



TRANSIT FRAMEWORK PLAN

August 2016

ACKNOWLEDGMENTS

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INTRODUCTION

ABOUT DOUGLAS COUNTY

Douglas County was formed in 1861 as one of the sixteen original Colorado counties. The County covers 844 square miles along the I-25 corridor between Denver and Colorado Springs. A majority of residents live in the urban designated areas of unincorporated Highlands Ranch, the City of Lone Tree, the City of Castle Pines, and the Towns of Castle Rock (the County seat), Parker, and Larkspur. The County has an estimated population of 305,963; which represents an increase of 7.2% residents since the 2010 census. By 2040, Douglas County population is projected to reach 478,650, a 56% increase over current estimates. In 2010, the 65 and over population was 20,343. By the year 2040, the senior population is projected to eclipse 100,000 making this group 21 percent of the total Douglas County population.

Douglas County is a desired place for entrepreneurial innovation in business. The County's healthy economy is supported by a pro-business regulatory and tax environment. Fortune 500 employers like DISH Network, Liberty Media, Western Union and CH2M, all call Douglas County home, along with other major employers like Charles Schwab, Visa and Sky Ridge Medical Center. The pioneer spirit and eternal beauty of the mountains, foothills, and plains remain in Douglas County. These characteristics, coupled with a highly educated, highly skilled labor force, exemplify the unrivaled quality of life found within the boundaries and municipalities of Douglas County.



MULTIMODAL TRANSPORTATION

The Douglas County Board of Commissioners is committed to connecting people through an integrated transportation network. This goal is achieved by investing in a safe, efficient, and affordable transportation infrastructure system.

TRANSIT DEMAND ANALYSIS

Guided by the top five County Commissioner Board Goals, the Douglas County Department of Community Development provides supportive services to assist individuals and families with special need circumstances to remain safe, stable, and productive. Douglas County conducted an initial Transit Demand Study in 2012. The scope of the 2012 study concentrated on the transportation needs of the County's senior, disabled, and at-risk populations.

This study seeks to expand upon the 2012 research by exploring the transportation patterns, habits, and needs of all Douglas County residents.

This project has been successful through:

- **Data Drive Processes:** Using data to understand and demonstrate transit needs and solutions for everyone, including transit dependent and choice riders.
- **Engagement, Education, Empowerment:** Facilitating data-driven conversations with citizens, jurisdiction, elected officials, and business leaders to educate and empower them as vital partners in the solutions.
- **Implementation:** Identifying flexible, affordable, innovative solutions with partnership opportunities that leverage funding sources for phased implementation.
- **Documentation:** Completing the project on time and budget, with a thorough list of recommendations and defined next steps, as well as a resource database that can be used to answer future questions.

2030 TRANSPORTATION PLAN

The Douglas County 2030 Transportation Plan (TMP) creates a vision for a multimodal transportation system in Douglas County. The vision was prepared with public support for increased mobility options, including cost effective transit investments to and from major Regional Transportation District (RTD) FasTracks stations. The TMP outlines multimodal transportation investments to maintain a high-quality of life given the forecasted population and employment increases anticipated in Douglas County over the next 15 years. It provides technical and policy direction for decisions related to planning future transportation facilities and improvements near the Lucent Station. Specifically, the TMP identifies the need for new transit services to meet the needs of growing and aging populations in the northern section of Douglas County. The TMP also outlines the need to collaborate with RTD to ensure that the community is connected to the Lucent Station, the passenger waiting areas are safe and comfortable, and there are intermodal connections near the station area.

The TMP provides the following policy guidance for transit development in the County.

Goal 7-3: Support enhanced public transit in Douglas County

Objective 7-3A: Facilitate an integrated transit plan as a component of the Douglas County Transportation Plan.

- Policy 7-3A.1: Coordinate and support existing and future transit services provided by other agencies to fulfill service demands of County residents, including seniors and people with disabilities.

Objective 7-3B: Incorporate transit facilities within development in urban areas.

- Policy 7-3B.1: Support land development patterns and practices that strengthen and create multimodal transportation options, transit-oriented development and economic development opportunities within the Primary Urban Area, and in the Separated Urban Areas, as appropriate.

COMMUNITY ENGAGEMENT

The best plans are the product of many informed perspectives: community input, local policies, previous vision plans, demographic data trends, funding capacity, and best practices. This project was strengthened by a community outreach approach that included an Advisory Committee, County-wide transit survey, “go to you” meetings, and community workshops. This process worked to engage many important stakeholders to create a vision based in community values.

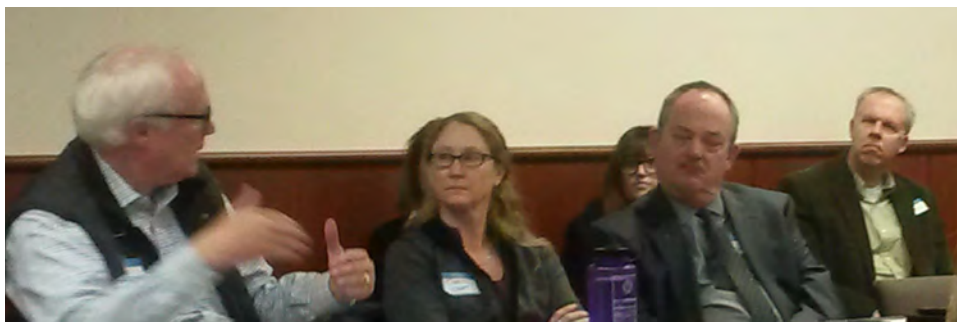
ADVISORY COMMITTEE

The Advisory Committee for this project was assembled by Douglas County and included a myriad of community stakeholders including community representatives from each of the municipalities within Douglas County, organizations focused on the needs of youth and seniors within the County, employers, business leaders, retailers, large scale developers, RTD, Denver Regional Council of Governments (DRCOG), and the Colorado Department of Transportation (CDOT).

Three Advisory Committee meetings were held over the course of the project. At each meeting, project information was shared, specific questions were discussed and guidance from the stakeholders was sought. The following summarize each of the Advisory Committee meetings. (All materials from the Advisory Committee meetings can be found in Appendix A.)

ADVISORY COMMITTEE MEETING #1

The first Advisory Committee meeting kicked off the community engagement process. The preliminary results of existing conditions analysis were presented and discussed. The Committee was also asked to share their perspectives and insights about Douglas County transit opportunities and constraints. The facilitated conversation resulted in the following lists, which directly guided the goals, objectives, recommendations and transit options presented later in this document.



Key Opportunities

- *Maximize the use of new technologies to provide affordable multimodal transportation opportunities.*
- *Use transit to help attract and support economic development, employers, and retail centers by providing users, customers, and employees with transportation options.*
- *Work with municipalities, RTD, CDOT, and other agencies to develop a coordinated transit approach and strategy.*

Key Constraints

- *Overcoming the negative image of transit in Douglas County.*
- *Only the northern portion of Douglas County is within the RTD boundary.*
- *No dedicated funding source for transit in Douglas County.*

ADVISORY COMMITTEE MEETING #2

The second Advisory Committee meeting explored stakeholders' desires for transit, and started the process of developing transit options. Attendees were asked to break into groups and brainstorm appropriate transit routes for Regional Commute, Point-to-Point, Local Circulator, and Demand Response transit services in Douglas County. Each route was then given planning level cost estimates which included actual cost and assumed there would be no outside funding from the federal government. After brainstorming, each group reported their options back and the full Committee was polled on what they felt were the most appropriate alternatives for Douglas County. The exercise resulted in preliminary transit options, which are described on pages 28-35. Several key takeaways included:

Key Takeaways

- *Strong interest in peak hour commute service on I-25 to Denver and Colorado Springs (including potential financial incentives to CDOT for a Bustang stop in Castle Rock).*
- *Transit in Douglas County should connect to existing RTD transit services.*
- *Bus Rapid Transit (BRT), "plush bus" (a bus with nice amenities), and other types of high quality transit connections between communities in Douglas County are important.*
- *Service within communities could be provided with circulators or demand response.*
- *Desire for high connectivity within communities and throughout the County.*
- *Interest in realistic funding potential for transit services and refined alternatives.*

ADVISORY COMMITTEE MEETING #3

The third Advisory Committee meeting began with a presentation from the project team that introduced the transit goals, evaluation criteria, and alternatives. After reviewing the goals and alternatives, the meeting attendees broke into groups for a discussion of how well each transit alternative (Local Circulators, Point-to-Point Connectors, Regional Commutes) meets the goals and evaluation criteria. Attendees were also asked about the level of investment for each alternative. Each participant marked a ballot with their preferences and the results were tallied. The following bullet points summarize the discussion and ballot responses.



Key Observations

- *The transit modes will work best integrated with one another, rather than as stand alone service.*
- *A combination of the three transit modes and alternatives would be the best solution.*
- *Point-to-Point Connectors best meet the goals and Moderate Investment was the preferred level of investment.*
- *Local Circulator Low Investment and Regional Commute Moderate Investment alternatives were the most popular among participants, but were considered slightly less important to implement than the Point-to-Point alternative.*
- *Mineral Station should be included in every Point-to-Point Connector alternative; it is important to connect to the existing system and infrastructure.*
- *Local Circulators need to provide the appropriate services for individual communities and are likely to look different in each community.*

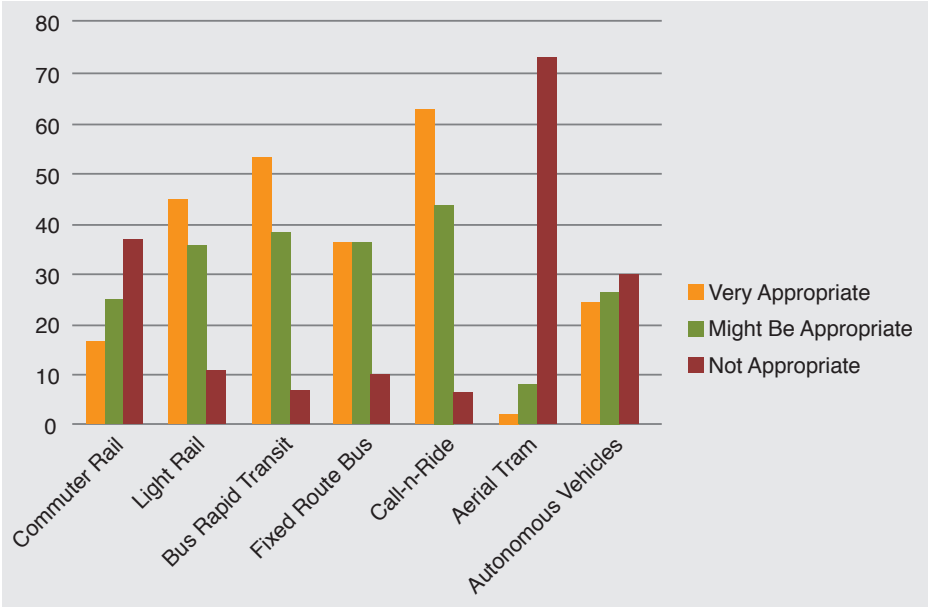
REACTION SURVEYS

A short reaction survey was administered with the Advisory Committee, Senior Council of Douglas County, DC Cares, and Douglas County Transit Solutions (DCTS). This short survey was developed to understand stakeholder thoughts about transit in Douglas County and identify challenges and opportunities surrounding existing and potential transit solutions. The survey results for each organization can be found in Appendix B.

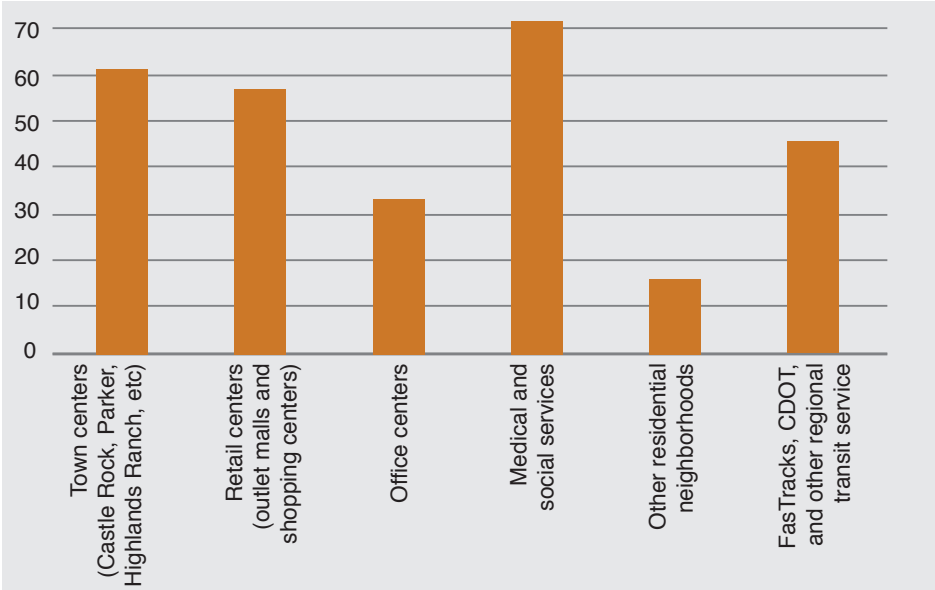
The short survey contained seven questions. The first three questions asked about transit modes (types of services) for Douglas County. Question four asked about the benefits of transit investments in Douglas County. Question five queried what transit could be used for in Douglas County. Finally, questions six and seven asked about challenges and opportunities related to transit, respectively. The results of the survey are shown below.

Stakeholders who took the reaction survey felt that Light Rail, Bus Rapid Transit, Fixed Route Bus, and Call-n-Ride (On-Demand service) were appropriate transit modes for the County. Investment in these types of transit would benefit the communities in many ways, and allow for myriad trips to be made using transit. Funding is considered the greatest challenge to implementing transit in Douglas County. However, opportunities such as changing demographics, travel behaviors, and community understanding of transit could outweigh the challenges.

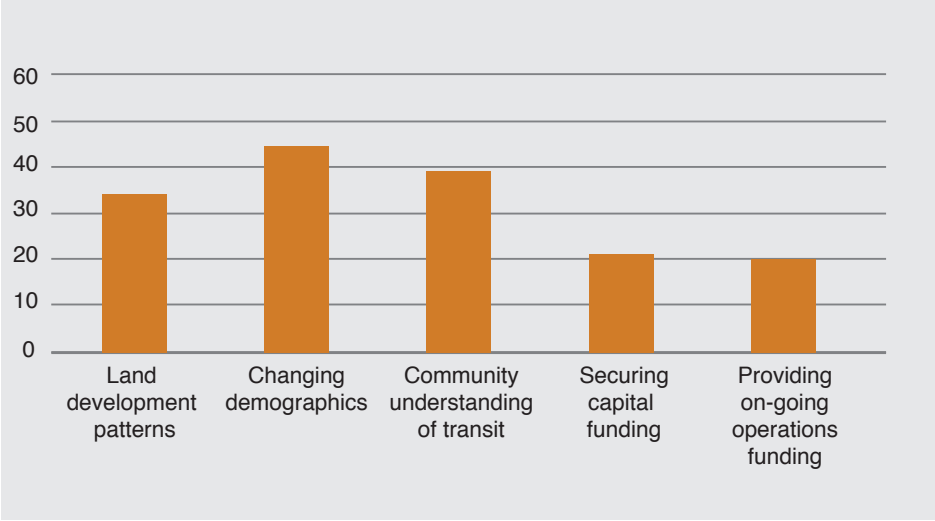
Q1-3 - Transit Mode Appropriateness



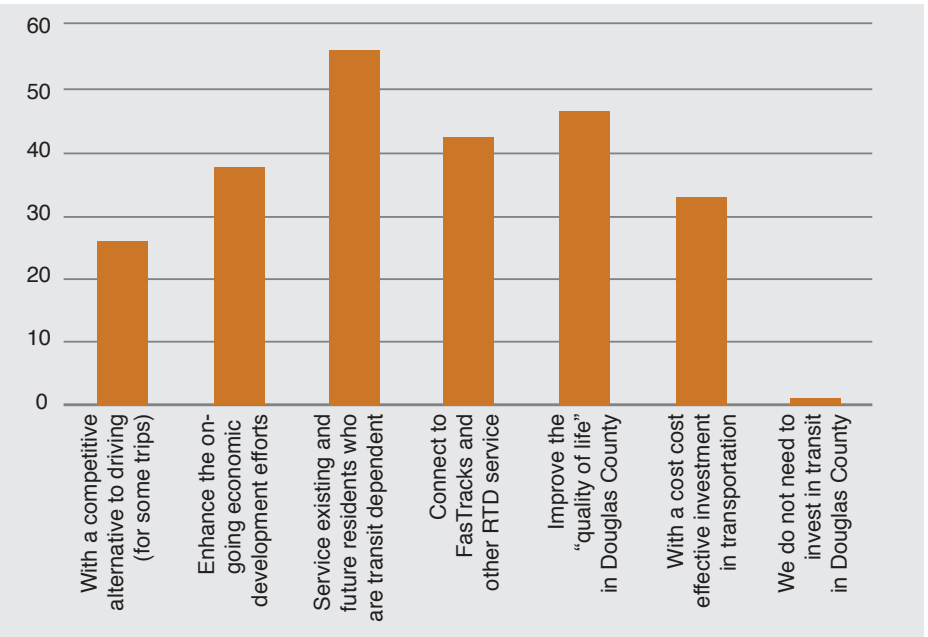
Q5 - Potential Transit Trip Types



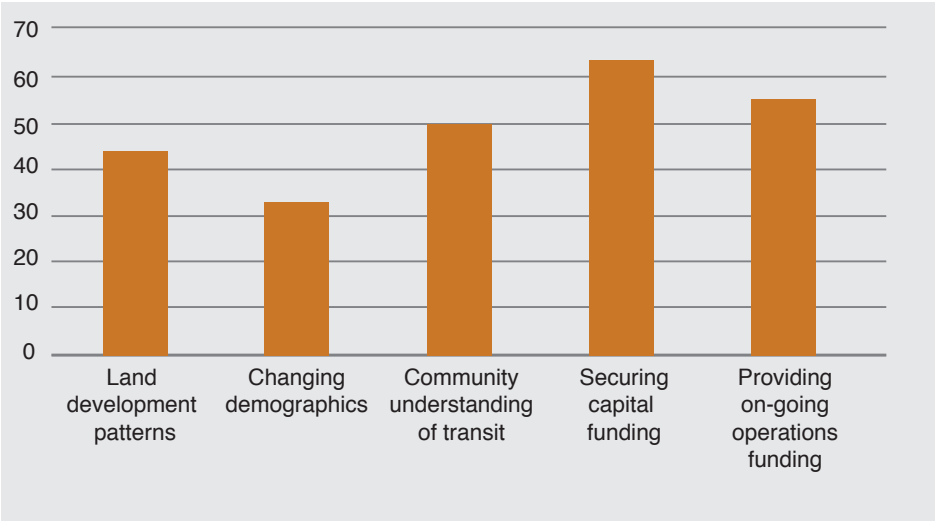
Q7 - Opportunities to Implement Transit



Q4 - Benefits of Transit Investment



Q6 - Challenges to Implementing Transit

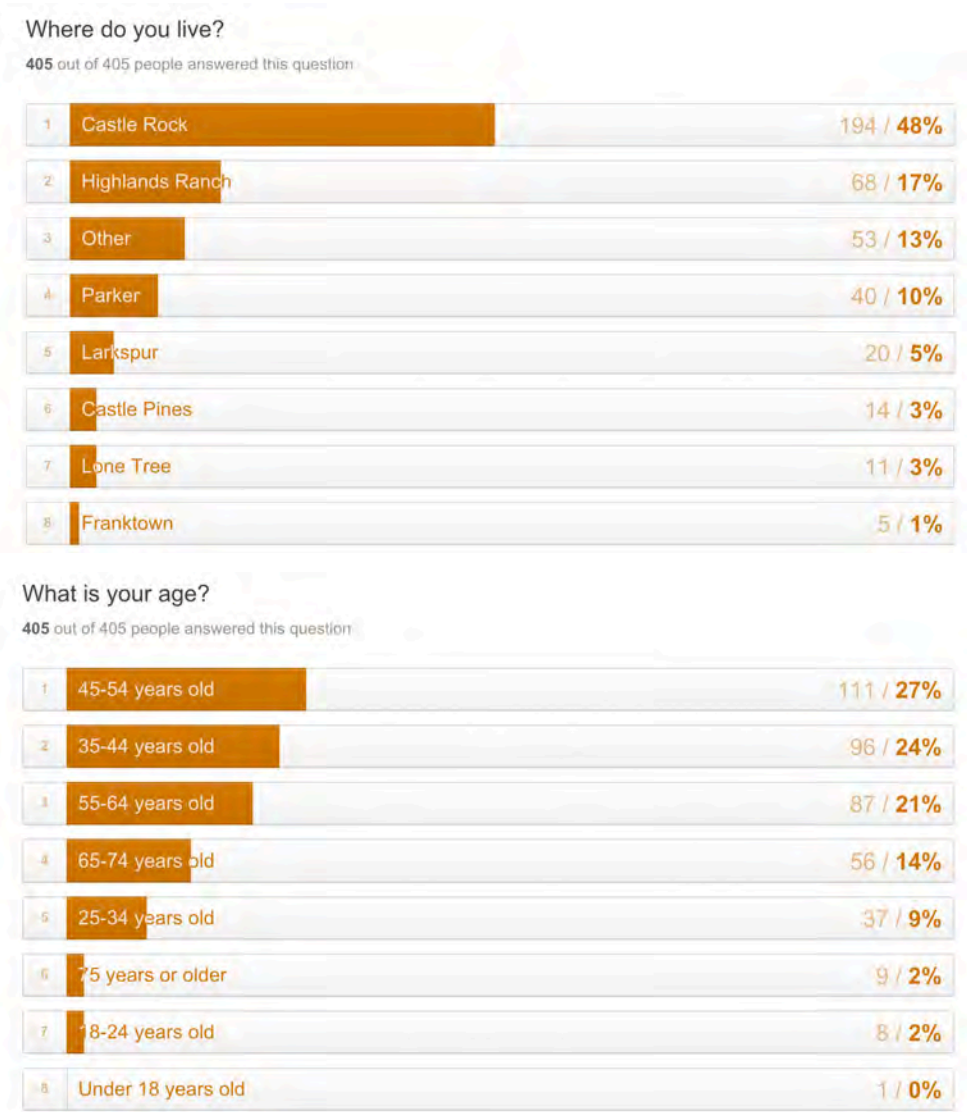


The reaction survey was administered to 225 community stakeholders

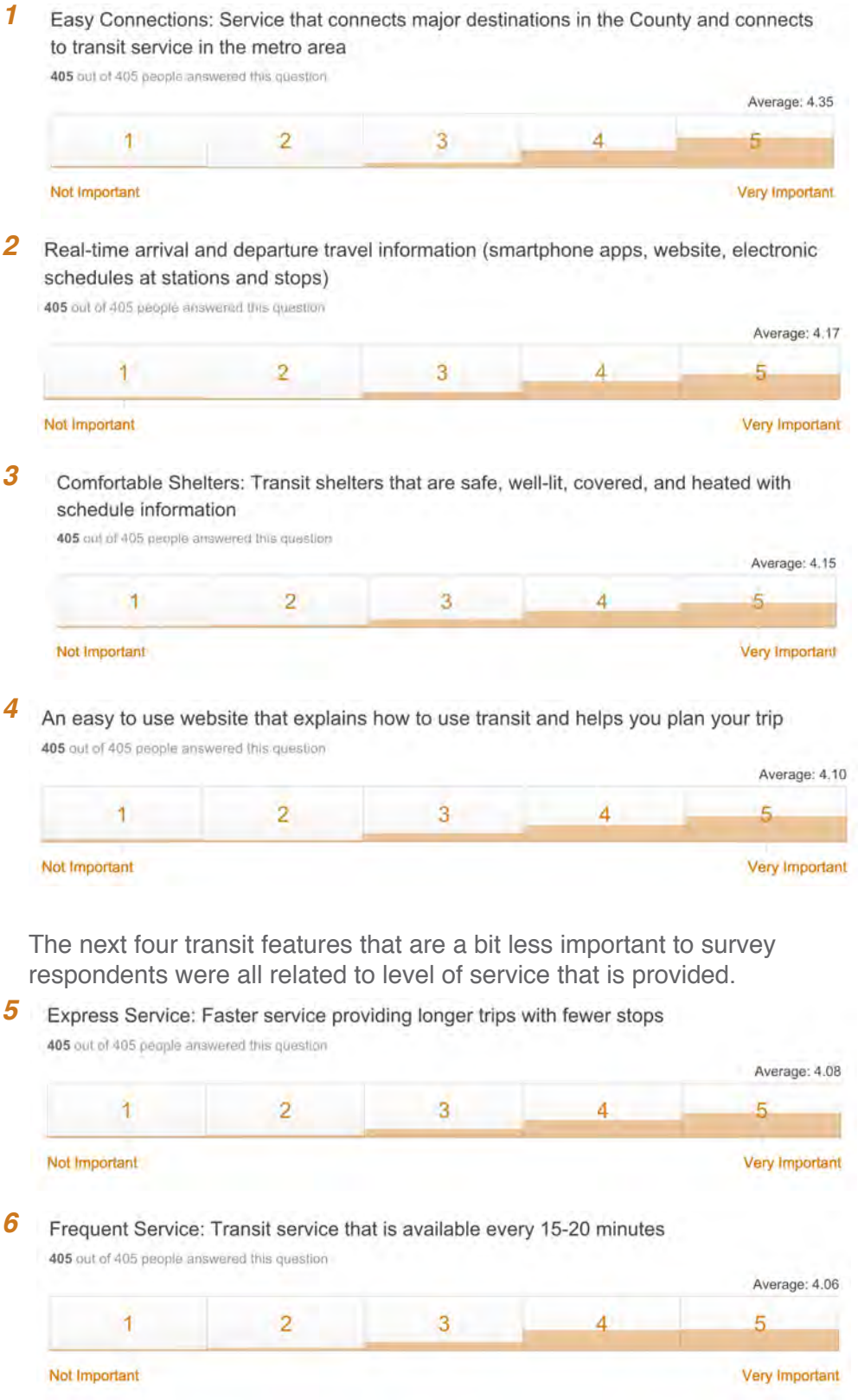
COMMUNITY SURVEY

A short, ten-minute online survey was conducted over four months to gauge the greater community thoughts and opinions regarding transit usage and transit investments in Douglas County. The survey was distributed to Douglas County residents via news publications, County list serves, municipalities within the County, Home Owner Associations, Chambers of Commerce, and other committees and organizations. The County received 1,328 responses to the survey. A detailed summary of results can be found in Appendix C.

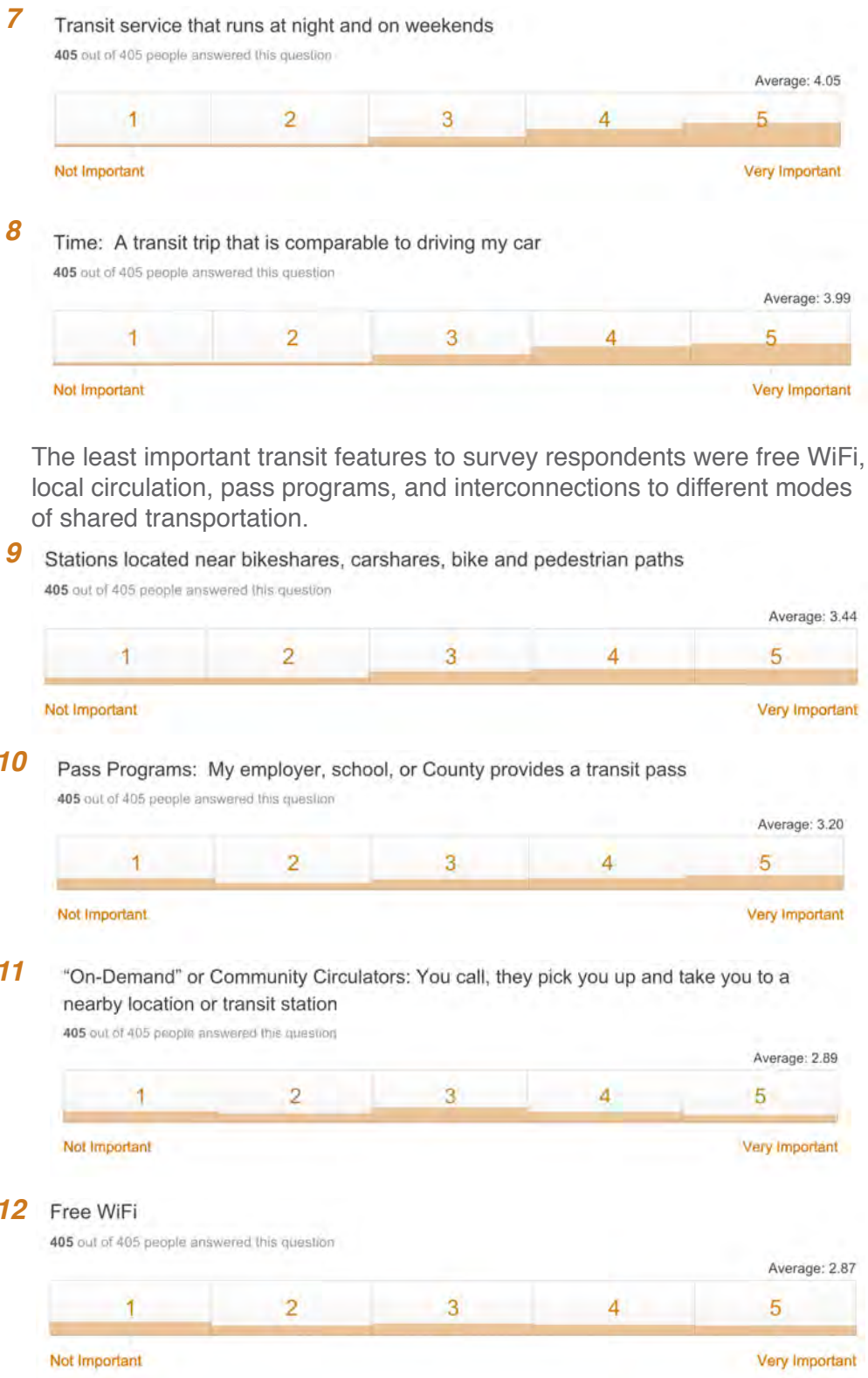
The survey asked several questions about the survey respondent. The survey was answered by community members living in Castle Rock, Highlands Ranch, Parker, and other locations throughout the County, including more rural communities such as Deckers and Franktown. Over half of the survey respondents were between 35 and 54 years of age, the majority of respondents had 2-3 cars, and made over \$100,000. This data was not surprising as it is consistent with the demographic data collected throughout this project.



Survey respondents were also asked about which transit features and characteristics are important when making decisions about using transit. The survey asked about 12 transit features. The top four transit features that are important to survey respondents surrounded ease of connections as well as easy to use technology.



The next four transit features that are a bit less important to survey respondents were all related to level of service that is provided.



1,328 people responded to the community survey.

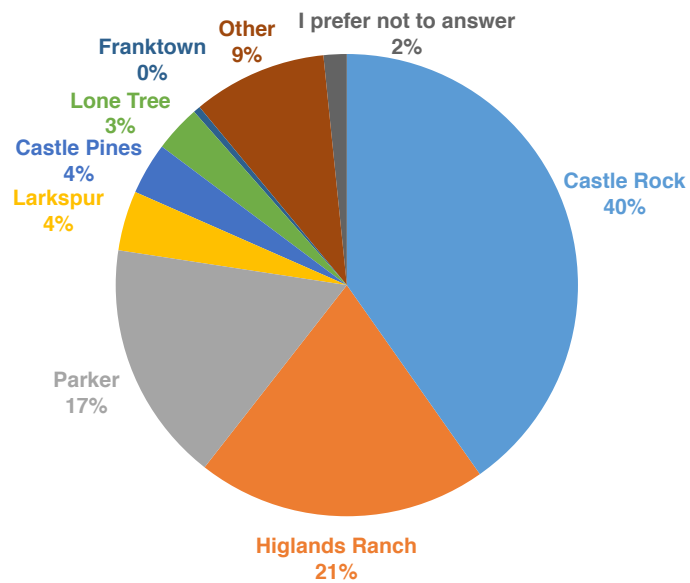
ONLINE COMMUNITY CONVERSATION

Due to the large geographic nature of Douglas County, the project team developed an online community meeting, rather than an in-person community workshop. This allowed County residents to provide comments about the proposed alternatives at their convenience instead of requiring them to attend a meeting at a specific location and time.

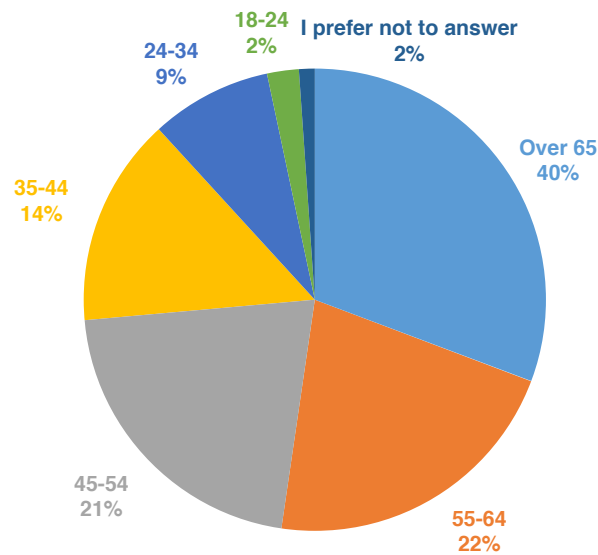
This approach resulted in almost 250 responses to the survey, with over 600 people navigating to the project website to learn more. This level of response is much higher than participation at a traditional community workshop. Recent in-person community meetings have had between 20 and 50 attendees.

The project website included four summary videos that provided information about the project and the transit alternatives. Virtual Community Meeting participants were encouraged to watch the videos before taking the survey, and the majority (89%) of them did. Virtual community meeting participants responded from across the County with a wide range of ages represented.

Where do you live?



What is your age?



Transit Demand Analysis



Douglas County is preparing a transit plan and we need your input. Please visit the project website to participate in a virtual online conversation.

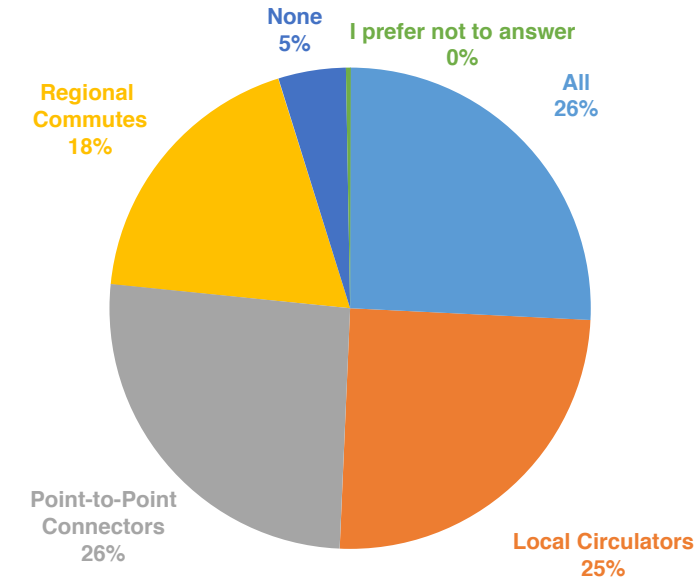
Virtual Online Community Conversation

Visit the Project Website to participate in a Virtual Online Community Conversation between October 26-November 22, 2015

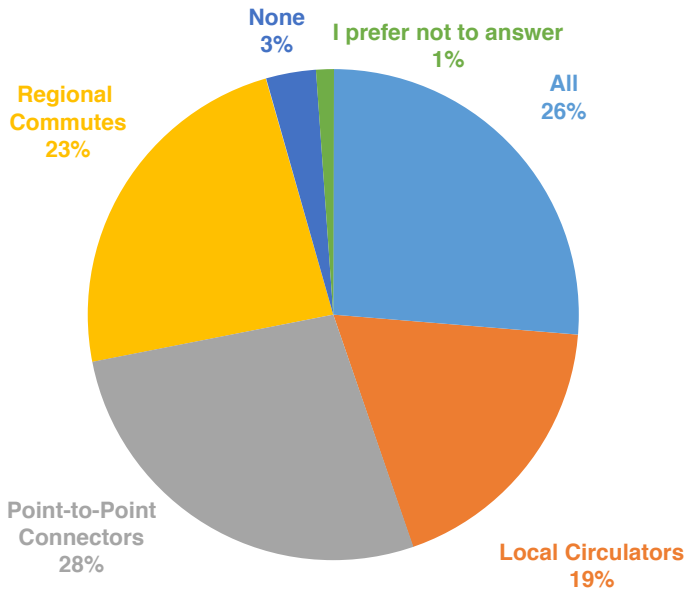
www.douglas.co.us/transit-demand-study

When asked which transit type best met the project goals, the results were relatively evenly split.

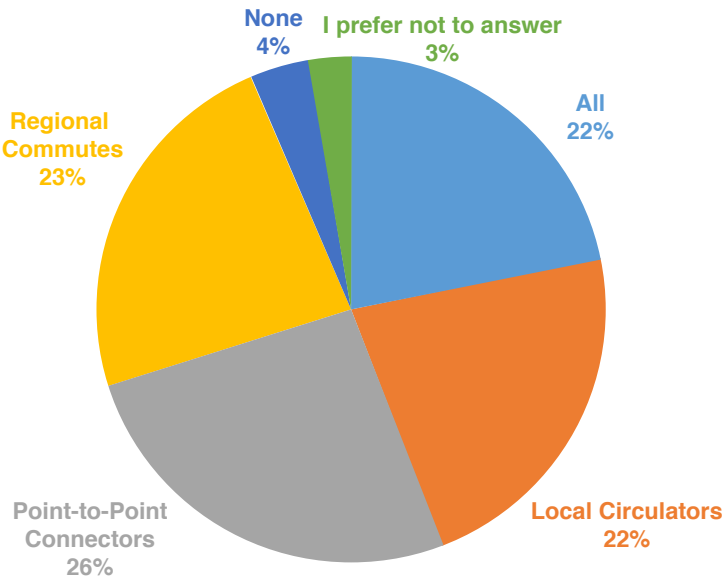
PROJECT GOAL #1: Develop a transit system that meets basic mobility needs while also providing essential mobility to all Douglas County residents.



PROJECT GOAL #2: Develop a transit network that maintains and enhances the quality of life and economic development potential of Douglas County.

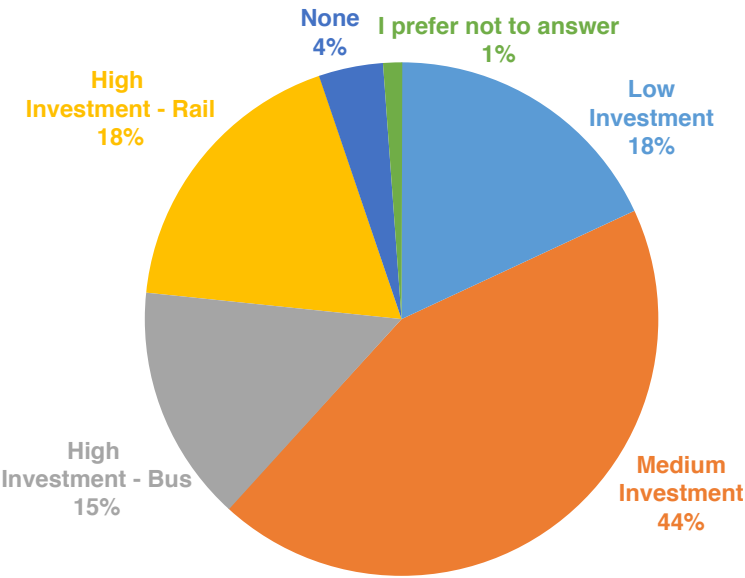


PROJECT GOAL #3: Develop a transit network that is cost-effective, affordable, and fiscally resilient.

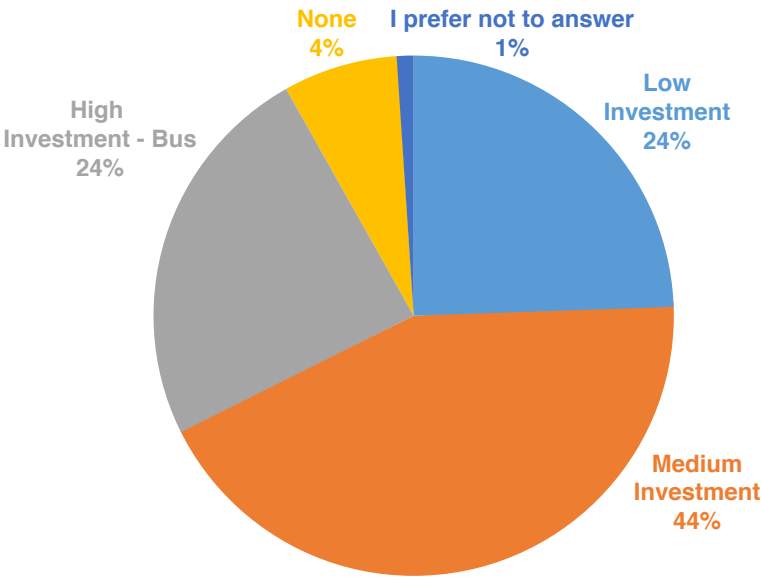


When asked what level of investment was appropriate for each mode of transit, medium investment was the preference for all modes.

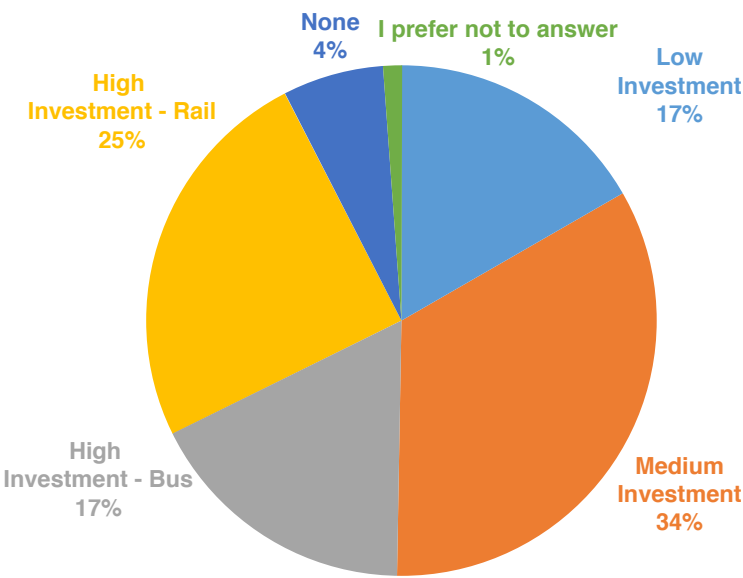
What level of local circulator investment is appropriate for Douglas County?



What level of point-to-point investment is appropriate for Douglas County?



What level of regional connector investment is appropriate for Douglas County?



EXISTING CONDITIONS

CURRENT AND PLANNED SERVICE

A portion of northern Douglas County is currently served by Light Rail, Bus, Call-n-Ride, and Access-a-Ride. RTD provides service to Highlands Ranch, City of Lone Tree, and the Town of Parker. The map on the opposite page shows the current and planned transit for Douglas County.

RTD LIGHT RAIL

Northern Douglas County is currently served by two transit lines – Southwest and Southeast Rail Lines. The Southwest Rail Line provides access to central Denver via the D Line and to Union Station via the C Line. Mineral station, just northwest of the Douglas County boundary, is the end of line station for the Southwest Rail Line. The station, located at Santa Fe and Mineral, provides 1,227 parking spaces, 10 bike racks, 30 bike lockers, and connections to bus routes 7, 401, 402L, and 403.

The Southeast Rail Line provides access to central Denver via the F Line and to Union Station via the E Line. Lincoln Station is the end of line station for the Southeast Rail Line. The station, located at I-25 and Lincoln Avenue, provides 1,734 parking spaces, 8 bike racks, 16 bike lockers, and connections to bus routes 403, 410, Lone Tree Call-n-Ride, Meridian Call-n-Ride, and the Lone Tree Link. The County Line Station, just to the north of the Lincoln Station, is also in Douglas County. Located at County Line Road and Park Meadows Center Drive, it provides 388 parking spaces, 4 bike racks, 16 bike lockers, and connection to bus route 402L, South Inverness Call-n-Ride, and Lone Tree Call-n-Ride.

RTD has planned extensions for both the Southwest and Southeast Rail Lines through its FasTracks Program. The Southwest Rail Extension will bring the line further into Douglas County adding 2.5 miles of light rail and 1,000 parking spaces at the future end of line C-470 and Lucent Station. An intermediate station, located near the southeast corner of the C-470 and US 85 interchange is also being considered as part of this extension.

The Southeast Rail Extension will extend into the City of Lone Tree. The extension will add kiss-n-ride stations at Sky Ridge Medical Center and Lone Tree City Center as well as an end-of-line station at RidgeGate with 1,300 parking spaces. The Southeast Rail Extension project is awaiting a final Full Funding Grant Agreement (FFGA) decision from the Federal Transit Administration (FTA) in order to begin construction. RTD has selected a general contractor, and has been authorized by the FTA to enter into construction contracts with them. If the extension is fully funded by the FTA, construction may begin as early as 2016 and is projected to be complete by 2019.

RTD BUS

RTD offers local and regional bus service to Douglas County in Highlands Ranch, City of Lone Tree, and the Town of Parker. Highlands Ranch is served by Routes 0, 24, 67, 401, 402L, and 403, which provide the following service:

- **Route O South Broadway** provides connection between Highlands Ranch Town Center and Downtown Denver along Broadway every 30 minutes between 5:30AM and 1:20AM.
- **Route 24 University Boulevard** provides connection between the C-470 & University Park-n-Ride to Colorado & 41st along University every 30 minutes between 5:00AM and 6:00PM, with hourly service until 9:45PM.
- **Route 67 Ridge Road Crosstown** provides connection between the Littleton Downtown Station and The Streets at Southglenn along Ridge Road every hour from 5:40AM to 8:40PM with 30 minute service during AM and PM peak times.
- **Route 401 Ranches Crosstown** provides connection between the Ken Caryl Park-n-Ride, Mineral Station, and Highlands Ranch Town Center Park-n-Ride via Ken Caryl Ave, Chatfield Ave, Platte Canyon and Mineral every 30 minutes between 5:45 and 8:15AM and 3:45 and 6:15PM.
- **Route 402L Highlands Ranch Parkway** provides connection between Mineral Station and County Line Station along Highlands Ranch Parkway every 30 minutes between 5:15AM and 7:45PM with hourly service until 9:45PM. The route switches to hourly service between 12:15 and 2:15PM.

Lone Tree is served by Routes 402L, 403, and 483, which provide the following service:

- **Route 402L Highlands Ranch Parkway** provides connection between Mineral Station and County Line Station along Highlands Ranch Parkway every 30 minutes between 5:15AM and 7:45PM with hourly service until 9:45PM. The route switches to hourly service between 12:15 and 2:15PM.
- **Route 403 Wildcat Crosstown** provides connection between Mineral Station and Lincoln Station along Wildcat Reserve Parkway every 30 minutes from 5:15 to 8:15AM and 2:15 to 6:45PM. Hourly service is provided from 8:15AM to 2:15PM.
- **Route 483 Parker Road - Lincoln Ave** provides connection between Parker and Arapahoe Crossing Shipping Center, and will operate north to Nine Mile Station for connections with the H line. Also provides service between Parker Road and Lincoln Station. Weekday service 60 minutes, peak 30 minute.

Parker is served by Route 483, which provide the following service:

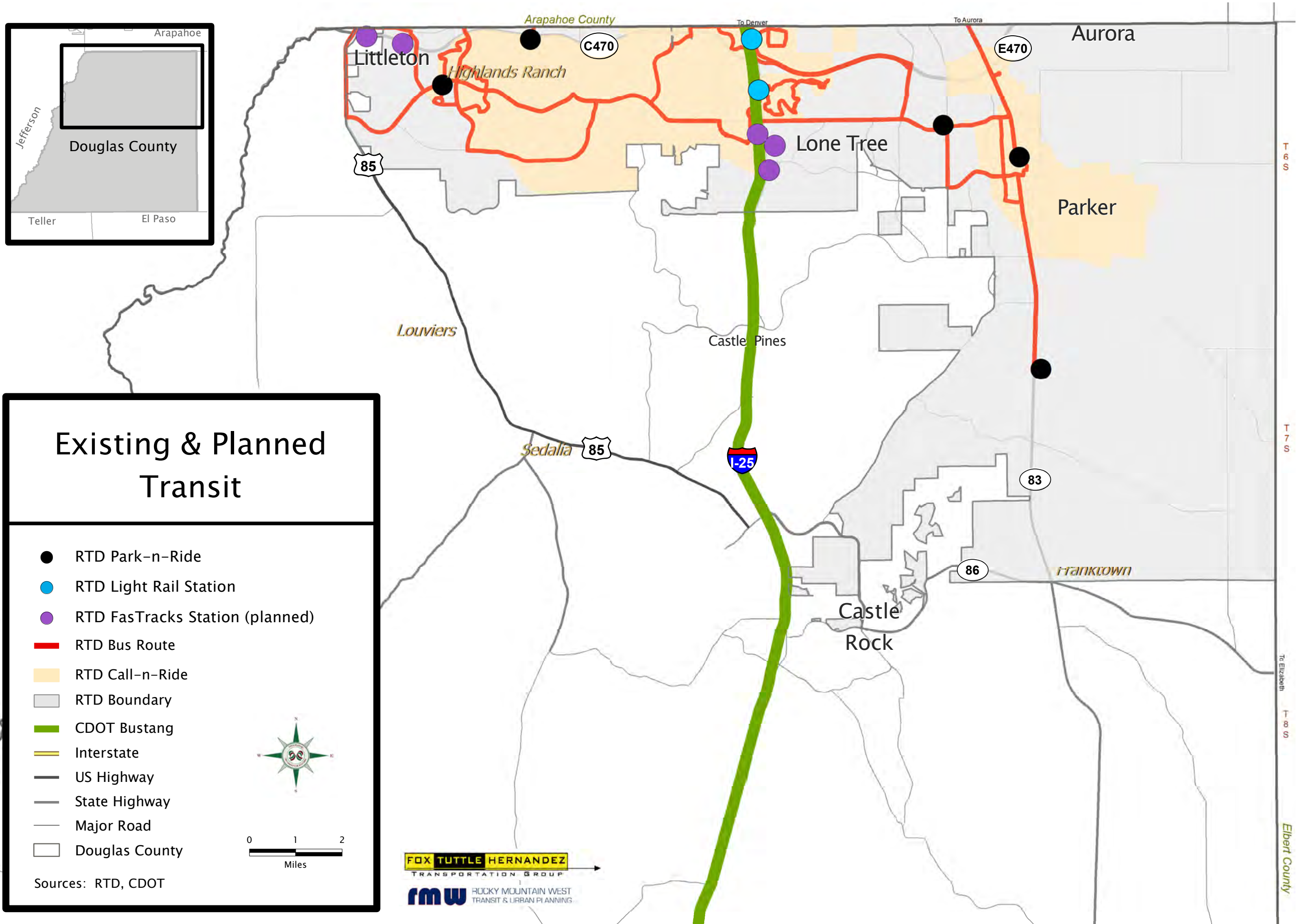
- **Route 483 Parker Road - Lincoln Ave** provides connection between Parker and Arapahoe Crossing Shopping Center, and will operate north to Nine Mile Station for connections with the H line. Also provides service between Parker Road and Lincoln Station. Weekday service 60 minutes, peak 30 minute.

RTD CALL-N-RIDE

Call-n-Ride is a personalized bus service that travels within select RTD service areas. Reservations for service can be made by phone or online up two weeks in advance, but requires at least two hours notice in advance of the requested travel time. RTD will provide an estimated pick-up time. Payment is made when the bus arrives. Douglas County is currently served by Highlands Ranch Call-n-Ride, Lone Tree Call-n-Ride, and Parker Call-n-Ride.

The **Highlands Ranch Call-n-Ride** provides service Monday through Friday between 6:00AM and 6:00PM. The Highlands Ranch Call-n-Ride serves areas of Highlands Ranch, with service extending north to C-470, east to South Quebec Street, Highland Heritage Park, and Rock Canyon High School, south to Wildcat Reserve Parkway and East Highlands Ranch Parkway, and west to South Broadway and Highlands Ranch Town Center Park-n-Ride.





The **Lone Tree Call-n-Ride** provides service Monday through Friday between 5:30AM and 7:00PM. The Lone Tree Call-n-Ride serves areas of Lone Tree west of County Line Station and Lincoln Station. Service extends north to East County Line Road, east to I-25, south to SkyRidge Medical Center and Cabela's, and west to South Quebec Street and the North-South Trail. In addition to reservation service, scheduled departures are made from the Lincoln station every hour between 6:00AM and 6:00PM.



In the past, RTD Call-n-Ride service has not met ridership criteria. In response, the communities have established Transit Advisory Committees, which have improved services and increased ridership to an acceptable level.

The **Parker Call-n-Ride** provides service Monday through Friday between 5:30AM and 6:00PM. The Parker Call-n-Ride serves the Town of Parker. Service extends along Parker Road, north to E-470 and Main Street, east to Canterbury Trail, south to Hilltop Road, and west to Twenty Mile Road and the Parker Recreation Center.



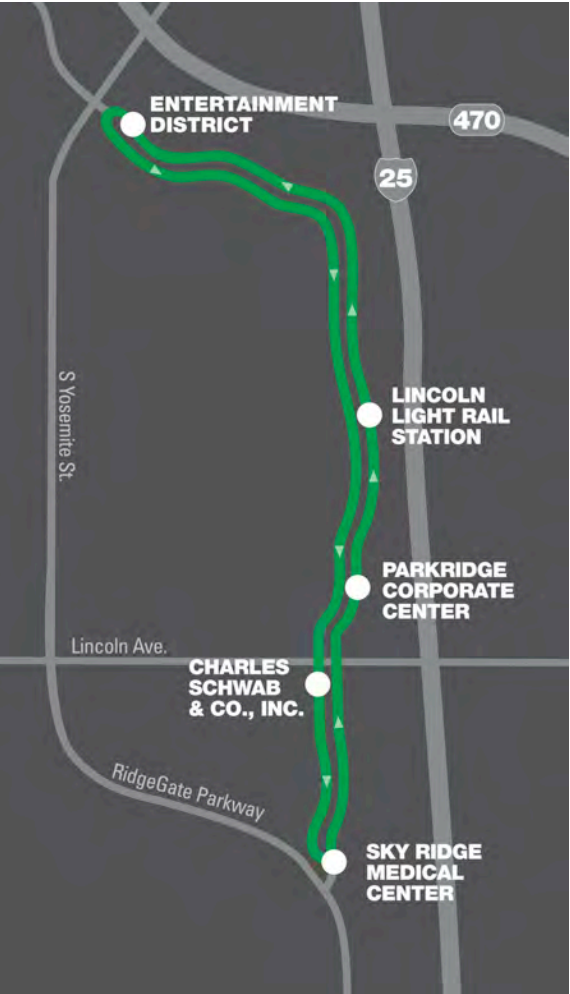
RTD ACCESS-A-RIDE

Access-a-Ride provides paratransit transportation for people with disabilities. Service is available in Douglas County within a 3/4 mile area surrounding any RTD local fixed transit route. Access-a-Ride is available during the same days and hours as the local-fixed bus service. Access-a-Ride offers curbside and door-to-door service with driver assistance if requested, as well as two-week subscriptions for passengers who make repeated trips to the same destination. While this is a great service for persons with disabilities, Access-a-Ride paratransit is extremely limited by the few fixed-route bus services offered by RTD in Douglas County.

LONE TREE LINK

The Lone Tree Link is a free shuttle service connecting key employment centers along Park Meadows Drive with restaurants, retail, and the RTD transit system. The Link runs a counterclockwise loop along Park Meadows Drive from the Entertainment District to Sky Ridge Medical Center. General operating hours are Monday through Friday from 6:00AM to 7:00PM. The following specifies the services provided:

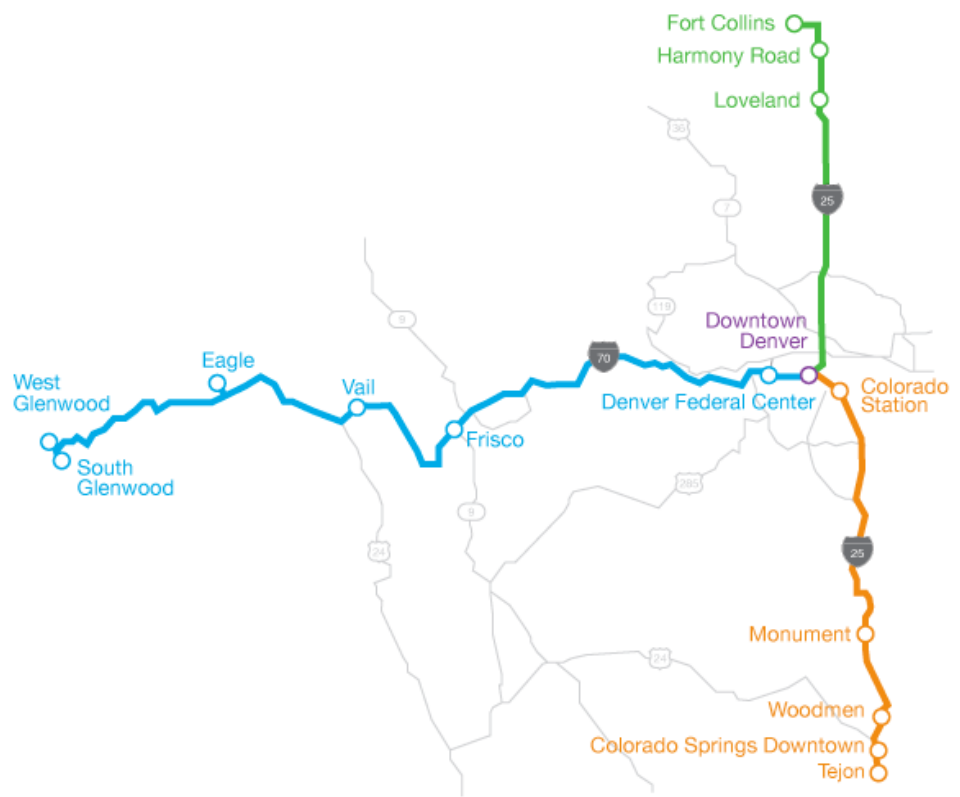
- **Morning Express Service: Charles Schwab & Co., Inc.** provides direct service every 10 minutes or less from the Lincoln Light Rail Station to Charles Schwab & Co., Inc. between 6:00 and 7:30AM.
- **Morning Express Service: Sky Ridge Medical Center** provides direct service every 10 minutes or less from the Lincoln Light Rail Station to Sky Ridge Medical Center between 6:00 and 7:30AM.
- **Employer Loop** provides service every 10 minutes between the Lincoln Light Rail Station, Kaiser Permanente, Charles Schwab & Co., Inc., Sky Ridge Medical Center, ParkRidge Corporate Center, and the City of Lone Tree.
- **Full Service Loop** provides connectivity between Lincoln Light Rail Station, Lone Tree Entertainment District, Kaiser Permanente, Charles Schwab & Co., Inc., Sky Ridge Medical Center, ParkRidge Corporate Center, and the City of Lone Tree.



CDOT BUSTANG

Bustang is CDOT’s new Interregional Express Bus service connecting commuters to the Downtown Denver Central Business District with three routes operating along the I-25 and West I-70 corridors. The North Line connects Downtown Denver and Fort Collins with stops at I-25 & Harmony and I-25 & US 34. Six southbound trips and six northbound trips are provided daily. The West Line connects Glenwood Springs and Denver with stops in Eagle, Vail, Frisco, and Lakewood with one morning trip from Glenwood to Denver and one evening trip from Denver to Glenwood Springs. Since the Bustang launch, this route has exceeded CDOT expectations. Additional service is expected to be added during 2016 with new buses and routes being added. The South Line connects Colorado Springs to Denver Union Station with stops in Colorado Springs, Monument, RTD Colorado Station and four Downtown Denver locations. Seven trips run northbound and seven trips run southbound each day.

No Bustang stops are currently planned for Douglas County. However, stakeholder interested and demographic analysis have identified the need for a stop in Douglas County. Bustang presents a future opportunity for Douglas County to work with CDOT to develop a stop in the County. A Bustang stop would provide an opportunity for commuters from Douglas County to connect to employment centers in the Tech Center and Downtown Denver.



COUNTY TRANSPORTATION SERVICES

Douglas County offers a number of local, state and federally funded transportation programs to assist residents with their access and mobility needs. Partnering with local non-profit agencies that cater to the daily necessities of seniors, individuals with disabilities, and low- to moderate-income residents, the County leverages existing resources that increase access to vital services which enhance the overall quality of life of its citizens. These partnerships work to meet the Board of County Commissioner’s Multimodal Transportation goals:

- **People and goods move across the County safely, efficiently, and affordably.**
- **The transportation system has a positive economic, social, and environmental impact.**

The County offers transportation services to citizens with Developmental Disabilities through its local Developmental Disabilities Mill Levy fund established by the voters in 2001. Individuals eligible to receive transportation services under this program must meet the State of Colorado definition of a person with a developmental disability. DRCOG provides funding for transportation to Douglas County seniors aged 60 and older. The funding originates from the Area Agency on Aging and is meant to improve quality of life for seniors throughout the DRCOG region. In addition to regional funding from DRCOG, the RTD provides local funds to Douglas County derived from a Federal Transit Administration (FTA) formula grant program known as Job Access Reverse Commute, or FTA Section 5307. This funding is determined by a formula which, in part, utilizes the total population of Douglas County. In recent years, RTD has granted a percentage of this formula funding back to Douglas County to provide transportation services to those who live outside of the RTD boundaries. Douglas County has used this funding to purchase wheelchair accessible vehicles to support local non-profit transportation programs and to provide employment related transportation services. Douglas County also receives funding from the FTA to serve the needs of seniors 65 and older, and adults with disabilities. This program, “Enhanced Mobility of Seniors and Individuals with Disabilities,” also referred to as FTA Section 5310, has existed since 1975. Douglas County has been a recipient of this funding since 2011. Together, these programs provide nearly 62,000 trips annually.

Although the Bustang does not currently stop in Douglas County, stakeholder interest and demographic analysis from this process identified the need for a Bustang stop in Douglas County.



EXISTING DEMOGRAPHICS AND TRAVEL PATTERNS

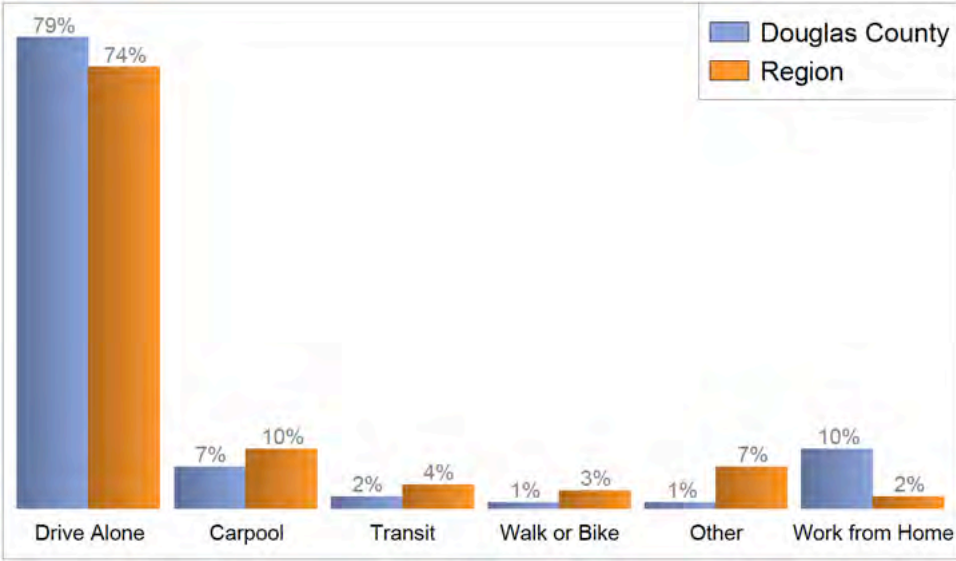
Douglas County demographic data was evaluated to understand the role of current and future transit services in Douglas County. Demographic characteristics such as car ownership, age, and income were used to understand travel needs and patterns around Douglas County and the potential effectiveness of different transit modes. Employment locations were evaluated to understand key destinations for people working in Douglas County. Current and future development projects were also evaluated to understand the need for potential transit modes to support the ongoing residential growth in the County. A full packet of data maps can be found in Appendix D.

Douglas County is unique in the region. Less than 10% of Douglas County was constructed prior to 1980, while almost half of the rest of the region was built before 1980. The County is also wealthy compared to the region with a median household of just over \$100,000; the region is closer to \$56,000. The County is also well educated with 55% of the population over 25 holding a Bachelor’s degree or higher. The region has just over 40%.

	DOUGLAS COUNTY	REGION
PERCENT OF HOUSING BUILT AFTER 1980	92%	52%
MEDIAN HOUSEHOLD INCOME	\$101,193	\$56,360
PERCENT OF POPULATION OVER 25 WITH BACHELOR’S OR HIGHER	55%	41%

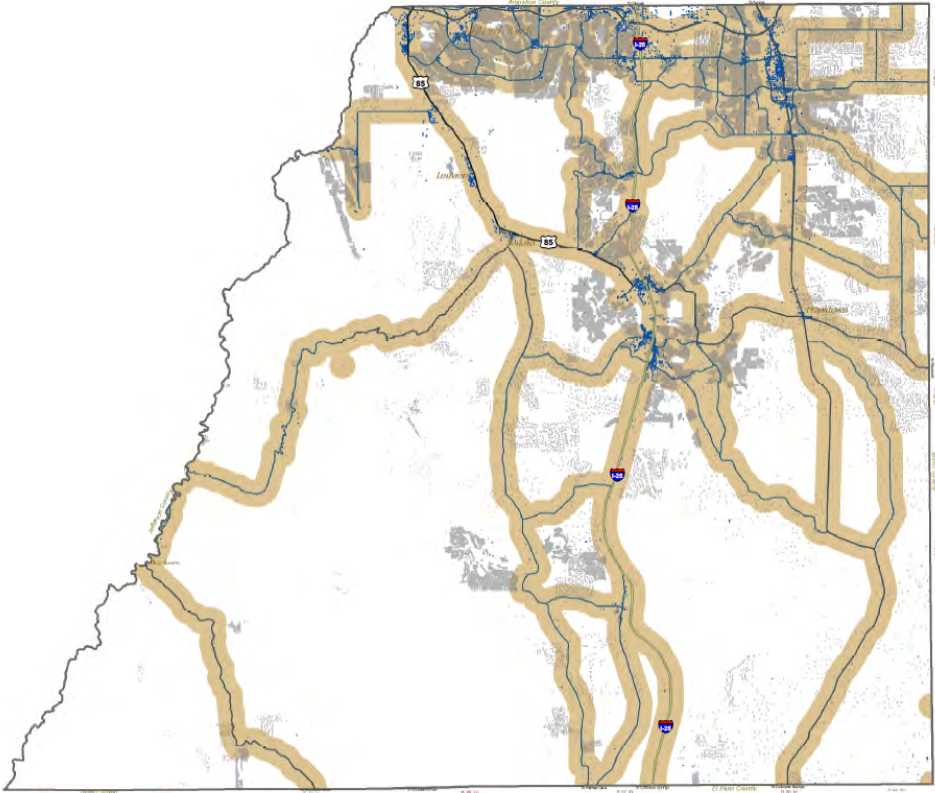
The majority of Douglas County households have been built in the past two decades, have incomes almost double the regional average, and higher educational attainment than the region.

Douglas County shares a very similar travel mode share when compared to the region. The County has a slightly higher percentage of people who drive alone and slightly lower percentages of people who carpool, use transit, and walk or bike compared to the rest of the region. Douglas County also has a much higher percentage of people who work from home.

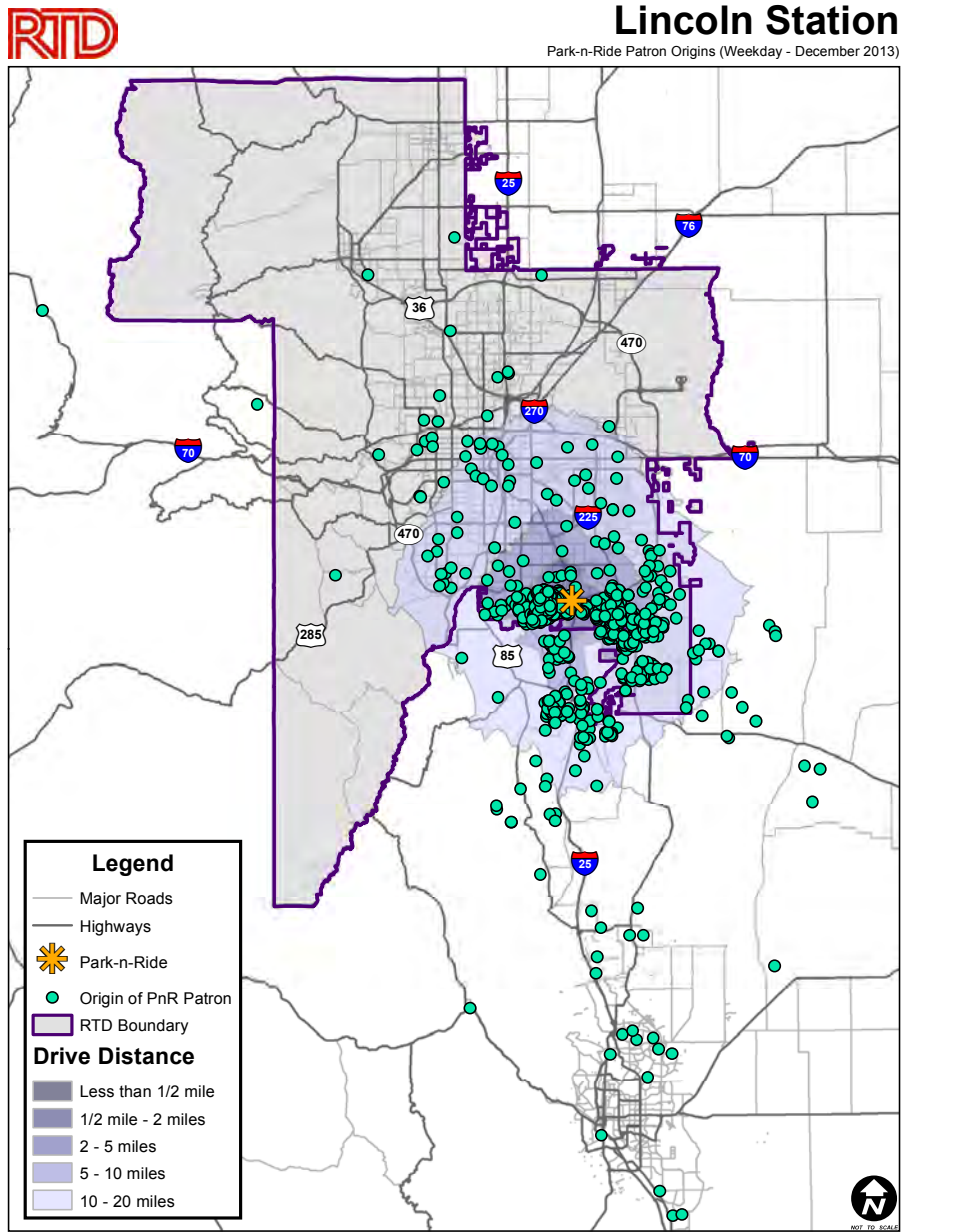


Most jobs and residents are within a 10-minute walk of potential transit corridors. When a ½ mile (10-minute walk) buffer is placed along state highways and arterial corridors in Douglas County, approximately 96% of jobs in the County and 72% of residents live within that buffer.

Half Mile Buffer along State Highways and Arterial Corridors




Douglas County residents rely on RTD light rail and buses on a daily basis. Each year RTD collects data at its light rail stations and park-n-ride locations. That data is used to understand where patrons of transit begin their trip to transit. Douglas County residents predominantly use the RTD Mineral Station and RTD Lincoln Station with lower use of the County Line and Dry Creek Stations. The following shows the origins of riders using Lincoln Station.



TRAVEL PROFILES


The County’s current demographic characteristics were used to develop travel profiles for Douglas County Residents. The population demographics of age, income, and vehicle ownership were used to develop the following travel profiles. Each travel profile includes a series of traits and characteristics that relate to a demographic categorization. The travel profiles help us understand expected travel needs around Douglas County and the effectiveness of different transit modes for each travel profile.



transit takers

TRANSIT TAKERS


Transit Takers include Douglas County residents with no access to a private vehicle. Their transit travel characteristics include a low time sensitivity, high transit tolerance, and high price sensitivity as they have limited options for travel. They are moderately flexible in their travel schedule and have moderate stress and social sensitivity because of their reliance on transit.



frugal travelers

FRUGAL TRAVELERS


Frugal Travelers include Douglas County residents with an income less than \$25,000 with access to a vehicle. Their transit travel characteristics include a low time sensitivity, moderate transit tolerance, and moderate price sensitivity as they have limited options for travel. They are also moderately flexible in their travel schedule and have moderate stress sensitivity and low social sensitivity.



boomers

BOOMERS


Boomers include Douglas County residents aged greater than 65 years. Their transit travel characteristics include a medium time sensitivity, low transit tolerance, and low price sensitivity as they have a variety of options for travel. They are also moderately flexible in their travel schedule and have low stress sensitivity but moderate social sensitivity.



middle makers

MIDDLE MAKERS

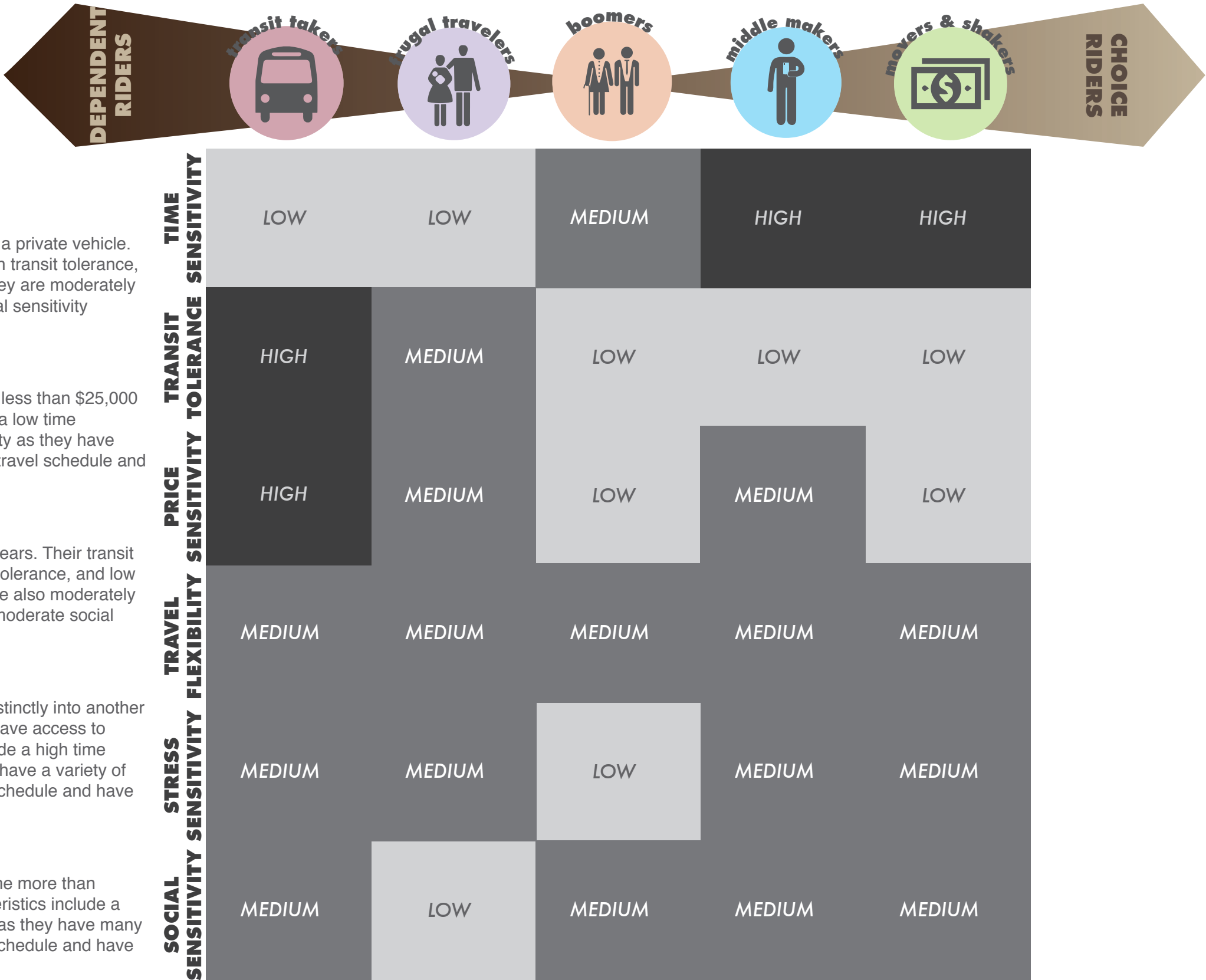
Middle Makers include Douglas County residents that do not fall distinctly into another category. They have incomes between \$25,000 and \$50,000 and have access to at least one private vehicle. Their transit travel characteristics include a high time sensitivity, transit tolerance, and moderate price sensitivity as they have a variety of options for travel. They are also moderately flexible in their travel schedule and have moderate stress sensitivity and moderate social sensitivity.



movers & shakers

MOVERS & SHAKERS

Movers & Shakers include Douglas County residents with an income more than \$50,000 as well as access to a vehicle. Their transit travel characteristics include a high time sensitivity, low transit tolerance, and low price sensitivity as they have many options for travel. They are also moderately flexible in their travel schedule and have moderate stress sensitivity and moderate social sensitivity.

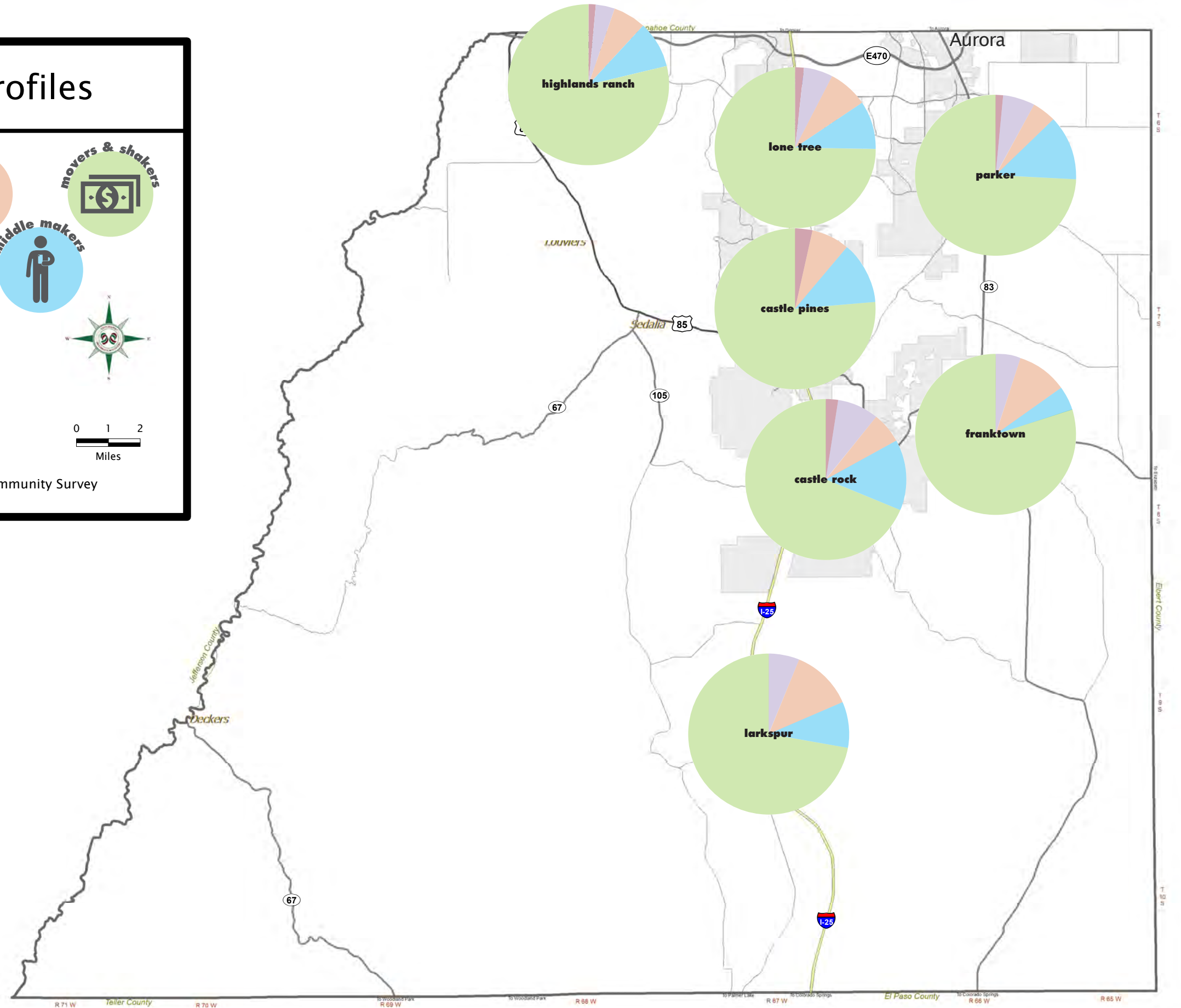
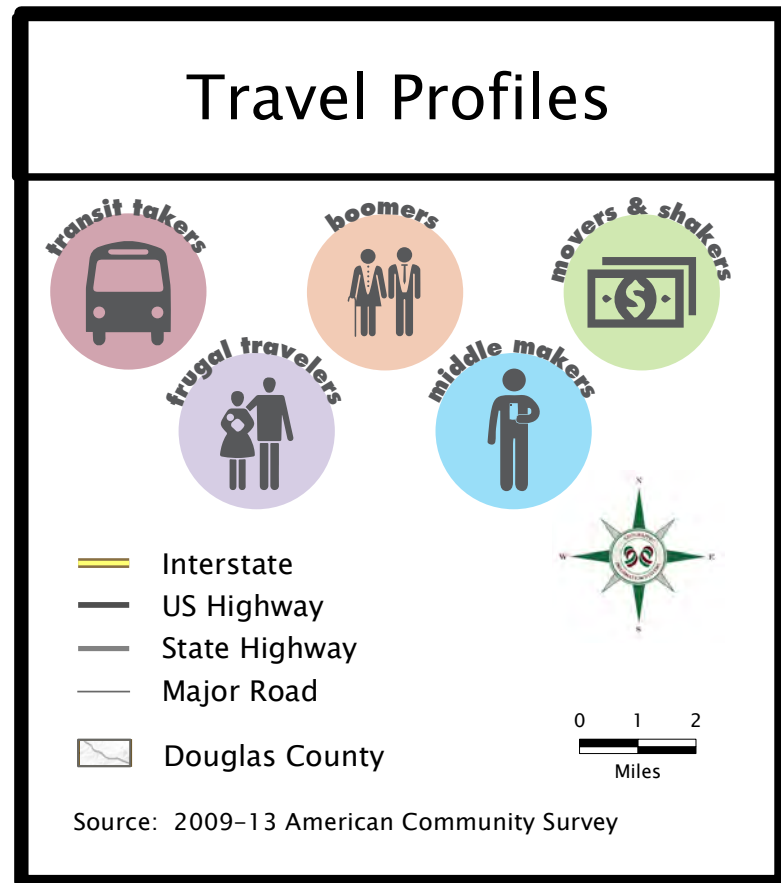


“DEPENDENT” AND “CHOICE” RIDERS

A simplified way travel profiles are often presented is that of transit “dependent” versus transit “choice” riders. People traditionally define transit “dependent” as those who do not have a personal car available for trips, either because they cannot afford one or because of physical or mental difficulties that prevent them from obtaining a driver’s license. These groups of people have no other choice than to take transit, no matter the service level. The “choice” transit rider, on the other hand, is one who has a personal automobile available, but on at least some trips he or she chooses to take transit, primarily because it is faster, cheaper or more convenient to take transit. The choice rider is very sensitive to issues such as cleanliness of the bus, friendliness of the bus driver, and perceptions of safety on transit. If the transit service does not meet their expectations, the choice rider will return to driving.



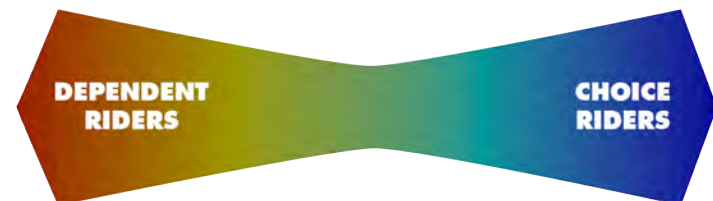
Douglas County Transit Demand Analysis





Douglas County Transit Demand Analysis

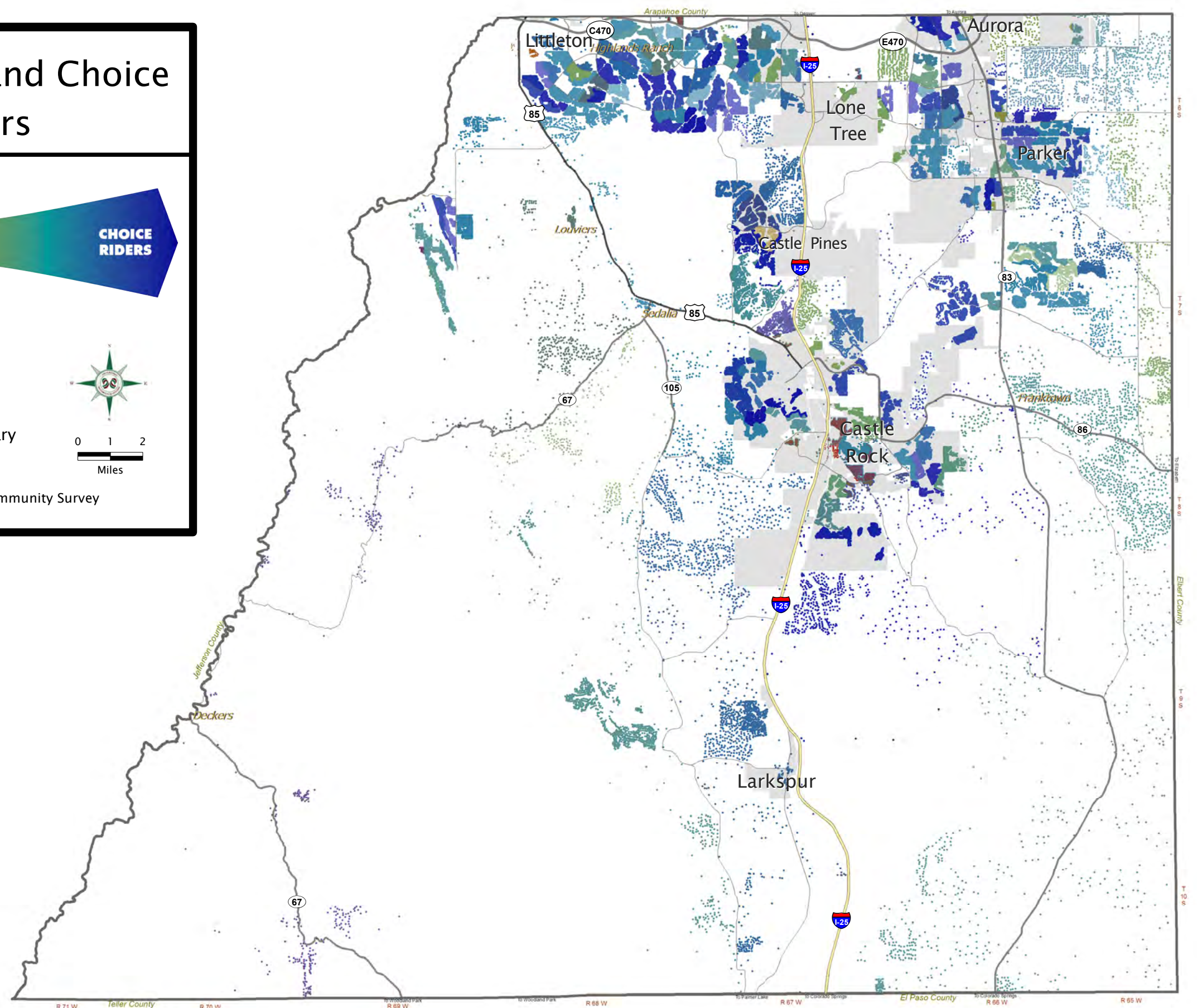
Dependent and Choice Riders



- Interstate
- US Highway
- State Highway
- Major Road
- Municipality Boundary
- Douglas County



Source: 2009-13 American Community Survey



2040 DEMOGRAPHIC CHANGES

According to projections by the U.S. Census Bureau, over half of the nation's population will belong to minority races or ethnicities by the year 2044. The number of foreign-born residents will increase to 17 percent of the population by 2040. The population will also be getting older; by 2040, 22 percent of the nation's population will be 65 years or older (compared to 15 percent in 2014).

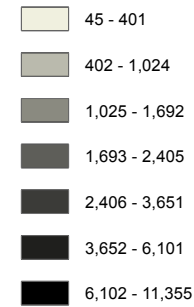
Douglas County will experience the same demographic changes as the country as a whole. In the past decade alone, the population age 65 and over has been increasing faster than the total population, as has the Hispanic or Latino population. Household sizes have been decreasing as the number of single-person households has increased.

Specifically, the 2040 housing projections for Douglas County assume the following.

- The location and quantity of housing units projected in 2040 are based on current zoning and comprehensive plan policies of both the county and the municipalities.
- The population projections anticipate a lower average household size.
- The type and age housing stock will be more diverse.
- The demographic characteristics of the 2040 population are expected to more closely resemble those of the entire metro area (lower household income, increased racial and ethnic diversity, age groups more evenly distributed).

2040 Projected Housing Data

Douglas County, Colorado



— Major Road

—— Local Road

 Highlands Ranch

☐ Municipality

 Lake

 Park

 Pike National Forest County Boundary

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 DOUGLAS COUNTY
JULY 2015 - JULY 2016

Document Path: S:\gisproj\TransitDemandAnalysis\2040 Projected Housing Data Print Date: 8/8/2016

EXISTING CONDITIONS SWOT

The existing conditions around the County have been evaluated to understand the current strengths, weaknesses, opportunities, and threats surrounding existing conditions in Douglas County.

STRENGTHS

- The northern portion of Douglas County is currently served by RTD.



- Community employers, municipalities, and entertainment districts have worked together to develop and fund a new transit circulator, the Lone Tree Link, with early success.



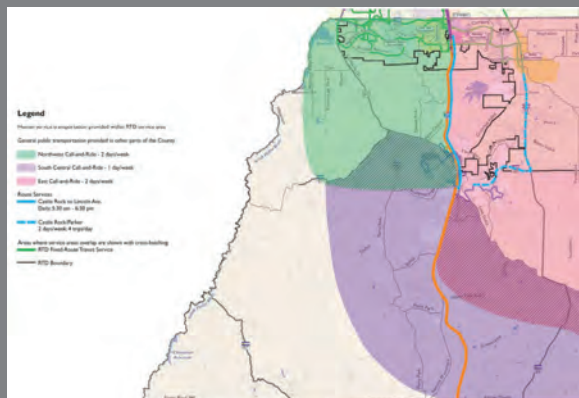
- Douglas County is undertaking the Transit Demand Analysis.

WEAKNESSES

- Only a portion of Douglas County is currently within the RTD boundary.



- Douglas County does not have the infrastructure to provide county-wide transit.
- Previous planning efforts have made limited recommendations for transit service in Douglas County.



OPPORTUNITIES

- Strong stakeholder interest in transit service in the County.



- CDOT's Bustang currently travels through Douglas County. There is potential for a future stop in RidgeGate or Castle Rock.



- New development in Douglas County is considering transit service during planning and design.

THREATS

- Development patterns within Douglas County have made it difficult to serve the County with traditional transit.



- In the past, the Call-n-Ride service provided by RTD has not consistently met ridership requirements.



TRANSIT SYSTEM ALTERNATIVES

TRANSIT SYSTEM CONSIDERATIONS

As Douglas County begins to analyze a potential transit network to serve its citizens, there are a number of key factors to consider related to the overall transit service types and their related costs and benefits. One question for the County and its residents to answer is: “What is the County’s overall aim in creating a transit plan?” Those answers could include factors such as:

- **Promoting Economic Development.** Many affluent communities around the country see transit as a key component in their economic development goals by providing access to jobs and focusing development around transit locations. In addition, good transit service is often seen as a major ‘selling point’ for communities hoping to attract and retain businesses, related employment talent and tax revenues.
- **Providing Access to Essential Human Services.** No matter the economic or demographic circumstances of any community, there will always be a component of the local population that will need mobility services to access human services such as health care, schools, community facilities, and other ‘lifeline’ services. An efficient and affordable transit network can help facilitate that access and promote self-sufficiency.
- **Provide links to Regional Transit Services.** Douglas County, similar to other suburban counties, is on the periphery of regional transit services – in this case, the RTD light rail and bus network. These types of areas often see their own local transit networks as helping to enhance linkages to those regional networks for the benefits of their citizens.
- **Reducing Auto Traffic and Related Congestion.** The first and primary aim of a transit plan is usually to encourage a shift from single-occupant auto trips to other modes of travel to provide travel choices and to help mitigate congestion by slowing the growth of auto trips or to reduce auto trips in popular areas.
- **Reducing Greenhouse Gases and Promoting Environmental Stewardship.** This factor, which often goes hand in hand with the one above, focused on the community and environmental benefits of reducing single-occupant auto emissions, particularly focused on reducing greenhouse gases that keep communities clean and free of harmful pollution.

There are a number of demographic and social factors that should guide local communities as they consider implementing transit systems and that could ultimately shape the nature and extent of their transit networks. Those factors include:

- **Changing Demographics:** The two largest population cohorts in the US today are Baby Boomers (those born between 1946 and 1962) and Millennials (those born between 1980 and 2000). Those two groups comprise more than 50% of the US population and often have similar or overlapping social preferences, including a propensity toward a more urban, walkable environment, and all the factors that comprise that environment (including transit).
- **Changing Driving Trends:** Concurrent with changing demographics, today’s population is driving less compared with previous generations. For example, per capita vehicle miles traveled is declining nationwide and is especially declining among Baby Boomers and Millennials. Similarly, the average age at which young people secure their drivers licenses is increasing, with some putting it off indefinitely in favor of transit.
- **The Age of Mobile Apps and Social Networks:** Many elements of our population, especially Millennials, rely heavily on social media and mobile phone applications for many everyday activities, including accessing transit. Many transit systems around the country are moving toward accommodating those preferences by making schedules and even fares available on mobile apps.
- **The Sharing Economy:** Many people, especially Millennials, are relying more on sharing networks for transportation and other commodities. Car-sharing and bike-sharing are growing more common in areas around the country, indicating less of a reliance on the individually-owned single-occupant automobile for transportation.
- **Private Sector Transit Services** are becoming more common in many areas, as the private sector relies on advanced technology for more efficient routing and scheduling. The private sector is often seen as more agile than the public sector in adopting new technologies. The private sector services have been seen as ‘worrisome’ competitors to public transit agencies, but many agencies are starting to adapt similar technological tools for routing and scheduling their systems.

- **Public-Private Partnerships** are also becoming and increasingly more common way to provide focused transportation options. For example, the Art Shuttle in Englewood is funded by local businesses to provide convenient linkages between the RTD light rail stop in its city and the high-employment hospital district. The Lone Tree Link is funded entirely by local business interests and the city and is providing an important linkage between the RTD light rail stop at Lincoln and the major employers in the area.
- **The First and Last Mile** is becoming an important concept in most transit areas. In line with the sharing economy, this means that local governments and businesses are providing the means for people to move between their transit connections (on both ends of their trips) and their origins and destinations using local circulators, bicycle and car sharing, and enhanced pedestrian facilities.

With those factors in mind, and using the key opportunities and constraints conversations with stakeholders as well as direction from County staff and officials, the project team developed a series of goals and objectives for transit system alternatives in Douglas County. Those initial goals and objectives are shown in the opposite page; for each objective, the team has developed corresponding recommendations on service types and costs for the County.

More than 1/4 of Douglas County residents stated that public transit should be the highest priority, second only to roadway maintenance (34%).

Douglas County 2014 voter opinion poll

GOALS AND OBJECTIVES

GOAL 1: DEVELOP A TRANSIT SYSTEM THAT MEETS BASIC NEEDS WHILE PROVIDING ESSENTIAL MOBILITY TO THOSE WHO NEED IT

Objective 1.A: Create a coordinated transit system that provides cost effective service to the transit dependent.

Objective 1.B: Create a transit system that meets the needs of choice riders for regional and local commuters and local connection services.

Objective 1.C: Create a transit system that meets today’s need while providing enough flexibility to meet future changing need and conditions.

GOAL 2: DEVELOP A TRANSIT NETWORK THAT MAINTAINS AND ENHANCES THE QUALITY OF LIFE AND ECONOMIC DEVELOPMENT POTENTIAL OF DOUGLAS COUNTY

Objective 2.A: Create a transit system that cost-effectively serves both populated and rural areas of the County.

Objective 2.B: Create a transit system that takes maximum advantage of existing land use patterns.

Objective 2.C: Create a transit system that serves and attracts jobs to activity centers.

GOAL 3: DEVELOP A TRANSIT NETWORK THAT IS COST-EFFECTIVE, AFFORDABLE, AND FISCALLY RESPONSIBLE

Objective 3.A: Develop a County-wide funding strategy for transit that is fiscally responsible.

Objective 3.B: Maximize partnerships with other public and private entities to identify funding options for transit.

Objective 3.C: Maximize the use of public-private partnerships to create new transit opportunities and complement existing services.

TRANSIT SERVICE MODELS

There are a small number of traditional transit service models that can serve the needs of Douglas County. While there are many variations, there are two basic categories of transit service models to consider: fixed-route and demand-response.

FIXED ROUTE SERVICE

Fixed route services are the most commonly operated in populated areas. Fixed route systems consist of pre-determined routes and published schedules that provide predictability and familiarity to most users. Variations of fixed-route services include:

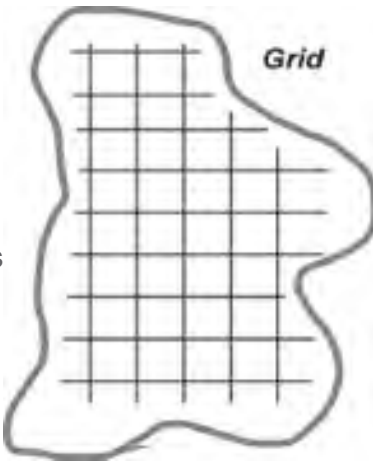
HUB AND SPOKE

This type of service usually focuses on the needs of longer-distance commuters, who regularly travel from regional collection points (such as park-and-rides) to a central destination such as a downtown area. RTD’s light rail service operating from its current end of line at Mineral on the southwest line and Lincoln on the southeast line are good examples of rail hub-and-spoke service. RTD’s express bus service between the Town of Parker and downtown Denver on the P route corridor is a good example of a bus hub-and-spoke system.



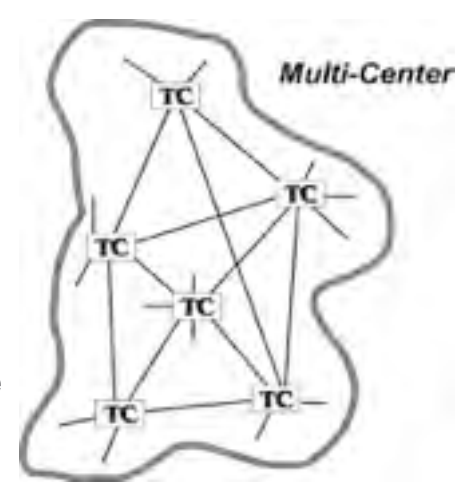
GRID

This type of service attempts to ‘blanket’ a relatively high-populated area and takes advantage of existing roadway grids to provide many opportunities for transfers and transit connections. RTD’s local routes in the core of Denver is an example of a grid network. Bus riders using east-west buses on East Colfax Avenue have many opportunities to connect to north-south buses at major intersections such as Colorado Boulevard and York and Josephine.



MULTI-CENTER

This type of service links multiple high-activity origins and destinations (including park-and-rides) with the aim of providing well-coordinated and timed transfers for riders. This avoids the need for buses to go to and from one key destination (such as a central business district) and instead serves other major activity centers outside the central core.



CIRCULATORS

This type of service operates in a non-linear fashion to provide multiple opportunities for riders to move around in a given area and to access a number of activity centers without the need to transfer. Circulators work best as two-way loop operations (to minimize travel time for riders). Good examples of circulators are the Lone Tree Link and the Hop, Skip, Jump, in Boulder, which provide access to different parts of the city and around the University of Colorado campus.

DEMAND-RESPONSE SERVICES

Demand-responses services are those that do not operate on specific fixed routes or schedules, but are ‘on demand’ to meet specific individual needs. General public and accessibility are generally two types of demand-response services offered.

GENERAL PUBLIC SERVICES

General public services are provided in a demand-response network as a substitute for, or sometimes in addition to, fixed-route services. These services are available to the general public similar to fixed-route services but rely on telephone (or mobile app) requests for service. RTD is experimenting with substituting demand-response general public services for fixed-route services in several low-density portions of its service area.

ACCESSIBILITY SERVICES

Accessibility services are provided as a demand-response service throughout the RTD service area (and is a requirement for RTD’s receipt of federal funds for its system). These are focused on the specific needs of persons with disabilities or others who need individual mobility (such as senior citizens) to access essential human services. While this type of service can be combined with general public demand-response services, they are usually operated independently.

HYBRID FIXED-ROUTE AND DEMAND-RESPONSE SERVICES

Demand-response services are those that do not operate on specific fixed routes or schedules but are ‘on demand’ to meet specific individual needs. Flexible fixed-route and checkpoint are generally the two types of demand-response services offered.

FLEXIBLE FIXED-ROUTE SERVICES

One hybrid approach, a combination of traditional fixed-route and demand-response service that is being used in some communities, is called a flexible fixed-route service. This type of service (also known as a “route deviation”) usually operates on a fixed route (often as a circulator) during high-demand peak hours, but is allowed “route deviations” during off-peak hours. In that case, an on-demand request for pick-up from a rider allows the vehicle operator to deviate from the fixed route within a certain “buffer” zone along the fixed route to provide door-to-door service.



CHECKPOINT SERVICES

Another hybrid called “checkpoint” service runs demand-response vehicles that are allowed to circulate throughout their service zones for most of the day, with scheduled stops at specific locations at specified times. This allows persons who live near checkpoints to rely on a vehicle being available at a specific location at a predictable time, allowing them to board the vehicle and request a stop in the service area or at another checkpoint similar to a traditional fixed-route service.

STRENGTHS AND WEAKNESSES OF SERVICE MODELS

SERVICE MODEL	STRENGTHS	WEAKNESSES
FIXED ROUTE		
HUB-AND-SPOKE	Good for long-distance commutes	Focused on peak period (often limited mid-day service)
GRID	Good geographic coverage	Expensive to operate Works best in dense neighborhood areas Often requires transfers to access final destination (long travel time)
MULTI-CENTER	Good geographic coverage Maximum flexibility	Expensive to operate Often requires transfers to access final destination (long travel time)
CIRCULATORS	Good geographic coverage Good linkages to activity centers	Requires two-way operations for maximum flexibility Often long travel times
DEMAND-RESPONSE		
GENERAL PUBLIC	Maximum flexibility Can replace fixed-route in low-population areas	Expensive to operate
ACCESSIBILITY	Provides linkages to essential human services	Expensive to operate May be difficult to combine with general public services
HYBRIDS		
FLEXIBLE ROUTE DEVIATION	Good coverage during non-peak hours	Limited to no service during peak hours
CHECKPOINT	Schedule reliability	Often difficult to coordinate with demand-response requirements

VEHICLE OPTIONS

There are a number of vehicle options available for different service types, many of which are familiar to Douglas County residents. Transit vehicle options generally are divided into two categories: buses and rail or other fixed-guideway systems.

BUS OPTIONS

There are several types of buses or bus-type vehicles available depending on the type of services offered and passenger seating capacities needed.

VAN

Vans or body-on-chassis vehicles are smaller vehicles (usually 10 to 20 passengers) that are most often used for on-demand services, including accessibility services. However, in low-demand situations, they can also be used for fixed-route and circulator services like that offered by the Lone Tree Link.



TRADITIONAL BUS

Traditional buses are perhaps the most familiar vehicles used in transit. The most common bus type is a standard 40-foot bus used on most RTD routes. However, RTD also uses smaller 30-foot buses on lower-demand routes (or in off-peak periods) and 60-foot articulated buses on higher-demand urban routes such as the 15L (limited service) on East Colfax Avenue. Articulated buses are also being used by many communities across the US in Bus Rapid Transit services (described later).



OVER-THE-ROAD COACH

Over-the-road coaches are most often used for long-distance commuter routes and include high-backed seating that is more comfortable than seating found on traditional buses. Over-the-road coaches also provide under-vehicle storage for cargo such as luggage.



RAIL AND OTHER FIXED GUIDEWAY OPTIONS

The term “fixed guideway” refers to a specific path or guideway that vehicles must take with no available deviation. By way of comparison, any bus service can obviously be rerouted instantaneously since it can move freely on roadways or freeways; rail service or other fixed-guideway service is by definition “fixed” and cannot be moved. This can refer to simple rails in the street (such as those that exist in downtown Denver), or to more complicated structures that are completely grade-separated (physically separated from other vehicles). The most common fixed-guideway options include:

LIGHT RAIL

Light rail, being used by the RTD system, is commonly used in many moderate-density urban settings around the US and throughout the world. The word “light” in light rail generally refers to passenger capacity (as compared with “heavy” rail described below). Light rail can operate in a street environment like in downtown Denver, or on their own separate guideways where they are not sharing right-of-way with autos. Light rail vehicles are generally 90-100 feet in length, and passenger stations are generally spread ¼ to ½ mile apart (but can be closer in a downtown environment).



STREETCARS

Streetcars are variations of light rail but are more likely to be operating as single-car trains and often in mixed traffic with autos. While some streetcar systems in the U.S. use smaller vehicles in the 65’ range (including Portland, Seattle, and Tacoma), some systems use low-floor light rail vehicles operating in a streetcar environment. (The most recent examples of low-floor systems are Salt Lake City and the Atlanta Streetcar.) Passenger stops are generally every 2-3 blocks in a downtown environment, though they can be spaced farther apart in less dense areas.



COMMUTER RAIL

Commuter rail is currently being built by RTD on its University of Colorado East Rail line, Gold Line, and North Metro corridors. Commuter rail is almost always constructed adjacent to existing freight railroad corridors (sometimes grade-separated), and generally provide long-distance commuter services. RTD’s commuter rail lines will be powered by overhead electric wires, but other commuter rail systems use locomotive-hauled coaches or self-propelled passenger vehicles. Commuter rail vehicles are usually 100’ or more in length and can operate in multi-car configurations (dictated by capacity needs and platform length constraints). Stations are usually 1-2 miles or more apart.



HEAVY RAIL

Heavy rail systems are found in many large, high-density urban areas such as Washington, Atlanta, and San Francisco, and provide very high capacity passenger services. They are always in exclusive grade-separated guideways and often run in subway or aerial structures. Vehicles are 100’ or more in length and can operate in multi-car configurations (up to 10 vehicles in some applications). Stations are generally 3-5 miles apart, though can be closer in dense downtown areas.

OTHER “ADVANCED GUIDEWAY TRANSIT”

Other “advanced guideway transit” options include technologies such as automated guideway transit, monorail, gondolas, personal rapid transit, and others that have specialized applications and are either used in high-capacity dense urban environments or in unique areas such as hospital or university campuses, amusement parks or areas with major grade changes.

PEER CITY SYSTEM ANALYSIS

Before examining potential transit systems and service options for Douglas County, it is useful to examine how other cities and regions similar to Douglas County have shaped and organized their transit services. This provides good comparisons of service types and operating costs that can be used as benchmarks for the development of services for the County.

Peer systems are determined by examining the National Transit Database (NTDB) and its statistical information on transit systems from around the country. The most recent year for which NTDB information is available is 2012. Peer systems examined are those serving geographic areas similar in size to Douglas County that provide both fixed-route and demand-response services, primarily those with at least one or more of the following characteristics:

- Suburban counties or communities that border a larger metropolitan area (with likely large commuter populations to a center city) that also have their own geographic unity and identity;
- Systems with large geographic service areas similar to the size of Douglas County (840 square miles); and/or
- Systems with service area populations similar to the population of Douglas County (approximately 315,000).

With those characteristics as a starting point, 19 transit systems were examined for statistical information that could help guide the development of a transit system for Douglas County. Table 1 summarizes the 19 systems examined for this peer system analysis (in addition to Denver RTD) and a brief description of the services they provide.

Appendix E includes a spreadsheet showing the complete statistical summary of the peer systems. Table 2 shows some of the key data to be gleaned from the peer systems for both fixed-route and demand-response services. The table also shows operating data for the RTD system as a whole and for current RTD demand-response services in Highlands Ranch, Lone Tree, and Parker.



Table 1: Peer Systems Examined

SYSTEM LOCATION	SERVICE AREA POPULATION	SERVICE AREA SIZE (SQ MI)	BUS FLEET	DEMAND RESPONSE FLEET	COMMENTS
REGIONAL TRANSPORTATION DISTRICT (CO)	2,619,000	2,326	822	364	
ANN ARBOR (MI) TRANSPORTATION AUTHORITY	212,492	81	64	14	West of Detroit, planning commuter rail service through county and connecting to Detroit
BERKS (PA) AREA TRANSIT AUTHORITY	411,442	864	44	55	Between Philadelphia and Harrisburg
BRAZOS (TX) TRANSIT DISTRICT	132,500	74	38	48	Suburban area north of Houston with extensive long-distance commute services
CAPE COD (MA) REGIONAL TRANSIT	221,049	395	25	60	Suburb of Boston with long-distance commutes
CENTRAL CONTRA COSTA (CA) TRANSIT	516,000	143	92	55	Inc Concord east of Oakland (end of BART system)
DENTON COUNTY (TX) TRANSIT AUTHORITY	234,552	157	41	9	Suburb north of Dallas with Commuter rail service connecting to DART LRT system
DUTCHESS COUNTY (NY) TRANSIT	351,997	1,067	26	18	Suburb of New York City
FORT COLLINS (CO) TRANSFORT	143,968	45	26	16	North of Denver with extensive long-distance commutes
KITSAP TRANSIT (BREMERTON, WA)	251,199	396	84	95	Suburb of Seattle
MANATEE COUNTY (FL) AREA TRANSIT	322,833	743	19	22	Service Bradenton (suburb of Tampa)
MONTEREY-SALINAS (CA) TRANSIT	421,898	280	63	24	South of San Jose
PLACER COUNTY (CA) TRANSIT	311,915	827	16	6	Northeast of Sacramento
SANTA BARBARA (CA) METRO TRANSIT	306,101	84	83	16	West of Los Angeles
SANTA CRUZ (CA) METRO TRANSIT	254,538	446	69	29	South of San Jose
SARASOTA COUNTY (FL) AREA TRANSIT	388,474	213	42	55	Between Tampa and Fort Myers
SONOMA COUNTY (CA) TRANSIT	493,285	390	41	25	North of San Francisco, planning commuter rail system to Marin County
WHATCOM TRANSIT (BELLINGHAM, WA)	203,318	776	44	29	Suburb north of Seattle with extensive vanpool commute operation
WORCHESTER (MA) REGIONAL TRANSIT	479,329	866	35	35	Suburb of Boston

Source: National Transit Database 2012

The table shows that, for fixed-route services, RTD has more vehicles per square mile and per capita than peer systems, but also higher operating costs per vehicle and per operating hour. However, RTD has lower costs per rider than the peer systems. For demand-response services, RTD also has more vehicles per square mile and per capita than peer systems, and its costs per vehicle and operating hour are slightly less than peer systems. RTD’s cost per user is virtually the same as peer systems. In addition, information from RTD and Douglas County on its three existing demand-response (Call-n-Ride) services shows similar results for operating cost per hour and rider.

These findings can help with estimating the potential ranges of costs and service parameters for transit services developed for Douglas County.

Table 2: Key Operating Data for Peer Systems

AVERAGES FOR SYSTEMS	VEHICLES	VEHICLE/ SQ MI	VEHICLES/ CAPITA	ANNUAL OPERATING COSTS	OPERATING COST/VEHICLE	ANNUAL RIDERS	ANNUAL VEHICLE HOURS	OPERATING COST/HOUR	OPERATING COST/RIDER
FIXED ROUTE									
RTD SYSTEM	822	0.35	0.00031	\$301.6 million	\$367,000	76.7 million	2.7 million	\$113	\$3.93
PEER SYSTEMS	47	0.11	0.00015	\$14.1 million	\$301,000	3.1 million	131,000	\$104	\$5.49
DEMAND-RESPONSE									
RTD SYSTEM	364	0.156	0.00014	\$46.4 million	\$103,000	1.2 million	449,000	\$70	\$40
HIGHLANDS RANCH	1	0.05	0.00001	\$249,600	\$249,6000	5,400	3,100	\$82	\$46
LONE TREE	1	0.2	0.00008	\$272,000	\$272,000	11,800	3,400	\$79	\$23
PARKER	1	0.05	0.00002	\$256,500	\$256,500	10,900	3,200	\$80	\$24
PEER SYSTEMS	34	0.078	0.00011	\$3.8 million	\$121,000	124,000	56,000	\$80	\$38

Source: National Transit Database 2012; RTD; Douglas County

TRANSIT SYSTEM SERVICE TYPES AND COSTS

The transit service models described in the previous section describe broad, high-level concepts for developing transit for a community. Those models (hub-and-spoke, grid, multi-center, circulators, and demand-response) can be applied to any number of transit service types, which are specific applications of service models that fit the needs of specific communities. Transit system service types are generally described in four categories: demand-response, local circulators, point-to-point connectors, and commute trips.

Commute trips are trips that serve longer-distance travel between major origins and destinations, such as between outlying suburbs and city centers, or between cities. They typically use a hub-and-spoke network to link, for example, outlying park-and-rides with central business districts. Commute trips can be served by both bus and rail, with their major characteristics as shown in Table 3.

Major features of commute-focused transit systems include:

- Widely-spaced stops, 1-5 miles or farther apart at each end of the trip.
- Moderate to higher speeds on major thoroughfares, highways, freeways, or rail corridors
- Relatively longer routes (10-30 miles or longer depending on origins and destinations)

Table 3: Key Operating and Cost Characteristics of Commute Service and Vehicles

CHARACTERISTIC	BUS VEHICLES	RAIL VEHICLES
TYPICAL VEHICLES	Standard (40') buses Articulated (60') buses Over-the-Road coaches for longer trips	Light rail vehicles (90') Commuter rail vehicles (100')
VEHICLE COST	\$80,000-1 million each	\$6 million each
OTHER CAPITAL COSTS	Moderate bus stop amenities (\$50,000 per mile)	Guideway and stops (\$30-45 million per mile)
TYPICAL OPERATING COST PER HOUR	\$130	\$300
OVERAGE SPEED (INCLUDING STOPS)	45 mph+	45 mph+

Point-to-point connectors are transit services that link relatively high-volume activity centers such as concentrated neighborhoods, park-and-rides, major destinations such as business districts or shopping districts, or other readily identifiable town centers. They can operate in a grid system, usually in a relatively dense area with major crossing streets that rely on transfers between transit lines. Alternatively, they can operate as multi-center neighborhood connectors that utilize major existing travel corridors to link a number of activity centers such as neighborhoods, park-and-rides, shopping districts, and other key origins and destinations. Point-to-point connectors can be served by both bus and rail, with their major characteristics as shown in Table 4.

Major characteristics of both include:

- Frequent stops, generally ¼ to ½ mile apart.
- Relatively slow speeds in that they usually operate in a relatively populated areas.
- Relatively short routes (2-10 miles, with most being in the lower part of the range).
- Usually smaller to medium-sized vehicles.

A variation of a point-to-point connector is Bus Rapid Transit (BRT), which can connect major activity centers and is usually focused on higher-capacity passenger volumes and higher speeds through travel time savings (such as a dedicated guideway or exclusive travel lanes). Key operating characteristics of Bus Rapid Transit are shown in Table 4.

Key features of BRT include:

- Moderately-spaced stops, generally ½ mile to 1 mile apart (or more).
- Moderate to higher speeds on major existing thoroughfares, highways, or freeways.
- Relatively longer routes (5-10 miles or longer)
- Generally focused on peak-period and peak-direction trips
- Usually use 40' standard or over-the-road buses, to longer articulated buses for higher passenger capacities.

Table 4: Key Operating and Cost Characteristics of Point-to-Point Service and Vehicles

CHARACTERISTIC	BUS VEHICLES	BRT VEHICLES	RAIL VEHICLES
TYPICAL VEHICLES	Smaller (30-40') buses	Standard (40') buses Articulated (60') buses Over-the-road coaches for longer trips	Streetcars (65-90') Light rail vehicles (90')
VEHICLE COST	\$80,000 each (depending on size)	\$80,000-1 million each	\$4-6 million each
OTHER CAPITAL COSTS	Moderate bus stop amenities (\$25-50,000 per stop or \$100,000 per mile)	Moderate cost stop amenities (\$50,000 per stop or \$100,000 per mile)	Guideway and stops (\$40-45 million per mile)
TYPICAL OPERATING COST PER HOUR	\$100	\$150	\$200
AVERAGE SPEED (INCLUDING STOPS)	15-20 mph	30-40 mph depending on operating condition	15-20 mph

Local circulators are similar to the service models described earlier. They provide internal circulation to a relatively small geographic area and link together a large number of activity centers. Local circulators can be served by both bus and rail, with their major characteristics as shown in Table 5.

Major characteristics include:

- Frequent stops, generally ¼ to ½ mile apart.
- Relatively slow speeds in that they usually operate in a relatively dense areas.
- Best operated as two-way circulators (one clockwise, one counter-clockwise) to minimize out-of-direction travel.
- Relatively short routes (2-10 miles, with most being in the lower part of the range).
- Usually smaller vehicles serving many on-and-off trips.

Table 5: Key Operating and Cost Characteristics of Local Circulator Service and Vehicles

CHARACTERISTIC	BUS VEHICLES	RAIL VEHICLES
TYPICAL VEHICLES	Vans Body-on-chassis Smaller (30-40') buses	Streetcars (65-90') Light rail vehicles (90')
VEHICLE COST	\$300,000-800,000 each (depending on size)	\$4-6 million each
OTHER CAPITAL COSTS	Moderate cost stop amenities (\$25-50,000 per stop or \$100,000 per mile)	Guideway and stops (\$40-45 million per mile)
TYPICAL OPERATING COST PER HOUR	\$100	\$200
OVERAGE SPEED (INCLUDING STOPS)	12-15 mph	12-15 mph

Demand-response service generally serve multiple origins and destinations with no fixed routes. As noted earlier, demand-response services can serve both the general public and persons with accessibility needs (such as persons with disabilities, senior citizens, and others who rely on transit for basic human services). Table 6 summarizes the types of vehicles that are generally appropriate for the different types of transit service types.

Demand-response services typically include a few key characteristics:

- They generally use small vans or body-on-chassis vehicles that can hold from 10 to 20 persons. Vehicles typically cost from \$300,000 to \$500,000.
- They are generally geography based, typically in ‘zones’ that are served by a dedicated fleet of vehicles. RTD demand-response service zones are roughly 3-5 miles in diameter or 10-20 square miles.
- Operating costs vary from system to system, depending on the size and intensity of service. As noted earlier, RTD’s costs for its demand response services average \$103,000 per vehicle, \$70 per operating hour, and \$40 per passenger trip.

Table 6: Types of Vehicles Appropriate for Different Transit Service Types

VEHICLE	DEMAND RESPONSE	LOCAL CIRCULATOR	POINT-TO- POINT	COMMUTE
VAN OR BODY-ON- CHASSIS	X	X		
SMALL BUS (30')	X	X	X	
STANDARD BUS (40')		X	X	X
ARTICULATED BUS (60')			X	X
OVER-THE-ROAD COACH				X
STREETCAR		X	X	X
LIGHT RAIL			X	X
COMMUTER RAIL				X

Local Circulators

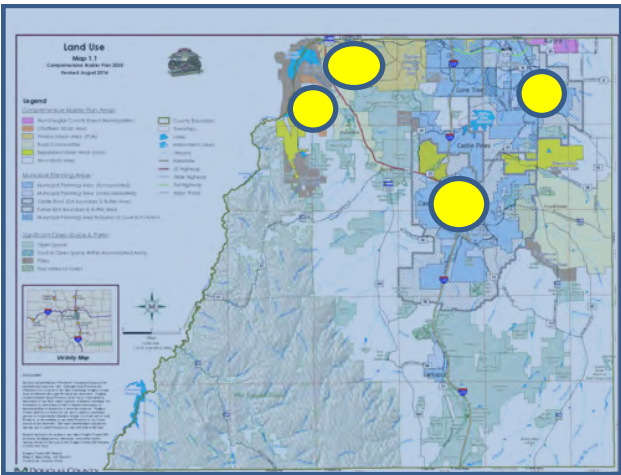
- Opportunity for innovative public/private partnerships.
- Serve focused geographic areas.
- Technology driven demand-response, fixed-route, or combination.
- Can use variety of vehicles (vans, body-on-chassis, small bus).
- Can be integrated with other services like car sharing or bike sharing.



Low Investment

Focus on key geographic, employment, and population areas.

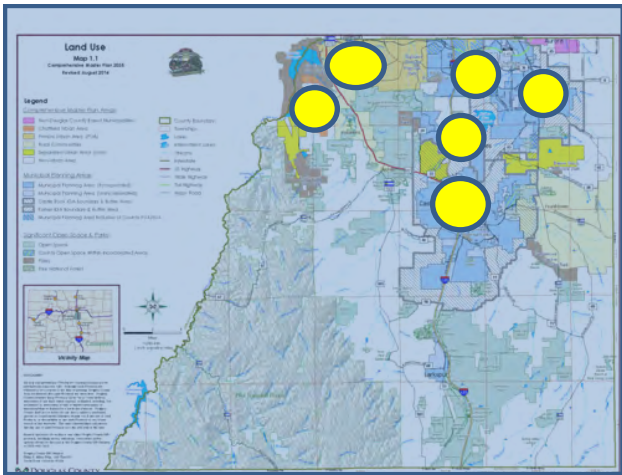
Route Miles Equivalent: 30
Vehicles Needed: 25
Start Up Cost: ~\$20 Million
Annual Cost: ~\$10 Million



Moderate Investment

Additional key geographic, employment, and population areas.

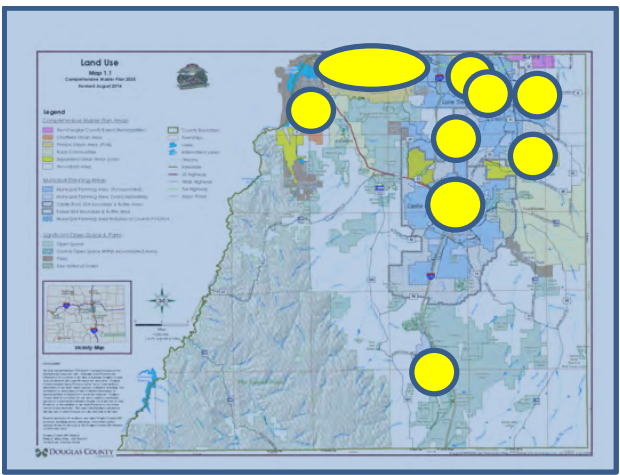
Route Miles Equivalent: 50
Vehicles Needed: ~60
Start Up Cost: ~\$40 Million
Annual Cost: ~\$20 Million



High Investment

Serves all population centers.

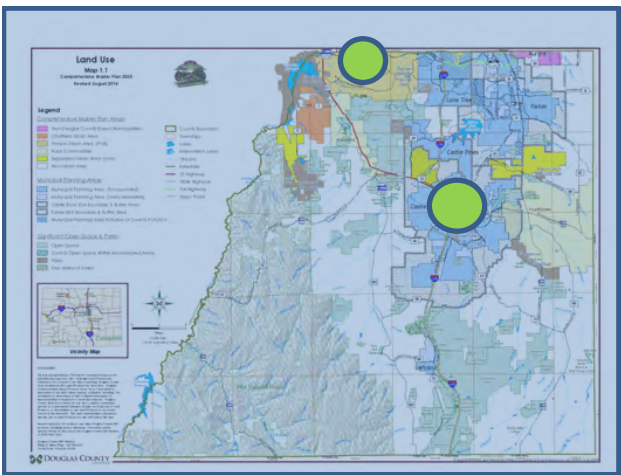
Route Miles Equivalent: 100
Vehicles Needed: ~100
Start Up Cost: ~\$50 Million
Annual Cost: ~\$40 Million



High Investment - Rail Option

Fixed-rail streetcar service (shared or exclusive lanes).

Castle Rock (CR): ~3 miles
• Start Up Cost: ~\$150 Million
• Annual Cost: ~\$4 Million
Highlands Ranch (HR): ~2.5 miles
• Start Up Cost: ~\$130 Million
• Annual Cost: ~\$3 Million



Point-to-Point Connectors

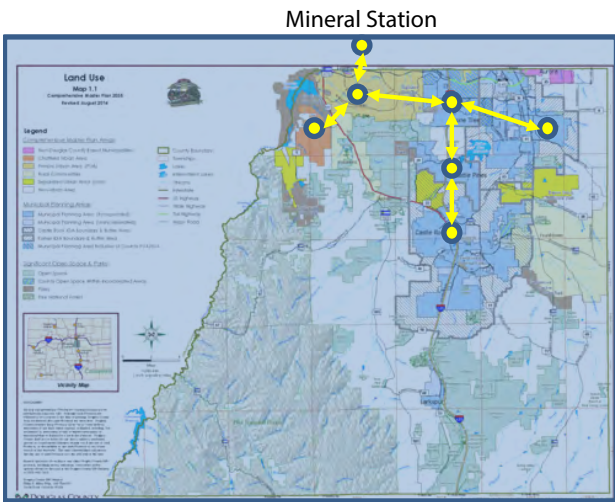
- Connect key employment and activity centers.
- Technology driven demand-response, fixed-route, or combination.
- Can use a variety of vehicles (vans, body-on-chassis, small buses, large buses).
- Can provide connections to regional services (including RTD and Bustang).
- Can operate as BRT in exclusive lanes for all or portions of routes.



Low Investment

Focus on key geographic, employment, and population areas.

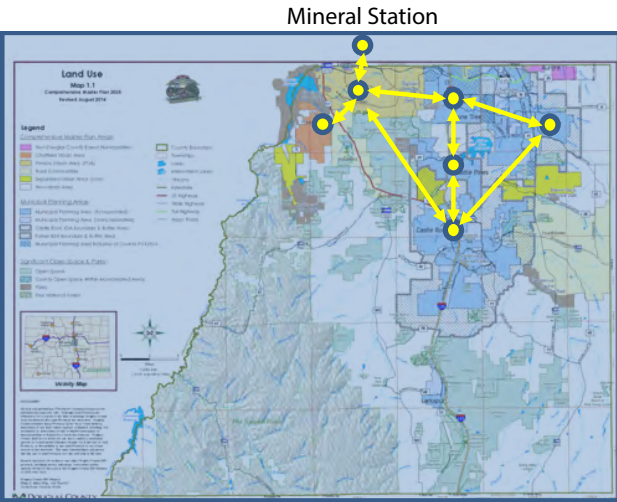
Route Miles Equivalent: 35
Vehicles Needed: ~20
Start Up Cost: ~\$15 Million
Annual Cost: ~\$5 Million



Moderate Investment

Additional key geographic, employment, and population areas.

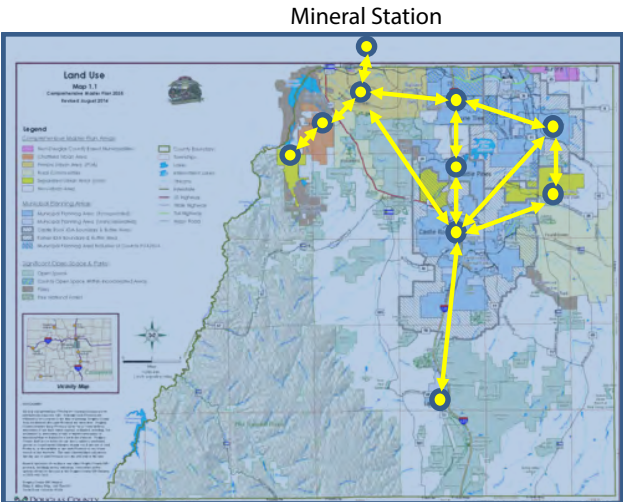
Route Miles Equivalent: 60
Vehicles Needed: ~40
Start Up Cost: ~\$40 Million
Annual Cost: ~\$15 Million



High Investment

Focus on all population centers.

Route Miles Equivalent: 100
Vehicles Needed: ~100
Start Up Cost: ~\$120 Million
Annual Cost: ~\$75 Million



Regional Commutes

- Connect key regional activity centers (including potentially RTD stations).
- Generally fixed-route.
- Can use a variety of vehicles (generally standard buses, articulated buses, or over-the-road coaches).



Low Investment

Focus on connecting Castle Rock and Lone Tree with DTC and Denver.

Route Miles Equivalent: 40
Vehicles Needed: ~10
Start Up Cost: ~\$10 Million
Annual Cost: ~\$2 Million

Moderate Investment

Focus on connecting employment and population centers with RTD.

Route Miles Equivalent: 50
Vehicles Needed: ~13
Start Up Cost: ~\$12 Million
Annual Cost: ~\$3 Million

High Investment

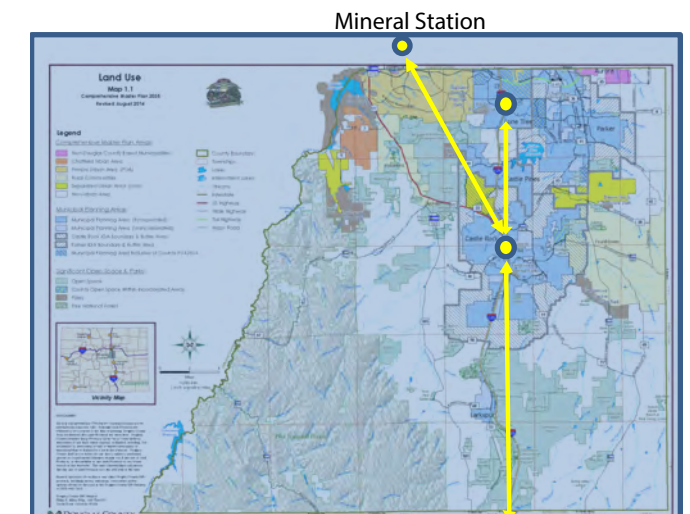
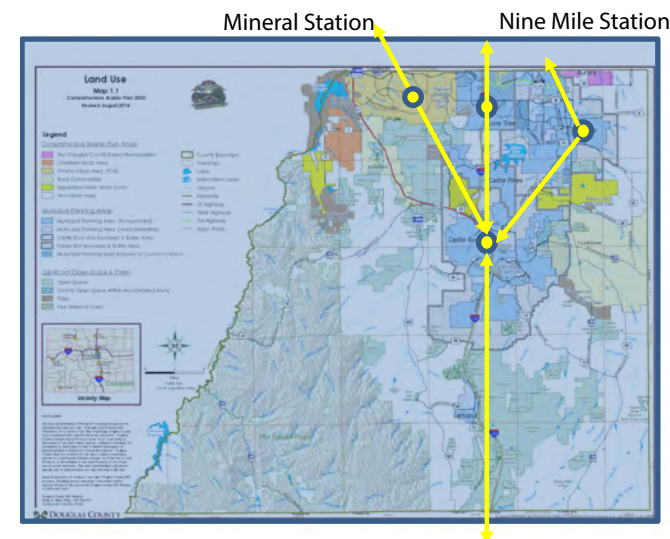
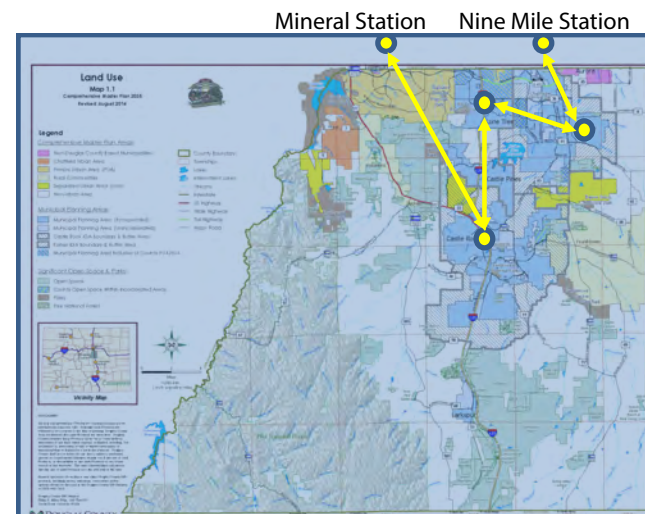
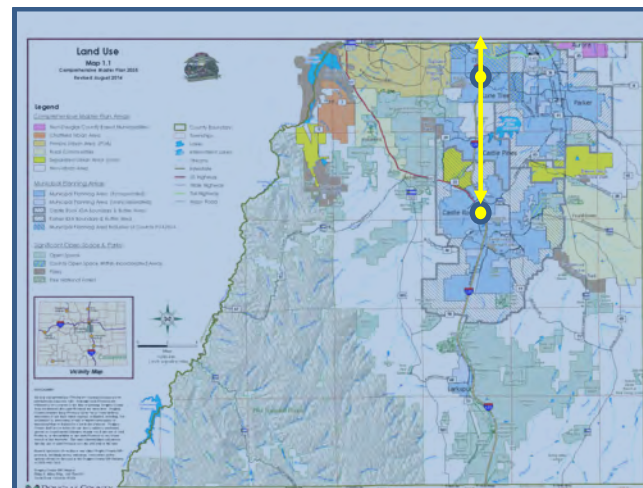
Focus on connecting employment and population centers with Denver and Colorado Springs.

Route Miles Equivalent: 80+
Vehicles Needed: ~20
Start Up Cost: ~\$25 Million
Annual Cost: ~\$6 Million

High Investment - Rail Option

Focus on connecting with RTD and Colorado Springs on commuter rail.

Route Miles Equivalent: ~50
Start Up Cost: ~\$1 Billion+
Annual Cost: ~\$15 Million



Alternatives Evaluation

- Criteria evaluate how well each alternative will achieve goals.
- Prioritize transit recommendations and investments.
- Stakeholder input will be incorporated into the evaluation.
- Evaluation can be updated as conditions in Douglas County change.

GOAL 1: Develop a transit system that meets basic needs while providing essential services to all Douglas County residents

Evaluation Criteria A: Mobility

Includes potential ridership, travel time competitiveness and reliability, improved transportation choices for all segments of the population, and integration with other systems.

GOAL 2: Develop a transit network that maintains and enhances the quality of life and economic development potential of Douglas County

Evaluation Criteria B: Community

Includes connections to major activity centers, consistency with local plans, potential economic benefits, and serve employment and population centers.

Evaluation Criteria C: Resilient

Includes service reliability in all conditions, cost-effectiveness, health and environment benefits, and quality of life benefits.

GOAL 3: Develop a transit network that is cost-effective, affordable, and fiscally resilient

Evaluation Criteria D: Fiscal

Includes capital and operating costs, local support and funding options, and potential availability

Evaluation Criteria E: Deliverable

Includes ease of implementation, use of existing infrastructure, expansion capability, ease of operations and maintenance, and innovative service delivery potential.

SERVICE RECOMMENDATIONS

CONNECTIVITY

The economic future and quality of life in Douglas County rely on an integrated transportation network. During this project, over 1,500 Douglas County residents indicated that transit is a necessary component of the transportation infrastructure in Douglas County. Stakeholders are interested in connectivity within their communities, between communities in Douglas County, and connectivity to the region.

WITHIN COMMUNITIES

Based on community feedback and stakeholder input, local circulator service is recommended in Highlands Ranch, Sterling Ranch, Lone Tree, Castle Pines, Castle Rock, and Parker. Local circulator services are intended to provide connectivity within the community that they serve. The local circulator areas provide opportunity for Douglas County to develop innovative public/private partnerships to serve focused geographic areas. Survey respondents want local circulator service that uses technology to provide a real-time arrival system with easy to use website.

BETWEEN COMMUNITIES

Based on community feedback and stakeholder input, point-to-point connectors are recommended to connect each of the local circulator systems, key employment centers, and activity centers. While the details of routing still need to be determined, some opportunities have been discussed. As the routes are developed, opportunities for dedicated transit lanes and BRT can be explored. Additionally, using technology to develop an easy to use website and real-time arrival information will make these services more appealing to Douglas County residents.

TO THE REGION

Based on community feedback and stakeholder input, regional commute services are recommended to connect communities to existing RTD Light Rail service. Regional commute service will be focused on peak hour transit that provides service to and from employment centers. For example, working with CDOT to “buy-up” service and negotiate a stop in Castle Rock could achieve the connection between Castle Rock, Colorado Springs, and downtown Denver. Other routes can focus on providing peak hour service to the Mineral, Lincoln, and Nine Mile light rail stations.



PUBLIC-PRIVATE PARTNERSHIPS

A public private partnership can be a mutually beneficial collaboration between a public agency and a private sector entity. Through this arrangement, the skills and assets of each sector can be shared in the delivery of transit service. Douglas County should proactively seek out public-private opportunities for developing high quality transit service that enhances quality of life for Douglas County residents and provides benefits for employers in the County.

LONE TREE LINK

The Link is a free service provided by a collaborative public-private partnership of five Lone Tree organizations that are working together to create a vibrant and healthy community. The partnership is an example of strategic investments that benefit the economy and contribute to a high quality of life in Lone Tree.

With convenient service every 10 minutes, the Lone Tree Link brings employees from the Lincoln light rail station to their place of employment. It's a reliable connection to daily destinations and appointments for the estimated 4,500 employees who work along Park Meadows Drive.

Lone Tree is a great place to do business. Because the Link service is designed specifically for commuters' needs, it acts as an employee benefit for the participating organizations. These major employers have come together to help workforce recruitment in the area and reduce traffic impacts.

The service is an example of the City of Lone Tree's proactive approach to preparing for and encouraging future economic growth while mitigating related traffic impacts. It's an innovative pilot program, where the City can test new ways to alleviate traffic for a relatively small investment of public money. The City and the partners behind the Link are investing in Lone Tree to assure it remains a premiere community for both businesses and residents.

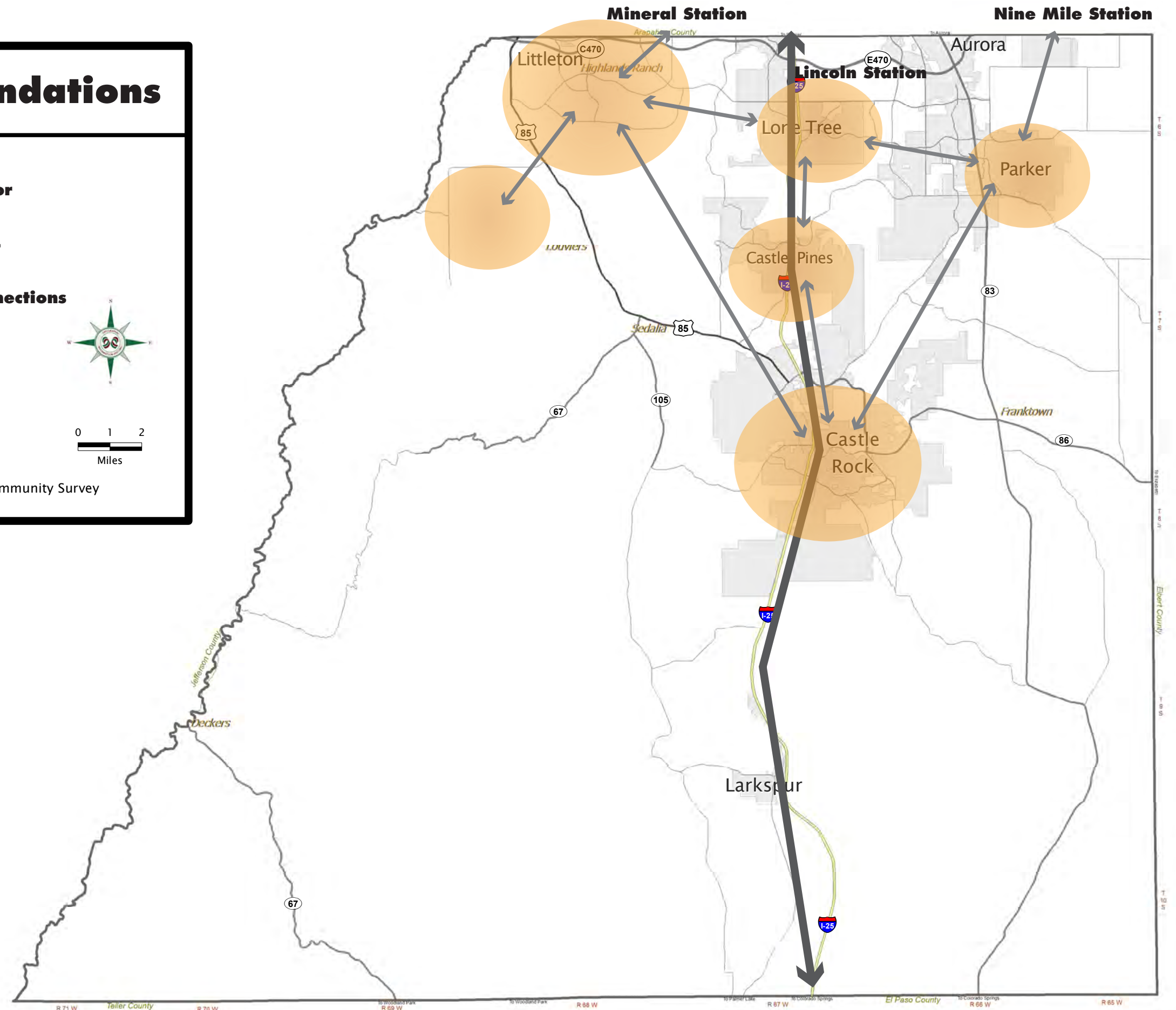
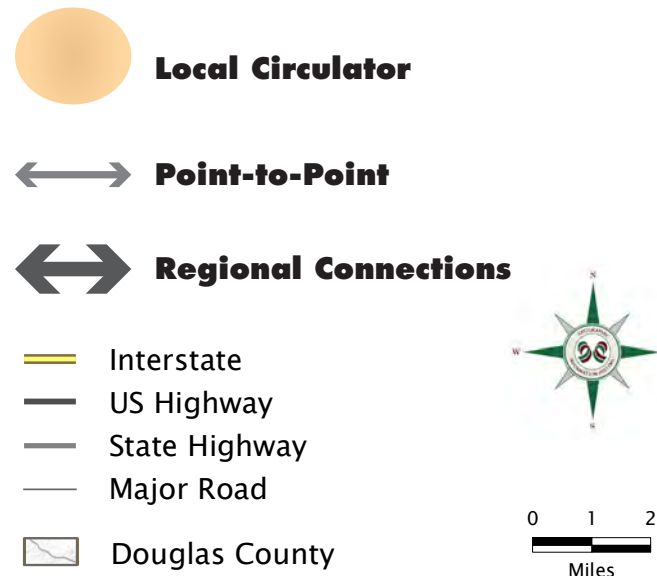
RTD AND LYFT

As a way to reduce demand response service cost, RTD is currently working on a public-private partnership with Lyft to create first and final mile options to connect to RTD's network.



Douglas County Transit Demand Analysis

Recommendations





 **DOUGLAS COUNTY**
COLORADO