minutes for the light to change so I can turn left from Himalaya onto Arapahoe Rd. The frustrating part is that there is little to no traffic at this time on Arapahoe. Can these lights be programmed to not wait that long at that time in the morning?	Arapahoe Rd & Himalaya Wy intersection
A097	Email	Roadway	PLEASE COMPLETE THE WIDENING PROJECT!! I drive this area every day and people race and pass on both sides of you (paying no attention to the lane lines) to beat you to the single lane when approaching this area from the west. When approaching this area from the east, it is another race with no attention to the fact that the road is reduced to one lane and people drive thru the Left turn lane to pass people. This has cause me many close calls since I do turn Left onto Himalaya way and people are still trying to pass and almost hit me in the rear.	Arapahoe - Waco to Himalaya
A098	Email	Roadway	Drainage from Arapahoe Rd filling the ditch and culvert in front of my house. Whenever there is any rain or melt off, I get dirt and garbage draining from Arapahoe Rd which ultimately fills the culvert under my driveway (every 3-4 years). Also, the last time I contacted Centennial to resolve this, they sent a team to dig out the dirt/garbage accumulation and made a very feeble attempt with a few rocks to shore up the ditch sides (of which that is now buried in dirt). they also dug up my 'Invisible Fence (Dog retention) that I was required to repair. Can someone please repair this correctly!	Arapahoe Rd & Himalaya Wy intersection

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A099	Email	Roadway	Lack of field grass cutting along Arapahoe Rd next to my property (6752 S. Himalaya Way). Arapahoe County purchase part of my property to widen Arapahoe Rd. It has been 10 years of not having this area managed very well. I believe the city should manage this better or give it back to me and I will take care of it.	Arapahoe Rd & Himalaya Wy intersection
A100	Email	Roadway	My comments were regarding the only remaining 2-lane portion of Arapahoe Road, between Chaparral and Grandview High School. I live along that portion and find the traffic almost always heavy and often have difficulty getting in and out of my street (S. Gibraltar St.) When we moved here, there was very little traffic. Things have changed dramatically. I know it's probably cost prohibitive, but a traffic light would be most helpful.	Arapahoe Rd & Gibraltar St intersection
A101	Email	Roadway	Signalize Yosemite Street & Mineral Drive intersection	Yosemite St & Mineral Dr intersection
A102	Email	Pedestrian	Hi, I live close to the skating rink off of Arapahoe Rd. We like to walk to Southglenn and have to cross Arapahoe Rd at Vine St. Could you consider making the light for walkers a bit longer. I usually have my 5 year old and by the time we walk fast to the middle of the street, the hand is blinking. It is a rush to get across. On the flip side, when I drive you can wait for 2 or more signals to turn due to a pedestrian and not allowing cars enough time to turn. It gets frustrating for all parties and often cars or pedestrians don't make wise choices. Thanks for considering changing the timing and/or clearer cross walks	Arapahoe Rd & Vine St intersection
A103	Email	Roadway	just wanted to make sure Arapahoe Road and Gibraltar Street were in your list as it an extremely dangerous intersection as most people know. There seems to be little if any kind of remediation in progress and the speeds coming east on Arapahoe are excessive. I really am shocked that someone has not been injured or killed at this intersection over the past few years. I have been communicating with Centennial since Randy Pye was Major and like Cathy Noon they just tell us to have patience. The road is not going to be widened for years, and we need someone to provide us assistance to exit our development in a timely and safe manner.	Arapahoe Rd & Gibraltar St intersection
A104	Email	Roadway	I was trying to comment on the intersection of South Holly and South Forest Way. I live close to that intersection and have trouble turning north from Forest Way onto Holly. The high median rocks and landscaping make it very difficult to see cars going north on Holly. A low sports car is almost impossible to detect. A traffic light would be terrific, but just lowering the median would help a lot.	Holly St & Forest Way
A105	Website	Roadway	The traffic conjection on single lanes on this part of Arapahoe Rd are very dangerous. With Aurora allowing development all around this area including the HS they need to widen the road ASAP.	Arapahoe - Waco to Himalaya
A106	Website	Roadway	Please change light to allow left on when east-west traffic has green light. Not just left turn only.	Arapahoe Rd & Buckley Rd intersection
A107	Public Mtg- August 2010	Roadway	We live on S Gibraltar St and cannot get out on Arapahoe Road without waiting	Arapahoe Rd & Gibraltar St intersection
A108	Website	Roadway	Peakview is a good alternate route, but its road surface is in terrible condition and needs attention ASAP!	Peakview Avenue (between Dayton and Peroria)

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A109	Website	Roadway	The intersection at Quebec and County Line southbound movements previously allowed 2 through lanes and 1 through/right lane. A change was made in 2008-2009 so that the former through/right lane was made into a right turn only lane (now strictly a westbound movement). Before this change was made, I usually waited only one light cycle before making my way through the intersection during the PM peak hour. Since this change was made, I wait 3 or sometime 4 light cycles before making it across the intersection. This delay also causes a queue down to St. Thomas More Church, which also impacts the intersection at Poplar Circle and people trying to get out of that shopping center. I understand that there may have been a need for the right turn lane, but should it have been to the detriment of the southbound through movement? Please consider changing the intersection back, changing the light cycles to allow more green time for the southbound movement, or constructing a new right turn lane so that the 3 through lanes remain. Thank you for your consideration.	Quebec and County Line
A110	Website		When is the next public meeting?	
A111	Website	Roadway	Are there any plans to include a right-turn (eastbound) only lane at this intersection? (Similar to that made at Havana & Easter) Believe it is needed	Havana Street & Briarwood Avenue/Costilla Avenue intersection
A112	Website	Roadway	This section of Liverpool is in serious need of not just patch work but complete repaving. Always a bumpy ride heading south.	Liverpool (Arapahoe Road to Smoky Hill Road)
A113	Website	Transit	I can't find a CallNRide serving this area. Since the SkyRide bus no longer stops at the S University ParkNRide, it's become harder to get to the airport--getting to the Arapahoe Village transit center is more complicated than it needs to be. One obvious fix would be for the Highlands Ranch CallNRide to be able to go from S University ParkNRide to the SkyRide at Arapahoe Village--but it doesn't.	Generally SW of Dry Creek and University
A114	Website	Bicycle Pedestrian	E Caley Ave is an ideal road for bicycle infrastructure, as it connects Light Rail to our well-developed trail network. Designated lanes or sharrows would be excellent improvements.	Caley Street near Quebec Street
A115	Website	Bicycle Pedestrian	There is a serious lack of bike/ped friendly places to cross I-25 in this area. Users are forced to go North to Yosemite or South to Dry Creek.	I-25 south of Arapahoe Road
A116	Website	Bicycle Pedestrian	E Dry Creek Road is currently the only place to cross I-25 south of Yosemite for bicycles and pedestrians. The road is certainly wide enough to accommodate a striped bike lane without interfering with traffic flow.	Dry Creek Road at I-25
A117	Website	Bicycle Pedestrian	The intersection at S Homestead Pkwy and Arapahoe road would benefit from a striped bike/pedestrian North/South crosswalk on the West side of the intersection. It is currently inconvenient and dangerous for southbound bicyclists coming out of Holly Park.	Arapahoe Road & Homestead Parkway intersection
A118	Website	Bicycle Pedestrian	Designated bicycle lanes on secondary through-streets such as S Clarkson St would encourage more bicycle trips in our city.	Clarkson Street south of Arapahoe Road
A119	Website	Bicycle Pedestrian	This would be a simple place to put in a gravel bike/ped path to make it easier to connect to the trail system in place near the recreation center across University. The previous road is overgrown and inaccessible, but it would be a very cost-effective connector.	Caley Avenue between University Blvd and Colorado Blvd
A120	Email	Roadway	Widen Long Avenue (in front of Creekside Elementary School) to four lanes and add turn lanes	Long Avenue west of Ireland Way
A121	Website	Bicycle Pedestrian	This light rail station is a destination. Please encourage biking to this station through bike lanes on Chester, way finding signs on Willow Creek trail connections.	Dry Creek LRT station
A122	Website	Bicycle Pedestrian	Bike lanes and way finding signs on Unita to encourage use of bike transit to the Arapahoe Light Rail Station	Unita Street south of Arapahoe Road

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A123	Website	Bicycle Pedestrian	A ped/bike undercrossing of Holly St here to encourage connection to the holly trail.	Holly St north of Arapahoe Road
A124	Website	Transit	With so many stores and shops as well as traffic at this intersection, I see considerable potential in TOD or major RTD bus transfer area.	County Line Road/Quebec Street
A125	Website	Roadway	Please add traffic calming devices E Costilla/ S Quince St. Cars still cut through this neighborhood at high speeds.	Costilla Avenue east of Quebec Street
A126	Website	Transit	This is a Major Shopping destination. Encourage potential location of Transit Center Here.	NE quadrant of Arapahoe Rd/Parker Rd
A127	Website	Transit	These Shopping Center Parking Lots are usually Half full. Please consider These small shopping center lots along E County Line Rd as Potential Park and Ride Locations... to feed nearby neighborhoods to DTC.	County Line Road/Holly Street
A128	Website	Transit	Please consider this shopping center for TOD... especially if E Arapahoe becomes a Bus Rapid Transit Corridor.	SE quadrant of Arapahoe Rd/University Blvd
A129	Website	Transit	Parking here is under utilized for shopping purposes. Please consider this as a future TOD/ Park n Ride for possible BRT on Arapahoe Rd to DTC	Arapahoe Rd/Glencoe St (Arapahoe Village Center)
A130	Website	Bicycle Pedestrian	Connect willow creek trail over/under Yosemite St.	Yosemite Street south of Mineral Drive
A131	Website	Roadway	Suggest Closing Access From Qubec St with neighboring houses approval. This will prevent SB Quebec cutting through nieghborhood.	Hinsdale Place at Quebec Street
A132	Website	Bicycle Pedestrian	This entire trail just needs to be improved all over. Wider, gentler grades, landscaping, concrete? This would drastically improve use and connections EW	Greenbelt trail through Walnut Hills
A133	Website	Bicycle Pedestrian	Way finding signs and bike lanes would improve usage and connections to Yosemite and businesses.	Walnut Hills (Xanthia Street)
A134	Website	Bicycle Pedestrian	Sidewalk improvements w/ vegetated buffer strip?	Arapahoe Rd/Holly St
A135	Website	Bicycle Pedestrian	Trail connections across Dry Creek Rd and continuing S to E Otero Ave	Dry Creek west of Detroit Street
A136	Website	Roadway	This bridge could use replacing for better lane configuration	Arapahoe Rd east of University (Big Dry Creek)
A137	Website	Transit	Arapahoe Rd to be considered a future Bus Rapid Transit Corridor.	Arapahoe Road (west of I-25)
A138	Website	Bicycle Pedestrian	Add cross-walk and trail connections to Willow creek Trail	Phillips Place (Willow Creek) west of Yosemite Street
A139	Website	Bicycle Pedestrian	E. Costilla Ave, between Quebec & S. Niagara CT has been proposed to add parking on the South side as well as the North. In addition bike lanes are proposed for both sides, adjacent to the parked vehicles. This is a flawed plan and no changes should be made. As a bike rider I cannot safely ride adjacent to parked cars without leaving room for the surprise door opening, about 3-4 feet. These changes would make it impossible for a passing car to leave 3 feet of space adjacent to a car when two cars pass. As a motorist, my margin of safety on this curved street is eliminated when passing oncoming vehicles. During winter, since this street is commonly not plowed, the above hazard will be greatly increased. Do not make this change.	Costilla Ave from Quebec St to Niagara Ct
A140	Website	Roadway	Dangerously fast traffic on this road. Speed bumps are needed.	Chapparral Cir south of Arapahoe Rd
A141	Website	Roadway	Road name change needed. South Chapparral Circle West & East are ridiculously long and confusing names.	Chapparral Cir W and Chapparral Cir E
A142	Website	Bicycle Pedestrian	Please consider a bike line on Holly from county line to the other edge of Centennial.	Holly from County Line Rd to Orchard Rd
A143	Website	Bicycle Pedestrian	Please consider a bike line on Dry Creek from Holly to University. This would make it safer for kids to ride their bikes to Arapahoe High school. Maybe allow the bike lane to go all the way to Broadway.	Dry Creek from Holly to University
A144	Website	Bicycle Pedestrian	In addition to the expansion of the dangerously narrow 2 lanes of traffic there should be sidewalks/bike paths on both sides of Arapahoe Rd the entire length between Liverpool and Parker Rd.	Arapahoe from Liverpool to Parker

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TMP Comment #	Source	Mode	comment	Location
A145	Website	Roadway	Allowing a 4 lane road in this area will drive cars into the neighborhood. This puts our properties and children at risk. Do not allow the proposed Costilla underpass to be constructed.	Costilla Avenue/I-25
A146	Website	Roadway	This is a dangerous curve. There has been at least three cars who have lost control and hit the fence and ended up in the backyard of the first house on Briarwood Blvd.	Yosemite Street north of Briarwood Blvd
A147	Website	Roadway	The slope of the roads in this area cause flooding of the streets during a big rain.	Yosemite Street north of Briarwood Blvd
A148	Website	Roadway	Cars coming into this neighborhood speed down the street. I've been nearly rear ended many times turning into my driveway. Remove traffic light and block off this street.	Briarwood Blvd west of Yosemite Street
A149	Website	Roadway	Not enough people are using the new thru lane east bound on Arapahoe Rd. Removing the k rails may eliminate confusion on three thru lanes vs the old 2.	Arapahoe Road under I-25
A150	Website	Roadway	Traffic calming devices are a must for E Briarwood Blvd. It is a very wide street. Suggest use of EMT friendly speed bumps or narrow the street w/ planters to reduce speeds.	Briarwood Blvd west of Yosemite Street
A151	Website	Bicycle Pedestrian	An alternative improvement here would be a flashing bike/pedestrian light that could be activated by a button. Traffic here rarely yields to crossing bike/ped users.	Holly Street at Forest Way
A152	Website	Bicycle Pedestrian	There should be a curb cut for the beginning of the Walnut Hills Park trail for bicycle and wheelchair access.	Xanthia Street at Little Dry Creek Trail (in Walnut Hills)
A153	CAC	Roadway	Post signage at Arapahoe/University to warn travelers of the need to merge (for WB to NB right turners)	Arapahoe Rd/Unviersity Blvd
A154	CAC	Roadway	Widen University Avenue bridge over Big Dry Creek	University/Big Dry Creek
A155	CAC	Roadway	The intersection of Arapahoe & Holly has downhill approaches on all four legs. The landscaping in the median obstructs the sight distance. There was a double fatal accident at this intersection recently. Perhaps the speeds on Arapahoe Road should be reduced and/or flashers should be added to warn of the upcoming signal. Right turn lanes (westbound to northbound and northbound to eastbound) should be added at this intersection.	Arapahoe Rd/Holly St
A156	CAC	Roadway	The addition of a southbound to westbound right turn lane at County Line Road and Yosemite should be a high priority.	County Line Rd/Yosemite St
A157	CAC	Roadway	Widening of Colorado Blvd from Dry Creek to County Line Rd should be a high priority	Colorado Blvd from Dry Creek to County Line Road
A158	CAC	Roadway	C-470 has stop and go traffic throughout the peak periods of the day. Traffic diverts onto Centennial's street network (County Line Road, Dry Creek, Arapahoe) to avoid the C-470 congestion. The City should support the widening of C-470 to relieve these parallel facilities.	C-470
A159	CAC	Roadway	At the intersection of Dry Creek & Quebec, it takes three to four cycles to clear the intersection in the southbound direction during the PM peak hour.	Dry Creek Rd/Quebec St
A160	CAC	Transit	Bus tops in the vicinity of the Streets at SouthGlenn are lacking and those that exist are not well located.	Arapahoe Rd/Unviersity Blvd
A161	CAC	Transit	RTD bus routes 67 and 77 provide service between Centennial and the Mineral LRT Station; however, the schedules are not well coordinated with the train schedule. Better schedule coordination may increase ridership.	Arapahoe Road corridor (west)
A162	CAC	Transit	Arapahoe Road is a high volume commuter route; a park-n-Ride is needed on the east end of Arapahoe so more people would use Route 66. The park-n-Ride should be located east of Parker/Arapahoe so that fewer vehicles use that intersection. A park-n-Ride currently exists at Liverpool/Smoky Hill; perhaps bus service to connect this p-n-R to Route 66.	Arapahoe Road corridor (east)
A163	CAC	Transit	RTD Bus route 66 is not a very direct route	Arapahoe Road corridor (east)
A164	CAC	Transit	Bus stop on University near Arapahoe High School is right in front of a pedestrian crossing	University/Dry Creek Rd

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### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A165	CAC	Transit	TMP should include minimum standards for bus such as providing access for the disabled and providing bike/ped access to stops from the surrounding areas.	City-wide
A166	CAC	Bicycle Pedestrian	The intersection of University and Easter Avenue needs bicycle and pedestrian improvements, including upgrading the sidewalks on the east side of the intersection. This intersection is a key access to the Streets at Southglenn; to the east, Easter Avenue connects to Cherry Knolls Park. Southglenn should be an attractor for bicyclists and pedestrians.	University/Easter
A167	CAC	Bicycle Pedestrian	There are no sidewalks connecting the parking garage at the Streets at Southglenn to the bus stops in the area.	Southglenn
A168	CAC	Bicycle Pedestrian	There is not enough time for a pedestrian to cross at the Arapahoe/University intersection.	Arapahoe Rd/University Blvd
A169	CAC	Bicycle Pedestrian	Colorado Blvd as potential complete street candidate.	Colorado Blvd from County Line to Orchard
A170	CAC	Bicycle Pedestrian	Bicycle/bicycle accidents are a problem where there are tight turns (on trails).	City-wide
A171	Public Mtg - Oct 2010	Roadway	The City does not need any more roads.	City-wide
A172	Public Mtg - Oct 2010	Roadway	The City should save everyone penny, don't spend money on new park development, etc., until there is enough money to widen Arapahoe Road from Waco to Himalaya. Someday there will be loss of life because emergency vehicles can't make it through the traffic.	Arapahoe Rd from Waco to Himalaya
A173	Public Mtg - Oct 2010	Roadway	Arapahoe Road should be highest priority (higher than Smoky Hill widening and others).	Arapahoe Rd from Waco to Himalaya
A174	Public Mtg - Oct 2010	Roadway	Widen Arapahoe Road (Waco to Himalaya).	Arapahoe Rd from Waco to Himalaya
A175	Public Mtg - Oct 2010	Roadway	Why not charge Aurora residents to the east to use the two lane segment of Arapahoe Road – raise some money to widen it.	Arapahoe Rd from Waco to Himalaya
A176	Public Mtg - Oct 2010	Roadway	Centennial needs to address the issue of the proposed underpass for I-25 at Costilla south of Arapahoe; this connection would dump a large amount of traffic into Walnut Hills neighborhood. This underpass should not be an option at all for the Arapahoe Road project. It doesn't appear to solve any problems on eastbound Arapahoe, is very expensive, and is very detrimental to a residential neighborhood.	I-25/Costilla
A177	Public Mtg - Oct 2010	Roadway	The conversion of the SB through lane at Quebec/County Line Rd has caused significant queuing in the PM peak hour. Congestion at the intersection will likely continue for the next 5-8 years. Can the City look into other measures to address cut-through traffic other than eliminating one of the southbound through lanes to add a right turn lane? Can the City work with the Sheriff's office to discourage cut-through?	County Line Rd/Quebec St
A178	Public Mtg - Oct 2010	Roadway	Costilla Avenue underpass would cause too much damage to Walnut Hills.	I-25/Costilla
A179	Public Mtg - Oct 2010	Roadway	Costilla Avenue underpass is a terrible idea – fix the problem (the I-25/Arapahoe interchange) rather than creating a new one.	I-25/Costilla
A180	Public Mtg - Oct 2010	Roadway	Are there any possible interim solutions for the two-lane section of Arapahoe Road?	Arapahoe Rd from Waco to Himalaya
A181	Public Mtg - Oct 2010	Roadway	Quincy Avenue should be given back to Arapahoe County – provides minimal benefit to City residents.	Quincy Avenue at Reservoir Rd
A182	Public Mtg - Oct 2010	Roadway	The Smoky Hill/Kirk Street signal should be a high priority.	Smoky Hill Rd/Kirk St
A183	Public Mtg - Oct 2010	Roadway	The proposed project to improve sight distance at Holly and Forest (R044) is not needed. Do not remove trees from Holly/Forest intersection.	Holly St/Forest Ave.
A184	Public Mtg - Oct 2010	Roadway	Add a partial interchange at C-470 and Colorado Blvd to and from the east.	C-470/Colorado Blvd
A185	Public Mtg - Oct 2010	Roadway	Dedicated right turn lanes are needed on all approaches at the Arapahoe/Holly intersection.	Arapahoe Rd/Holly St

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### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A186	Public Mtg - Oct 2010	Roadway	Add dedicated right turn lanes at Arapahoe/Quebec [NOTE: dedicated right turn lanes exist on all approaches except for the eastbound to southbound movement]	Arapahoe Rd/Quebec St
A187	Public Mtg - Oct 2010	Roadway	Add signage on Arapahoe Road to encourage slower traffic to use right lane.	Arapahoe Road east of I-25
A188	Public Mtg - Oct 2010	Roadway	Add a dedicated right turn lane for northbound to eastbound Himalaya at Arapahoe.	Arapahoe Rd/Himalaya St
A189	Public Mtg - Oct 2010	Roadway	Fix the timing of the signals on Reservoir Rd from Chenango to Quincy.	Reservoir Rd from Chenango to Quincy
A190	Public Mtg - Oct 2010	Bicycle Pedestrian	Create a bike share program.	City-wide
A191	Public Mtg - Oct 2010	Bicycle Pedestrian	Fill in the gaps in bicycle facilities.	City-wide
A192	Public Mtg - Oct 2010	Bicycle Pedestrian	Make Arapahoe Road more bike friendly.	Arapahoe Road corridor
A193	Public Mtg - Oct 2010	Bicycle Pedestrian	Shared use paths could be raised at minor intersections or at right turn channeled-lanes to make drivers more aware of bikes/peds.	City-wide
A194	Public Mtg - Oct 2010	Bicycle Pedestrian	Bike lanes are needed on Arapahoe Road from Liverpool to the light rail station.	Arapahoe Rd from I-25 to Liverpool
A195	Public Mtg - Oct 2010	Bicycle Pedestrian	Fill in the gaps in pedestrian facilities.	City-wide
A196	Public Mtg - Oct 2010	Bicycle Pedestrian	Lighting is needed at Liverpool & Smoky Hill – there are a lot of pedestrians in this area and it's difficult to see at night.	Smoky Hill Rd/Liverpool St
A197	Public Mtg - Oct 2010	Bicycle Pedestrian	Where sidewalks are the preferred facility for bicycle use, signs should be posted to encourage bicyclists to get off the street.	City-wide
A198	Public Mtg - Oct 2010	Bicycle Pedestrian	Holly Street south of Orchard Rd should be considered for a road diet – one through lane in each direction with bicycle lanes.	Holly Street County Line Road to Orchard
A199	Public Mtg - Oct 2010	Bicycle Pedestrian	Sidewalks are needed all throughout IKEA area.	IKEA area
A200	Public Mtg - Oct 2010	Bicycle Pedestrian	Provide a landscape buffer on Yosemite and Arapahoe to separate the sidewalks from the street.	Yosemite St and Arapahoe Road
A201	Public Mtg - Oct 2010	Bicycle Pedestrian	Need good bike/ped access to rail stations.	Rail stations
A202	Public Mtg - Oct 2010	Bicycle Pedestrian	Bicycle and pedestrian facilities/routes should be developed in coordination with adjacent jurisdictions.	City-wide
A203	Public Mtg - Oct 2010	Bicycle Pedestrian	Six foot (minimum) sidewalk is needed on University between Arapahoe and Orchard (in the vicinity of Goodson Recreation Center).	University Blvd from Arapahoe to Orchard
A204	Public Mtg - Oct 2010	Bicycle Pedestrian	Add sidewalk on north side of Arapahoe Road between Colorado and University. [NOTE: a 4-5 foot detached sidewalk exists on this stretch of Arapahoe Road]	Arapahoe Road from Colorado to University
A205	Public Mtg - Oct 2010	Bicycle Pedestrian	Provide sidewalk/trail connections between neighborhoods.	City-wide
A206	Public Mtg - Oct 2010	Bicycle Pedestrian	Add a separated shared use path along Arapahoe Road corridor from I-25 east to E-470. Consider raised crossings at minor access points.	Arapahoe Road from I-25 east to E-470
A207	Public Mtg - Oct 2010	Bicycle Pedestrian	Pedestrian crossings will be needed at the new Arapahoe/Parker interchange.	Arapahoe Rd/Parker Rd
A208	Public Mtg - Oct 2010	Bicycle Pedestrian	Provide a bike/ped/equestrian underpass of Arapahoe Road when widening occurs (between Waco and Himalaya).	Arapahoe Rd east of Waco
A209	Public Mtg - Oct 2010	Bicycle Pedestrian	Encourage bike/ped/transit, less emphasis on roads.	City-wide
A210	Public Mtg - Oct 2010	Bicycle Pedestrian	Seems like a well thought out plan.	City-wide
A211	Public Mtg - Oct 2010	Bicycle Pedestrian	Arapahoe Road west of I-25 needs more landscaping.	Arapahoe Rd corridor (west)

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### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A212	Email	Transit	The City of Centennial is well served by rail transit on its eastern and western ends. However, the part of Centennial that I live in - its east-west center, near the Streets at Southglenn - is served only by bus. Currently bus service near the Streets is almost an afterthought: the main bus stop is behind the development and is visually blocked off from the development. I would love it if the Master Plan could include means to encourage better bus transit facilities - a mini station of sorts, or a more comfortable and visually noticeable area - for bus transit. I would also like it if Centennial could cooperate with RTD to provide the best possible transit connections between this part of Centennial and downtown.	Southglenn area
A213	Email	Bicycle Pedestrian	I would also appreciate if the Master Plan could continue to push for even better commuter bike possibilities. We're blessed with a lot of commuter bike options already, but highest on my priority - what would get me on my bike more frequently - would be completing the Big Dry Creek Trail so that it connects the Highline Canal trail with the Platte River bikeway.	Big Dry Creek
A214	Email	Transit	Add PRT system centered at Arapahoe/I-25 serving a park-n-Ride on the east side of I-25 half way between Dry Creek and Arapahoe	Arapahoe/I-25 area
A215	Email	Bicycle Pedestrian	There is no sidewalk on south side of Orchard between Highline Canal and Ogden Street or west of Clarkson Street	Orchard Rd generally from Broadway to University
A216	Website	Bicycle Pedestrian	The speed on Caley is appropriate given its neighborhood setting, however the size of the road is very misleading. The road width suggests a faster speed. This safety issue is compounded by the fact that pedestrians are constantly walking on the south side of the road, where there is no sidewalk. These safety problems could be addressed by adding a wide sidewalk along the south side of the road, therein providing a place for pedestrians, reducing the width of the road (which will naturally cause drivers to slow down), and will allow the city to retain access to the wide corridor for future improvements.	Caley west of Quebec
A217	Website	Bicycle Pedestrian	no sidewalk/safe walk path. north side arapahoe rd, west of colorado blvd. to appx. cook st (on south side of arapahoe rd.	Arapahoe Rd from Colorado Blvd west to Cook St
A218	Website	Bicycle Pedestrian	Add bicycle lane along Easter Ave and S Knolls Way to connect bicycle lane at Knolls Park/Easter Ave and bicycle lane at S Clarkson	Easter Ave west of University
A219	Website	NA	Map does not load. I would like to be able to see it. I am using Internet Explorer 7. Fairly new computer.	NA
A220	Website	Roadway	During sunset with bright light from the west, eastbound traffic on Dry Creek often runs red lights @ Homestead Parkway. Drivers cannot see that the light has changed to red.	Dry Creek Rd and Homestead Pkwy
A221	Website	Roadway	There is no standard signage to indication that a school zone has ended. I have seen signage in other locations that put an "end school zone" sign with the normal speed limit after the zone. I usually use the opposite lane's flashing signal that indicates the school zone is active as my notice to resume normal speed	City-wide
A222	Website	Bicycle Pedestrian	Consider a connection of a future Cherokee Trail extension south to connect with a future Aurora Pkwy extension.	southwest of Parker Rd & Broncos Pkwy
A223	Website	Roadway	There may be delay at this intersection, but a signal seems like overkill. Signals cost a lot of money and can increase certain accident types. Is this intersection an existing safety issue?	Peakview Avenue & Syracuse Way
A224	Website	Roadway	A roundabout here would be a HUGE improvement.	Peakview Avenue & Peoria Street
A225	Website	Bicycle Pedestrian	The sidewalk on the north side of Arapahoe needs to be widened to 10' to accommodate the highly used little dry creek trail from the new underpass to Holy Park.	Arapahoe Road near Krameria Way

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### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A226	Website	Bicycle Pedestrian	Please include a bike and ped crossing of I-25 at this location. The crossing could be connected to the Little Dry Creek Trail thereby providing a safe and continuous east-west route for cyclists and pedestrians.	I-25 south of Arapahoe Road (in the vicinity of Briarwood/ Costilla)
A227	Website	Bicycle Pedestrian	Please complete this missing link of Little Dry Creek Trail.	Little Dry Creek south of Arapahoe and west of Briarwood Circle
A228	Website	Bicycle Pedestrian	I think this is a good project. Additional focus should be on providing bike lanes and/or a multi-use trail along the west side of Colorado to connect Big Dry Creek Trail to the C-470 Trail.	Colorado Blvd at Mineral Avenue
A229	Website	Roadway	This section of county line sees a lot of delay due to the bottleneck caused by the two-lane section. A four-lane section would be a great improvement. Please be sure there are adequate sidewalks included in the project scope.	County Line Road between Broadway and University
A230	Website	Bicycle Pedestrian	Please provide better ped and bike accommodation across University and way finding from Big Dry Creek Trail to the Streets at Southglenn. These are very compatible uses and there should be better connectivity	University Blvd at Big Dry Creek Trail (north of Arapahoe Road)
A231	Website	Roadway	The stoplight needs to be reconfigured to accomodate the increased amount of eastbound/westbound traffic on Easter Ave. at this interesection	Easter Avenue & Lima Street
A232	Website	Roadway	Stop lights need to be synchronized better on eastbound/westbound Dry Creek so that traffic can flow instead of stopping every 20 feet.	Dry Creek Road near I-25
A233	Website	Roadway	This new stoplight should be synchronized with the stoplights on Holly & Colorado Blvd. to assist the flow of traffic on Dry Creek in this area.	Dry Creek Road & Eudora Street
A234	Website	Roadway	The stoplight should be reconfigured to allow more time for the eastbound/westbound traffic on County Line as there is very little traffic on Holly at this interesection.	County Line Road & Holly Street
A235	Website	Roadway	Widen NB Holly at Arapahoe to put in right turn lane. The storm sewer is already located for this. Every morning the right turners try to squeeze by on the right and there is a traffic back-up at this location.	Arapahoe Road & Holly Street
A236	Website	Roadway	add a right turn lane for southbound university at county line.	County Line Road & University Blvd
A237	Mail	Roadway	Across from Ealecrest High School, on Picadilly Road, running north and south between Chenango Avenue and Riveria Way, there is a traffic problem during the students' arrival between 6:40 AM and 7:10 AM (I'm sure there are other time affected, however, this is the only time I've observed a problem). Students are crossing the crosswalk continuously between this time, and traffic remains backed up for an average of fifteen minutes, just for this intersection. A traffic light needs to be installed at this intersection complete with a traffic signal to indicate when it is safe for students to cross. Their safety is at risk, and the community members who travel this route are put at an inconvenience due to the unorganized fashion in which people are crossing and driving through.	Picadilly Rd between Chenango Avenue and Riveria Way
A238	Public Mtg - May 2011	Bicycle Pedestrian	One map that I would like to see but don't is something indicating all proposed short and long-term bike and pedestrian projects with potential future improved at-grade and above/below grade opportunities.	City-wide
A239	Public Mtg - May 2011	Bicycle Pedestrian	I hope that the City would consider improved bike/pedestrian crossings in all capital improvement projects. The Arapahoe Road underpass west of Quebec is a great example of improved bike/pedestrian access and continuity that was added when Arapahoe Road was improved and drainage was improved.	City-wide

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TMP Comment #	Source	Mode	comment	Location
A240	Public Mtg - May 2011	Roadway	To reduce traffic in Centennial: Do as much as possible to discourage or divert traffic from Highlands Ranch. Centennial is over used as a corridor for Highlands Ranch with no benefit to Centennial, commercial or otherwise. I specifically oppose any widening of Colorado Boulevard south of Dry Creek.	Colorado Boulevard south of Dry Creek
A241	Public Mtg - May 2011	Bicycle Pedestrian	I ride a bike to my vanpool pick-up and appreciate the bike lanes and wide sidewalks to keep me off most streets. Good job!	City-wide
A242	Public Mtg - May 2011	Transit	I think that the City could do a better job of marketing light rail: convenience, price, no need to find parking and to save gas and help with air pollution.	Light rail lines
A243	Public Mtg - May 2011	Roadway	The May 2011 Centennial Connection Transportation Master Plan Update features the widening of Colorado Boulevard from Dry Creek to County Line Road. My Highlands 460 neighbors and I adamantly oppose this project on the basis that it will greatly increase the traffic from Highlands Ranch. The City of Centennial should not expend funds, even with cost sharing of Arapahoe County and CDOT, to provide a conduit for HR residents to get from A to B. Highlands Ranch traffic problems should not become Centennial or Highlands 460 problems. The philosophy: "If you build it, they will come" certainly applies here and we do not wish to encourage any additional volume.	Colorado Boulevard south of Dry Creek
A244	Public Mtg - May 2011	Roadway	As much as I support the forming of Centennial due to the practices of Greenwood Village, I would even support the GV practice of traffic calming devices by adding three-way stops at Monroe, Mineral and/or Links Parkway to further discourage HR drivers from speeding through our neighborhood. They have better alternatives: South Holly and South University which are already four lanes, and with the University/C-470/County Line improvements, volume should not be a problem.	West side of Centennial
A245	Public Mtg - May 2011	Roadway	Please do not build this major arterial [Colorado Blvd] for the convenience of Highlands Ranch. Their problems should not become our problems.	Colorado Boulevard south of Dry Creek
A246	Public Mtg - May 2011	Planning Process	A well thought plan and very nicely presented. The charts and graphs did a lot to support and show the planning involved, the thinking process and decision to be made.	City-wide
A247	Public Mtg - May 2011	Roadway	I am concerned that you DO NOT make Clarkson a thoroughfare from Orchard to Arapahoe Road. We already have a speedway going all times of the day and night, to compete with the school buses and the trash trucks. More cars, going faster would just complicate our lives.	Clarkson Street from Arapahoe Road to Orchard Road
A248	Public Mtg - May 2011	Bicycle Pedestrian	Provide sidewalks and bike paths allowing walkers/bikers to shop and travel to work.	City-wide
A249	Public Mtg - May 2011	Roadway	Tough to "significantly" reduce auto travel. Cars are here to stay as long as gas isn't \$10/gallon.	City-wide
A250	Public Mtg - May 2011	Bicycle Pedestrian	More sidewalks around Centennial Promenade	Centennial Promenade
A251	Public Mtg - May 2011	Bicycle Pedestrian	Convert a travel lane to bike lane or widen sidewalks along corridors like Colorado Boulevard – Arapahoe Road to Dry Creek, where capacity is under-utilized.	Colorado Boulevard from Arapahoe to Dry Creek
A252	Public Mtg - May 2011	Bicycle Pedestrian	We need more underpasses for bikes under Arapahoe Road.	Arapahoe Road
A253	Public Mtg - May 2011	Bicycle Pedestrian	We need more connecting sidewalks east of I-25 on Arapahoe.	Arapahoe Road
A254	Public Mtg - May 2011	Bicycle Pedestrian	Bicycle improvements should first and foremost focus on on-street bike lanes. Not only is it more cost-effective for the City, but more efficient and often safer for cyclists. The simple need of cyclists is equal access to major corridors and a solid grid enough to navigate the City and region. Non major and non-arterial streets are easy enough to navigate without much attention.	City-wide
A255	Public Mtg - May 2011	Bicycle Pedestrian	It's important to provide easy access [for bicyclists and pedestrians] to transportation stations/hubs/stops.	City-wide

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A256	Public Mtg - May 2011	Bicycle Pedestrian	For pedestrians, on-street paths are pretty awful, loud, dangerous, dirty, polluted, etc. on major arterials. Thus, off-street is more enjoyable, but usually less convenient and efficient. Good luck balancing the two in the build—out areas.	City-wide
A257	Public Mtg - May 2011	Bicycle Pedestrian	Bike/pedestrian at-grade and below grade crossings should be considered in all future capital improvements. Considered alone an above/below grade crossing is expensive. However, it may be feasible when constructed in tandem with capital improvement.	City-wide
A258	Public Mtg - May 2011	Bicycle Pedestrian	New bike and pedestrian projects should be focused off-street; on street is too dangerous.	City-wide
A259	Public Mtg - May 2011	Roadway	in theory every street in Centennial would be better off incorporating concepts of complete streets, if not more comprehensive use. The areas consisting of retail, mixed-use, and TOD ought to be considered first and include all future development/major improvement.	City-wide
A260	Public Mtg - May 2011	Roadway	Castilla going under I-25 [as a complete street] and going thru to Yosemite would eliminate traffic from Hunter Hill and Walnut Hills from going onto either Dry Creek or Arapahoe.	I-25 crossings
A261	Public Mtg - May 2011	Roadway	Yosemite south of Arapahoe to Dry Creek is 35 to 40 MPH already. A complete street design would further "calm" traffic.	Yosemite Street south of Arapahoe Road
A262	Public Mtg - May 2011	Bicycle Pedestrian	Please use the pedestrian crossing i.e., Kirkland/Seattle, WA – for marked but unprotective crossings. Education would be needed. Team with school districts and SSPRD.	City-wide
A263	Public Mtg - May 2011	Bicycle Pedestrian	Hope all bike and pedestrian improvements hook into trails, parks, schools, etc. to facilitate the "fight" on obesity.	City-wide
A264	Public Mtg - May 2011	Roadway	Fix striping on NB Colorado at Dry Creek to let right turners get around thru traffic queues.	Colorado at Dry Creek
A265	Public Mtg - May 2011	Roadway	Widening Colorado Boulevard will make it harder to get out. Hard enough now. Traffic calming like GWV.	Colorado Boulevard south of Dry Creek
A266	Public Mtg - May 2011	Bicycle Pedestrian	Connect sidewalks from E. Euclid Avenue and Arapahoe (Arapahoe Estates Subdivision) so that we can walk or bike to streets of Southglenn.	Euclid Avenue and Arapahoe Road
A267	Public Mtg - May 2011	Roadway	Add street lights north side of Arapahoe.	Arapahoe Road
A268	Public Mtg - May 2011	Roadway	Turning right from Xanthia to South Yosemite and then left on Dry Creek is very difficult.	Yosemite Street/Xanthia intersection
A269	Public Mtg - May 2011	Roadway	Walnut Hills – Uinta and Briarwood Boulevard. Make it harder or slower for traffic to "cut through" the neighborhood, avoiding traffic at Arapahoe and Yosemite.	Walnut Hills
A270	Public Mtg - May 2011	Transit	A "call-and-ride service" that would also take wheelchairs , would make 1 resident very happy. Why is it that First Transit only takes the elderly and not the handicapped too? You are adding access-a-ride buses to already congested roads when one bus could do both.	City-wide
A271	Public Mtg - May 2011	Bicycle Pedestrian	More foot and bicycle overpasses on Broadway and Arapahoe Road, so that slow moving wheelchairs don't have to play "target practice" with fast moving high speed traffic.	Broadway and Arapahoe
A272	Public Mtg - May 2011	Bicycle Pedestrian	Paving the trail on Highline Canal so I can go for "wheelchair rides" with my walking family members.	Highline Canal
A273	Public Mtg - April 2012	Roadway	The improvement of this bottleneck is long overdue! As a long time resident, I fail to understand how more housing and development can be approved for this area when this stretch of road is so inadequate to handle the traffic. Another accident today. It is not unusual to have an accident a week. Please take care of this public safety issue.	Arapahoe Road from Waco to Himalaya
A274	Public Mtg - April 2012	Roadway	I have been driving this stretch of road to and from work for over 10 years and I'm sick and tired of the traffic backups that occur almost every day during rush hour and the near accidents where the road goes from 6 to 2 lanes because people are rushing to get ahead of traffic before the lanes narrow. This stretch of road should have been widened years ago when Arapahoe was widened for the Farm development.	Arapahoe Road from Waco to Himalaya

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A275	Public Mtg - April 2012	Roadway	Arapahoe Road is one of the most congested roads in this part of Aurora. The road needs to be widened as soon as possible as it continues to get worse with the increase in development to the East of the metro area. When an accident occurs the road is sometimes shut down until the accident can be cleared and the alternative roads then become congested as well. Also, the road is dangerous where the road goes from six lanes to two at Waco. Drivers try to beat other drivers out and this has caused accidents at this point.	Arapahoe Road from Waco to Himalaya
A276	Public Mtg - April 2012	Roadway	This is a high priority due to the amount of traffic generated by GVHS continued eastward development and the lack of sidewalks and turn lanes. This stretch of road is extremely dangerous and when there are accidents or bad weather there is no way to get around the problem.	Arapahoe Road from Waco to Himalaya
A277	Website	Bicycle Pedestrian	Clarkson is bike striped from Arapahoe to County Line but crossing to the connector path to the E470 path is very dangerous for pedestrians and bikers without a traffic signal. Striping encourages alternate transportation but lack of a signal light discourages it.	Clarkson
A278	Website	Roadway	Install red-light runner cameras, especially for Buckley South bound to Smoky Hill East bound turn	Buckley and Smoky Hill
A279	Website	Bicycle Pedestrian	A connection here (crosswalk) from the Dry Creek/Willow Creek trail to the new striped bike lane on E Easter Ave would encourage safe crossing of S Holly St and add connectivity to the bike routes.	Dry Creek/Willow Creek Trail
A280	Website	Roadway	The intersection is very torn up and needs repaving. The patchwork keeps coming up causing the holes to get bigger.	Dry Creek/University Blvd
A281	Website	Roadway	Can you give us an estimated start date for this project? This 1000 ft. stretch of Quincy has narrowed from 3 lanes in each direction down to 1 lane in each direction, then back to 3 lanes again, for upwards of 15 years. The area for the road is already open and wide enough for the additional lanes in this 1000 foot distance. Please reply. Thanks	Quincy Avenue
A282	Website	Bicycle Pedestrian	There is no sidewalk along the north side of Arapahoe Road from Euclid Avenue to the bridge/bike path near university. There is a well-worn dirt path, which shows that there is consistent foot traffic along this street. Recommend installation of wide sidewalk/bike patch on the north side of Arapahoe Road from Euclid Avenue to the bridge/bike path close to University.	Arapahoe Road at Euclid
A283	Website	Roadway	When is the widening of Arapahoe between Waco & S. Himalaya Way starting?	Arapahoe Road from Waco to Himalaya
A284	Website	Roadway	I am adamantly against widening of Colorado Blvd. We do not need a conduit to further encourage HR residents to speed thru our neighborhood. Don't build it, don't encourage them. I would even like four-way stops at Monroe and Mineral to slow them down and encourage them to seek an alternate route.	Colorado Boulevard south of Dry Creek
A285	Website	Planning Process	This is an interesting process that my community is looking at replicating. just here to look around	City-wide

## Public Comments

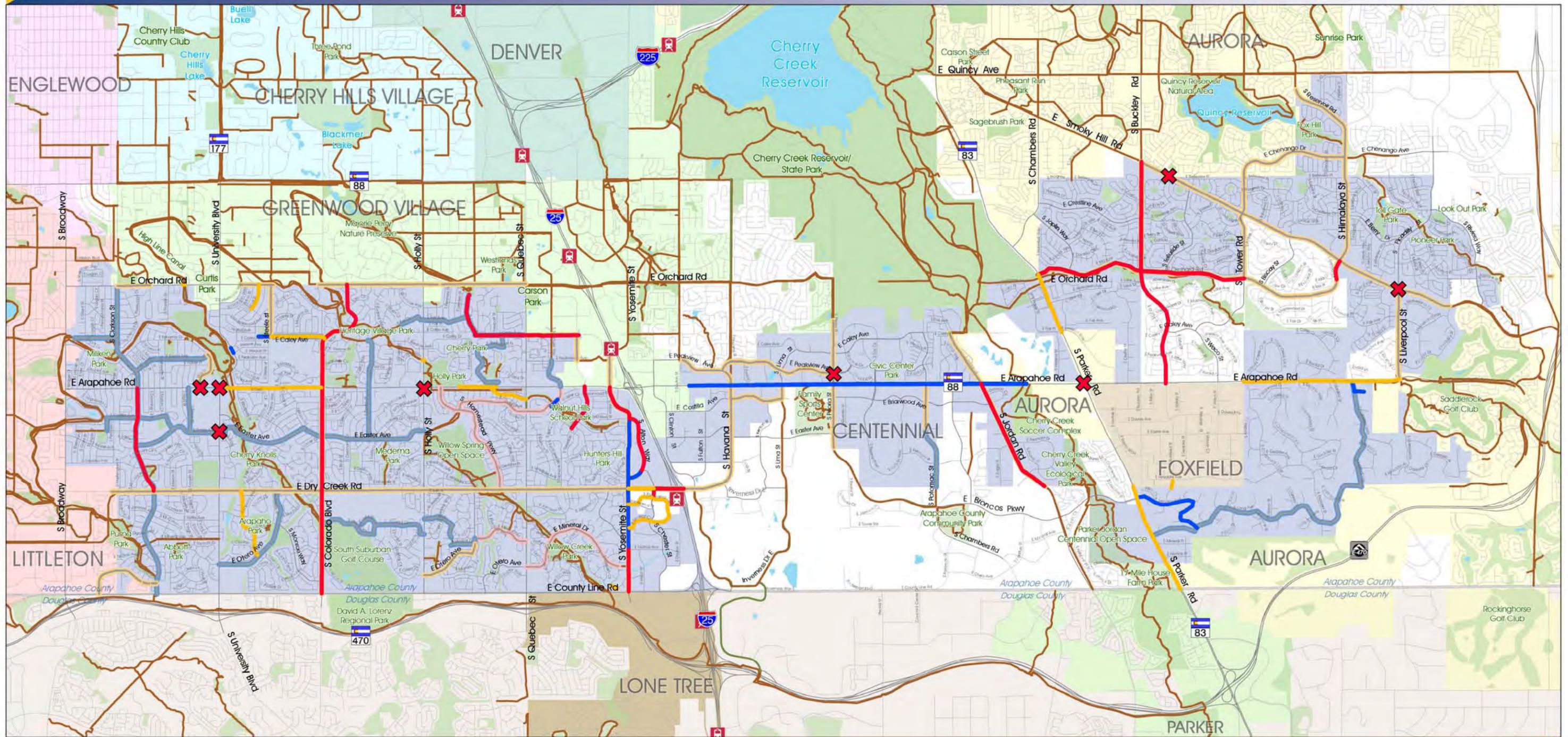
### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A286	Website	Roadway	Please reconfigure the stoplight at S Forest Way to coincide with the stoplight at Holly St. Traffic going west from a green light at Holly is forced to stop immediately at Forest Way which causes major backups in the evening commute on Arapahoe Rd.	Arapahoe Road/Forest Way intersection
A287	Website	Roadway	A longer green light for east/west traffic on Easter would be beneficial at this intersection during the morning commute. Just as much traffic occurs this way as north/south on Peoria, but the green light is observed as twice as long for traffic in that direction.	Peoria/Easter
A288	Website	Bicycle Pedestrian	The new bike lanes seem to be over-positioned toward the center of the road and have really narrowed the area for cars to travel safely within the white lines. The bike lanes should be moved more towards the curb.	Easter Avenue
A289	Website	Bicycle Pedestrian	This section of Spruce St was included in the bike route project, but there is opportunity to stripe bike lanes here if we strip parking on the west side of Spruce St. There are no residences here and the businesses along this stretch all have adequate parking on site. The bike lanes may also help slow vehicles down that are traveling on Spruce St.	Spruce Street
A290	Website	Bicycle Pedestrian	Complete the missing link of Little Dry Creek & provide an underpass connection for the trail.	Little Dry Creek
A291	Website	Bicycle Pedestrian	Continue the Greenwood Gulch Trail from Palos Verdes Park to Quebec and then work with Greenwood Village to provide an underpass below Quebec. The new trail will provide access to Palos Verdes Park for children in this area to get to the Palos Verde without forcing them to walk/bike on Orchard or going a half mile out of the way to get to the park. The potential Quebec underpass would provide children access to the skate park in William McKinley Carson Park. The trail would also provide access to the businesses to the east and provide a direct connection to the Regional Highline Canal.	Greenwood Gulch Trail
A292	Website	Bicycle Pedestrian	Please provide a better connection and signage between the bike lanes on Easter Ave and the bike lanes on Costilla Ave. A safer crossing treatment on Holly would also be useful.	Easter Avenue & Costilla Avenue bike lanes
A293	Website	Bicycle Pedestrian	Provide a safer crossing treatment for the Clarkson bike lanes to cross Arapahoe Road.	Clarkson
A294	Website	Bicycle Pedestrian	Provide better signage along Lee Gulch Trail to alleviate confusion as to the route to take to continue along Lee Gulch Trail. Also widen the sidewalk along the segments of Lee Gulch Trail that are shared with local roads.	Lee Gulch Trail
A295	Website	Bicycle Pedestrian	Provide way finding signage for cyclists reaching this point along the Lee Gulch Trail and/or the Clarkson Bike Lanes where to go to connect to the E470 trail.	Lee Gulch Trail
A296	Website	Bicycle Pedestrian	Provide way-finding for cyclists using Lee Gulch Trail that they can connect to the E470 trail to the south.	Lee Gulch Trail
A297	Website	Bicycle Pedestrian	Complete the missing segment of Cottonwood Creek Trail, connect to the Goddard School, and continue the trail south underneath Arapahoe Road to provide a safe pedestrian crossing and ped access to the businesses south of Arapahoe.	Cottonwood Creek Trail

## Public Comments

### Centennial Transportation Master Plan

TMP Comment #	Source	Mode	comment	Location
A298	Website	Bicycle Pedestrian	Please provide a trail connection from Cherry Creek State Park to the new Centennial Center Park.	Cherry Creek State Park bike paths
A299	Website	Bicycle Pedestrian	Please work with adjacent municipalities to complete this missing segment of the Cherry Creek Trail.	Cherry Creek Trail
A300	Website	Bicycle Pedestrian	Please provide an East-West bicycle route south of Arapahoe Road to tie into the bike lanes on Broncos Parkway.	Arapahoe Road
A301	Website	Bicycle Pedestrian	Construct the Willow Creek Trail along this open space corridor and tie to Holly Park via an underpass below Arapahoe Road.	Willow Creek Trail
A302	Website	Bicycle Pedestrian	Please improve the Little Dry Creek Trail crossing at Holly. Perhaps an underpass, a traffic signal, or a HAWK signal?	Little Dry Creek Trail
A303	Website	Bicycle Pedestrian	A program should be implemented to systematically increase the sidewalk widths on residential collectors to 5' minimum and on larger collectors and arterials to 6'+. Additionally, adjacent land owners should be required to keep their portion of the sidewalk unobstructed as this is a significant problem for seniors with walkers, moms with strollers, little kids on bicycles, and people in wheel chairs.	City-wide
A304	Website	Bicycle Pedestrian	Please provide bulb-outs and vehicles must yield to pedestrians signs at this location to make the crossing more visible to motorists.	City-wide
A305	Website	Bicycle Pedestrian	Please provide a pedestrian underpass of Arapahoe Rd and a safe route to connect the new Centennial Center Park to the Sout Suburban Family Sports Center.	Centennial Center Park
A306	Website		People drive way to fast in this area. There is a school nearby and it's dangerous.	Long Avenue east of Parker Road



LEGEND

- ~ Bike/Ped Need
- ~ Bike Need
- ~ Ped Need
- X Intersection/Access Improvements
- ~ Designated Bike Route/Trails
- ~ Off-Street Multi-Use Path
- ~ Wide/Separated Sidewalk
- ~ Bike Lane
- ~ Narrow/No Sidewalk
- City Limits
- Parks
- RTD RTD Light Rail Station

Notes:

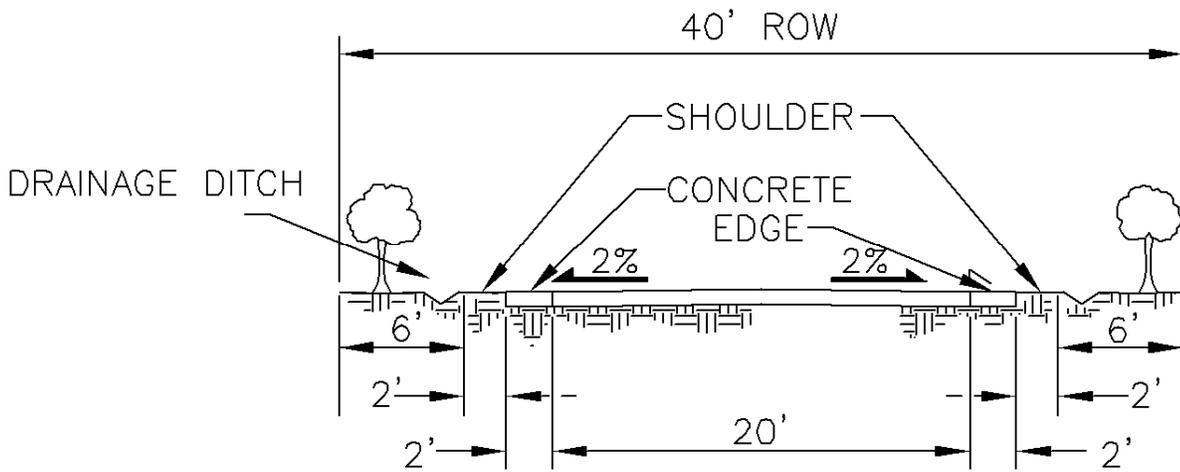
1. Needs identified through public process and committee meetings
2. Identified needs may not be candidates for funding

General Comments:

1. Need more Ped/Bike connections throughout
2. Need to connect to other cities
3. Consider Bicycle Advisory Committee and include Bicycle Colorado
4. Recognize different bicycle rider classes and provide infrastructure for all classes
5. Maintain Trails, routes, and sidewalks

# **Appendix B      Typical Roadway Cross Sections**

# RURAL RESIDENTIAL STREET (<500 ADT)



**NOTES:**

- 1) MINIMUM 1/2 ACRE LOTS

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

## TYPICAL RURAL RESIDENTIAL STREET CROSS SECTION

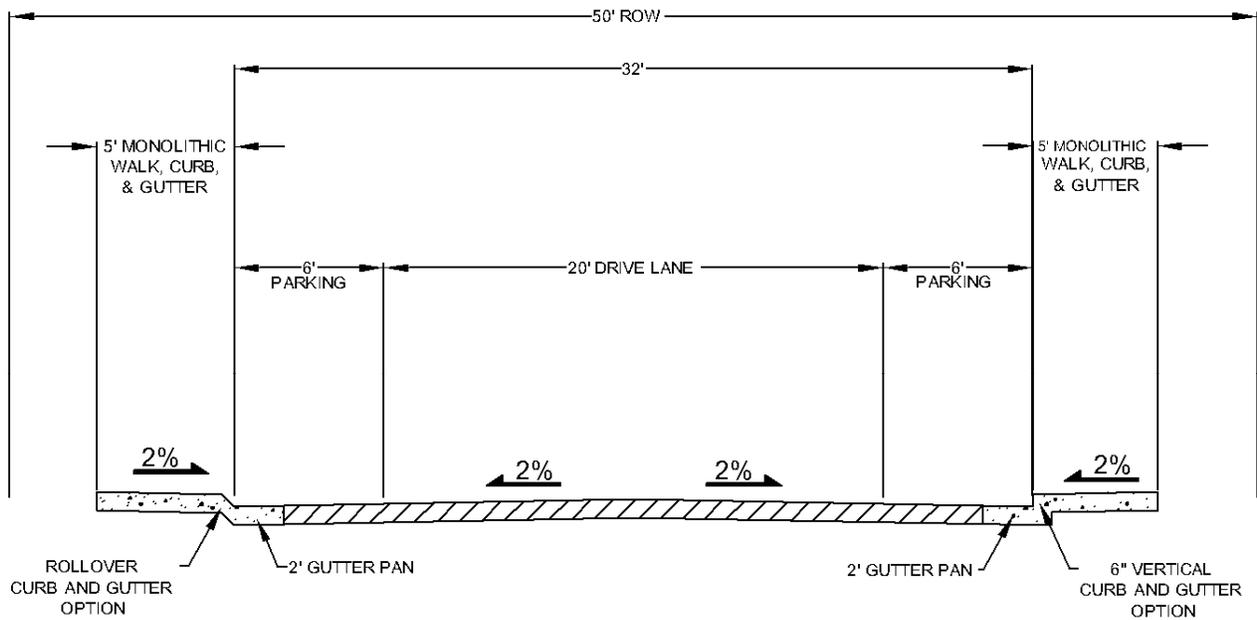
SD# B1

DATE: (M/Y)      NOT TO SCALE



City of Centennial

## LOCAL-RESIDENTIAL ATTACHED WALK



NOTE: FOR VERTICAL CURB AND GUTTER OPTION PREDETERMINED DRIVE CUTS SHALL BE APPROVED PRIOR TO ISSUANCE OF PERMITS

RESIDENTIAL (<1000 ADT)

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

LOCAL RESIDENTIAL  
ATTACHED  
WALK  
SD# B2

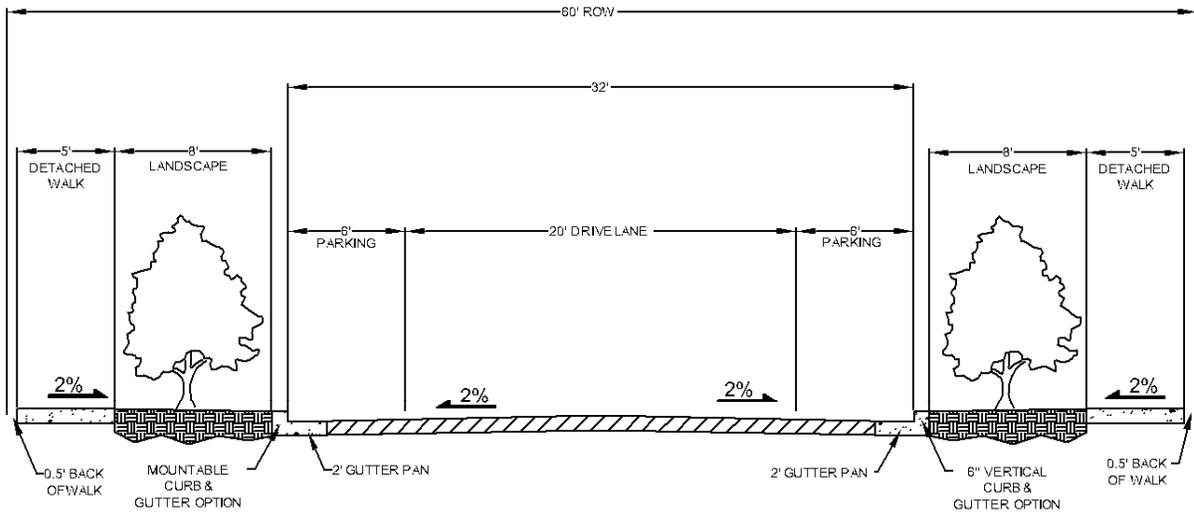
DATE: (M/Y)

NOT TO SCALE



City of Centennial

LOCAL RESIDENTIAL DETACHED WALK (≤1000 ADT)



- NOTES
- 1 DRIVEWAYS SHALL NOT EXCEED 2% UNTIL BACK OF WALK
  - 2 ADDITIONAL REINFORCED ROLLOVER CURB AND GUTTER MAY BE USED IN-LEU OF VERTICAL SECTION
  - 3 DRIVEWAYS SHALL EXTEND 18-FEET FROM BACK OF WALK TO THE STRUCTURE
- RESIDENTIAL (≤1000 ADT)

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

LOCAL STREET  
DETACHED  
WALK  
SD# B3

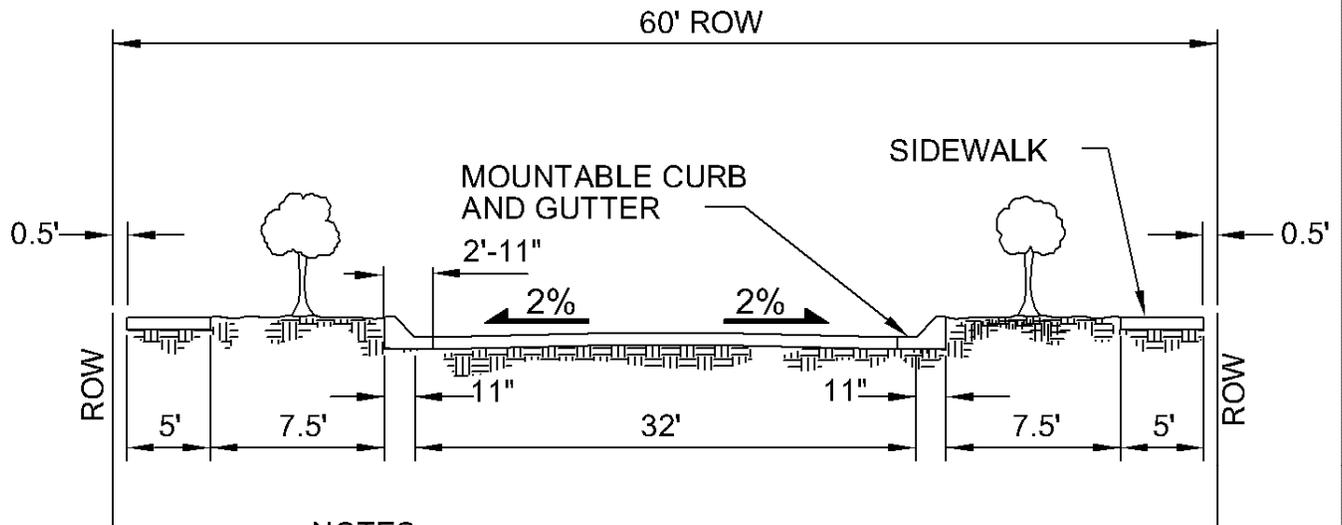
DATE:(M/Y)

NOT TO SCALE



City of Centennial

**LOCAL COMMERCIAL** (<3,000 ADT)



**NOTES:**

- 1) LEFT TURN LANES AT INTERSECTIONS & ACCESSES AS NECESSARY
- 2) ON-STREET BIKE LANES
- 3) LIMITED AND RESTRICTED ACCESS
- 4) NO SINGLE FAMILY RESIDENTIAL FRONTAGE OR DRIVEWAY ACCESS
- 5) WITH PARKING, ADD 6' TO EACH SIDE

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

**LOCAL COMMERCIAL  
TYPICAL COLLECTOR  
CROSS SECTION**

SD# B4

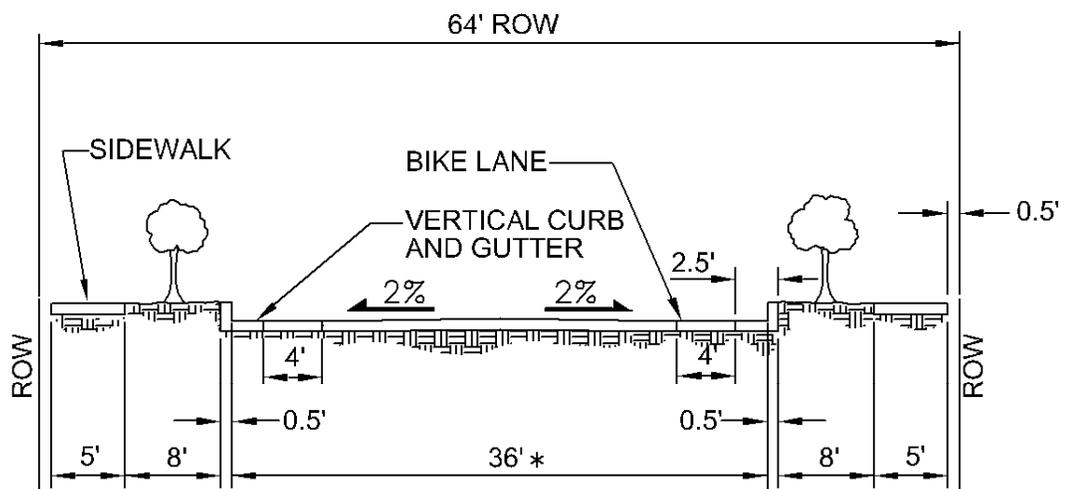
DATE:(M/Y)

NOT TO SCALE



City of Centennial

**COLLECTOR (<8,000 ADT)**



**NOTES:**

- 1) LEFT TURN LANES AT INTERSECTIONS & ACCESSES AS NECESSARY
- 2) ON-STREET BIKE LANES
- 3) LIMITED AND RESTRICTED ACCESS
- 4) NO SINGLE FAMILY RESIDENTIAL FRONTAGE OR DRIVEWAY ACCESS
- 5) WITH PARKING, ADD 6' TO EACH SIDE

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

**TYPICAL COLLECTOR STREET CROSS SECTIONS**

SD# B5

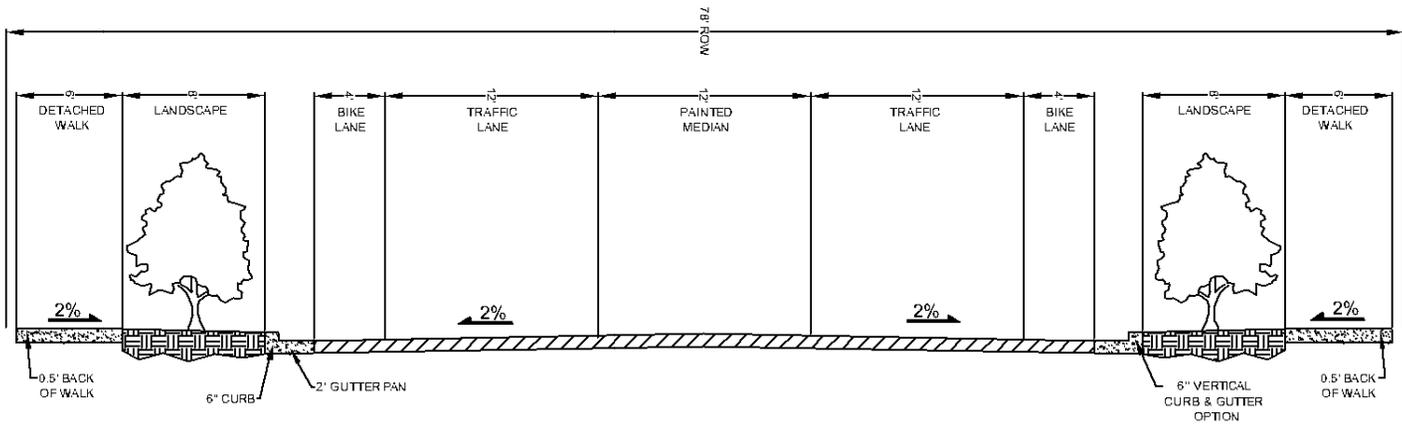
DATE: (M/Y)

NOT TO SCALE



City of Centennial

MAJOR COLLECTOR (<15,000 ADT)



- NOTES:
- 1 DIRECT BACKING ACCESS(DRIVEWAYS) SHALL BE PROHIBITED ON COLLECTOR ROADWAYS
  - 2 ON STREETS WHERE BIKE LANE MARKING/DESIGNATION HAS BEEN APPROVED, BIKE LANES AT INTERSECTIONS WHERE AUXILIARY LANES ARE REQUIRED BIKE LANES SHALL CONTINUE THROUGH AND THE AUXILIARY LANE VEHICLES SHALL YIELD TO BIKE TRAFFIC

APPROVAL:

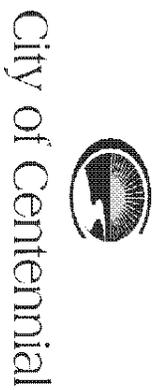
CITY ENGINEER

REV.#	DATE	DWN.	DESCRIPTION
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#	(M/M)		
#	(M/M)		

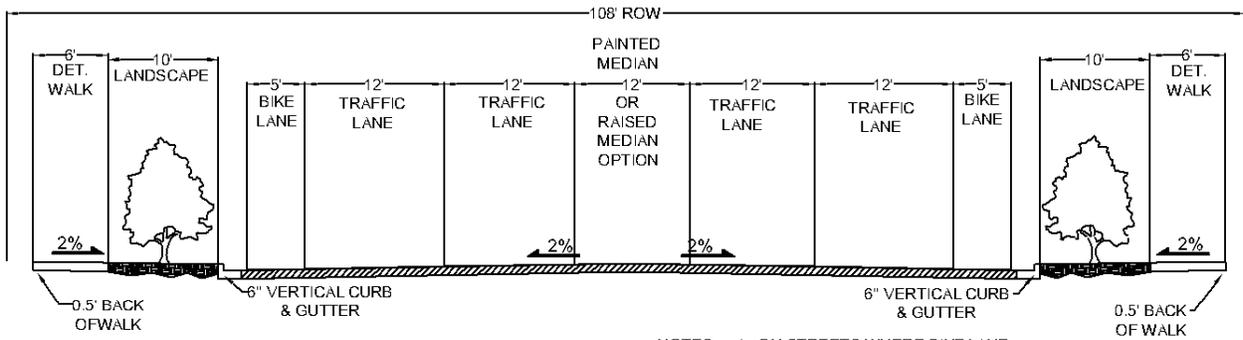
MAJOR COLLECTOR  
CROSS-SECTION  
SD# B6

DATE:(M/M)

NOT TO SCALE



FOUR-LANE ARTERIAL (<30,000 ADT)



- NOTES:
1. ON STREETS WHERE BIKE LANE MARKING/DESIGNATION HAS BEEN APPROVED, BIKE LANES AT INTERSECTIONS WHERE AUXILIARY LANES ARE REQUIRED BIKE LANES SHALL CONTINUE THROUGH AND AUXILIARY LANE VEHICLES SHALL YIELD TO BIKE TRAFFIC.
  2. MEANDERING SIDEWALK IS PERMISSIBLE PROVIDED IT REMAINS WITHIN RIGHT-OF-WAY OR ADEQUATE PUBLIC USE EASEMENTS ARE DEDICATED.

APPROVAL:

CITY ENGINEER

REV. #	DATE	DWN	DESCRIPTION
#	(M/Y)		
#	(M/Y)		
#	(M/Y)		

FOUR-LANE ARTERIAL

SD# B7

DATE: (M/Y)

NOT TO SCALE

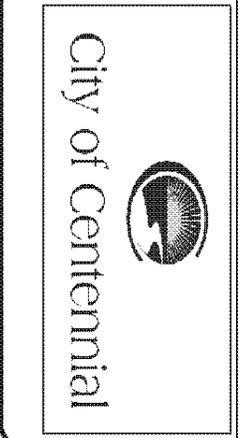


City of Centennial

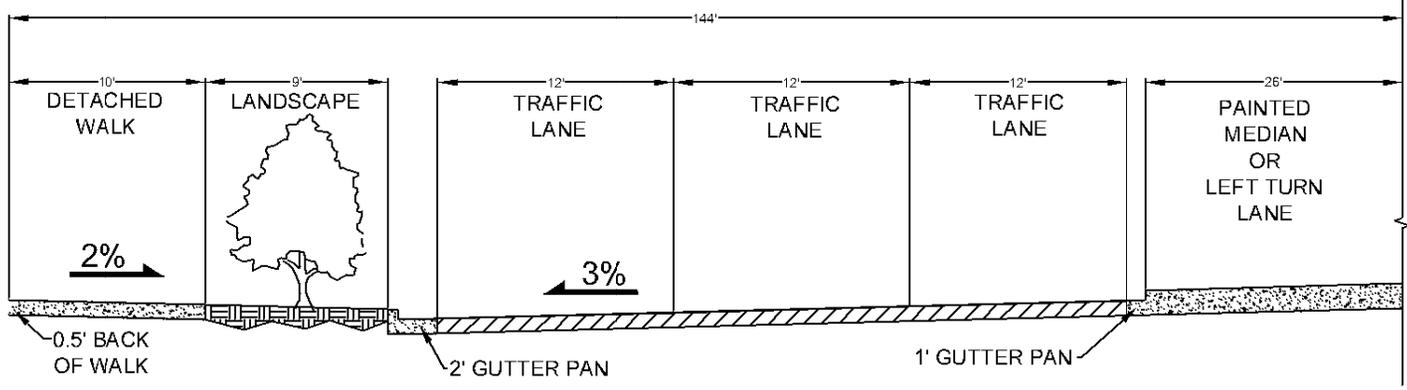
APPROVAL:			
CITY ENGINEER			
REV. #	DATE	DWN	DESCRIPTION
#	(MM)		
#	(MM)		
#	(MM)		

SIX-LANE  
PRINCIPAL ARTERIAL  
WITHOUT BIKE LANE  
SD# B8

DATE: (MM)



SIX-LANE PRINCIPAL ARTERIAL (>30,000 ADT)  
WITHOUT BIKE LANES



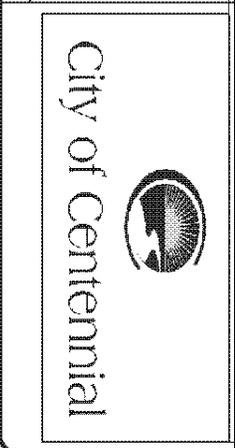
NOTE: MEANDERING SIDEWALK IS PERMISSIBLE PROVIDED IT REMAINS WITHIN RIGHT-OF-WAY OR ADEQUATE PUBLIC USE EASEMENTS ARE DEDICATED.

MIRRORED LAYOUT AND DIMENSIONS ACROSS MEDIAN CENTERLINE

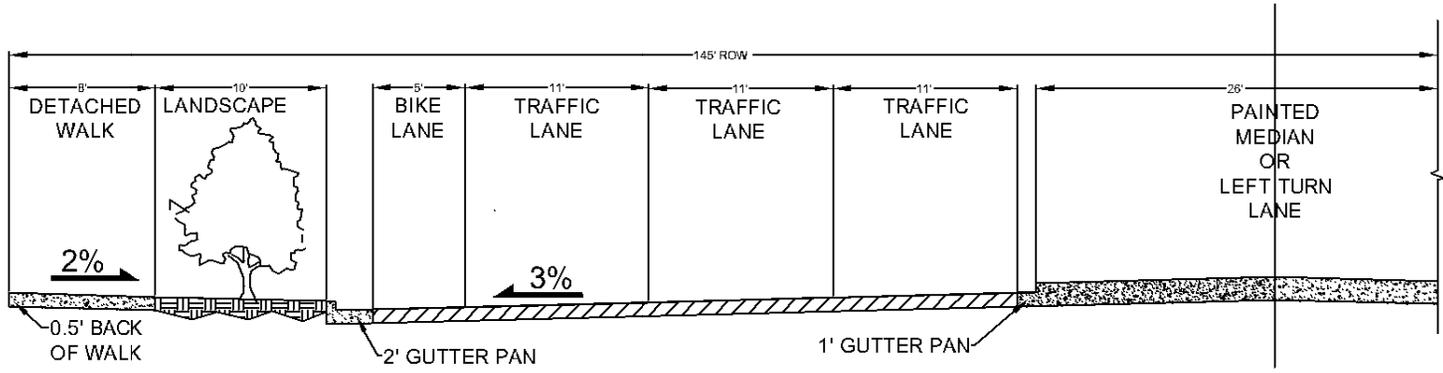
APPROVAL:			
CITY ENGINEER			
REV. #	DATE	DWN	DESCRIPTION
#	(M/M)		
#	(M/M)		
#	(M/M)		

SIX-LANE  
PRINCIPAL ARTERIAL  
WITH BIKE LANE  
SID# B9

DATE: (M/M)      NOT TO SCALE



**SIX-LANE PRINCIPAL ARTERIAL**      (>30,000 ADT)  
WITH BIKE LANES



NOTE:  
MIRRORED LAYOUT AND DIMENSIONS ACROSS  
MEDIAN CENTERLINE

## Street Cross-Sectional Properties

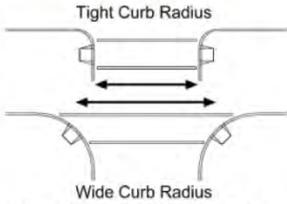
Design Element	Six-Lane Principal Arterial with Bike Lanes	Six-Lane Principal Arterial No Bike Lanes	Four-Lane Arterial with Bike Lanes	Local Residential with Landscape	Local Residential No Landscape	Major Collector with Bike Lanes	Collector	Local Commercial	Rural Residential Street
ADT	> 30,000	> 30,000	< 30,000	< 1,000	< 1,000	< 15,000	< 8,000	< 3,000	<500
Right of Way Width	145'	144'	112'	60'	50'	78'	64'	60'	40'
Roadway Width (Pavement Width)	66'	72'	66'	28'	28'	44'	32'	26'-2"	20'
Total Through Lanes	6	6	4	2	2	2	2	2	2
Travel Lanes	11'	12'	12'	20' drive lane	20' drive lane	12'	23' drive lane	26'-2" drive lane	20' drive lane
Paved Shoulder(each side)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2' concrete
Unpaved Shoulder (each side)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2'
Bike Lane Width	5'	n/a	5'	n/a	n/a	4'	4'	n/a	n/a
Raised Median (including curb and 1' gutter pan)	28'	28'	8' or painted	n/a	n/a	n/a	n/a	n/a	n/a
Painted Median	n/a	n/a	8' or raised	n/a	n/a	12'	n/a	n/a	n/a
Curb and Gutter	6" barrier with 2'	6" barrier with 2'	6" barrier with 2'	6" barrier with 2'	6" barrier with 2'	6" barrier with 2'	6" barrier with 2.5'	6" barrier with 2'	n/a
Parking Lane	n/a	n/a	n/a	6'	6'	n/a	n/a	n/a	n/a
Landscape Strip (each side)	10'	9'	10'	8'	n/a	8'	8'	7.5'	6'
Sidewalk Width	8' detached	10' detached	6' detached	5' detached	5' attached	6' detached	5' detached	5' detached	n/a
Super Elevation Roadway	3%	3%	2%	2%	2%	2%	2%	2%	2%
Super Elevation Landscape/Walkway/Etc...	2%	2%	2%	2%	2%	2%	2%	2%	2%

# **Appendix C      Pedestrian Toolbox**

## Pedestrian Enhancement and Safety Toolbox

TOOL	DESCRIPTION	BENEFITS	APPLICATION/ CONSIDERATION	COST
<b>Two-Lane Roadways</b>				
<p><b>In-Street Pedestrian Crossing Signs</b></p>  <p><i>Image source: <a href="http://mutcd.fhwa.dot.gov">http://mutcd.fhwa.dot.gov</a></i></p>	<ul style="list-style-type: none"> <li>Regulatory pedestrian signage posted on lane edge lines and road centerlines</li> <li>May be used to remind road users of laws regarding right of way at an unsignalized pedestrian crossings</li> </ul>	<ul style="list-style-type: none"> <li>Highly visible to motorists.</li> <li>Has a positive impact on pedestrian safety at crosswalks</li> <li>Good driver compliance with yielding to pedestrians though compliance decreases on multi-lane roadways</li> </ul>	<ul style="list-style-type: none"> <li>Mid-block crosswalks</li> <li>Unsignalized intersections</li> <li>Low-speed areas</li> <li>Two-lane roadways</li> <li>May need to be removed in snowy conditions</li> </ul>	\$
<b>Two-Lane and Multi-Lane Roadways</b>				
<p><b>Advanced Yield Lines</b></p>  <p><i>Image source: <a href="http://www.saferoutesinfo.org">www.saferoutesinfo.org</a></i></p>	<ul style="list-style-type: none"> <li>Solid white triangles pointing towards approaching vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>Increases the pedestrian crossing's visibility to motorists</li> <li>Reduces the number of vehicles encroaching on the crosswalk</li> </ul>	<ul style="list-style-type: none"> <li>Useful in areas where pedestrian visibility is low and in areas with aggressive drivers</li> <li>Addresses the multiple-threat collision on multi-lane roads.</li> </ul>	\$
<p><b>Raised Crosswalks</b></p> 	<ul style="list-style-type: none"> <li>Marked crosswalks that are raised to act simultaneously as a traffic calming device.</li> </ul>	<ul style="list-style-type: none"> <li>Provide safety advantage to pedestrians with demonstrated increased yielding by drivers.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate on multi-lane streets with moderate traffic.</li> <li>Particularly effective where heavily used trails cross a road.</li> <li>Operations and maintenance implications need to be considered and addressed prior to implementation.</li> </ul>	\$\$

TOOL	DESCRIPTION	BENEFITS	APPLICATION/ CONSIDERATION	COST
<p><b>Median Pedestrian Island</b></p>  <p><i>Image source: <a href="http://thegoodcity.wordpress.com/category/transportation/">http://thegoodcity.wordpress.com/category/transportation/</a></i></p>	<ul style="list-style-type: none"> <li>• Raised islands are placed in the center of a roadway, separating opposing lanes of traffic with median opening along the pedestrian path, providing a refuge for people crossing</li> </ul>	<ul style="list-style-type: none"> <li>• This measure allows pedestrians to focus on each direction of traffic separately, and the refuge provides pedestrians with a better view of oncoming traffic. Allows drivers to see pedestrians more easily.</li> </ul>	<ul style="list-style-type: none"> <li>• Recommended for multi-lane roads wide enough to accommodate a 4 ft minimum median with ADA compliant ramps.</li> </ul>	<p>\$\$\$</p>
<p><b>Staggered Median Pedestrian Island</b></p> 	<ul style="list-style-type: none"> <li>• Crosswalks in the roadway are staggered such that a pedestrian crosses half the street and then must walk <i>towards</i> traffic to reach the second half of the crosswalk.</li> <li>• Must be designed for accessibility by including rails and truncated domes to direct sight-impaired pedestrians along the path of travel.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in the concentration of pedestrians at a crossing and the provision of better traffic views for pedestrians.</li> <li>• Motorists are better able to see pedestrians as they walk through the staggered refuge.</li> </ul>	<ul style="list-style-type: none"> <li>• Best used on multi-lane roads with obstructed pedestrian visibility or with off-set intersections.</li> <li>• Must be designed for accessibility by including rails and truncated domes to direct sight-impaired pedestrians along the path of travel.</li> </ul>	<p>\$\$\$</p>
<p><b>Curb Extension/ Bulb Outs</b></p> 	<ul style="list-style-type: none"> <li>• A traffic calming measure meant to slow traffic and increase driver awareness.</li> <li>• Consists of an extension of the curb into the street, making the pedestrian space (sidewalk) wider.</li> </ul>	<ul style="list-style-type: none"> <li>• Narrows the crossing distance for pedestrians.</li> <li>• Increases the sidewalk space on the corners.</li> <li>• Improves pedestrian visibility.</li> <li>• Lowers vehicle turning speeds.</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable along Two-Lane and multi-lane roadways with a parking lane.</li> <li>• Need to consider impact on transit service and could provide extended curb extension that extends length of bus stop so long as there is another travel lane to bypass the stopped bus.</li> <li>• Need to consider larger vehicle turning paths.</li> </ul>	<p>\$\$\$</p>

TOOL	DESCRIPTION	BENEFITS	APPLICATION/ CONSIDERATION	COST
<p><b>Reduced Curb Radii</b></p>  <p><i>Image Source: www.ci.austin.tx.us</i></p>	<ul style="list-style-type: none"> <li>The radius of a curb is reduced requiring motorists to make a tighter turn</li> </ul>	<ul style="list-style-type: none"> <li>Narrow the distance pedestrians have to cross.</li> <li>Reduce traffic speeds and increase driver awareness (like curb extensions).</li> </ul>	<ul style="list-style-type: none"> <li>Beneficial on Two-Lane or multi-lane streets with high pedestrian activity, on-street parking, and no curb-edge transit service.</li> <li>More suitable for wider roadways and roadways with low volumes of heavy truck traffic.</li> </ul>	<p>\$\$</p>
<p><b>Rapid Flash Beacons</b></p>  <p><i>Image source: mutcd.fhwa.dot.gov</i></p>	<ul style="list-style-type: none"> <li>Install rapid flashing LED lamps and appropriate pedestrian crossing signing and striping.</li> <li>The beacons may be push-button activated or activated with pedestrian detection.</li> </ul>	<ul style="list-style-type: none"> <li>Very effective as measured by increased driver yielding compliance (more than 80% compliance rate).</li> <li>Solar panels reduce energy costs associated with the device.</li> <li>Wireless capabilities reduce installation cost.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate for Two-Lane and multi-lane roadways.</li> <li>Effectiveness decreases as the number of travel lanes increases.</li> </ul>	<p>\$\$</p>
TOOL	DESCRIPTION	BENEFITS	APPLICATION/ CONSIDERATION	COST
<b>Multi-Lane Roadways</b>				
<p><b>Overhead Flashing Beacons</b></p>  <p><i>Image source: tti.tamu.edu</i></p>	<ul style="list-style-type: none"> <li>Flashing amber lights installed on overhead signs in advance of the crosswalk or at the crosswalk.</li> </ul>	<ul style="list-style-type: none"> <li>Blinking lights during pedestrian crossing times increase the number of drivers yielding for pedestrians and reduce pedestrian-vehicle conflicts.</li> <li>May also improve conditions on multi-lane roadways.</li> </ul>	<ul style="list-style-type: none"> <li>Best used in places where motorists cannot see a traditional sign due to topography or other barriers.</li> <li>Appropriate on multi-lane roadways.</li> </ul>	<p>\$\$ \$\$</p>

**Pedestrian Hybrid Beacon**



Image Source: [www.tftrc.gov/](http://www.tftrc.gov/)

- Pedestrian-actuated beacon that is a combination of a beacon flasher and a traffic control signal.
- When actuated, the beacon displays a yellow (warning) indication followed by a solid red light.
- During pedestrian clearance, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the signal goes dark.
- Reduces pedestrian-vehicle conflicts and increases driver compliance with yielding to pedestrians (80-90% compliance).
- Reduces vehicle delay when compared to standard pedestrian traffic signal.
- Useful in areas where it is difficult for pedestrians to find gaps in automobile traffic to cross safely, but where normal signal warrants are not satisfied.
- Appropriate for higher speed multi-lane roadways.

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**Pedestrian Overpass/ Underpass**



Image source: [omahamidcenturymodern.blogspot.com](http://omahamidcenturymodern.blogspot.com)

- Pedestrian-only overpass or underpass over a roadway.
- Provides complete separation of pedestrians from motor vehicle traffic, normally where no other pedestrian facility is available.
- Connects off-road trails and paths across major barriers.
- Allow for the uninterrupted flow of pedestrian movement separate from the vehicle traffic.
- Most feasible and appropriate in extreme cases where pedestrians must cross freeways and high-speed, high-volume arterials.
- This measure should be implemented only after a detailed engineering study to evaluate its viability.

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# **Appendix D      Project Scoring Guidelines**

# PROJECT SCORING GUIDE

## ROADWAY IMPROVEMENT PROJECTS

### Safety Enhancement

Score	Description
3	Project is at a Top 25 Crash Rate intersection, and project will specifically address the safety issue.
2	Project is at a Top 25 Crash Rate intersection, and project will provide some safety benefits. -OR- Project is not a Top 25 Crash Rate intersection, but project is specifically intended to improve safety.
1	Project is not a Top 25 Crash Rate intersection, but project could provide some safety benefits.
0	Project will not improve safety.

### Congestion Mitigation

Score	Description
3	Project is on a segment that is currently congested, and project will significantly reduce congestion.
2	Project is on a segment that is currently congested, and project will provide some congestion reduction. -OR- Project is on a segment that is not currently congested but will be in the future, and project will significantly reduce congestion.
1	Project is on a segment that is not currently congested but will be in the future, and project will provide some congestion reduction.
0	Project will not reduce congestion.

## Continuity

Score	Description
3	Project will complete a missing segment of the roadway system.
2	Project will bring an inadequate roadway segment up to standard.
1	Project will partially complete a missing segment of the roadway system. -OR- Project will bring an inadequate roadway up to standard at a spot location or an extension of a roadway segment.
0	Project will not enhance continuity.

## Economic Development

Score	Description
3	Project is within an identified Primary or Secondary Activity Center and would support economic development.
2	Project is within an identified Neighborhood Activity Center and would support economic development.
1	Project is not within an identified Activity Center but it would support economic development in the City.
0	Project would not support economic development.

## Multi-Modal Enhancements

Score	Description
3	Project would significantly enhance the usability of bicycle, pedestrian, or transit. -OR- Project would significantly improve access to a transit station.
2	Project would enhance the usability of bicycle, pedestrian, or transit.
1	Project would accommodate other modes.
0	Project would deter use of other modes.

## Improved Use of Existing Infrastructure

Score	Description
3	Project would reduce demands on or improve the efficiency of the transportation system through measures that do not require significant infrastructure construction.
2	Project would reduce demands on or improve the efficiency of the transportation system through measure that would require minimal infrastructure construction.
1	Project would reduce demands on or improve the efficiency of the transportation system but would require considerable infrastructure construction.
0	Project would not reduce demands on or improve the efficiency of the transportation system.

## Community Benefits

Score	Description
3	Project is in a heavily populated area of the City and/or within ½ mile of multiple shopping, employment, and recreational opportunities or a school.
2	Project is in a populated area of the City and/or within ½ mile of some shopping, employment, and recreational opportunities or a school.
1	Project is in a somewhat populated area of the City and/or within ½ mile of a shopping, employment, or recreational opportunity or a school.
0	Project is not in a populated area of the City nor near shopping, employment, recreation destinations or schools.

## Regional and Citywide Importance

Score	Description
3	Project is on facility with regional continuity and has been identified in another planning document.
2	Project is on a facility with regional continuity but the project has not been specifically identified in another planning document. -OR- Project is on a facility with limited continuity and has been identified in another planning document.
1	Project is on a facility with limited continuity and project has not been specifically identified in another planning document.
0	Project is on a neighborhood facility.

## Implementation

Score	Description
3	Project has other funds earmarked and there are no major roadblocks anticipated.
2	Project has the potential to leverage City funds with other funding sources and there are no major roadblocks anticipated.
1	Project has limited potential to leverage City funds with other funding sources. -OR- Project has potential major roadblocks that may delay implementation.
0	Project has no potential to leverage City funds with other funding sources. -AND- Project has potential major roadblocks that may delay implementation.

## Community Support

Score	Description
3	Project has significant support from the community.
2	Project has support from the community.
1	Project has neither community support nor opposition.
0	Project has significant opposition from the community.

# PROJECT SCORING GUIDE

## BICYCLE IMPROVEMENT PROJECTS

### Safety Enhancement

Score	Description
3	Project has bicycle accident history, high vehicular speed, high volumes, and inadequate space on the road for bicycles.
2	Project has moderate speeds, moderate volumes, and may or may not have adequate space on the road for bicycles.
1	Project has low to moderate speeds, low to moderate volumes, and may have width for bicycles. The improvement would provide some Bicycle safety benefits.
0	Project would not provide safety benefits.

### Congestion Mitigation

Score	Description
3	Project is in an area that is currently congested and can provide alternatives.
2	Project is in an area that is currently congested and can provide future alternatives.
1	Project is in an area that is not congested but would be in the future and can provide alternatives.
0	Project would not provide alternatives.

### Continuity

Score	Description
3	Project will complete a missing segment.
2	Project brings a segment up to standard.
1	Project partially completes a missing segment or partially brings a segment up to standard.
0	Project does not enhance continuity.

## Economic Development

Score	Description
3	Project is within an identified Primary or Secondary Activity Center and would support economic development.
2	Project is within an identified Neighborhood Activity Center and would support economic development.
1	Project is not within an identified Activity Center but it would support economic development in the City.
0	Project would not support economic development.

## Multi-Modal Enhancements

Score	Description
3	Project would significantly improve access to a transit station or other modes of travel.
2	Project would enhance usability of bicycle, pedestrian system and/or transit.
1	Project would accommodate bicyclist along a roadway.
0	Project would deter use of other modes.

## Improved Use of Existing Infrastructure

Score	Description
3	Project would improve efficiency of transportation system without significant construction.
2	Project would improve efficiency of transportation system with minimal construction.
1	Project would improve efficiency of transportation system with considerable construction.
0	Project would not improve efficiency of transportation system.

## Community Benefits

Score	Description
3	Project is in a heavily populated area of the City and/or within ½ mile of multiple shopping, employment, and recreational opportunities or a school.
2	Project is in a populated area of the City and/or within ½ mile of some shopping, employment, and recreational opportunities or a school.
1	Project is in a somewhat populated area of the City and/or within ½ mile of a shopping, employment, or recreational opportunity or a school.
0	Project is not in a populated area of the City nor near shopping, employment, recreation destinations or schools.

## Regional and Citywide Importance

Score	Description
3	Project is on or connects to facility with regional continuity and has been identified in another planning document.
2	Project is on or connects to facility with regional continuity but is not on another planning document.
1	Project is on or connects to a facility that has limited continuity and is not on another planning document.
0	Project is on or connects to a neighborhood facility only.

## Implementation

Score	Description
3	Project has other funds earmarked and there are no major roadblocks anticipated.
2	Project has the potential to leverage City funds and other funding sources.
1	Project has limited potential to leverage City funds or has major roadblocks
0	Project has no potential to leverage City funds and has major roadblocks.

## Community Support

Score	Description
3	Project has significant support from the community.
2	Project has support from the community.
1	Project has neither community support nor opposition.
0	Project has opposition from the community.

# PROJECT SCORING GUIDE

## PEDESTRIAN IMPROVEMENT PROJECTS

### Safety Enhancement

Score	Description
3	Project has Pedestrian accident history or high vehicular speeds, limited or no sidewalk, and adjacent to a large roadway facility or requires crossing multiple lanes of traffic.
2	Project has moderate speeds, sidewalk width is inadequate or there is no buffer between traffic and walk, and adjacent to a large roadway facility or requires crossing multiple lanes of traffic.
1	Project has limited to no sidewalk or sidewalk width is inadequate and provides some Pedestrian safety benefits.
0	Project would not provide safety benefits.

### Congestion Mitigation

Score	Description
3	Project is in an area that is currently congested and can provide alternatives.
2	Project is in an area that is currently congested and can provide future alternatives.
1	Project is in an area that is not congested but would be in the future and can provide alternatives.
0	Project would not provide alternatives.

### Continuity

Score	Description
3	Project will complete a missing segment.
2	Project brings a segment up to standard.
1	Project partially completes a missing segment or partially brings a segment up to standard.
0	Project does not enhance continuity.

## Economic Development

Score	Description
3	Project is within an identified Primary or Secondary Activity Center and would support economic development.
2	Project is within an identified Neighborhood Activity Center and would support economic development.
1	Project is not within an identified Activity Center but it would support economic development in the City.
0	Project would not support economic development.

## Multi-Modal Enhancements

Score	Description
3	Project would significantly improve access to a transit station or other modes of travel.
2	Project would enhance usability of bicycle system, and/or transit.
1	Project would accommodate other modes.
0	Project would deter use of other modes.

## Improved Use of Existing Infrastructure

Score	Description
3	Project would improve efficiency of transportation system without significant construction.
2	Project would improve efficiency of transportation system with minimal construction.
1	Project would improve efficiency of transportation system with considerable construction.
0	Project would improve efficiency of transportation system.

## Community Benefits

Score	Description
3	Project is in a heavily populated area of the City and/or within ½ mile of multiple shopping, employment, and recreational opportunities or a school.
2	Project is in a populated area of the City and/or within ½ mile of some shopping, employment, and recreational opportunities or a school.
1	Project is in a somewhat populated area of the City and/or within ½ mile of a shopping, employment, or recreational opportunity or a school.
0	Project is not in a populated area of the City nor near shopping, employment, recreation destinations or schools.

## Regional and Citywide Importance

Score	Description
3	Project is on or connects to facility with regional continuity and has been identified in another planning document.
2	Project is on or connects to facility with regional continuity but is not on another planning document.
1	Project is on or connects to a facility that has limited continuity and is not on another planning document.
0	Project is on or connects to a neighborhood facility only.

## Implementation

Score	Description
3	Project has other funds earmarked and there are no major roadblocks anticipated.
2	Project has the potential to leverage City funds and other funding sources.
1	Project has limited potential to leverage City funds or has major roadblocks
0	Project has no potential to leverage City funds and has major roadblocks.

## Community Support

Score	Description
3	Project has significant support from the community.
2	Project has support from the community.
1	Project has neither community support nor opposition.
0	Project has opposition from the community.

# **Appendix E      Detail Project Scores**

**Roadway Improvement Projects**  
Centennial Transportation Master Plan

Project ID#	Location	Description	Safety Enhancement	Congestion Mitigation	Continuity	Economic Development	Multi-Modal Enhancement	Improved Use of Existing Infrastructure	Community Benefits	Regional and Citywide Importance	Implementation	Community Support	Weighted Total	Preliminary Rank (With Weighting)
			<b>16</b>	<b>20</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>9</b>	<b>10</b>	<b>7</b>	<b>300</b>	
R002	Arapahoe Road from Waco to Himalaya	Roadway widening and reconstruction	2	3	2	1	3	1	2	3	2	3	228	1
R012	County Line Road from University to Broadway	Reconstruction and widening to 4 lanes	1	3	2	3	3	1	2	3	2	1	214	2
R003	County Line Road & Quebec Street Intersection	New southbound to westbound right turn lane	2	3	1	3	1	2	1	2	1	3	202	3
R015	Quincy Avenue from Reservoir Road to Himalaya	Widen to 6 lanes	2	3	2	1	3	1	0	3	2	1	200	4
R017	Smoky Hill Road from Buckley to Tower	Reconstruction and widening to 6 lanes	1	3	1	2	1	1	3	3	2	1	190	6
R039	University Blvd Structure over Big Dry Creek (n/o Arapahoe)	Replace structure	1	2	2	3	1	1	2	2	2	3	185	7
R004	Smoky Hill Road from Tower Road to Orchard Road	Roadway reconstruction and widening to 6 lanes	1	2	1	3	1	1	3	3	1	1	168	9
R018	Smoky Hill Road from Orchard to Piccadilly	Reconstruction and widening to 6 lanes	1	2	1	3	1	1	3	3	1	1	168	9
R021	Smoky Hill Road & Piccadilly Street Intersection	Signalize intersection	1	3	1	1	2	2	0	2	2	1	166	11
R016	Arapahoe Road & Holly Street Intersection	Add dedicated right turn lanes on all approaches	2	2	1	2	1	1	2	1	1	2	158	12
R014	Dry Creek Road & Colorado Blvd Intersection	Intersection reconstruction and auxiliary lanes	2	3	1	1	1	1	1	1	1	1	156	13
R032	Smoky Hill Rd from Liverpool St to E-470	Widen to 6 lanes	1	2	1	1	1	1	2	3	2	1	155	14
R034	Arapahoe Rd & Jordan Rd Intersection	Safety Improvements - Review intersection signal head	3	0	1	1	1	3	2	2	2	1	152	15
R005	County Line Road & Yosemite Street Intersection	New southbound to westbound right turn lane	1	2	1	1	1	2	3	2	1	1	150	16
R019	Arapahoe Road & Clarkson St Intersection	Signalize intersection	1	2	1	0	2	2	2	1	1	2	140	17
R037	Arapahoe Rd & Himalaya St Intersection	Add northbound to eastbound right turn lane	1	3	1	1	1	2	0	1	1	1	140	17
R001	Briarwood Ave & Potomac St Intersection	Signalize intersection	1	1	1	1	2	2	3	0	3	1	139	19
R036	Arapahoe Rd Structure over Big Dry Creek (e/o University)	Replace structure	1	1	2	1	1	1	2	2	1	3	139	19
R007	Briarwood Ave & Peoria St Intersection	Signalize intersection	1	1	1	2	2	2	3	0	2	1	137	21
R030	Havana St & Briarwood Ave/Costilla Ave Intersection	New eastbound to southbound right turn lane	1	1	1	3	1	2	3	1	1	1	137	21
R023	Peakview Ave & Syracuse Way Intersection	Signalize intersection / roundabout	1	1	1	1	2	2	3	0	2	1	129	23
R008	Yosemite Street & Mineral Drive Intersection	Signalize intersection	1	1	1	0	2	2	3	1	1	2	127	24
R035	Quebec Street & Hindsdale Place Intersection	Close access to Quebec Street	2	1	1	1	0	2	2	1	1	1	123	25
R009	Yosemite Street & Willow Way Intersection	Signalize intersection	1	1	1	0	2	2	3	1	1	1	120	26
R024	Piccadilly Street & Berry Drive Intersection	Signalize intersection / roundabout	1	1	1	0	2	2	3	1	1	1	120	26
R013	Peakview Avenue & Dayton Street Intersection	Intersection reconstruction and signal upgrade	1	1	1	1	1	1	3	0	2	1	115	28
R006	Holly Street & Foxridge Plaza Intersection	Signalize intersection	1	1	1	2	2	2	1	0	1	1	113	29
R020	Buckley Road & Crestline Ave Intersection	Signalize intersection	1	1	1	0	2	2	2	1	1	1	113	29
R025	Colorado Blvd & Easter Ave/Nobles Road Intersection	Signalize intersection / roundabout	1	1	1	0	2	2	2	0	1	1	104	31
R027	Smoky Hill Road & Kirk Street Intersection	Signalize intersection	0	2	1	0	2	0	1	1	1	1	96	32
R029	County Line Rd & Clarkson St Intersection	Signalize intersection	0	2	1	0	2	0	0	1	1	2	96	32

**Pedestrian/ Bicycle Improvement Projects**

Centennial Transportation Master Plan

Project ID#	Location	Description	Safety Enhancement	Congestion Mitigation	Continuity	Economic Development	Multi-Modal Enhancement	Improved Use of Existing Infrastructure	Community Benefits	Regional and Citywide Importance	Implementation	Community Support	Weighted Total	Preliminary Rank (With Weighting)
			<b>25</b>	<b>5</b>	<b>14</b>	<b>4</b>	<b>10</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>12</b>	<b>7</b>	<b>100</b>	
B013	Dry Creek Rd at I-25 crossing	Add multi-use path for crossing	3	3	3	2	3	1	2	2	2	2	246	1
P008	Dry Creek Rd from University Blvd to Franklin St	Widen and detach sidewalk on north side near school	2.25	3	3	2	2	3	3	1	2	3	243	2
P018	Yosemite St from Arapahoe Rd to County Line Rd	Add 5' minimum sidewalks in missing areas	2.5	3	3	2	2	3	3	1	2	2	243	2
P012	Arapahoe Rd from Adams Way to Nobles Way	Widen sidewalk to 5' minimum on south side through segment	2.5	2	3	2	2	2	3	2	2	3	243	2
P027	Arapahoe Rd & Holly St	Add 5' minimum sidewalk on NE corner	2.5	2	3	1	2	3	2	2	3	2	243	2
B012	E Panorama Cir/Panorama Dr e/o Yosemite St	Add flashing sign or HAWK at parking garage entrance on Panorama Ci & stripe bike lanes on Panorama	2	2	3	2	3	2	3	3	2	2	239	6
P010	Arapahoe Rd from Steel St to 200 ft w/o Elizabeth St	Add 5' minimum sidewalk on north side	2.5	3	3	2	1	2	3	2	2	3	238	7
P019	Alton Way from Yosemite St to I-25	Add 5' minimum sidewalks	2.25	3	3	2	2	3	3	1	2	2	236	8
P024	University Blvd from Mineral to Otero	Add 5' minimum sidewalks in missing areas	2.5	1	3	1	2	3	2	2	2	3	233	9
P006	S University Blvd from Josephine Way to 250 ft s/o Crabtree Dr	Widen / Install sidewalk on east side. Provide wayfinding signs for trail connection	2.25	1	3	2	2	3	2	2	2	3	230	10
P005	University Blvd from Columbine Way to Euclid Pl	Add 5' or 8' sidewalk	2.5	3	3	1	2	3	2	1	2	2	230	10
C	Dry Creek and University SE of Arapahoe HS	Raised crosswalk at RT lane	2.25	2	2	2	1	3	3	1	3	3	226	12
B014	Alton Way from Yosemite St to I-25	Stripe bike lanes	1.75	2	3	2	3	1	3	3	2	2	225	13
B018	Arapahoe Rd from Liverpool St to Jordan Rd	Add Multi-use path on one side and sidewalk on the remaining side - Recommend a phased approach with multi-use path constructed in short term	3	2	3	2	2	1	1	2	2	2	222	14
P013	Colorado Blvd from Dry Creek Rd to Otero	Add 5' minimum (detach or 8' attached) sidewalk to east side with retaining wall	2.25	2	3	1	2	3	2	1	2	2	218	15
P009	S Detroit St from Dry Creek Rd to Detroit	Enhance crossing with flashing sign or better signage and marking	2	2	3	2	2	2	3	1	2	2	217	16
B007	E Caley Ave from Quebec St to Arapahoe LRT Station	Stripe bike lanes	2.25	1	3	2	2	2	2	2	2	2	215	17
P020	Arapahoe Rd from I-25 to Parker Rd	Add 8' sidewalk in phases w roadway improvements	3	2	2	1	2	2	2	2	2	1	214	18
P022	Arapahoe Rd from Liverpool St to Jordan Rd	Add Multi-use path on one side and sidewalk on the remaining side - Recommend a phased approach with multi-use path constructed in short term	2.5	2	3	3	2	1	1	2	2	2	214	18
B011	Yosemite St, Nichols Ave, and Chester St from Mineral Dr to Dry Creek LRT Station	Provide multi-use path connection along Yosemite St (Mineral Dr to Nichols Ave) and stripe on-street bike lanes along Nichols and Chester	2	1	3	0	2	3	3	2	2	1	211	20
B005	Holly St from County Line Rd to Orchard Rd	Complete corridor analysis to remove a travel lane and stripe on street bike lanes in both directions; tie into C-470 trail to the south and Orchard Road	2.5	1	2	2	2	2	3	1	2	2	211	20
B015	Clinton St from I-25 to Peakview Ave	Add bike lanes along corridor	2	2	3	1	3	1	3	1	2	1	208	22
P026	Caley Ave east of Quebec	Add detached 5' sidewalk on south side	2.25	0	3	1	2	2	2	2	2	2	206	23
B003	Colorado Blvd from Orchard Rd to County Line Rd	Add bike lanes	2.25	1	3	2	1	2	2	2	2	2	205	24
P011	Caley Ave from Steele St to St. Paul Way (around Peabody Elementary)	Recommend 5' walks on all residential roadways. Additionally, connect Caley via a multi-use trail between Steel St and St. Paul Way on south side of school	2	2	3	1	2	2	2	0	2	3	205	25
P025	Quebec St from Caley Ave to Peakview Ave	Add detached 5' sidewalk on west side	2.5	0	3	1	1	2	2	2	2	2	203	26
P001	Orchard Rd from Clarkson St to Sherman Way	Install 5' minimum sidewalk on south side	2.25	2	3	2	1	2	1	2	2	2	201	27
P002	Orchard Rd from Highline Canal Trail to Ogden St	Install 5' minimum sidewalk on south side	2.25	2	3	2	1	2	1	2	2	2	201	27
P015	Spruce St s/o Arapahoe and e/o Quebec (at Little Dry Creek Trail)	Connect trails with way finding signs and road markings	1.25	2	2	1	2	3	3	1	3	2	200	29

**Pedestrian/ Bicycle Improvement Projects**

Centennial Transportation Master Plan

Project ID#	Location	Description	Safety Enhancement	Congestion Mitigation	Continuity	Economic Development	Multi-Modal Enhancement	Improved Use of Existing Infrastructure	Community Benefits	Regional and Citywide Importance	Implementation	Community Support	Weighted Total	Preliminary Rank (With Weighting)
			<b>25</b>	<b>5</b>	<b>14</b>	<b>4</b>	<b>10</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>12</b>	<b>7</b>	<b>100</b>	
P004	Arapahoe Rd from Vine St to Broadway	Widen to minimum 5' attached sidewalk	2.25	2	2	2	2	1	2	2	2	2	198	30
P014	Little Dry Crk Trail from Krameria Way to Briarwood Cir (s/o Quebec and Arapahoe)	Widen walk on north side of Arapahoe Rd from Krameria to new Arapahoe Rd underpass	2.5	1	2	1	2	2	2	1	2	2	198	30
P016	Uinta St from Costilla Blvd to Arapahoe Rd (near Walnut Hills Elementary School)	Widen to 5-6' attached sw or provide traffic calming measures along street to maintain slow vehicle speeds and install bicycle signage/ sharrow or a bicycle blvd	2	1	2	2	2	1	3	1	2	2	190	32
P021	Parker Rd from Orchard Rd to Valley High Dr (B020)	Add Multi-use path on one side and minimum 8' sidewalk on remaining side both bike / ped travel	3	2	2	2	2	1	1	1	1	2	190	32
B020	Parker Rd from Orchard Rd to Valley High Dr (P021)	Add Multi-use path on one side and minimum 8' sidewalk on remaining side both bike / ped travel	3	2	2	2	2	1	1	1	1	2	190	32
P023	Liverpool St from Arapahoe Rd to Smoky Hill Rd	Add 8' minimum sidewalk and retaining wall on east side	2.5	1	3	1	2	1	1	2	1	2	189	35
B017	Orchard Rd & Telluride intersection	Add crossing via flashing crosswalk to get to trail	2	1	2	0	2	3	2	1	3	0	187	36
B006	Locust St & Caley Ave (w/o Quebec)	Sign for bicycles	1.5	1	3	0	1	3	2	2	2	2	187	36
P017	Xanthia St Trail at Briarwood Blvd	Install curb that meets ADA standards for trail crossing	1.25	1	1	2	2	3	3	0	3	3	186	38
B008	Greenwood Plaza Blvd from Arapahoe Rd to Fiddlers Green to LRT Station (in Greenwood Village)	Add bike lanes	1.75	1	2	2	2	3	2	2	1	2	185	39
B010	Willow Creek from Mineral Ave to Mineral Dr	Connect existing bike lanes from E Mineral Ave to E Mineral Dr	1.5	2	3	1	2	2	2	1	2	1	185	39
B001	County Line Rd and Clarkson St intersection	Signalize intersection (Refer to R029)	2	1	2	1	2	1	2	3	2	1	182	41
B004	Orchard Rd from Colorado Blvd to Quebec St	Sign for bicycles and stipe bike lane	2	1	3	1	1	1	2	2	2	1	180	42
P003	Highline Canal Trail at Orchard Rd (1800 ft w/o University Blvd)	Emphasize crosswalk, consider HAWK or flashing signs	2	1	1	1	2	2	2	2	2	2	177	43
B016	Failr Ave - Caley Ave Trail Extension	Connect Caley Ave Trail Extension to Cherry Creek Trail. Provide clear signage and shorten gate to allow bicycle access	1.5	1	3	0	1	3	2	2	2	0	173	44
B002	Franklin St from Dry Creek Rd to Easter Pl (w/o Araphaoe HS)	Strip bike lanes connecting Arapahoe HS to E Easter Pl	1.5	1	2	2	1	2	3	1	2	1	169	45
B009	Uinta St from Costilla Blvd to Arapahoe Rd (near Walnut Hills Elementary School)	Widen to 5-6' attached sw or provide traffic calming measures along street to maintain slow vehicle speeds and install bicycle signage/ sharrow or a bicycle blvd	1.5	1	2	2	2	1	2	1	2	2	169	45
G	Colorado Blvd & Euclid St intersection	Review for Ped signal or other pedestrian crossing enhancement	2	0	0	0	1	3	3	1	3	2	167	47
A	Arapahoe Rd & Vine St intersection	Replace signal head and verify timing	1.25	0	1	0	1	3	3	0	3	1	149	48



# **Appendix F      Long-Term Roadway Plan Analysis**



## Appendix F1 Travel Demand Model Process and Results



## Appendix F1 – Travel Demand Modeling Process

A travel demand model for the study area was developed for the Centennial Transportation Master Plan. A travel demand model is a planning tool for assessing alternative improvements to a transportation system, given projected future demand. It provides output in the form of estimated traffic volumes on the roadway system and ridership on the transit system. The Centennial travel demand model was developed for the 2035 planning horizon and provides traffic volume forecasts for various improvements alternatives.

The most current version of the DRCOG regional travel demand model at the onset of the forecasting process, Compass 4.0 (Cycle 2, 2009), was used as a basis for developing traffic forecasts. The DRCOG Traffic Analysis Zone (TAZ) system was refined to provide sufficient zonal definition for the study area as well as to incorporate zone boundary changes made during the Arapahoe Road Corridor Study, Parker Road Corridor Study, and the I-25 / Arapahoe Road Interchange Environmental Assessment. The TAZ map is shown on **Figure F1-1**.

Travel forecasts for the Centennial TMP are based on the DRCOG travel demand model using the base year 2010 model and the out year 2035 model. The DRCOG land use totals for Centennial have been maintained. City staff provided some reallocation of 2010 land use by TAZ to better match existing conditions, while maintaining the DRCOG totals for Centennial TAZs. Likewise, the staff reallocated the 2035 land use forecasts by TAZ to better represent likely growth patterns, maintaining DRCOG totals. The household and employment forecasts by TAZ are shown on **Tables F1-1 and F1-2**, respectively

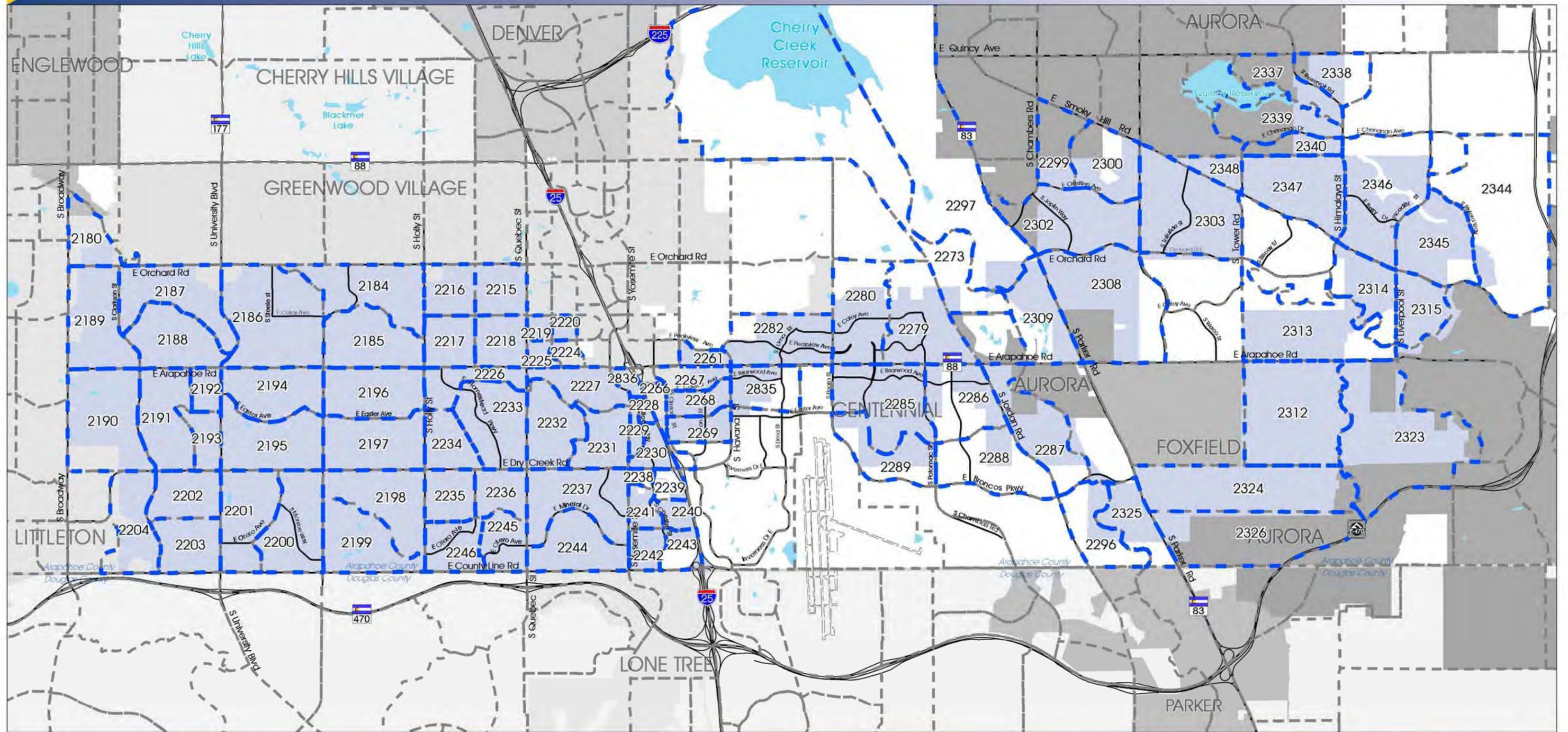
A baseline 2035 model was run using DRCOG's 2035 Fiscally Constrained travel demand model, which includes improvements throughout the Denver region which are included in DRCOG's Fiscally Constrained Plan. Roadway network definition in the Centennial area has been added to the model to better represent the current system. Centennial's roadway network in this Baseline model generally represents existing conditions, since no major roadway improvements in Centennial have identified and committed funding sources. However, two major widening projects, which are designed but do not have committed funding, are assumed to be completed before any additional major roadway improvements would be made in Centennial:

- ▶ Arapahoe Road from Waco to Himalaya – widen to six lanes
- ▶ County Line Road from Broadway to University – widen to four lanes

The Baseline model represents the travel demands forecasts for 2035 if no improvements were made to Centennial's transportation system beyond these two major widening projects.

The 2010 model was used as the basis for post-processing the Baseline model results and all subsequent model runs. 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 the base year (2010) model's predicted traffic volumes versus actual traffic counts. These comparisons provide estimations of the error associated with the model's representation of travel conditions. The model-produced forecasts can then be adjusted to account for the errors found in the model to provide more reliable forecasts. This post-processing adjustment process, as prescribed in the Transportation Research Board's publication NCHRP 255, was applied to the Centennial Transportation Master Plan forecasts.





LEGEND

- Centennial TAZs
- Other TAZs
- Major Streets/Highways
- TAZ ID's
- City Limits
- Lakes



**Table F1-1 Household Forecasts**

HOUSEHOLDS								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Low Income	Med Income	High Income	Total HH	Low Income	Med Income	High Income	Total HH
2180	37	255	41	333	39	259	41	339
2184	35	558	375	968	39	611	399	1,049
2185	37	570	303	911	42	619	320	981
2186	44	908	371	1,323	48	963	383	1,393
2187	12	297	144	453	14	316	149	479
2188	46	581	208	835	51	640	224	915
2189	70	452	194	716	85	534	225	844
2190	95	797	317	1,209	267	2,178	847	3,292
2191	101	507	246	854	136	659	313	1,108
2192	0	101	101	202	50	225	125	400
2193	73	402	99	574	75	402	97	574
2194	26	421	198	645	34	525	241	800
2195	49	854	403	1,306	54	920	422	1,396
2196	81	815	255	1,151	93	910	279	1,281
2197	33	711	318	1,062	38	803	350	1,190
2198	13	322	284	619	18	439	374	830
2199	8	108	87	203	8	109	86	203
2200	40	535	333	908	44	582	352	978
2201	79	874	398	1,351	101	1,089	485	1,675
2202	14	339	191	544	15	342	188	544
2203	5	394	262	661	5	401	259	665
2204	19	489	310	818	20	494	304	818
2215	9	197	135	341	12	242	161	414
2216	7	239	126	372	7	241	124	372
2217	17	173	131	321	17	175	129	321
2218	8	251	188	447	9	254	185	447
2219	37	314	107	458	38	315	105	458
2220	1	2	2	5	6	23	15	44
2224	0	0	0	0	31	276	94	401
2225	22	199	70	291	22	201	68	291
2226	52	782	454	1,287	56	832	469	1,357
2227	14	243	99	356	15	244	97	356
2228	0	0	0	0	0	0	0	0
2229	0	0	0	0	0	0	0	0
2230	0	0	0	0	0	0	0	0
2231	30	544	275	850	31	549	270	850
2232	34	449	213	696	35	453	208	696
2233	40	471	224	735	45	519	241	805
2234	8	175	123	306	8	177	121	306
2235	11	292	240	543	11	296	235	543
2236	20	299	130	450	21	307	131	459
2237	34	617	414	1,065	38	664	433	1,135

HOUSEHOLDS								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Low Income	Med Income	High Income	Total HH	Low Income	Med Income	High Income	Total HH
2238	19	168	59	246	19	169	58	246
2239	0	0	0	0	0	0	0	0
2240	0	0	0	0	15	138	46	200
2241	0	0	0	0	0	0	0	0
2242	6	58	20	84	13	116	39	168
2243	0	0	0	0	15	138	46	200
2244	20	411	308	739	22	455	331	809
2245	51	325	156	532	53	326	153	532
2246	30	250	149	429	31	251	146	429
2261	15	120	33	168	15	121	32	168
2266	0	0	0	0	0	0	0	0
2267	1	1	1	3	1	2	1	4
2268	0	0	0	0	0	0	0	0
2269	0	0	0	0	0	0	0	0
2273	2	32	19	53	2	32	18	53
2279	6	80	62	148	13	186	138	337
2280	0	0	1	1	0	0	1	1
2282	0	181	145	326	0	184	142	326
2285	0	0	0	0	0	0	0	0
2286	1	4	2	7	1	4	2	7
2287	54	215	141	410	68	264	168	500
2288	87	344	225	656	90	345	221	656
2289	7	28	18	53	62	242	153	457
2296	69	273	178	520	74	283	181	538
2297	17	278	140	435	18	284	139	441
2299	7	209	196	412	7	213	192	412
2300	15	369	296	680	17	416	323	756
2302	5	537	480	1,022	5	546	471	1,022
2303	32	1,074	672	1,778	35	1,140	693	1,867
2308	10	206	177	392	10	209	173	392
2309	0	236	198	434	0	245	199	444
2312	5	159	127	291	12	331	258	601
2313	16	184	151	351	16	187	148	351
2314	14	295	229	538	26	551	415	992
2315	0	48	48	96	0	75	73	148
2323	8	160	152	320	44	875	806	1,725
2324	5	120	96	221	5	122	94	221
2325	0	1	1	2	0	116	46	162
2326	0	102	85	187	0	806	654	1,460
2337	12	466	166	644	12	469	163	644
2338	10	265	153	428	10	268	150	428
2339	21	524	252	797	22	528	247	797
2340	17	319	137	473	19	359	150	528
2344	51	1,416	819	2,286	70	1,912	1,076	3,058

HOUSEHOLDS								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Low Income	Med Income	High Income	Total HH	Low Income	Med Income	High Income	Total HH
2345	0	707	341	1,048	0	1,363	639	2,002
2346	41	1,106	592	1,739	53	1,421	740	2,214
2347	13	648	478	1,139	18	863	618	1,499
2348	10	185	116	311	11	208	126	345
2835	0	0	0	0	0	0	0	0
2836	0	0	0	0	27	239	81	347
<b>Total</b>	<b>1938</b>	<b>28641</b>	<b>15988</b>	<b>46,568</b>	<b>2609</b>	<b>36790</b>	<b>20099</b>	<b>59,496</b>

**Table F1-2 Employment Forecasts**

EMPLOYMENT								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Prod/Dist	Retail	Service	Total EMP	Prod/Dist	Retail	Service	Total EMP
2180	67	821	270	1,158	65	672	262	999
2184	20	11	297	328	21	12	320	353
2185	6	7	602	615	6	7	692	705
2186	85	352	342	779	69	325	399	793
2187	11	45	87	143	19	81	156	256
2188	69	23	417	509	77	26	464	567
2189	62	477	283	822	63	405	285	753
2190	43	79	168	290	90	167	354	611
2191	57	1	313	371	59	1	324	384
2192	19	911	329	1,259	19	1,606	400	2,025
2193	5	5	13	23	7	8	99	114
2194	17	131	242	390	18	142	262	422
2195	27	187	102	316	31	215	117	363
2196	44	277	437	758	44	277	437	758
2197	19	79	154	252	23	95	184	302
2198	53	6	976	1,035	50	260	1,279	1,589
2199	12	282	87	381	12	279	86	377
2200	37	8	27	72	60	13	44	117
2201	12	378	358	748	12	378	358	748
2202	23	217	272	512	23	219	275	517
2203	63	22	78	163	73	26	90	189
2204	34	27	141	202	35	27	143	205
2215	264	58	640	962	310	68	752	1,130
2216	15	425	190	630	15	415	186	616
2217	5	1	5	11	7	2	7	16
2218	14	13	124	151	14	13	124	151
2219	149	65	586	800	206	90	809	1,105
2220	96	18	1,044	1,158	96	18	2,387	2,501
2224	2	177	329	508	2	177	2,329	2,508
2225	7	186	202	395	10	257	280	547
2226	77	0	709	786	78	0	718	796

EMPLOYMENT								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Prod/Dist	Retail	Service	Total EMP	Prod/Dist	Retail	Service	Total EMP
2227	165	119	1,594	1,878	147	119	1,594	1,860
2228	330	0	724	1,054	390	0	856	1,246
2229	68	73	563	704	150	173	663	986
2230	598	176	885	1,659	598	176	885	1,659
2231	32	36	70	138	32	36	70	138
2232	8	6	91	105	11	9	128	148
2233	227	11	90	328	244	12	97	353
2234	1	5	10	16	1	9	19	29
2235	25	1	75	101	27	1	83	111
2236	49	19	117	185	56	22	133	211
2237	41	26	131	198	41	26	131	198
2238	30	20	922	972	33	22	1,030	1,085
2239	28	122	951	1,101	34	105	1,591	1,730
2240	0	44	2,028	2,072	140	223	3,635	3,998
2241	381	198	1,280	1,859	458	238	1,541	2,237
2242	371	246	1,389	2,006	448	298	1,679	2,425
2243	0	534	166	700	57	551	593	1,201
2244	16	153	229	398	16	153	229	398
2245	20	189	97	306	22	209	107	338
2246	42	239	328	609	46	265	363	674
2261	32	253	79	364	48	310	120	478
2266	29	0	491	520	45	0	774	819
2267	131	445	931	1,507	131	379	1,231	1,741
2268	181	91	274	546	304	152	460	916
2269	55	78	382	515	55	78	382	515
2273	0	0	293	293	0	0	266	266
2279	31	28	422	481	44	140	595	779
2280	951	264	1,118	2,333	995	356	1,273	2,624
2282	806	324	882	2,012	1,098	346	1,202	2,646
2285	1,800	429	3,640	5,869	1,988	378	4,123	6,489
2286	796	84	638	1,518	1,095	116	878	2,089
2287	976	31	619	1,626	988	51	626	1,665
2288	511	134	259	904	1,100	347	617	2,064
2289	273	100	3,033	3,406	296	109	3,291	3,696
2296	3	1	5	9	3	1	5	9
2297	37	108	290	435	45	118	533	696
2299	25	24	76	125	25	24	77	126
2300	8	188	423	619	8	188	424	620
2302	69	894	259	1,222	73	874	275	1,222
2303	48	34	186	268	59	42	226	327
2308	16	895	574	1,485	15	856	549	1,420
2309	1	3	17	21	5	11	60	76
2312	9	9	35	53	24	23	90	137
2313	35	0	78	113	36	0	79	115
2314	27	1	143	171	33	1	172	206

EMPLOYMENT								
TAZ	2010 CENTENNIAL				2035 CENTENNIAL			
	Prod/Dist	Retail	Service	Total EMP	Prod/Dist	Retail	Service	Total EMP
2315	13	3	4	20	23	5	7	35
2323	4	0	532	536	5	0	635	640
2324	27	6	13	46	48	10	22	80
2325	0	0	0	0	9	6	17	32
2326	1	3	4	8	4	23	28	55
2337	8	0	11	19	8	0	12	20
2338	0	7	12	19	1	19	32	52
2339	16	0	27	43	17	0	29	46
2340	3	0	10	13	4	0	12	16
2344	35	2	378	415	44	2	472	518
2345	20	61	102	183	32	96	160	288
2346	66	170	271	507	72	184	294	550
2347	55	429	386	870	56	437	393	886
2348	6	20	105	131	10	32	169	211
2835	596	208	1,169	1,973	711	249	1,395	2,355
2836	329	180	0	509	0	879	2,972	3,851
<b>Total</b>	<b>11875</b>	<b>13013</b>	<b>39735</b>	<b>64,623</b>	<b>14122</b>	<b>15770</b>	<b>55026</b>	<b>84,918</b>



## Appendix F2 Considerations Evaluation and Screening



## Appendix F2 – Considerations Evaluation and Screening

A series of ten roadway improvement considerations were identified to evaluate their effectiveness in addressing the 2035 travel demand in Centennial, as shown on **Figure F2-1**. Each of the considerations has been evaluated independently to isolate the effects on the travel patterns in the City. Each consideration has been compared to the Baseline travel demand model forecasts, which includes two major roadway improvement projects that are assumed to be complete before any additional major roadway improvements would be made in Centennial:

- ▶ Arapahoe Road from Waco to Himalaya – widen to six lanes
- ▶ County Line Road from Broadway to University – widen to four lanes

### Analysis and Screening Process

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The evaluation of the ten roadway improvement considerations followed a three step analysis and screening process. The **Level 1** analysis addressed the following components:

- ▶ 2035 traffic forecasts, ability to relieve congestion
- ▶ Magnitude of construction costs

The **Level 2** analysis involved a more refined evaluation of the of the 2035 travel patterns including:

- ▶ Origins and destinations of travelers
- ▶ Operational analysis

Finally, the **Level 3** analysis included:

- ▶ Conceptual construction costs
- ▶ Qualitative assessment of evaluation criteria, as outlined in the Short Term Transportation Plan

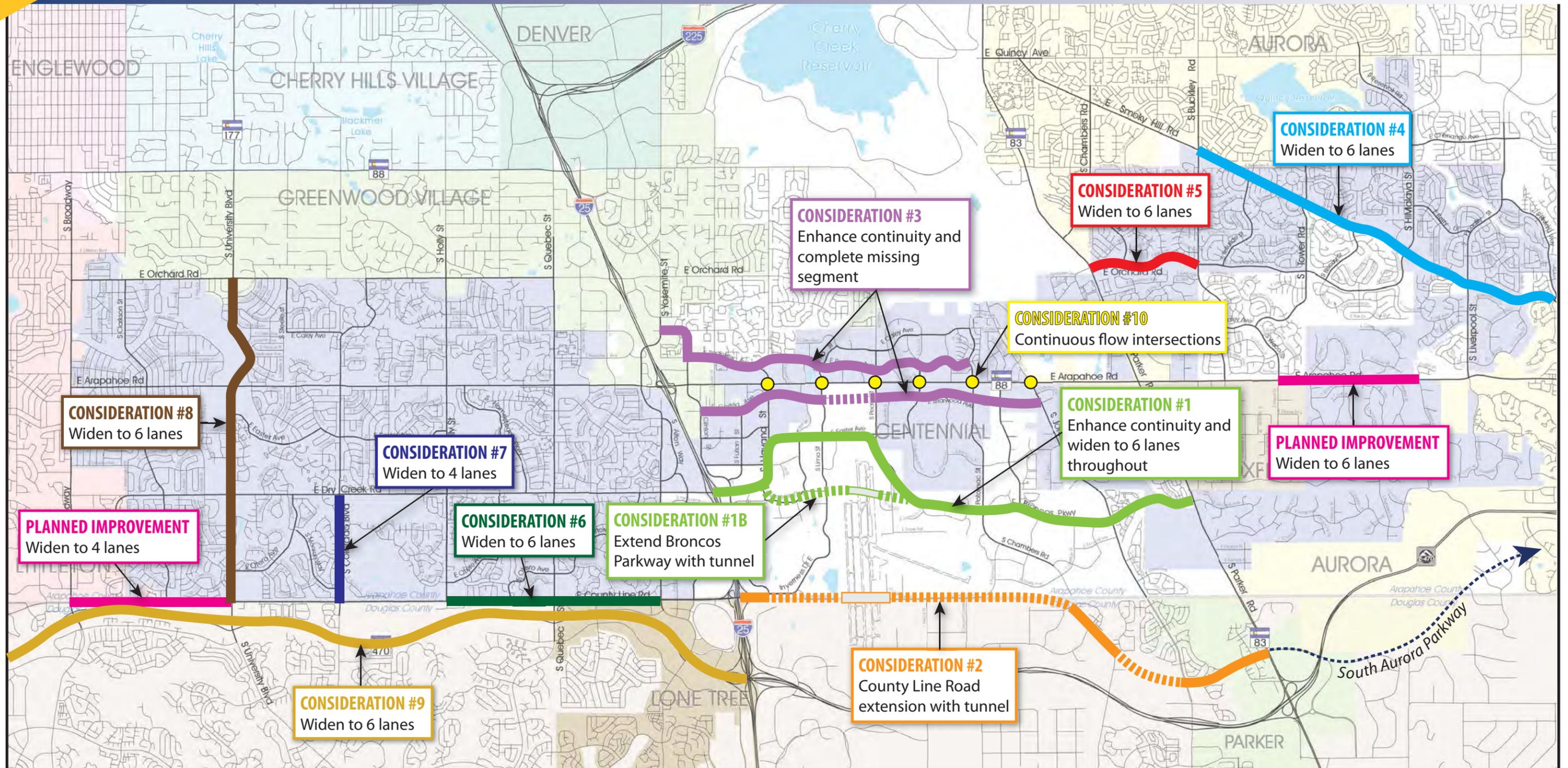
The results from each level of analysis and the recommended screening were presented to and discussed with the Staff Working Group and The Community Advisory Committee. The final recommendations received concurrence from the City Council and the Planning & Zoning Commission at the March 12, 2012 joint workshop.

### Summary of Analysis and Screening Results

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A summary of the considerations retained and screened in each of the three levels is provided in **Table F2-1**. As shown, seven of the ten roadway improvement considerations have been retained and included in the Long Range Roadway Plan (**Figure 14** of the Transportation Master Plan) as Centennial-led improvements.





LEGEND	
	Roadway Improvement Alternative
	New Roadway
	Tunnel



**Table F2-1 Summary of Analysis and Screening**

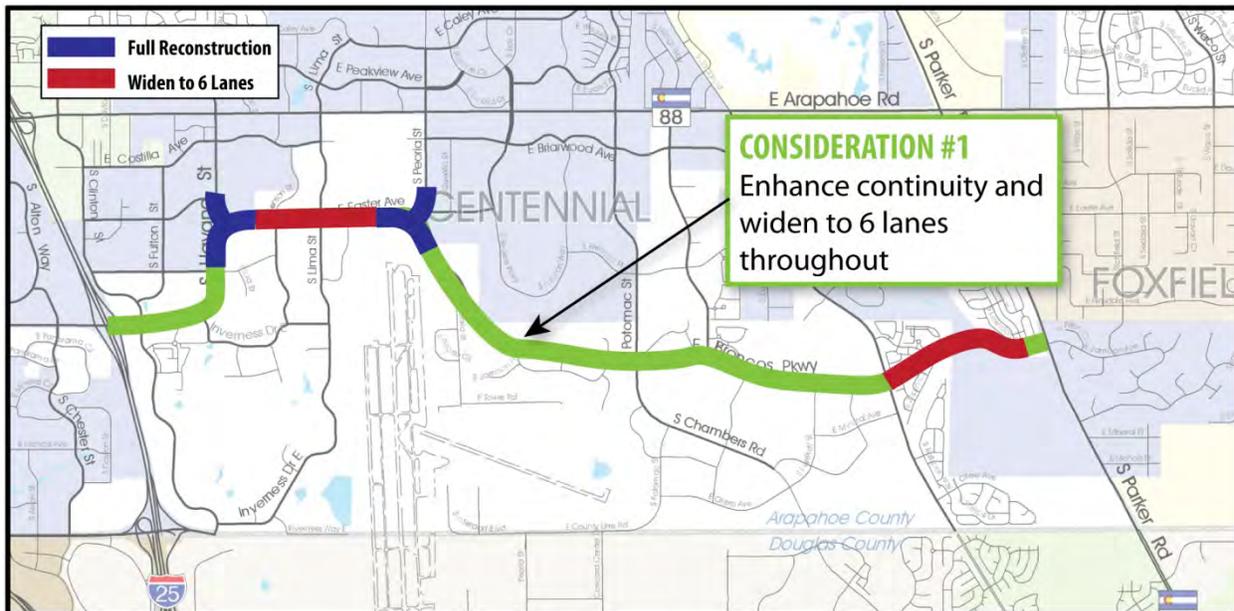
Consideration	Level 1	Level 2	Level 3
#1 – Broncos Parkway	✓	✓	✓
#1B – Broncos Parkway with Tunnel	⊘	-	-
#2 – County Line Rd Extension	⊘	-	-
#3 – Peakview and Briarwood	✓	✓	✓
#4 – Smoky Hill Rd Widening	✓	NAC	✓
#5 – Orchard Rd Widening	✓	NAC	✓
#6 – County Line Rd Widening	✓	✓	✓
#7 – Colorado Blvd Widening	✓	✓	✓
#8 – University Blvd Widening	✓	NAC	⊘*
#9 – C-470 Widening	⊘*	-	-
#10 – Arapahoe Road CFIs	✓	✓	✓

✓ = Move Forward      NAC = No Analysis Completed  
 ⊘ = Eliminate      ⊘\* = Eliminate as Centennial-led improvement

## Description of Roadway Improvement Considerations and Evaluation

### Consideration #1 – Broncos Parkway

Description: create a six-lane arterial from I-25 to Parker Road



### Level 1 Analysis:

- ▶ Enhancing Broncos Parkway will increase the 2035 traffic volume by 18,200 vpd
  - 4,700 vpd (26%) of the increase will come from volume decrease along Arapahoe Road
  - 2,800 vpd (15%) of the increase will come from volume decreases along Peakview Avenue and Briarwood Avenue
  - 3,400 vpd (19%) of the increase will come from volume decreases along E-470 and Lincoln Avenue
  - The remaining volume increases (40%) are from other facilities; a significant portion is likely the result of new regional trips using the corridor due to the new capacity and upgraded continuity (i.e., trips have changed their destinations as a result of the new available capacity)

### Level 2 Analysis:

- ▶ Traffic using Broncos Parkway will have the following characteristics,
  - 44% of the trips will be Centennial traffic (with at least one trip end in Centennial)
  - 56% of the trips will be non-Centennial traffic (with no trip end in Centennial)
  - 
  - 23% of the trips will be short distance local trips (with both trip ends within Central TAZs)
  - 7% of the trips will be long distance through trips (with no trip end in Central TAZs)
  - The remaining trips (70%) are of varying lengths, but each have one trip end in a Central TAZ and the other end elsewhere the Denver Metro area
- ▶ Of the new trips,
  - 11% of the trips along Broncos Parkway will be local Centennial traffic
  - 39% of the trips along Broncos Parkway will be local non-Centennial traffic
  - 8% of the trips along Broncos Parkway will be non-local Centennial traffic
  - 42% of the trips along Broncos Parkway will be non-local non-Centennial traffic

### Level 3 Analysis:

- ▶ Conceptual construction cost estimate: \$20M
- ▶ Considerable work has been done by Arapahoe Road toward making Broncos Parkway a viable alternative route to Arapahoe Road; Centennial's focus would be on reconfiguring the intersections of Havana/Easter and Easter/Broncos Parkway.

Havana/Easter



Peoria/Easter

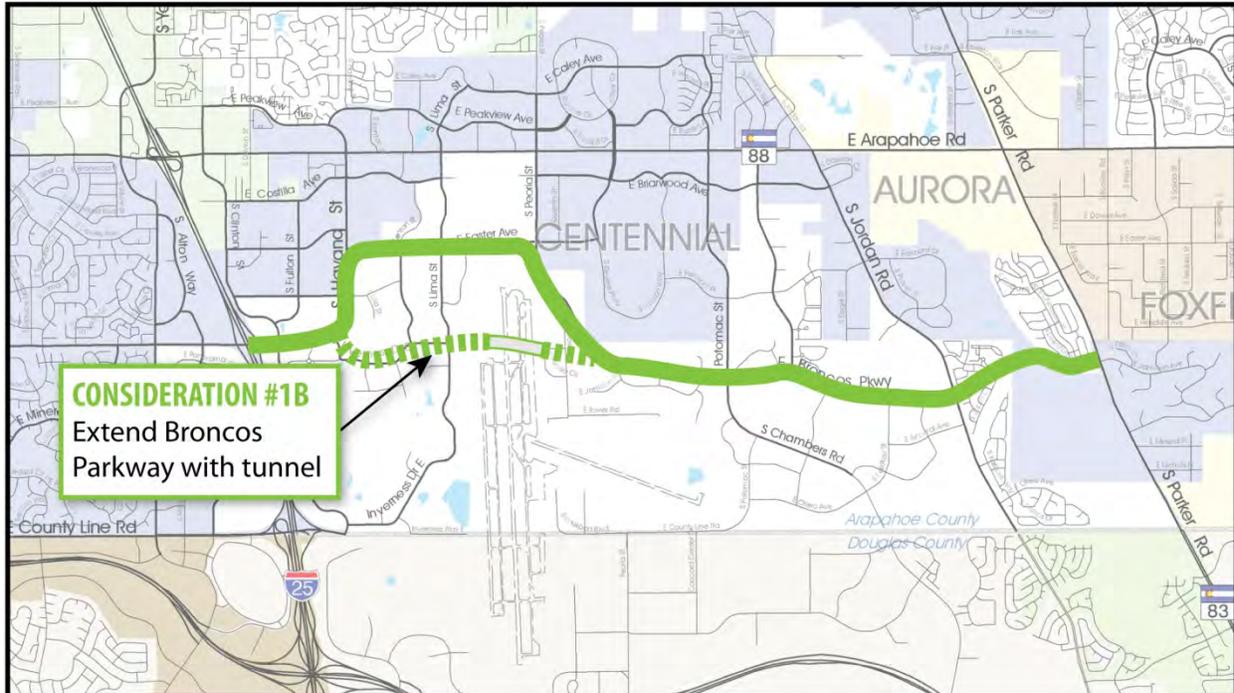


### Summary of Results and Recommendations

- ▶ Parallel alternative to Arapahoe Road; provides some relieve to Arapahoe Road, but not the "silver bullet"
- ▶ Would attract new regional trips to the area
- ▶ 93% of trips have one "trip end" between I-25 and Parker Road
- ▶ Makes use of existing infrastructure
- ▶ Joint effort with Arapahoe County
- ▶ **Incorporate in Long Range Roadway Plan**

## Consideration #1B – Broncos Parkway with Tunnel

Description: Create a six-lane arterial from I-25 to Parker Road with a tunnel under Centennial Airport runways



### Level 1 Analysis

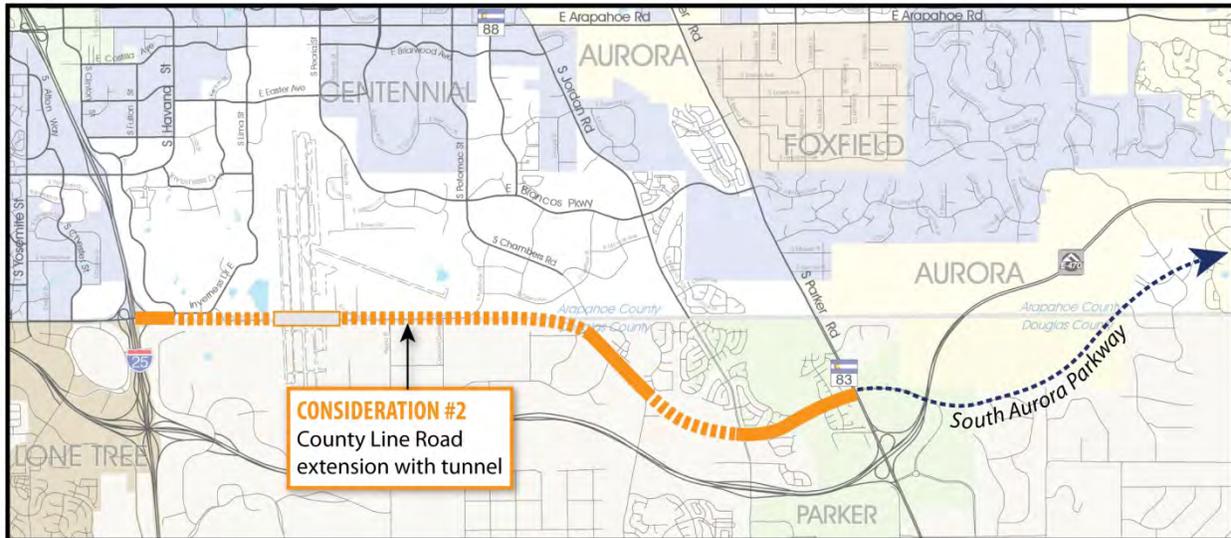
- ▶ The existing E/W section of Broncos Parkway would attract 45,000 to 50,000 vpd (5,000 to 10,000 vpd more than Consideration #1). V/C ratio of 0.94 to 1.04.
- ▶ The new section of Broncos Parkway (tunnel) would attract approximately 38,000 vpd
- ▶ This Consideration would provide some relief to the section of Arapahoe from I-25 to Havana, which Consideration #1 did not. Traffic along Arapahoe from I-25 to Potomac would be reduced by 5,000 to 10,000 vpd. East of Potomac, only minor reductions in traffic on Arapahoe.

### Summary of Results and Recommendations

- ▶ The additional traffic diversion from Arapahoe Road is not worth the cost of tunneling under the airport runways
- ▶ Significant coordination efforts would be required (land acquisition, environmental clearances, etc.)
- ▶ **Eliminate from further consideration**

## Consideration #2 – County Line Road Extension

Description: Extend County Line Road from I-25 to Parker Road with a tunnel under Centennial Airport runways



### Level 1 Analysis

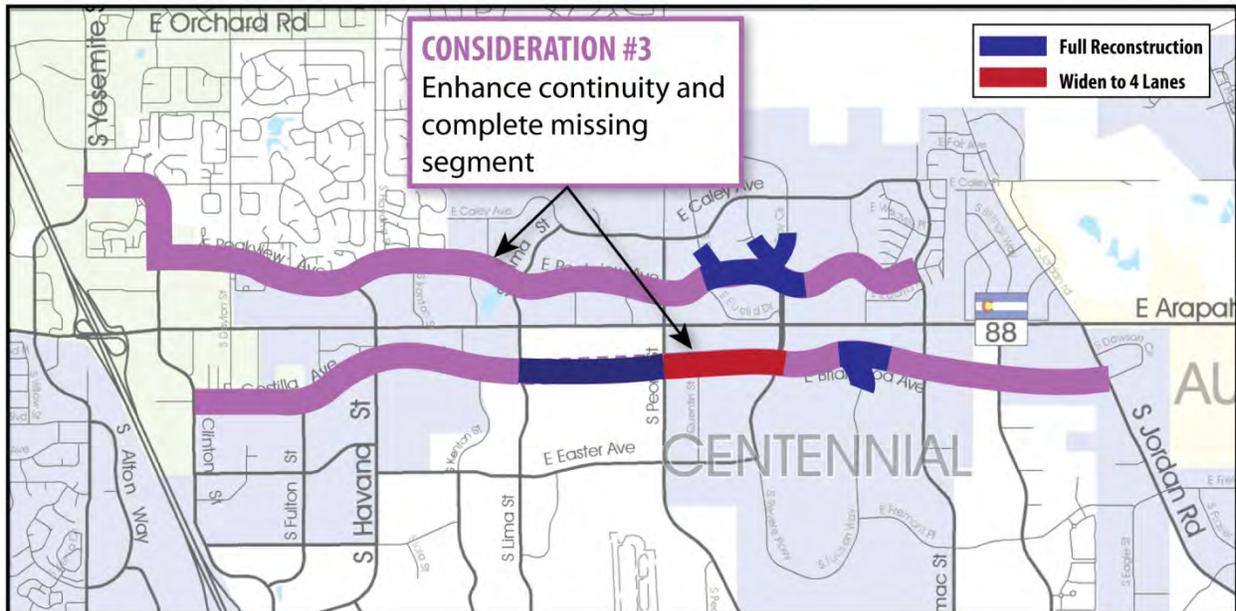
- ▶ The new segment of County Line Road (I-25 to Parker Road) would attract approximately 45,000 vpd (V/C ratio of 0.94).
- ▶ This Consideration would provide only minimal relief to Arapahoe Road (I-25 to Parker), with volume reductions of 5,000 vpd or less along the corridor.
- ▶ The new corridor would pull some traffic from E-470 (approximately 6,000 vpd), and from Broncos Parkway/Easter (approximately 4,000 vpd).
- ▶ Suppressed trips (induced demand) using this new corridor – likely travelers are changing their destinations based on availability of this route. Further analysis needed to understand origins and destinations of users.

### Summary of Results and Recommendations

- ▶ Would provide only minimal relief to Arapahoe Road at a high cost
- ▶ Would attract new regional trips
- ▶ Significant coordination efforts would be required (land acquisition, environmental clearances, etc.)
- ▶ Potential for significant opposition from residents in Aurora/Douglas County
- ▶ **Eliminate from further consideration**

### Consideration #3 – Peakview Avenue and Briarwood Avenue

Description: Create parallel facilities to Arapahoe Road – enhance continuity and complete missing links



#### Level 1 Analysis

- ▶ Both Peakview Avenue and Briarwood Avenue would carry an additional 5,000 – 10,000 vpd.
- ▶ Arapahoe Road (I-25 to Potomac Street) would be relieved by as much as 5,000 vpd.
- ▶ Suppressed trips (induced demand) using these corridors – likely travelers are changing their destinations based on availability of these improved routes. Further analysis needed to understand origins and destinations of users.

#### Level 2 Analysis

- ▶ Traffic using Peakview Avenue will have the following characteristics,
  - 56% of the trips will be Centennial traffic (with at least one trip end in Centennial)
  - 44% of the trips will be non-Centennial traffic (with no trip end in Centennial)
- ▶ Traffic using Briarwood Avenue will have the following characteristics,
  - 62% of the trips will be Centennial traffic (with at least one trip end in Centennial)
  - 38% of the trips will be non-Centennial traffic (with no trip end in Centennial)
- ▶ Traffic pattern changes as a result of Consideration #3,
  - Will increase 2035 volume along Peakview Avenue by 9,400 vpd
    - 25% of the new trips will be local Centennial traffic
    - 32% of the new trips will be local non-Centennial traffic

- Will increase 2035 volume along Costilla Avenue by 4,300 vpd
  - 31% of the new trips will be local Centennial traffic
  - 28% of the new trips will be local non-Centennial traffic
- Will decrease 2035 volume along Arapahoe Road (between Lima and Peoria) by 3,300 vpd
  - 94% of these vehicles are local traffic using the upgraded roadways to access local destinations along the corridor

### Level 3 Analysis

- ▶ Conceptual Construction Cost Estimate:
  - Peakview: \$3.0M
  - Briarwood: \$4.8M
- ▶ Crossing of the golf course is a concern; consider focusing on Peakview, with Briarwood as a lower priority

### Summary of Results and Recommendations

- ▶ Makes use of existing infrastructure
- ▶ Opportunity for developer participation as development/redevelopment along the corridors occurs
- ▶ Bicycle and pedestrian accommodation should be considered
- ▶ **Incorporate in Long Range Roadway Plan**

## Consideration #4 – Smoky Hill Roadway Widening

Description: Extend six-lane arterial from Buckley to Versailles; use auxiliary lanes and median as possible



### Level 1 Analysis

- ▶ Traffic on Smoky Hill Road would increase by 5,000 – 7,000 vpd, with daily volumes ranging from 30,000 – 50,000 vpd. (V/C ratio ranging from 0.63 to 1.04). The section of Smoky Hill between Buckley Road and Liverpool Street would be near the capacity of a six lane road; other segments would be within the six lane roadway capacity.
- ▶ The widening would provide only minor relief to Orchard Road; the segment of Orchard from Parker to Buckley is projected to be over capacity in 2035, the volume would be reduced by only 1,500 vpd with the Smoky Hill widening.

## Level 2 Analysis

N/A

## Level 3 Analysis

- ▶ Conceptual Construct Cost Estimate: \$7.3M

## Summary of Results and Recommendations

- ▶ Would relieve current (and future) congestion on Smoky Hill Road; would result in minor increase in demand
- ▶ Wider road would be more difficult for bike/ped crossing
- ▶ Separate right turn lanes would need to be analyzed in more detail
- ▶ **Incorporate in Long Range Roadway Plan**

## Consideration #5 – Orchard Road Widening

Description: Widen to 6-lane arterial from E. Ida to Buckley; new signals at E. Ida, Joplin, & Buckley



### Level 1 Analysis

- ▶ Traffic on Orchard Road would increase by less than 2,000 vpd, with a forecasted volume of 37,100 vpd on this segment (V/C ratio of 0.77 – well within the capacity of a six lane roadway).
- ▶ This improvement would relieve the capacity deficiency on this particular segment, but would have minimal effect on the travel patterns on the rest of the network.

### Level 2 Analysis

N/A

### Level 3 Analysis

- ▶ Conceptual Construction Cost Estimate: \$3.8M

### Summary of Results and Recommendations

- ▶ Would relieve current (and future) congestion on Orchard Road
- ▶ Wider road would be more difficult for bike/ped crossing
- ▶ Potential interchange at Parker Road should be considered
- ▶ **Incorporate in Long Range Roadway Plan**

## Consideration #6 – County Line Road Widening

Description: Widen to 6-lane arterial from Holly to Yosemite; widen both sides Holly to Quebec, widen WB Quebec to Yosemite; new signal at Niagara



### Level 1 Analysis

- ▶ Traffic on this segment of County Line Road would increase by 3,000 – 7,000 vpd, with forecasted daily volumes in the range of 46,000 – 50,000 vpd (V/C ratio ranging from 0.96 to 1.04).
- ▶ This improvement would relieve the capacity deficiency on this particular segment, but would have minimal effect on the travel patterns on the rest of the network.

### Level 2 Analysis

- ▶ Traffic using County Line Road will have the following characteristics,
  - 41% of the trips will be Centennial traffic (with at least one trip end in Centennial)
  - 59% of the trips will be non-Centennial 2035 traffic (with no trip end in Centennial)

### Level 3 Analysis

- ▶ Conceptual Construction Cost Estimate: \$5.1M

### Summary of Results and Recommendations

- ▶ Would mostly relieve current (and future) congestion on County Line Road
- ▶ Minimal shifts in travel patterns
- ▶ 41% of trips will be Centennial traffic
- ▶ Wider road would be more difficult for bike/ped crossing
- ▶ **Incorporate in Long Range Roadway Plan**

## Consideration # 7 – Colorado Boulevard Widening

Description: Widen to 4-lane arterial from Mineral to Dry Creek Road; intersection and signal improvements at Dry Creek/Colorado



### Level 1 Analysis:

- ▶ Traffic on this segment of Colorado Boulevard would increase significantly (by 9,000 vpd) for a daily volume of 27,000 vpd (V/C ratio of 1.13). The widening would have minimal effect on the existing four lane section north of Dry Creek Road.
- ▶ Traffic volumes on parallel routes (Holly Street and University Boulevard) would be reduced only minimally with this widening.

### Level 2 Analysis

- ▶ Widening Colorado Boulevard will increase the 2035 traffic volume by 9,300 vpd
  - 30% of the new trips will be Centennial traffic (with at least one trip end in Centennial)
  - 70% of the new trips will be non-Centennial traffic (with no trip end in Centennial)
- ▶ Traffic using Colorado Boulevard will have the following characteristics,
  - 70% of the trips will be Centennial traffic (with at least one trip end in Centennial)
  - 30% of the trips will be non-Centennial traffic (with no trip end in Centennial)

### Level 3 Analysis

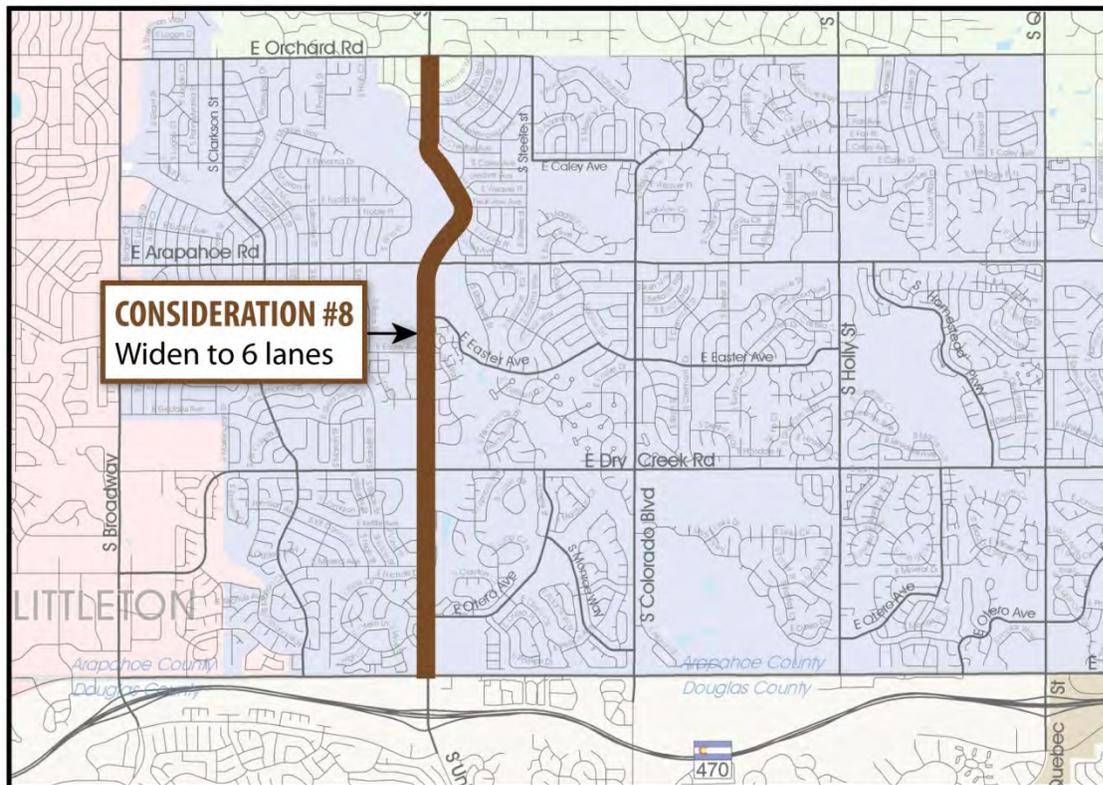
- ▶ Conceptual Construction Cost Estimate: \$1.9M

### Summary of Results and Recommendations

- ▶ Would help relieve current (and future) congestion on Colorado Boulevard
- ▶ Traffic on this segment would increase significantly
- ▶ Widening would primarily benefit non-Centennial traffic (only 30% of all new trips would be Centennial traffic)
- ▶ Possibility of improving Dry Creek/Colorado intersection first, adding a signal between Dry Creek and County Line Road when warranted, and waiting to see if entire widening is necessary
- ▶ Accommodation of bicyclists (along and across) corridor needs to be considered
- ▶ **Removed from the Long Range Roadway Plan due to lack of City Council support**

## Consideration #8 – University Boulevard Widening

Description: Widen to 6-lane arterial from County Line Road to Orchard Road



### Level 1 Analysis

- ▶ Traffic on this segment of University Boulevard would increase by as much as 12,000 vpd with volumes ranging from 40,000 – 50,000 vpd (V/C ratio of 0.83 – 1.04). Demand on the segment from County Line Road to Dry Creek Road would exceed a six lane roadway capacity.
- ▶ Traffic on this widening facility would be drawn from a number of parallel north-south facilities including Broadway, Colorado Boulevard, and Holly Street. However, the reductions in demand on these facilities would not substantially relieve them. For example, the two-lane section of Colorado Boulevard (County Line Road to Dry Creek) would still have volumes in excess of the two-lane roadway capacity.

### Summary of Results and Recommendations

- ▶ Would help relieve current (and future) congestion on University Blvd)
- ▶ State Highway under jurisdiction of CDOT; regional issue; no plans from adjacent communities to widen
- ▶ Would require extensive ROW acquisition
- ▶ **Do not include in TMP as Centennial-led improvement**
- ▶ **Include discussion in TMP about partnership with CDOT to address regional congestion issues (such as University)**

## Consideration #9 – C-470 Widening

Description: Widen to six lanes from I-25 to Santa Fe



### Level 1 Analysis

- ▶ The intent of modeling this consideration is to understand to degree to which widening of C-470 could relieve Centennial's east-west facilities. The results show the follow:
  - County Line Road – reduction of 2,000 – 6,000 vpd
  - Dry Creek Road – reduction of 1,000 – 2,000 vpd
  - Arapahoe Road (west of I-25) – reduction of 1,000 – 2,000 vpd

### Summary of Results and Recommendations

- ▶ Would provide improved regional mobility; but would not significantly relieve Centennial's roads
- ▶ State Highway under jurisdiction of CDOT; regional issue
- ▶ **Do not include in TMP as Centennial-led improvement**
- ▶ **Include discussion in TMP about partnership with CDOT (and others) to address future improvements on C-470 and their affect on Centennial's roads**





## Appendix F3 CFI Operational Analysis



## Appendix F3 - CFI Operational Analysis

### Introduction

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A continuous flow intersection (CFI) is an at grade intersection where the left-turning traffic does not require a separate phase. The CFI configuration can lower delay experienced at the intersection by having the left-turning traffic cross opposing traffic at a signal prior to the primary intersection during the opposing movements through phase. Arapahoe Road (SH 88) is currently a very congested corridor between I-25 and Parker Road (SH 83). The *Arapahoe Road Corridor Study* was completed in 2007 and analyzed a number of alternatives to relieve congestion. CFI's were included in the analyses but it was decided that the concept should be reevaluated in more detail.

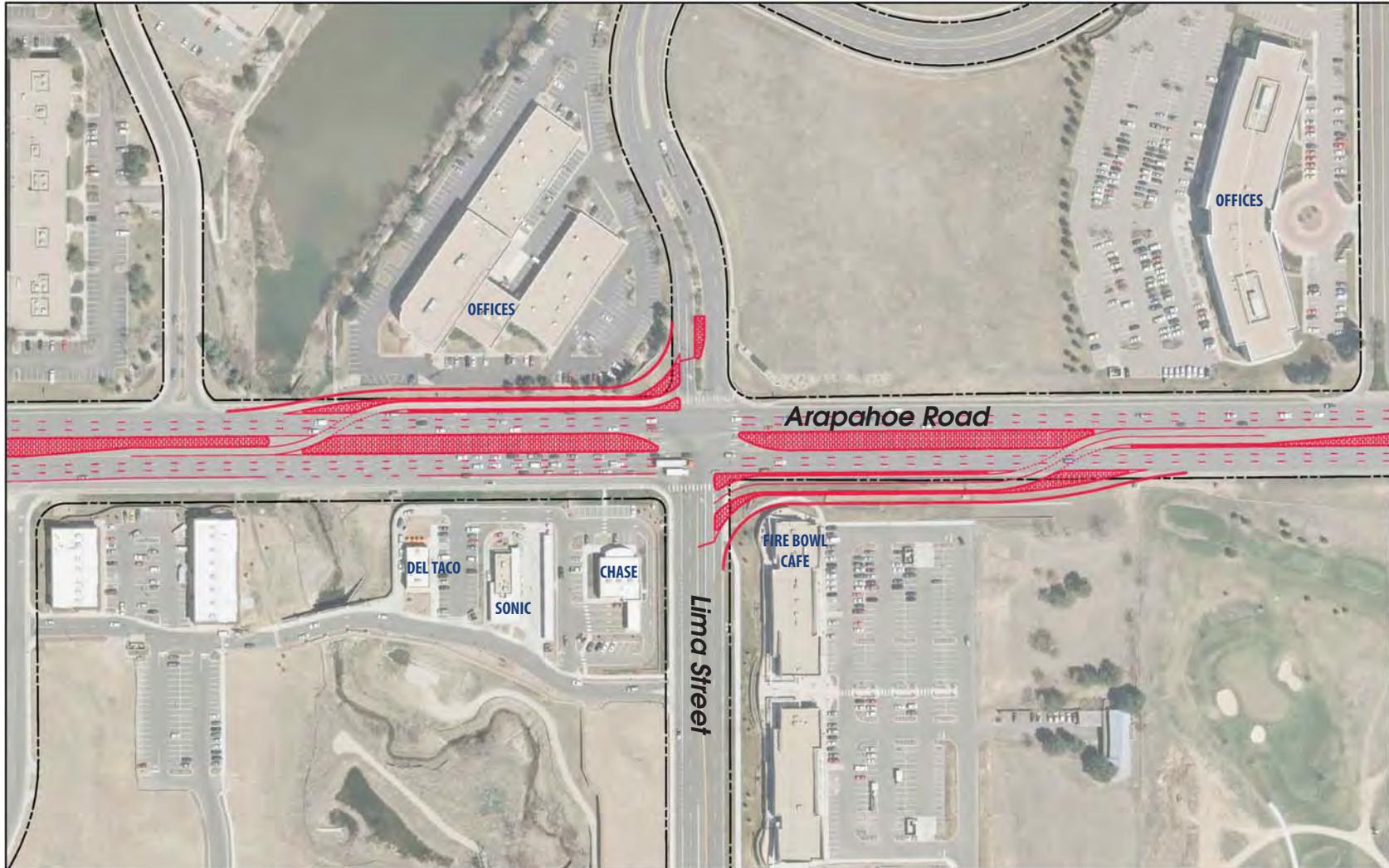
**Figure F3-1** shows a typical east/west CFI. As shown, there is an additional traffic signal located several hundred feet to the east and west of the primary intersection. At the signal to the east of the intersection the westbound left-turning vehicles cross eastbound through traffic during the northbound and southbound through traffic phase at the primary intersection. At the same time, the eastbound left-turning vehicles cross the westbound through traffic at the signal located west of the primary intersection. These left-turning vehicles then run parallel to the through traffic on the far left side of the roadway. They can then make the left-turning movement unopposed during the eastbound and westbound through phase of the traffic signal. With an east/west CFI, there is no longer an eastbound/westbound left-turn movement phase at the primary intersection.

Intersections can be designed with east/west CFI movements, north/south CFI movements, or they can be designed as a full CFI with the left-turning movements crossing opposing traffic prior to the primary signal for all four approaches.

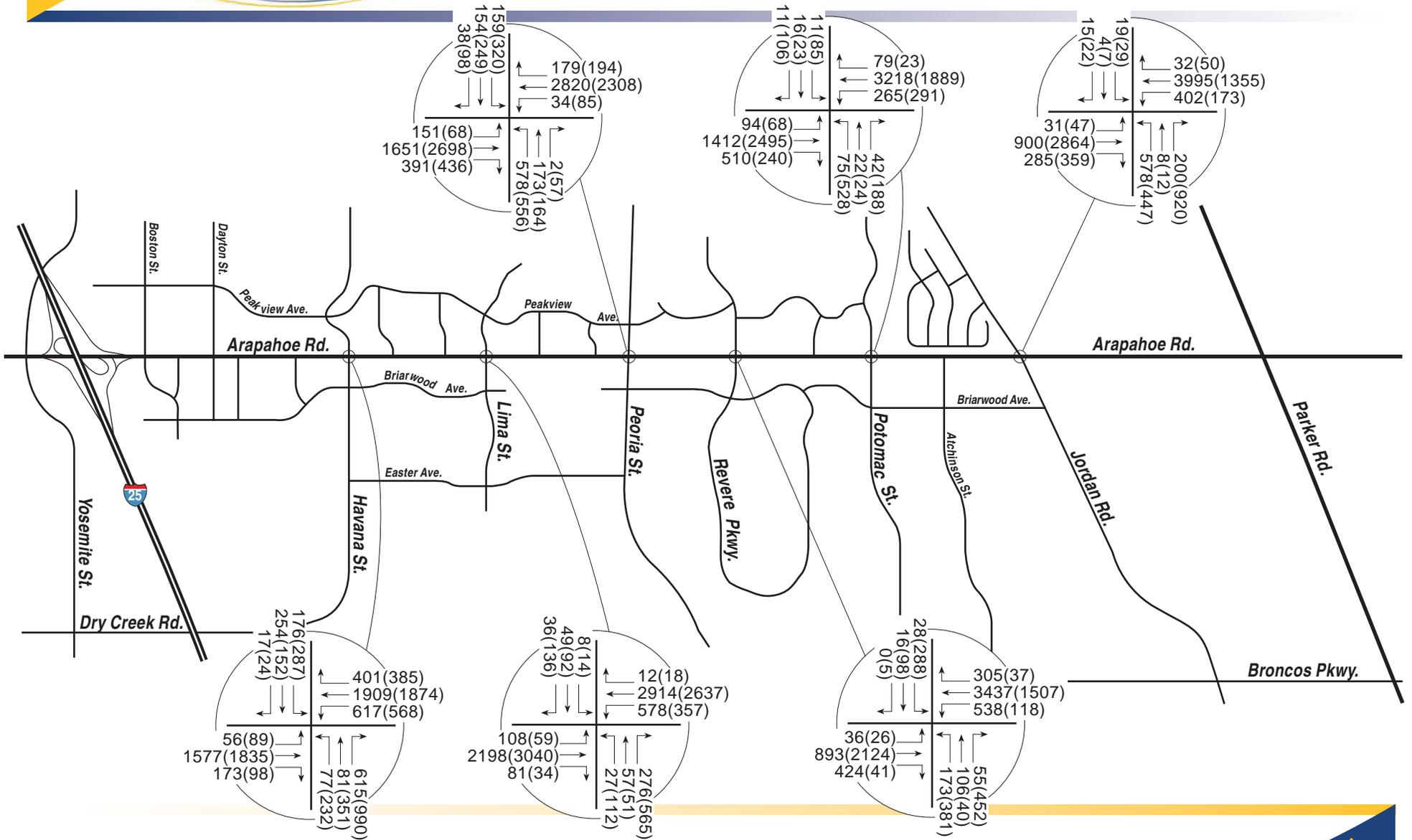
### Traffic Volumes

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Existing traffic volumes at Arapahoe Road intersections were provided by the City of Centennial in Synchro files analyzing existing conditions. The 2030 traffic volumes used in the CFI analysis are from the *Arapahoe Road Corridor Study* completed in April 2007 by David Evans and Associates. **Figures F3-2** and **F3-3** provide the existing and 2030 traffic volumes, respectively.



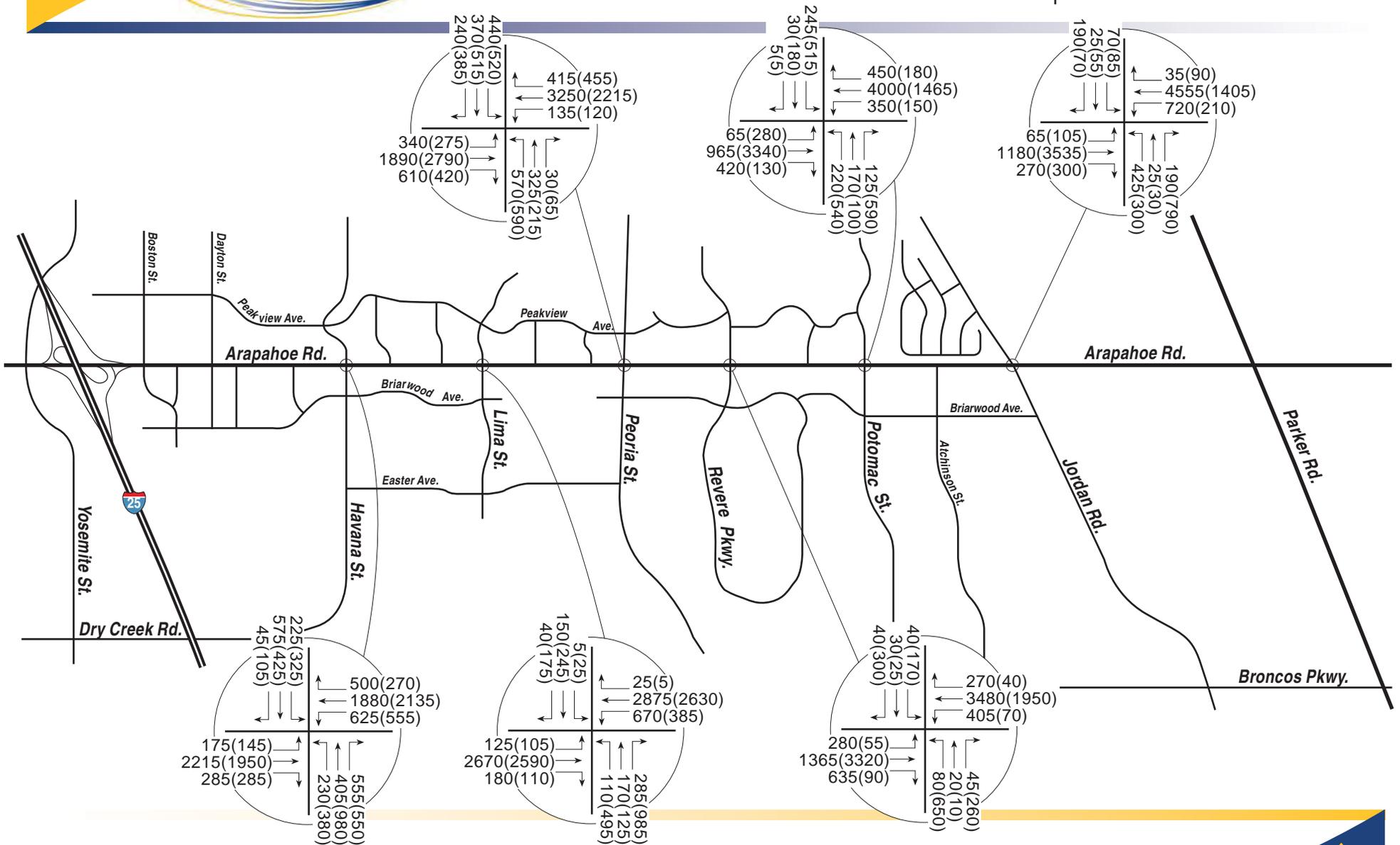
**Figure F3-2**  
Existing Peak Hour Turning Movements -  
Arapahoe Road Intersections



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

**Figure F3-3**  
No Action 2030 Peak Hour Turning Movements -  
Arapahoe Road Intersections



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

## Analysis

A Synchro analysis was completed for the following scenarios: No Action, East/West CFI, North/South CFI, and a Full CFI at each of six intersections along Arapahoe Road. These scenarios were analyzed using existing volumes with the resulting delays shown in **Table F3-1** and with 2030 volumes shown in **Table F3-2**.

**Table F3-1 Existing Volumes Delay**

Location	No Action		East / West CFI		North / South CFI		Full CFI	
	Delay (sec/veh)		Delay (sec/veh)		Delay (sec/veh)		Delay (sec/veh)	
	AM	PM	AM	PM	AM	PM	AM	PM
Havana	28	38	8	10	28	75	12	24
Lima	16	31	13	7	82	79	13	14
Peoria	36	37	14	14	66	51	19	14
Revere	15	24	14	8	67	33	18	10
Potomac	20	18	30	6	163	14	28	9
Jordan	78	92	100	28	277	149	87	36

**Table F3-2 2030 Volumes Delay**

Location	No Action		East / West CFI		North / South CFI		Full CFI	
	Delay (sec/veh)		Delay (sec/veh)		Delay (sec/veh)		Delay (sec/veh)	
	AM	PM	AM	PM	AM	PM	AM	PM
Havana	113	91	24	46	44	37	12	12
Lima	25	106	12	83	128	45	11	32
Peoria	141	130	42	36	113	72	32	17
Revere	55	77	14	43	153	151	29	30
Potomac	52	63	66	73	219	178	59	41
Jordan	132	134	170	99	385	190	137	52

This initial analysis shows that North/South CFI's provide little or no improvement in delay at the study intersections when compared to the No Action scenario. As shown in the tables, the delay at several intersections including Jordan Road, Potomac Street, Revere Street, and Lima Street gets significantly worse with a North/South CFI as compared to No Action with both existing and 2030 volumes. The Havana Street and Peoria Street intersections with Arapahoe Road show some improvement with the 2030 volumes, but no improvement with the existing traffic volumes. As a result, none of the study intersections are recommended to be considered for a North/South CFI.

The East/West and Full CFI scenarios show little to no improvement in delay at the intersections of Revere Street, Potomac Street, and Jordan Road with Arapahoe Road with both the existing and 2030 traffic volumes. As a result these intersections are not recommended to be considered for East/West or Full CFI improvements.

The East/West and Full CFI scenarios do show decreased delay when compared to the No Action scenarios at the intersections of Havana Street, Lima Street, and Peoria Street with Arapahoe Road. However at each of these intersections, the Full CFI only shows a slight improvement in delay over the East/West CFI. Given the additional right of way requirements for a Full CFI and the additional construction costs of a Full CFI, the slight improvement in delay does not seem to warrant a Full CFI over an East/West CFI at these intersections.

Thus, it is recommended that East/West CFIs be considered for the intersections of Havana Street, Lima Street, and Peoria Street with Arapahoe Road. Conceptual layouts of these SFIs are shown on **Figure F3-1** for Lima Street, on **Figure F3-4** for Havana Street, and on **Figure F3-5** for Peoria Street.

