SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

FINAL REPORT

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EXECUTIVE SUMMARY

INTRODUCTION

The Southwest Salt Lake County Transit Feasibility Study began in March 2010 under the direction of the Wasatch Front Regional Council (WFRC). The purpose of this Feasibility Study was to identify a realistic and suitable high-frequency/high-capacity transit project to serve the communities of South Jordan, Herriman, Riverton, Bluffdale, and Draper, that connects the end of the Mid-Jordan TRAX line at the Daybreak subdivision in South Jordan and the FrontRunner station in Draper. To prepare this project for future study, and to avoid duplication of effort, this study followed a modified Alternatives Analysis approach to identify the purpose and need for a project, determine alternatives, and screen alternatives to arrive at a preferred alternative. This report documents each of the steps associated with this Feasibility Study.

The public process for this study was a multi-level approach to educate residents, business owners, and city officials about the potential for transit in the area and solicit input and comments. Outreach efforts consisted of an open house and a public workshop, a website survey, and University of Utah Urban Planning student involvement.

STAKEHOLDER COMMITTEE

Bluffdale City
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STUDY AREA

The Study Area is a 33-square-mile region in the southwestern portion of Salt Lake County, Utah, and includes portions of South Jordan City, Herriman City, Riverton City, Bluffdale, and Draper. The general Study Area boundaries are 6000 West on the west, 200 West on the east, 14600 South on the south, and 11400 South on the north.

Population is growing in this area of the Salt Lake Valley, perhaps faster than any other region in the Wasatch Front. Demographic projections are shown in Table ES -1.

TABLE ES- 1
DEMOGRAPHIC PROJECTIONS FOR STUDY AREA

	2005	2040	Change	Percent Change
Population	77,900	211,000	133,100	171%
Households	20,400	69,100	48,700	239%
Total Employment	21,800	112,600	90,800	417%

Source: Wasatch Front Regional Council, summarized by Fehr & Peers (August 2010).

PROBLEMS IDENTIFIED IN THE STUDY AREA

A careful analysis of the existing and future conditions in the Study Area was undertaken to understand the problems facing the southwest area of Salt Lake County. The following problem statements were identified as a result of analyzing the future transportation conditions in the Study Area. Based on population and employment projections, and travel demand projections, the following were identified as the top three issues related to transportation in Southwest Salt Lake County:

1. Limited access to transit in the southwest area of Salt Lake County

The Mid-Jordan TRAX extension will serve the Daybreak subdivision in South Jordan, but as the population, employment, and travel needs of the southwest part of Salt Lake County grow, there is no plan for high-frequency/high-capacity transit to serve those trips beyond the last station of this extension. This limited access to higher-speed and higher-frequency transit hinders the choice to ride transit.

2. Inability of the transportation network to accommodate the increase in travel demand due to residential and employment growth.

The Study Area is unique in that it includes some of the only remaining contiguous open lands in Salt Lake County, and these contiguous parcels provide an opportunity for an increase in residential and office development. The planned growth in population and employment will increase demand on the transportation system. On a regional scale, daily vehicle miles traveled (VMT) is expected to grow from 37 million to 65 million, comparing between current conditions and a freeway-oriented growth option (Source: WFRC Long Range Plan). This equates to a growth of 78%. Between 2005 and 2040, daily VMT is forecasted to increase by 254% within the Study Area - this equates to an average annual growth of 3.7%. By 2040, as much as 25% of p.m. peak period VMT in the Study Area is expected to occur on congested roads at or near capacity, contributing to low travel speeds and high levels of delay.

3. Increasing difficulty traveling east/west in the Study Area

The Salt Lake Valley has long devoted resources to moving people in a north-south direction, but more recent needs have been identified to move people east-west. By 2040, all of the major east-west arterials in the Study Area west of Bangerter Highway will be highly congested, including 11800 South, 12600 South, and 13400 South. East of Bangerter Highway, both 11400 South and 12600 South will be congested. Without robust transit infrastructure, travelers will lack choice to avoid this congestion.

A purpose statement was developed to reflect the goals of the project. The purpose of a transit project is to better connect the southwest area of Salt Lake County with the regional transit system in order to improve transportation choice and mobility within the Study Area, as well as improved access to important regional destinations. The project needs address the problems identified in this Study Area, and move towards meeting the goals of the project team. The project needs are:

- To provide additional capacity to the transportation network in the Study Area
- To reduce the negative effects associated with population and employment growth, and congestion

- To support local land use plans to diversify and densify land use, including job centers and mixed-use developments
- Provide additional transportation options to enhance livability and sustainability for the communities in the Study Area

DEVELOPMENT OF ALTERNATIVES

The preliminary screening of alternatives consisted of an evaluation of both mode and alignment. Preliminary screening included the following levels of analysis:

- Mode Evaluation. Mode evaluation included the consideration of a 'universe' of modes, and then narrowed the list to the most applicable modes for this context.
- Alignment Evaluation. Preliminary alignment evaluation included a 'universe to long list' analysis, and a 'long list to short list' evaluation.

In addition, a workshop was conducted with the Stakeholders to understand important origins and destinations, and to gather plans for future land use changes that could support transit oriented development.

ANALYSIS OF ALTERNATIVES

The Long List of Alignments was refined and paired with transit modes to create the Short List of Alternatives, as shown in Figure ES-1:

- Alternative A – Standard bus operating on 12600 South
- Alternative B – Bus Rapid Transit (BRT) to Herriman Towne Center, 3600 West, 12600 South
- Alternative C – BRT using the Power Utility Corridor, 12600 South
- Alternative D – BRT to Herriman Towne Center, 13400 South, Bangerter Highway
- Alternative E – Mid-Jordan TRAX extension to Herriman Towne Center with BRT on 3600 West and 12600 South

Table ES-3, located on page ES-6, compares each of the Short List Alternatives under 2040 conditions.

PREFERRED ALTERNATIVE

The selection of Preferred Alternative was guided by the application of the established criteria, a Stakeholder meeting to discuss the merits of each of the alternatives, and one-on-one discussions with each Stakeholder. In addition, each of the alternatives was presented at a public workshop, and was available for comment on the WFRC website. The Preferred Alternative is Alternative B (from the Short List of Alternatives) with additional refinements made to the alignment. These revisions included:

- Refinement of the alignment exiting the Daybreak sub-division and continuing to Herriman
- Re-routing of the alignment to avoid a grade-separated crossing of Bangerter Highway between major intersections while still accessing the planned transit oriented development at the PRI property.

- Addition of a short and long term alignment to connect the FrontRunner station in Draper to either 12400 South/900 East TRAX station (short-term) or future Draper TRAX end of line.

The Preferred Alternative, shown in Figure ES-2, is Bus Rapid Transit (BRT). At approximately 9.8 miles in length, the route will complete a one-way end-to-end trip in 23 minutes at an average speed of 26 miles per hour. The route connects the Mid-Jordan TRAX Daybreak station to the FrontRunner station in Draper. The figure below shows station-level boardings, including off-model projections shown in red-dashed lines. Off-model projections were prepared to predict ridership including demographic changes which might not be reflected in the WFRC model, special generators such as the Salt Lake Community College – Herriman Campus, and improved access to transit with an enhanced walkable network. Working with Herriman and Riverton, specific station areas were chosen to develop off-model estimates. The estimates were prepared for stations at the Salt Lake Community College – Herriman Campus, Herriman Towne Center, a potential PRI development in Riverton, and for a parcel near 13400 South and 2700 West.

Performance

In addition to applying the criteria developed to compare among alternatives, an additional analysis reflects the ability of this alternative to meet some key sustainability measures in 2040. This alternatives shows a reduction of vehicle miles traveled (VMT), and hence vehicle emissions. The BRT would reduce VMT by approximately 22,000 daily miles, and save over 3 million kilograms per year in carbon dioxide vehicle emissions.

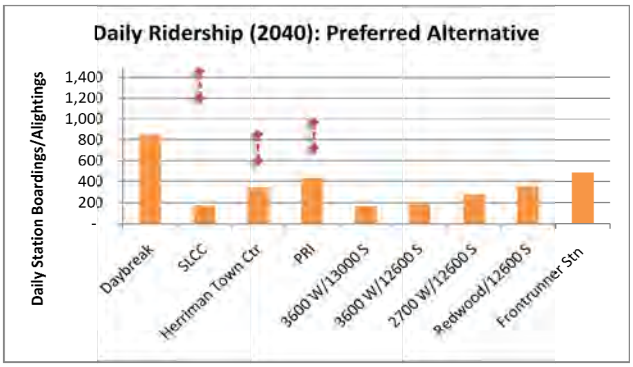


TABLE ES-2
PREFERRED ALTERNATIVE PERFORMANCE

Distance in miles (one way)	9.8
Travel time (one way)	23 minutes
Frequency	15 minutes (peak and off-peak periods)
Daily Ridership Range[1]	2,700-3,100
UTA System Ridership Increase	2,800-3,200
Conceptual Capital Cost (millions) [2]	$147-197
Cost/Benefit (Ridership + Cost)	Medium
Support for TOD plans	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. Some likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	Crossings at Mountain View Corridor (2), and Bangerter Highway.
Capacity Improvements	Improves capacity by approximately 13% in each direction.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers.
2. Capital Costs usually include right of way, vehicles, construction, finance costs, management, other procurement, and design.

Draper Extension Alternatives

From the Draper FrontRunner station at 12800 South, the Preferred Alternative could extend east on 12600 South, connecting to either of the planned light rail stations at 11800 South or Draper Town Center (12400 South). This extension would be 2.5 to 3 miles in length and increase route ridership of the Preferred Alternative by roughly 27% by attracting additional riders on the extension segment and also increasing ridership at stations west of FrontRunner. Eventually the Draper TRAX Full Build scenario will extend to 14800 South, and provide another opportunity to link transit routes. This 2.5-to-3-mile alignment is highly dependent on the maturation of land use and infrastructure surrounding the FrontRunner station at 12800 South. This maturation includes among other things, a structure to cross the Frontrunner corridor and the future redevelopment of the Utah State Prison property. These options are shown in Figure ES-2.

Next Steps and Implementation

This Feasibility Study is the first step towards implementing a transit project. Several subsequent studies will be necessary including an Alternatives Analysis, Financial Feasibility Study, Environmental Study, Preliminary Engineering, and Incorporation into local plans.

Land Use Considerations (preparing for the success of transit)

Throughout the study there has been focus on transit-oriented development as a means to support a future high-frequency/high-capacity major transit investment. To prepare for such a transit investment, below are suggested next steps for cities in southwest Salt Lake County that wish to develop transit-supportive plans or to implement zoning (or other) ordinances. These suggested steps are intended to aid cities as they develop and implement TOD planning in their jurisdiction in order to achieve a desired result. Steps include:

1. Clarify areas to explore station area planning
2. Categorize potential station areas by type
3. Develop your planning approach for each station type
4. Develop planning products (overlay, small area plan, district, etc) before development applications are anticipated.

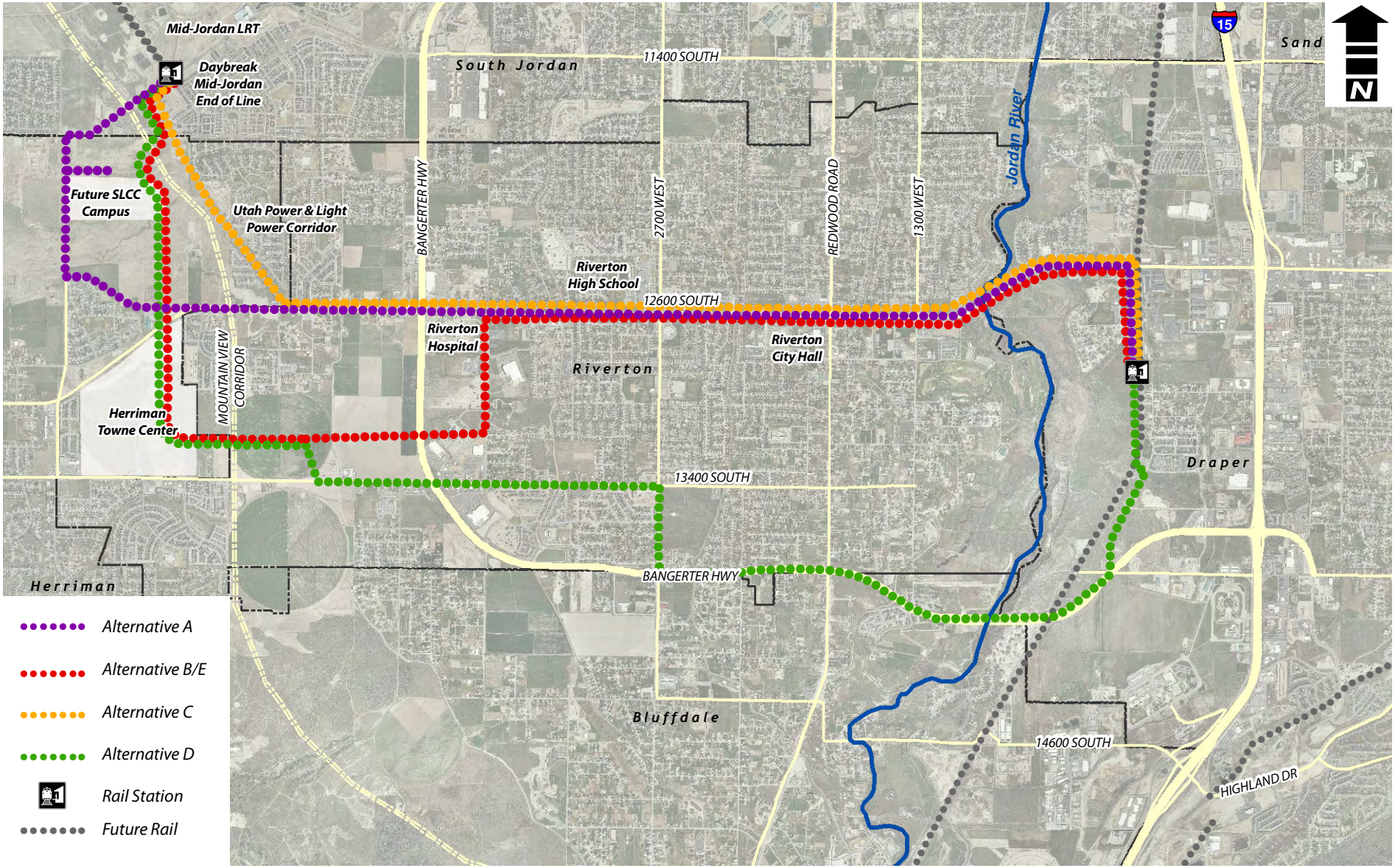
Phasing Considerations

Because of the flexibility of BRT, this technology may be implemented in a variety of ways, and phasing options should be considered. In the short term, communities in the Study Area may consider beginning bus service along this route, and increasing frequency as it is warranted. Over time, and as demand increases, other amenities may be added, such as signal priority or station development. As demand increases further, and funding is secured, the project would evolve into its final state. With a vision towards the future, and if demand warrants such an upgrade, it may be advantageous to preserve additional right of way (a total of 28') to allow for a future light rail line.

TABLE ES-3
SUMMARY COMPARISON OF ALTERNATIVES (2040)

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Distance in miles (one way)	8.6	9.3	7.4	9.9	9.3
Travel time (one way)	32	20	17	22	26 min (incl. 5 min transfer)
Daily Ridership Range[1]	400-800	3,100-3,500	2,800-3,200	2,400-2,800	5,500-5,900
UTA System Ridership Increase	700-1,100	2,600-3,000	2,400-2,800	3,000-3,400	2,900-3,300
Conceptual Capital Cost (millions)	Minimal	$140-$187	$111-$148	$149-$199	$217-$280
Cost/Benefit (Ridership + Cost)	N/A	Medium	High	Medium	Low
Support for TOD plans	Does not support TOD development	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. High likelihood development will increase ridership, and cost effectiveness.	Few TOD plans on this alignment	Service to Herriman Towne Center, PRI parcel, employment area on 3600 West, and parcel at 2700 W/13400 S. High likelihood development will increase ridership, and cost effectiveness.	Service to Herriman Towne Center and PRI parcel. Some likelihood development will increase ridership, and cost effectiveness.
Construction Challenges	No new construction	Crossings at Mountain View Corridor (2), and Bangerter Highway.	Challenges associated with utility corridor	Crossings at Mountain View Corridor (2), Bangerter Highway, FrontRunner corridor.	Crossings at Mountain View Corridor (2), and Bangerter Highway.

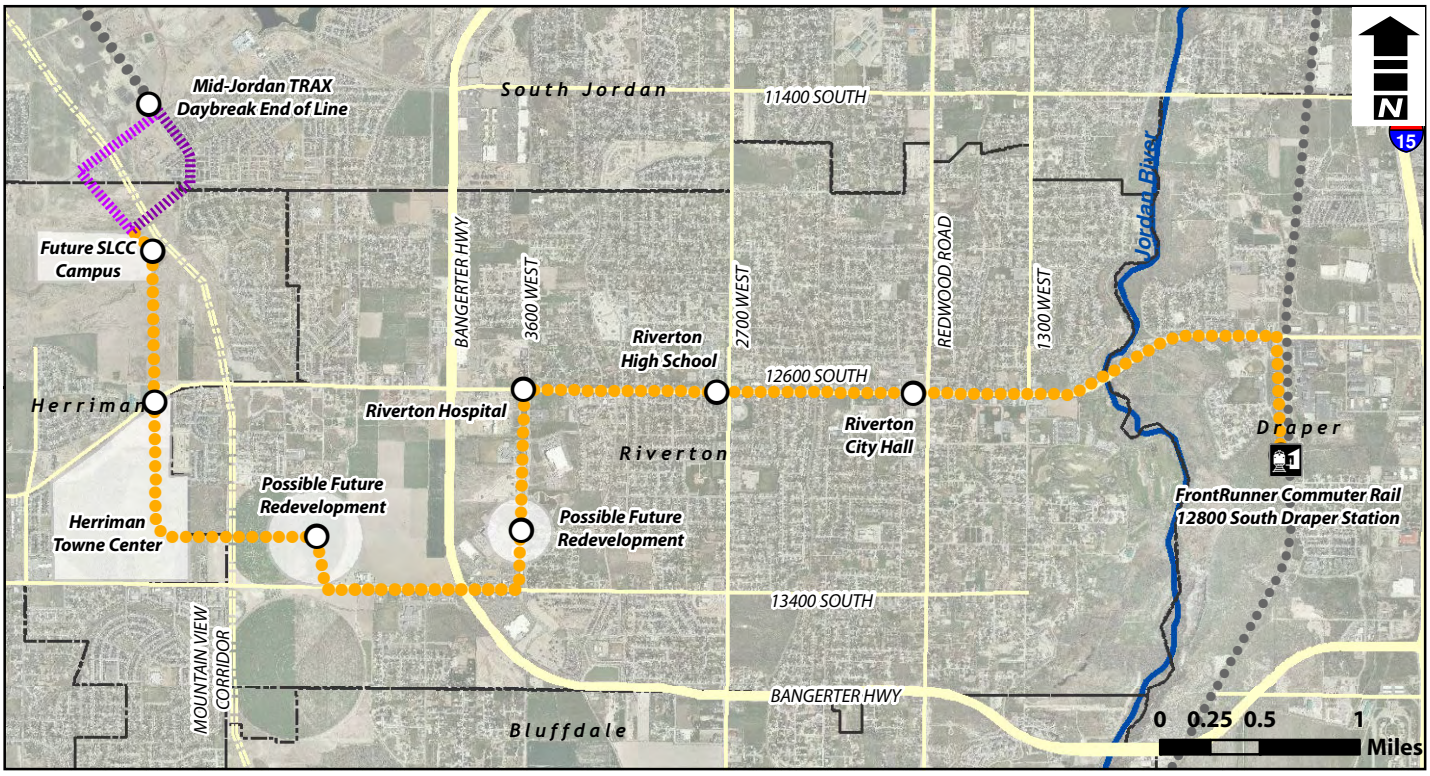
1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers. Ridership estimates do not include additional off-model forecasts which were prepared using Direct Ridership Forecasting.



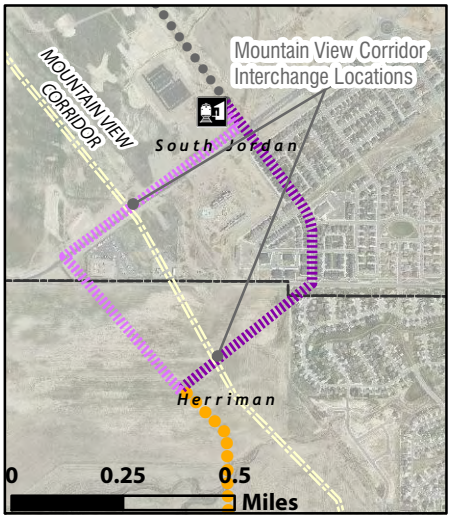
SOUTHWEST SALT LAKE COUNTY TRANSIT FEASIBILITY STUDY

Short List of Alternatives

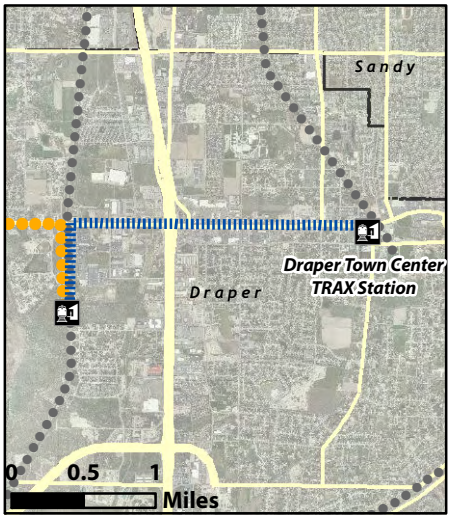
FIGURE ES-1



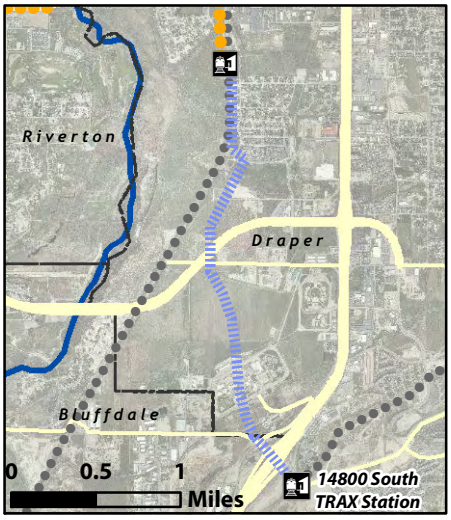
PREFERRED ALTERNATIVE



WESTERN TERMINUS OPTIONS



EASTERN TERMINUS OPTION #1



EASTERN TERMINUS OPTION #2

- Preferred Alignment
- Western Terminus Options
- Eastern Terminus Option #1
- Eastern Terminus Option #2
- Potential Stations
- Commuter Rail/TRAX Station

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Preferred Alternative

FIGURE ES-2

1. INTRODUCTION

The Southwest Salt Lake County Transit Feasibility Study began in March 2010 under the direction of the Wasatch Front Regional Council (WFRC). The purpose of this feasibility study was to identify a realistic and suitable high-frequency/high-capacity transit project to serve the communities of South Jordan, Herriman, Riverton, Bluffdale, and Draper, and that would ultimately connect the end of the Mid-Jordan TRAX line at Daybreak subdivision in South Jordan, and the FrontRunner station in Draper. To prepare this project for future study, and to avoid duplication of effort, this study followed a modified Alternatives Analysis approach to identifying the purpose and need for a project, determining alternatives, and screening alternatives to arrive at a preferred alternative. This report documents each of the steps associated with this Feasibility Study.

STAKEHOLDER GUIDANCE

The Southwest Salt Lake County Feasibility Study was a collaborative effort between the WFRC, the Utah Transit Authority (UTA), the cities of South Jordan, Herriman, Riverton, Bluffdale, and Draper, Salt Lake County, the Utah Department of Transportation (UDOT), Rio Tinto and Property Reserve, Inc. Representatives from each of these groups participated on a Stakeholder Committee, which was responsible for making the decisions to advance a transit project. The Stakeholder Committee met eight times during the course of the project.

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PUBLIC OUTREACH

The public process for this study was a multi-leveled approach to educate residents, business owners, and city officials about the potential for transit in the area and receive input and comments. Outreach efforts consisted of the following strategies:

Public Open House

A public open house was conducted on June 16, 2010 at the Riverton City Hall. The purpose of the open house was to introduce the project to the public and to gain feedback from the public on the development of goals and objectives for the project. Advertising for the event included several strategies:

- Utility bill mailers
- Media advisory and publication of newspaper article
- Postings on city and agency websites
- Announcements in city newsletters

At the open house, educational materials were presented and project staff was available to answer questions and to instill a general understanding of the process and technical information being presented. In addition, representatives from UTA and WFRC provided additional information on future planned transit for the open house attendees. There were interactive areas of the open house where public provided comment. A summary of the comments is included in the Appendix.

CITIZENS LEARN ABOUT PROJECT AT PUBLIC OPEN HOUSE

Public Workshop

An interactive, public workshop was held on September 25, 2010 at the Riverton City Hall. The purpose of the workshop was to provide an overview of the study elements, study progress and to gain feedback on the short list of transit alternatives. Advertising for the event included several strategies:

- Media advisory
- Postings on city and agency websites
- City and agency Facebook pages and Twitter feeds
- Announcements in city newsletters

Project representatives outlined the study elements and proposed transit alternatives. Participants were invited to discuss the transit alternatives in small groups and provide comments on the pros and cons of each alternative. Copies of the comment worksheets are provided in the Appendix.

Online Survey

An online survey was conducted to gain feedback on the short list of transit alternatives. Participants in the first open house were invited to take the survey, which was posted in conjunction with notification of the workshop described above. A copy of the survey and survey results are included in the Appendix.

STUDENT INVOLVEMENT

As part of the Southwest Salt Lake County Transit Feasibility Study, the consultant team worked closely with a group of five students from the University of Utah's College of Architecture + Planning. These students, who were participating in a two-semester course studying land use and transportation, had already given considerable thought to the Study Area and had prepared materials for the project team in advance of meeting with the consultants. The students' activities fell into three tasks: data collection efforts; a field review on April 12, 2010; and a presentation to the project's Steering Committee on April 29, 2010. While the students were not part of the Stakeholder Committee, they did contribute valuable information to the study through data collection and synthesis.

Data Collection Efforts

The students' involvement supported analysis of existing conditions in the Study Area through data collection. The students focused their attention on four primary topic areas: natural environment, transportation, socioeconomics, and land use. The data collected are summarized below.

- Natural environment: AGRC GIS shapefiles of major rivers, streams, wetlands, and soils; air quality and pollutant charts; and documentation of the Kennecott South Zone Superfund site.
- Transportation: Regional ridership data from WFRC, transportation master plans for Herriman and Riverton, existing bus routes for Herriman and Riverton, and ridership and construction cost information on the soon-to-be-completed Mid-Jordan TRAX LRT line.
- Socioeconomics: Population, income, and journey-to-work data from the 2000 Census for Bluffdale, Draper, Herriman, Riverton, and South Jordan.
- Land use: Zoning maps for Bluffdale, Draper, Herriman, Riverton, and South Jordan, as well as local tax rates.

The students' data collection efforts were supplemented by a field trip, led by staff from the consultant team, UTA, and WFRC. The students collected additional information during the field trip, including:

- Activity Centers: location, jurisdiction, status (existing vs. proposed), transit access, bicycle access, pedestrian access, and intensity of activity
- Transportation Corridors: number of travel lanes, presence of median, transit features, bicycle and pedestrian elements, presence of parkstrips and on-street parking, and utility components.
- Photo library of multiple locations throughout the Study Area.

This information helped the students further develop their ideas about transportation and land use conditions in the Study Area, and think through potential barriers and constraints.

Presentation

The students compiled their research and data collection efforts into a PowerPoint presentation, which was delivered to members of the Stakeholder Committee. The presentation summarized demographic and employment trends; existing transportation and land use conditions; and traffic and transit data, including ridership, average daily traffic (ADT), vehicle miles travelled (VMT), and level of service (LOS) on local roads. The students also presented a range of alignment alternatives, demonstrating the connections between alignments and population and employment centers. In addition, they provided an overview of next steps: identifying mode alternatives, selecting a preferred alternative, conducting the NEPA process, and establishing a funding source.

2. STUDY AREA

The Study Area is a 33-square-mile region in the southwestern portion of Salt Lake County, Utah, and includes portions of South Jordan City, Herriman City, Riverton City, Bluffdale, and Draper. The general Study Area boundaries, shown in Figure 1, are 6000 West on the west, 200 West on the east, 14600 South on the south, and 11400 South on the north.

This region has been the focus of numerous transportation studies and investments. Mountain View Corridor, Mid-Jordan TRAX, FrontRunner South, and the Draper TRAX extension will all be operational within the next five years. Bus rapid transit (BRT) on 5600 West into Herriman is on the WFRC Long Range Transportation for 2025. The *West Salt Lake County Transit Study* identified a route to serve the needs of this area, as shown in Figure 2. Transportation-related decisions have a big impact on a community. These choices not only influence land use patterns that shape where people work, live, shop, and recreate, but they define the type of community. Some communities promote higher-density development and walking to foster a vibrant urban feel; others wish to preserve a rural lifestyle yet remain accessible. Cooperative planning efforts undertaken by Salt Lake County reveal a high attractiveness for residential growth in the southwest portion of the County, paired with strong attractiveness for employment growth along the central transit lines in the Salt Lake Valley.

Current transit within the Study Area is limited. The Riverton/Herriman Fast Bus route circulates on weekdays every 15 minutes with service from Herriman to Riverton and every 20 minutes with service to downtown. The West Jordan Fast Bus route connects Southwestern Salt Lake County to Downtown in the AM peak period on 15-minute headways and connects Downtown to Southwestern Salt Lake County in the PM peak period on 15-minute headways. In addition, UTA has recently introduced custom flex routes which also serve the area. Flex routes can deviate up to three-fourths of a mile from the standard route, thereby offering door-to-door transit service to a large area.

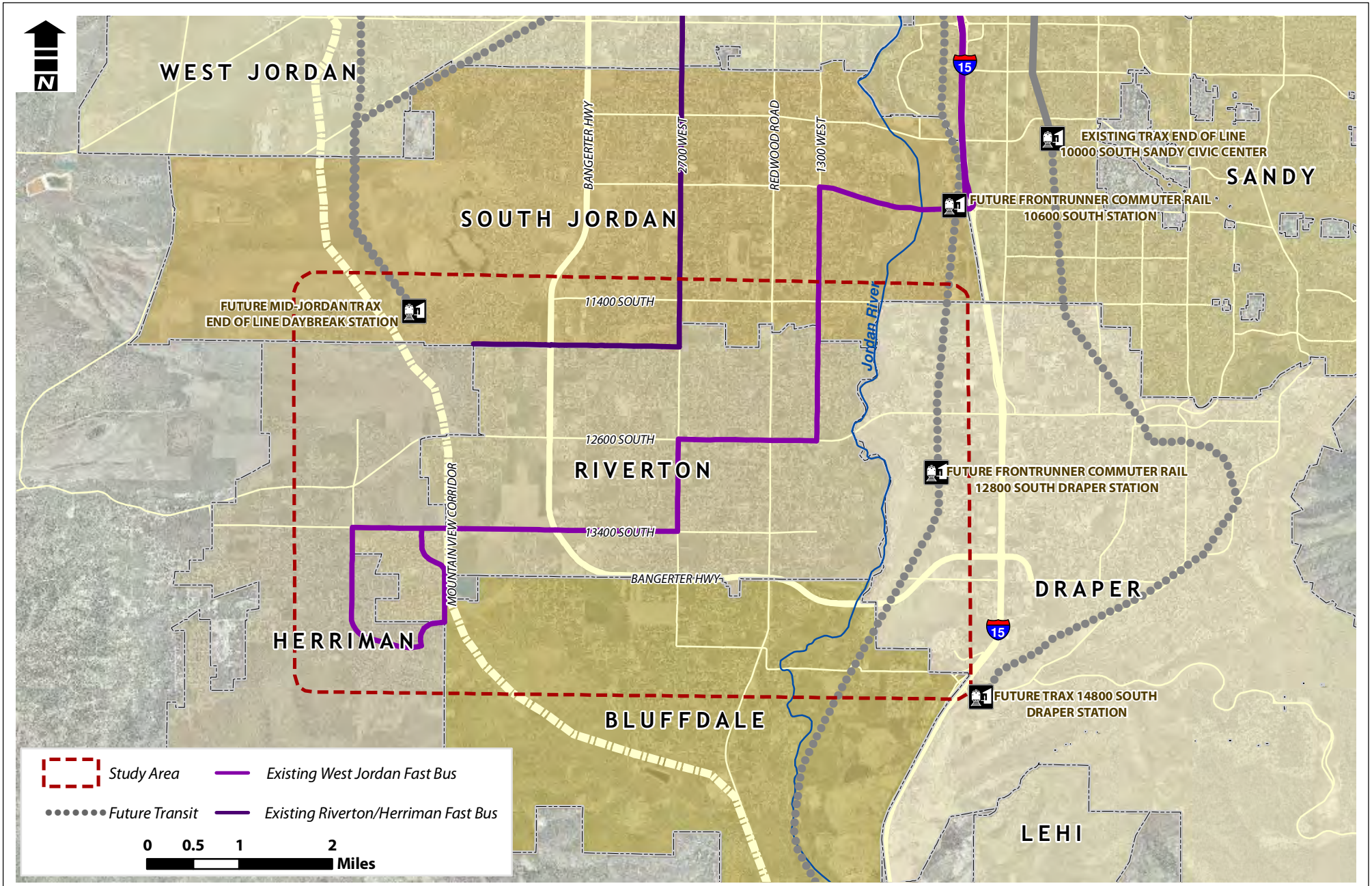
Population is growing in this area of the Valley, perhaps faster than any other region on the Wasatch Front. In an effort to rebalance jobs and housing, additional efforts are underway to attract business to this area. Demographic projections are shown in Table 1.

TABLE 1
DEMOGRAPHIC PROJECTIONS FOR STUDY AREA

	2005	2040	Change	Percent Change
Population	77,900	211,000	133,100	171%
Households	20,400	69,100	48,700	239%
Total Employment	21,800	112,600	90,800	417%

Source: Wasatch Front Regional Council, summarized by Fehr & Peers (August 2010).

To keep pace with the growth in the Study Area, numerous studies have been completed that recognize the need for improved transportation connections and additional investments that will be necessary to meet the mobility needs of the community. Plans relevant to this study are described below. Figure 2 shows the multitude of plans which have occurred in this area of the valley and the transportation corridors that have been recommended by those plans. Recent plans are:



SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Study Area

FIGURE 1

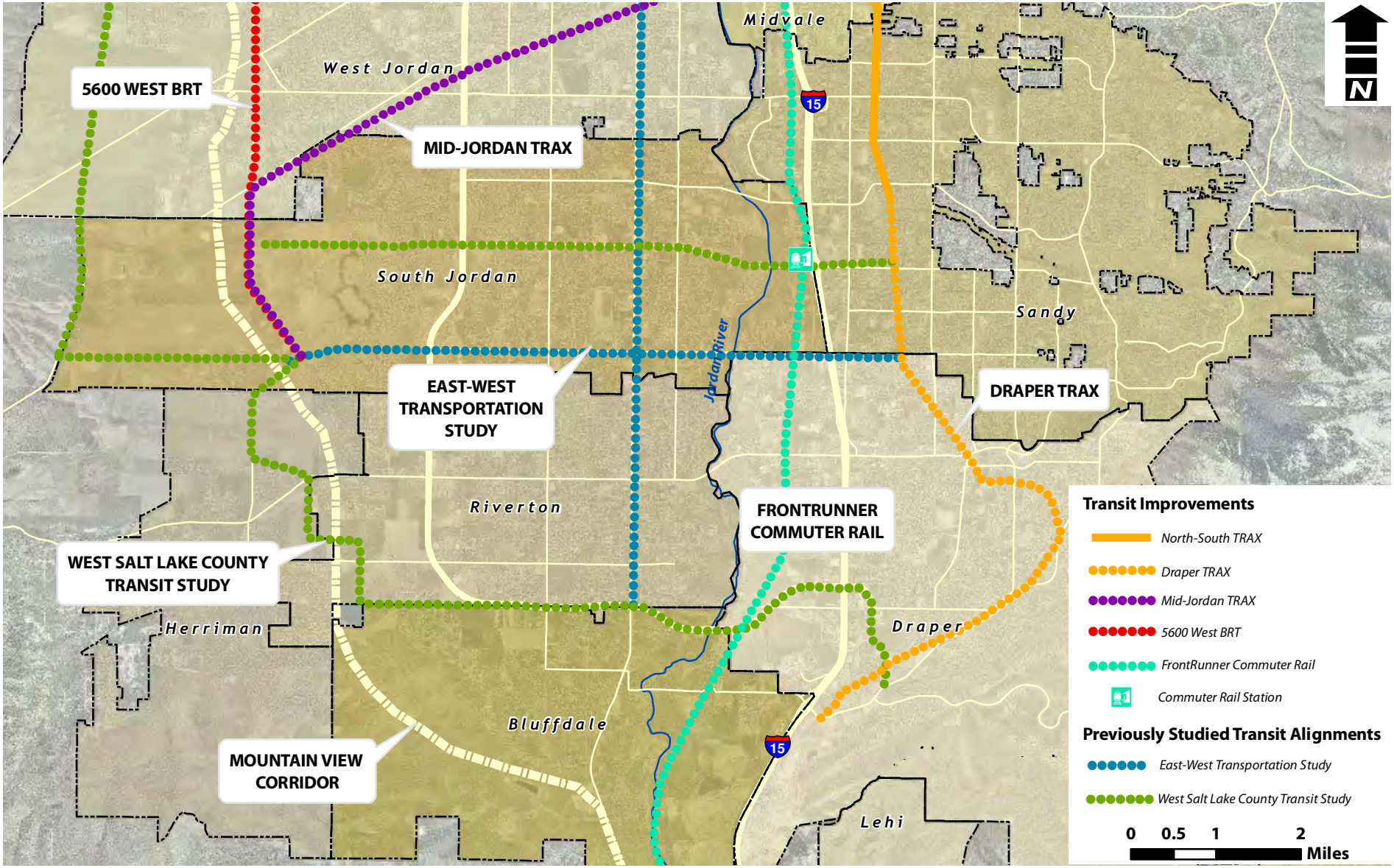
Salt Lake County East-West Transportation Study – Completed in 2008, this study evaluated land use and travel demand needs in Salt Lake County. The study recommended several roadway expansion and transit enhancements projects within the Southwest Salt Lake County Study Area included in the *Wasatch Front 2030 Regional Transportation Plan*. In particular, this study recommended a BRT route to serve the Southwest part of Salt Lake County, connecting through Herriman, Riverton, and terminating in Draper.

Mountain View Corridor EIS – The Mountain View Corridor (MVC) is a north-south highway planned to extend from I-80 in Salt Lake County to I-15 in Utah County. The *Record of Decision on the Final Environmental Impact Statement* is dated November 2008. MVC will be located at approximately 5800 West to 13400 South and then southeast to connect to Utah County at Redwood Road. It will be built in phases, incrementally adding vehicle capacity and grade-separated interchanges. The MVC bisects the western portion of the Southwest Salt Lake County Study Area. In addition to the freeway component, the MVC project includes a fixed-guideway transit alignment on 5600 West between 11800 South and the Salt Lake City International Airport. The transit component will also be implemented in phases, initially as BRT and eventually converted to rail transit.

West Salt Lake County Transit Study – This 2009 study evaluated land use and transportation needs throughout the entire western portion of Salt Lake County for year-2040 and build-out conditions and provides the framework for the future transit system of the *Regional Transportation Plan*. Based on conclusions from this study, the proposed 5600 West transit route was assumed to function as a BRT route in 2040. The *West Salt Lake County Transit Study* recommends a BRT route in the Southwest Salt Lake County Study Area; however, this BRT alignment assumes a connection to a FrontRunner station near Bangerter Highway. Since the *Westside Transit Study*, the FrontRunner station was relocated from south of Bangerter Highway to 12800 South.

Other relevant studies include:

- *Draper Transit Corridor EIS* – This study recommends a light rail transit (LRT) extension from the existing Sandy Civic Center 10000 South Station to 14600 South through Draper. The *Record of Decision on the Final Environmental Impact Statement* is dated September 2010.
- *FrontRunner South ESR* – This 2008 study analyzed the impacts of the FrontRunner extension from Salt Lake City south into Utah County. In 2009 the Bluffdale Station near Bangerter Highway was reevaluated and replaced with a station at 12800 South.
- *South Salt Lake County Transit Corridors Analysis* – This study was completed in 2000 and identified several corridors for Light Rail expansion. Relevant to the Southwest Salt Lake County Feasibility Study, the Draper Extension was recommended. Just north of the study area, the West Jordan Extension and the Towne Center spur were also identified.



SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Relevant Projects and Studies

FIGURE 2

3. PURPOSE AND NEED FOR THE PROJECT

WHAT IS PURPOSE AND NEED?

According to Federal Transit Administration (FTA) guidance on preparing alternatives analyses, the purpose and need establishes the problems which must be addressed in the analysis; serves as the basis for the development of project goals, objectives, and evaluation measures; and provides a framework for determining which alternatives should be considered as reasonable options in a given corridor. During the feasibility stage of a transit project it is important to outline the problems to be addressed, the goals set by the community, as well as the purpose and need statement for the project. Though refinements may occur during future study, the purpose and need is the framework for the project as it moves forward.

PROBLEMS IDENTIFIED IN THE STUDY AREA

A careful analysis of the existing and future conditions in the Study Area, and in some cases in the region, was undertaken to understand the problems facing the southwest area of Salt Lake County. The following problem statements were identified as a result of analyzing the future transportation conditions in the Study Area. Based on the population, and employment projections, and travel demand projections, the following were identified as the top three issues related to transportation in Southwest Salt Lake County:

1. Limited access to transit in the southwest area of Salt Lake County

The Mid-Jordan TRAX extension will continue to serve the Daybreak subdivision in South Jordan, but as the population, employment, and travel needs of the southwest part of Salt Lake County grow, high-frequency/high-capacity transit will be needed to serve those trips beyond the last station of this extension. Three planned transit projects will terminate just short of the Study Area, including the Mid-Jordan TRAX line, ending at Daybreak (shown below). A park and ride is planned to provide access to this line from the surrounding communities. The FrontRunner station will provide park and ride access to Riverton, Draper, and Herriman communities, but is located at the edge of the Study Area and far from the projected growth in housing and jobs in Herriman and Riverton. The Draper Light Rail Extension project will provide TRAX service to the eastern perimeter of Draper, and will not be easily accessible for mid- and western-valley communities. This limited access to higher speed and higher frequency transit hinders the choice to ride transit for the Southwest.

2. Inability of the transportation network to accommodate the increase in travel demand due to residential and office growth.

The land uses within the Study Area are generally suburban, with isolated commercial use and office parks. The Study Area is unique in that it includes some of the only remaining contiguous open lands in Salt Lake County, and these contiguous parcels provide an opportunity for an increase in residential and office development. The cities recognize citizen desire for more local employment and retail options,

including urban mixed-use centers that offer commercial, office, and housing options. By diversifying land uses to include these mixed-use elements, cities within the Study Area are working to address and meet their citizens' needs.

The increase in land development and residential growth will contribute to an increase in travel demand within the Study Area. Furthermore, travel demand will increase for trips that originate or end in the Study Area. Figure 3 shows areas of high employment and population growth. Figure 4 represents travel demand in terms of total daily trips, forecasted in 2040. The distribution of total trips and work trips is heavily weighted to neighboring communities to the east and north of the Study Area.

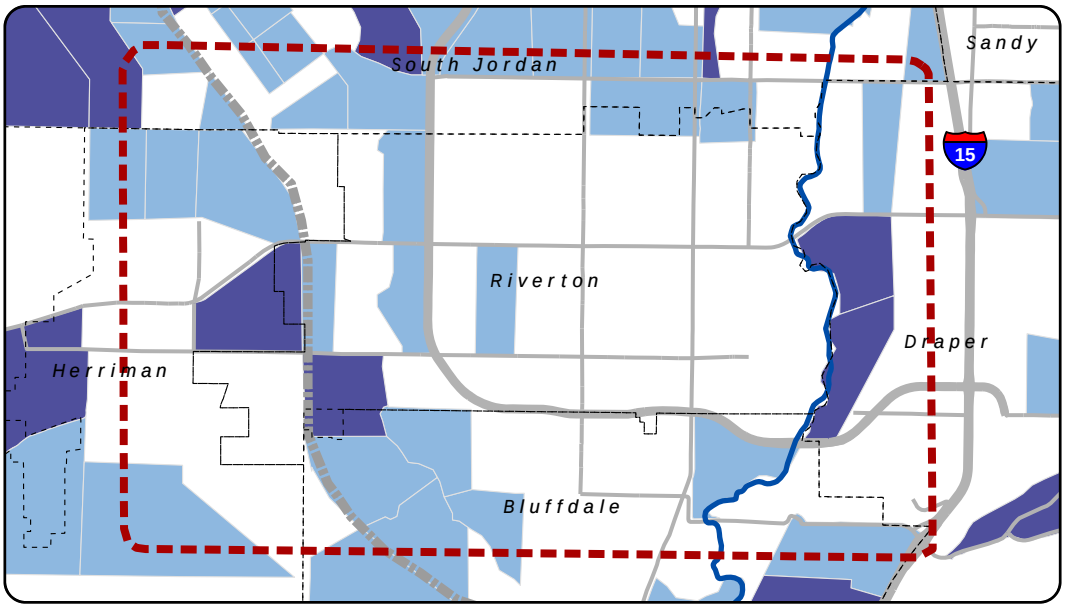
Throughout the Study Area there are a number of developments with potential transit-supportive densities. The Daybreak subdivision in South Jordan, for example, has proven a successful model for planned communities with mixed residential types at generally higher densities than traditional suburban developments. According to municipal plans, much of the future development in the Study Area is expected to occur in a fashion compatible with transit, by defining dense, mixed-use focal points within the community. Because a large portion of this development is planned in green-field areas, there are fewer barriers to transit corridors than might otherwise exist in a built-out urban environment.

The planned growth in population and employment will increase demand on the transportation system. On a regional scale, daily vehicle miles traveled (VMT) is expected to grow from 37 million to 65 million, comparing between current conditions and a freeway-oriented growth option (Source: WFRC Long Range Plan). This equates to a growth of 78%. Between 2005 and 2040, daily vehicle miles traveled (VMT) is forecasted to increase by 254% within the Study Area - this equates to an average annual growth of 3.7%. By 2040, as much as 25% of p.m. peak period VMT in the Study Area is expected to occur on highly congested roads at or near capacity, contributing to low travel speeds and high levels of delay. Both north-south and east-west corridors have high volume-to-capacity ratios in 2040.

Traditional methods may not be sufficient to accommodate trips to major destinations in the Valley. Figure 5 shows the demand for vehicle travel will exceed the roadway capacity on certain sections of roadway in the Study Area, resulting in congested conditions. Figure 5 includes planned improvements included in the WFRC Long Range Plan. high-frequency/high-capacity transit can provide an option to serve this demand without building wide roadways that can divide communities and make pedestrian travel difficult.

3. Increasing difficulty traveling east/west in the Study Area

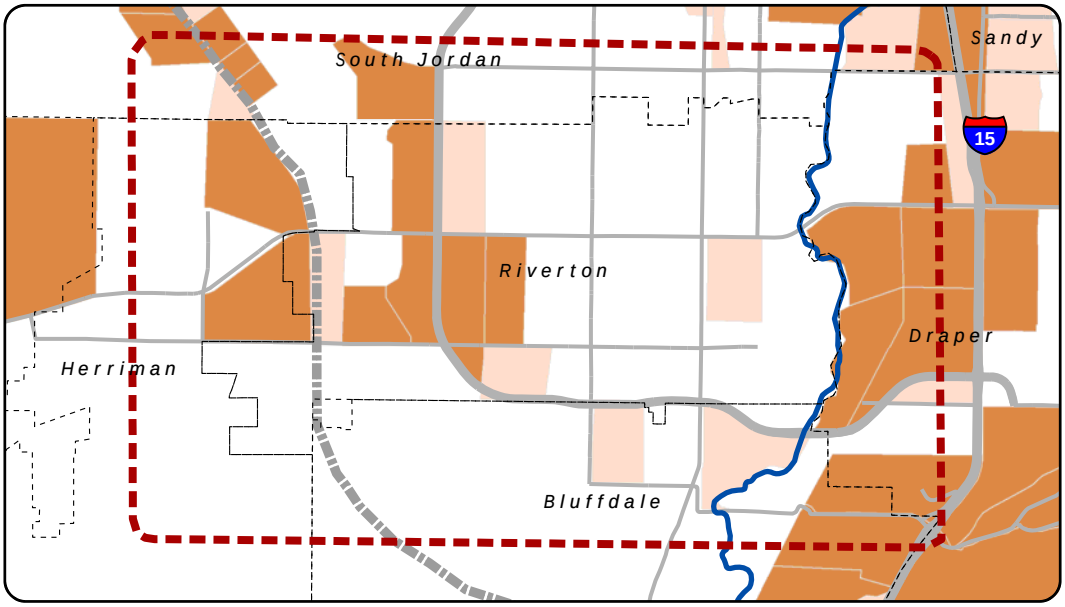
The Salt Lake Valley has long devoted resources to moving people in a north-south direction. More recent needs have been identified to move people east-west. Figure 4 shows the demand for travel will reflect a growing need for east west travel options. Figure 5 shows peak period congestion in 2040 on the major routes within the Study Area. Level of Service (LOS) is a measure of the ability of a roadway to accommodate the demand for travel on that roadway. A LOS E or F, which is reflected in red and black, essentially indicates highly congested roadway segments. By 2040 all of the major east-west arterials in the Study Area west of Bangerter Highway will be highly congested, including 11800 South, 12600 South, and 13400 South. East of Bangerter Highway, both 11400 South and 12600 South will be congested. Without robust transit infrastructure, travelers will lack choice to avoid this congestion.



2005-2040 Population Change

High Growth (1,000-3,000 persons)

Very High Growth (>3,000 persons)



2005-2040 Employment Change

High Growth (500-1,000 jobs)

Very High Growth (>1,000 jobs)

Study Area

Municipal Boundaries

Jordan River

0 0.5 1 2 Miles

Source: Wasatch Front Regional Council, 2010

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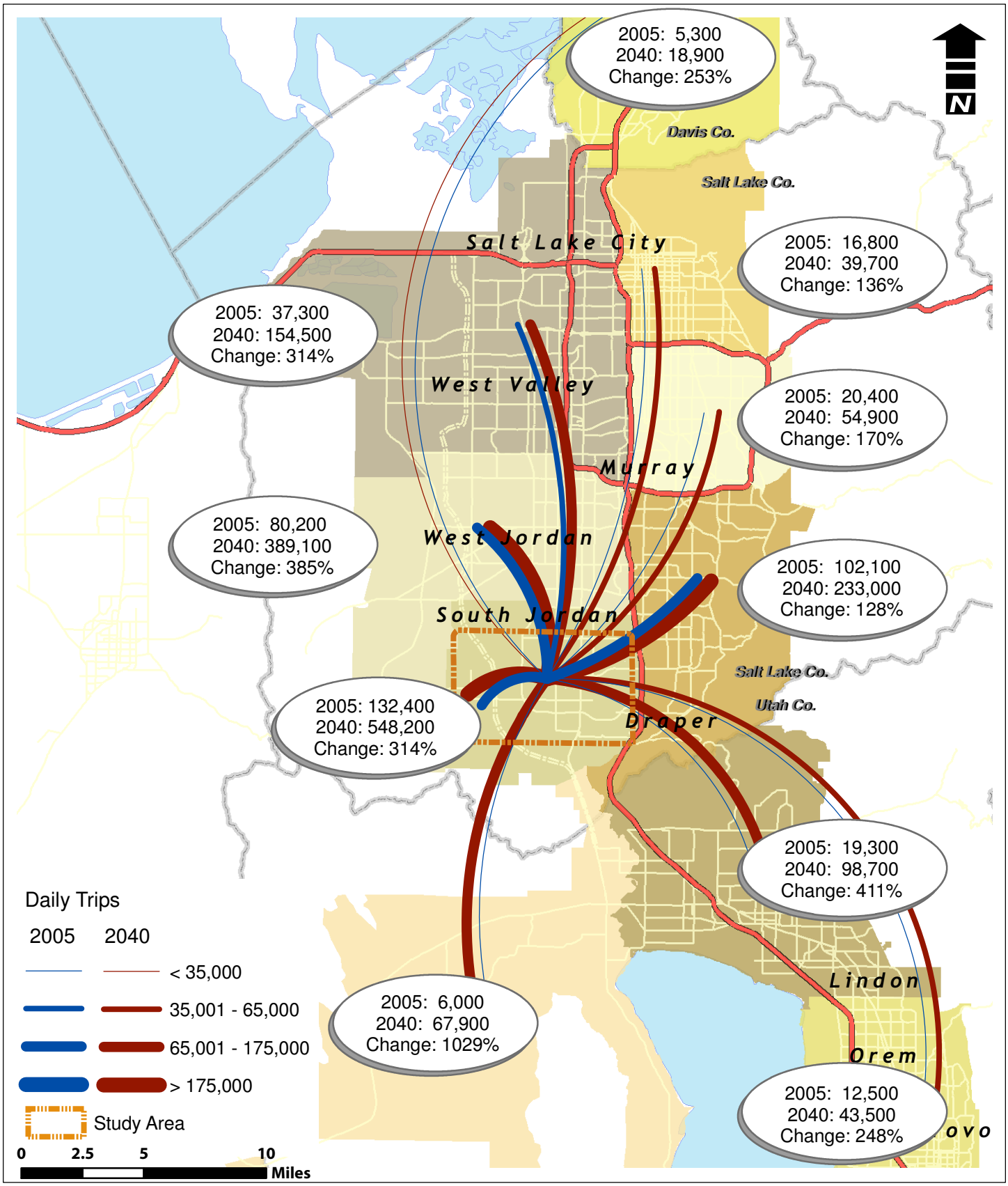
Population and Employment Growth (2005-2040)

FIGURE 3



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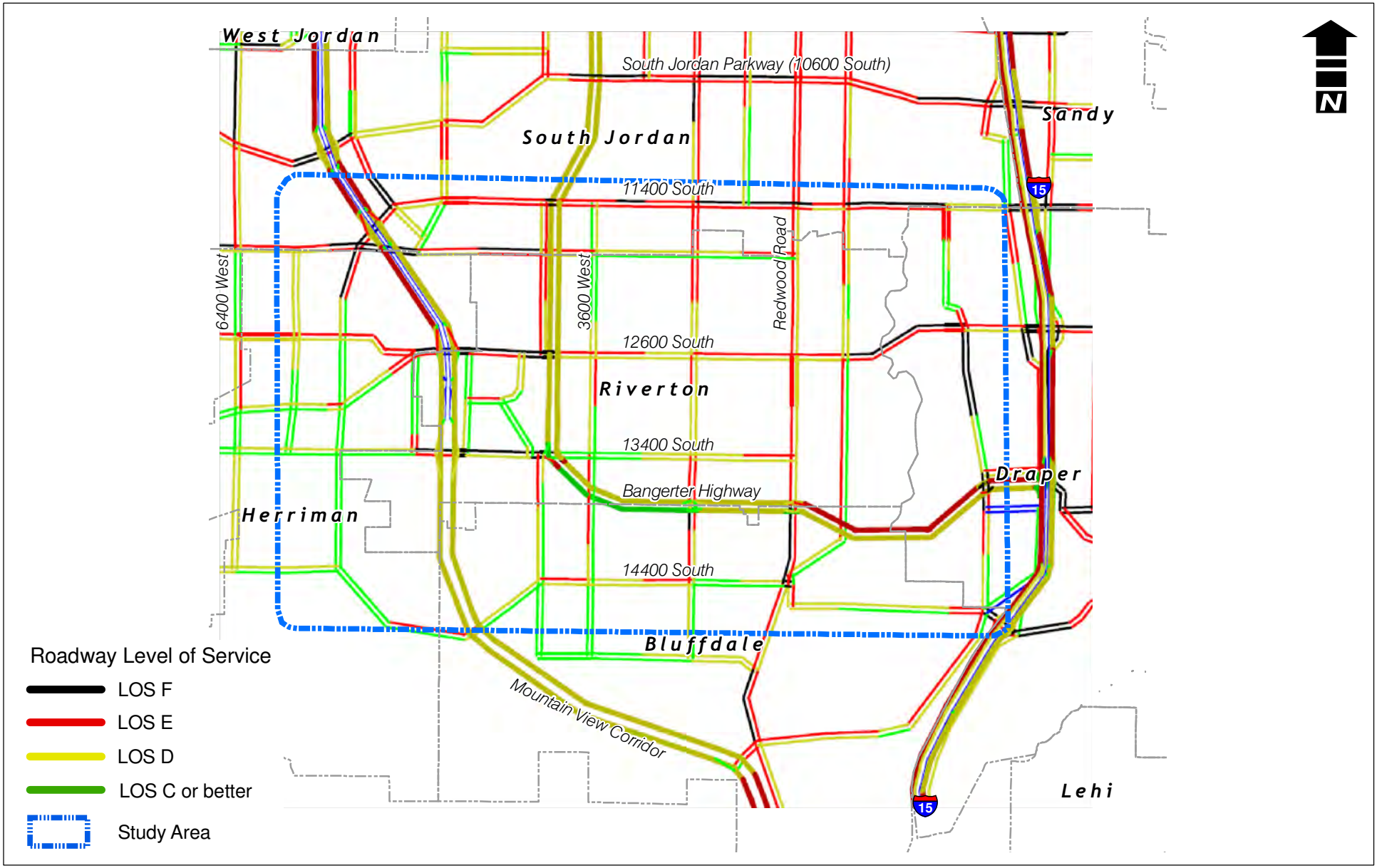
Existing and Future Travel Demand

FIGURE 4



Source: WFRC Regional Travel Demand Model, Volume-to-capacity ratio summarized by Fehr & Peers

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Peak Period Congestion in 2040

FIGURE 5

GOALS

The project goals are a summary of the feedback gained from the Stakeholder Committee and through public outreach. Based on the results of a questionnaire distributed to each of these representatives, as well as open discussion in committee meetings, the team identified the following study goals (i.e. that transit in the Study Area should accomplish the following):

- Address east-west congestion
- Address circulation within communities
- Increase multi-modal options, reduce congestion, improve air quality
- Support economic development and redevelopment through the diversification of land uses including office and mixed-use growth
- Improve communication between jurisdictions on transportation issues and solutions
- Maximize efficiency of available resources by reducing energy consumption related to transportation

PURPOSE

The purpose statement was developed to reflect the goals of the project. The purpose of a transit project is to better connect the southwest area of Salt Lake County with the regional transit system in order to improve transportation choice and mobility within the Study Area, as well as to important regional destinations.

NEED

The project needs were developed to address the problems identified in this Study Area, and to move towards meeting the goals of the project team. The project needs are:

- To provide additional capacity to the transportation network in the Study Area
- To reduce the negative effects associated with population and employment growth, and congestion
- To support local land use plans to diversify and densify land use, including job centers and mixed-use developments
- Provide additional transportation options to enhance livability and sustainability for the communities in the Study Area

Provide additional capacity to the transportation network in the Study Area

Additional capacity is needed to serve the growing number of trips anticipated in the Study Area by 2040, and without the completion of the transit network the only approach will be to widen roadways. With many roadways predicted to be at or over capacity within the Study Area, alternative modes are needed to increase travel capacity, especially for east-west travel.

Reduce the negative effects associated with population and employment growth and congestion

Transit connections to the Southwest Salt Lake County area are necessary to reduce the negative effects associated with the trips generated by employment growth. The planned growth in population and employment will increase demand on the transportation system. Between 2005 and 2040, daily VMT is forecasted to increase by 254% within the Study Area - this equates to an average annual growth of

3.7%. By 2040, as much as 25% of p.m. peak period VMT in the Study Area is expected to occur on highly congested roads at or near capacity, contributing to low travel speeds and high levels of delay.

Support local land use plans to diversify and densify land use, including job centers and mixed use developments

Significant growth is expected to occur in the Study Area over the next 30 years. There are substantial amounts of undeveloped land in the western portion of the Study Area, where high population growth is planned. Redevelopment projects in established areas also contribute to the overall regional growth, and several projects are currently being planned. Employment growth is planned to be clustered around the Mountain View Corridor and I-15 corridors. The Herriman Towne Center is planned to include mixed-use development with both housing and employment. In Riverton, additional properties are being considered for higher-density, transit-oriented development. Property adjacent to the 12600 South FrontRunner station in Draper has been rezoned for very high-density, mixed-use development. Transit is needed to support quality growth, versus lower-density housing.

Provide additional transportation options to enhance livability and sustainability for the communities in the Study Area.

Livability and sustainability relates to the quality of life for residents in the Salt Lake Valley and in the Study Area. The ability for transportation to improve access to jobs, reduce emissions, improve air quality, and save travel time is an important aspect of a transit project in the Study Area. It should also be noted that livability and sustainability have become key criteria for the Federal Transit Administration in terms of the assessment of new capital transit projects.

EVALUATION METHODOLOGY AND CRITERIA

Together, the goals and purpose and need statement above shaped the development of several of the criteria used to evaluate each alternative. Additional criteria designed to measure performance and competitiveness were added so the analysis of alternatives would lead to a feasible project with such considerations as cost effectiveness and public support. The process to evaluate alternatives included the following steps:

- Identification of all Alternatives – A workshop was conducted with the Stakeholders in which a range of alternatives was identified. Sometimes called 'the universe of alternatives,' the exercise provided a starting point for analysis, and was refined and supplemented by the technical team to produce a long list of alternatives.

- Development of Alternatives – A Level 1 qualitative screening was performed on each of the Long List of Alternatives. The result of this screening was the identification of the alternatives for final analysis (Short List of Alternatives).

- Analysis of Final Alternatives – A Level 2 quantitative screening was performed on the Short List of Alternatives. At the close of this screening, a Preferred Alternative was selected.

- Preferred Alternative – Additional measures were used to evaluate the effectiveness of the Preferred Alternative, including sustainability and capacity improvements.

Table 2 shows the evaluation criteria, the methodology, and at which level of analysis the criterion was used.

TABLE 2
EVALUATION CRITERIA

Criteria	Description	Methodology	Level of Analysis
Ridership	Compares alignments and modes at each level of screening to determine the effectiveness of each alternative at generating riders.	WFRC Regional Travel Demand Model was used to prepare the comparisons at Levels 1 and 2. This information was supplemented with additional projections at Level 2. New riders to the system was also used as a measure to compare effectiveness at Level 2.	1 and 2
Cost and Cost Effectiveness	Compares alignments and modes at each level of screening, and provides a comparison of the cost effectiveness of each alternative.	A preliminary order-of-magnitude estimate of cost per mile was prepared for each alternative during Level 1. Costs were paired with ridership to determine a conceptual cost effectiveness indicator for Level 2.	2
Construction Constraints	This information was used to help guide cost comparisons.	An engineering field review was conducted to assess the potential difficulties of constructing various transit alternatives.	1
Travel Time	Compares the mobility effectiveness of alignments and modes by comparing the travel time between destinations.	The WFRC Regional Travel Demand Model was used to predict travel times between Mid-Jordan end of line and the Draper FrontRunner station. In addition, consideration was given to travel times to downtown and other destinations.	1 and 2
Access to Transit	Measures the increase in populations and employment served by each alternative	GIS was used to determine the number of households and jobs within ½ mile of proposed station locations, which was then used to analyze potential transit ridership	1 and 2
Support for TOD Plans	Compares among alternative alignments and modes the ability to serve or promote transit-oriented development	An 'off-model' exercise to determine the effectiveness of transit oriented development in producing riders. In addition, this exercise helped inform the Cities and potential developers the density and intensity needed to support transit.	2
Sustainability and Livability measures	Reduction of GHG and other sustainability measures. Ridership, travel time, and support for TOD are all effective proxies used during the alternatives analysis to support this concept.	Technical Evaluation	Final Analysis
Public Support and Community Context	Public sentiment about each of the alignments and modes. Community context with respect to modes.	Public sentiment was gathered at an open house in June, 2010, and at a public workshop in September, 2010.	1 and 2

4. DEVELOPMENT OF ALTERNATIVES

The preliminary screening of alternatives consisted of an evaluation of both mode and alignment. Preliminary screening included the following levels of analysis:

- **Mode Evaluation**. Mode evaluation included the consideration of a 'universe' of modes, and then narrowed the list to the most applicable modes for this context.
- **Alignment Evaluation.** Preliminary alignment evaluation included a 'universe to long list' analysis, and a 'long list to short list' evaluation.

TRANSIT MODES

Using the screening criteria developed from the Purpose and Need elements and input from the Stakeholder Committee, the project team eliminated unrealistic transit modes from the universe of alternative modes, and advanced more appropriate modes for the Study Area. Given the desire to link to the regional transit systems, there was an emphasis on advancing modes compatible with transit technology planned in the Study Area (light rail transit and bus rapid transit) to accommodate route extensions and interlined routes. Table 3 identifies all of the potential modes considered and explains the evaluation process and outcomes.

TABLE 3
UNIVERSE TO LONG LIST MODE EVALUATION

Mode	Description	Moved Forward?
Standard Bus	Low cost and reliability, however this mode already exists. Fits within community context. UTA is already using this technology.	Yes
Bus Rapid Transit (BRT)	Lower cost, higher reliability, produces moderate ridership. Fits within community context. UTA is already using this technology. Compatible with proposed BRT on 5600 West for possible route extension.	Yes
Modern Street Car	Moderate cost, moderate reliability, serves neighborhoods. Produces moderate ridership.	No
Light Rail Transit (LRT)	Higher cost, higher reliability, higher ridership. Fits within community context. Connections to existing TRAX possible. UTA is already using this technology. Compatible with Mid-Jordan TRAX for possible route extension.	Yes
Diesel Multiple Unit (DMU)	Higher cost and reliability. Some question as to whether it fits within the community context. Larger, heavier vehicle with more noise and vibration. Usually serves Commuter Rail needs.	No
Monorail	High cost. Does not fit within the context of the community. Has not been used in this valley. Typically related to tourism.	No
Commuter rail, heavy rail, high speed rail	High cost. Typical station spacing does not provide enough service to Study Area.	No
Ferry, tramway	Not appropriate for the context	No

Source: Fehr & Peers, October 2010.

Applying the criteria discussed above, the following modes were advanced for consideration.

- **Bus Rapid Transit (BRT).** BRT is a rubber tire vehicle distinguished from standard buses with improved reliability due to exclusive lanes and signal priority. BRT is arranged into three primary categories of service. BRT I is similar to bus service. It provides some additional amenities and faster travel times with enhanced signaling systems, and some consideration of queue-jump lanes. BRT II is an improvement on BRT I, and provides additional travel time benefits such as queue jump lanes and additional signal priority. BRT II may also include some segments of exclusive lanes. BRT III includes exclusive lanes of travel, and an expanded list of amenities including traveler information, well designed stations with platforms, and off-board fare collection. BRT III is assumed for the purposes of this study, and the following features are included:

    - Bus vehicle powered either by diesel or alternative fuel sources
    - Station spacing typically ½-mile to 1½-miles
    - Signal priority to allow faster speeds for the BRT
    - General range of $12 million per busway mile
    - Vehicles cost between $500,000 and $750,000
    - Exclusive guideway, either in the center median of the street or side running
    - Raised platform stations with shelters offer traveler comfort and system visibility
    - Ticket kiosks at each station platform allow passengers to purchase tickets prior to boarding and thereby reduce vehicle dwell times

- **Light Rail Transit (LRT).** A light rail vehicle similar to UTA's Mid-Jordan TRAX. The system is assumed to operate in an exclusive guideway, offer visible station platforms with traveler information, and off-board fare collection. For the purposes of this study, the following features are considered:

    - Powered by electric overhead wires
    - Stops spaced every ½-mile to 1½-mile
    - Able to increase capacity by adding rail cars
    - Steel wheels and tracks
    - General range of $40- $50 million in capital infrastructure costs per mile, assuming TRAX standards.
    - General range of $3 - $4 million per vehicle
    - Exclusive guideway, either in the center median of the street or side running
    - Raised platform stations with shelters offer traveler comfort and system visibility
    - Ticket kiosks at each station platform allow passengers to purchase tickets prior to boarding and thereby reduce vehicle dwell times

IDENTIFICATION OF ALTERNATIVE ALIGNMENTS

The Stakeholder Committee initially identified all practical corridors to consider transit service – this starting point is considered the 'Universe' of alternatives since it includes a variety of alignments, service areas, and destinations. Practical corridors for transit were identified in conjunction with a consideration of potential station areas in a Stakeholder Workshop. The Stakeholder Committee began this process by identifying locations where transit-supportive land uses are either currently being contemplated, or, where transit-supportive land uses may be considered in future local planning processes. A sketch planning exercise enabled committee members to compare their potential station areas – and the approximate ridership of current or proposed plans – with potential station areas in other cities along hypothetical corridors. By doing so, they gained an initial sense of the practicality of various corridors.

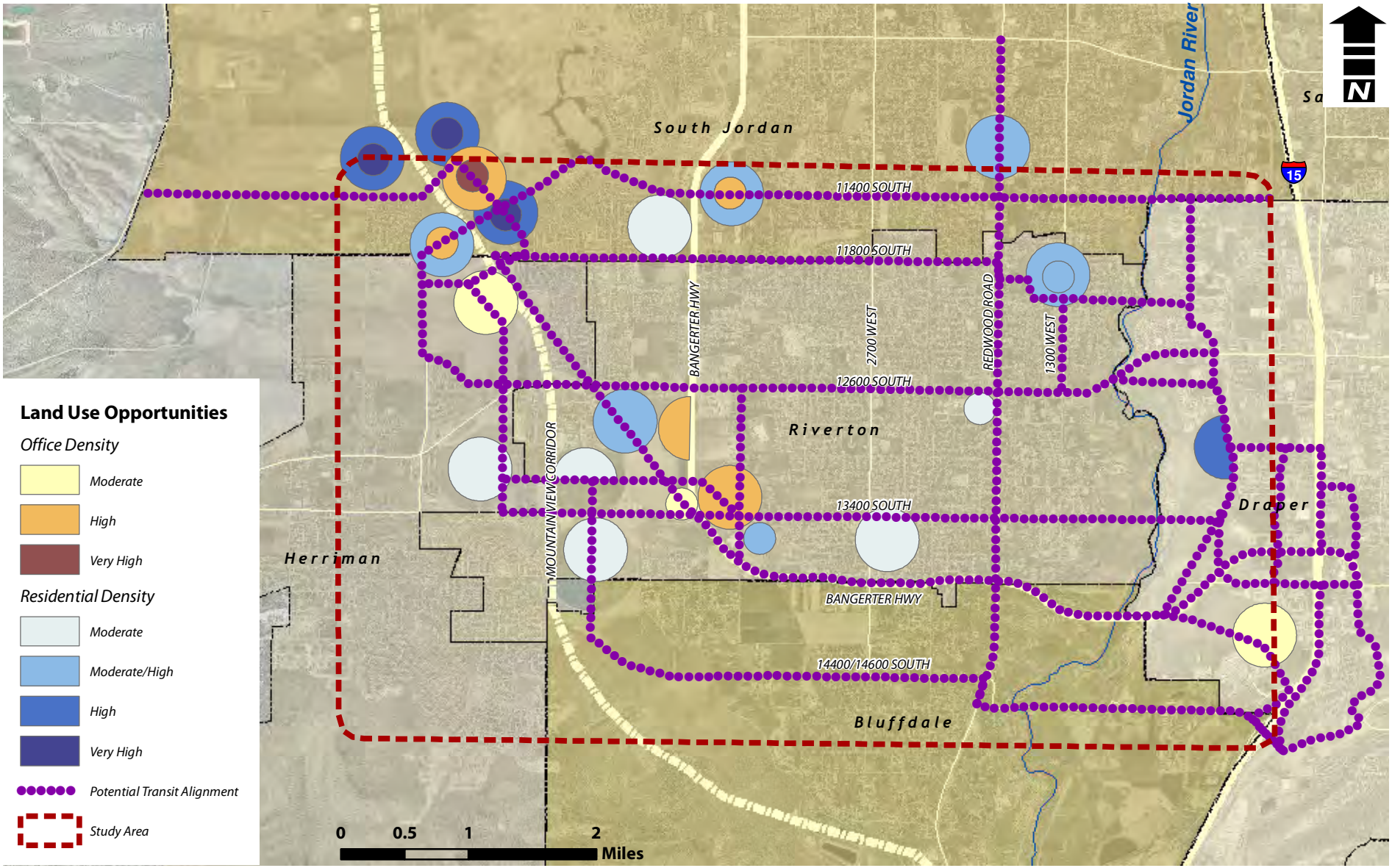
To simplify the evaluation process and support the goals of the project, connections to major transit facilities were established as critical service areas. These connections include TRAX stations at Daybreak (Mid-Jordan TRAX) and 14800 South (Draper TRAX Extension), and FrontRunner stations at 10600 South and 12800 South. To help further define the Long List of Alignments, the Stakeholders participated in a workshop to identify areas of population and employment growth within each of their cities. The work completed during this workshop helped to establish preliminary station areas for each alignment. The results of this workshop are shown in Figure 6. The Long List of Alignments, shown in Figure 7, includes:

- 11400 South – Daybreak TRAX Station to 10600 South FrontRunner Station
- 11800 South – Daybreak TRAX Station to 12600 South FrontRunner Station
- 12600 South - Daybreak TRAX Station to Power Utility Corridor to 12600 South FrontRunner Station
- 13400 South (Eastern) - Daybreak TRAX Station to Power Utility Corridor to 12600 South FrontRunner Station
- 13400 South (Western) - Daybreak TRAX Station to Herriman Towne Center to 12600 South FrontRunner Station

SCREENING OF ALTERNATIVE ALIGNMENTS

Table 4 shows the criteria and evaluation for a range of candidate alternatives. The criteria used to screen the long list alignments consisted of the following:

- Population and employment served at each conceptual station area along the candidate alignments
- Travel time as an indicator of improved mobility
- Together, population, employment and travel time were used as a proxy for ridership estimates. These three factors are known to be strong indicators for ridership.
- Support for future transit oriented development
- Physical challenges



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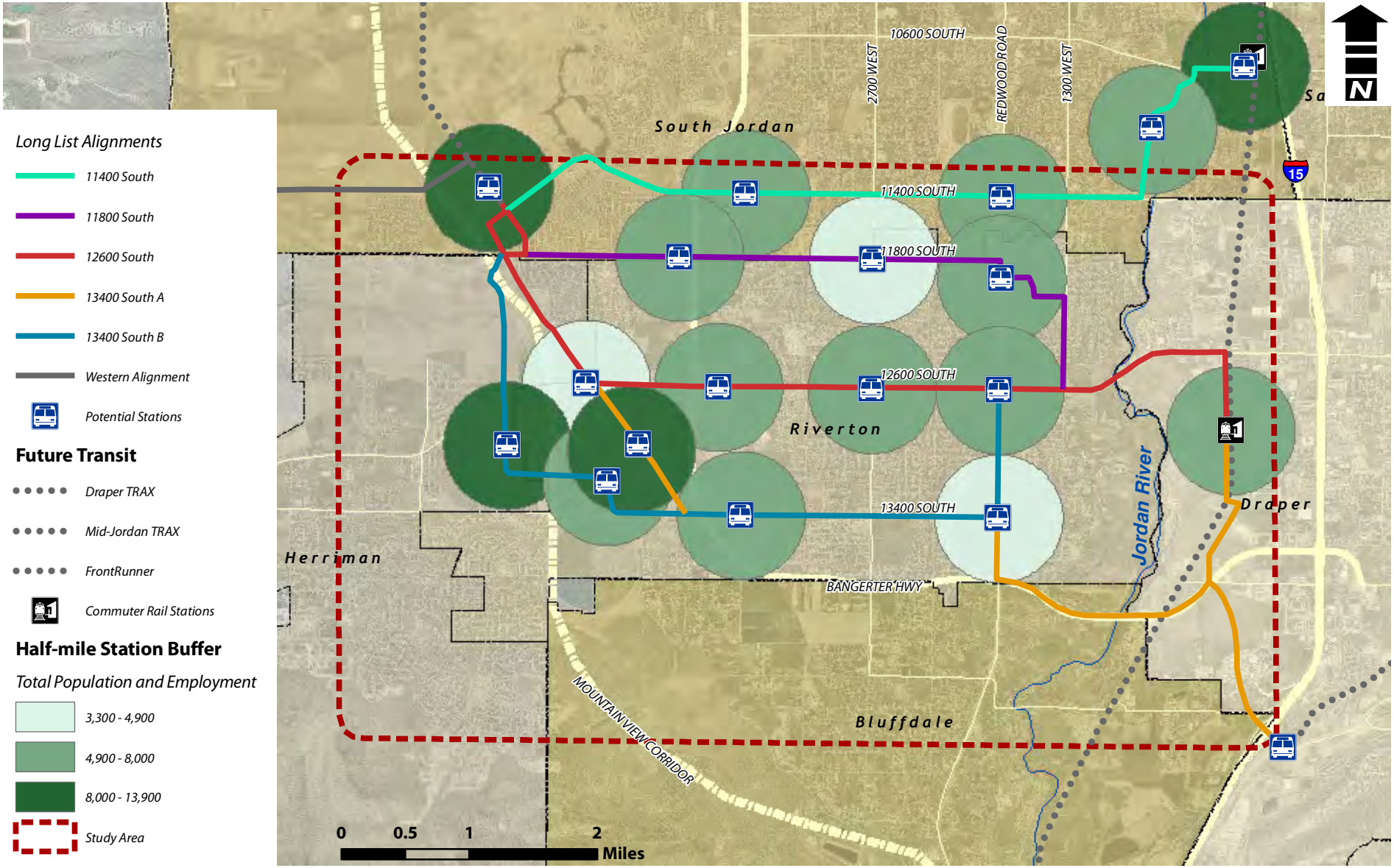
Land Use Projections - Results of Stakeholder Workshop

FIGURE 6



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Long List of Alignments
Population and Employment Totals for Potential Stations

FIGURE 7

TABLE 4
SUMMARY COMPARISON OF ALTERNATIVES

		11400 S. Route	11800 S. Route	12600 S. Route	13400 S. Route A (Utility)[1]	13400 S. Route B	Draper Route
Characteristics	Distance in miles (one way)	7.6	8.5	7.6	10.2	10.4	Pending
	Stations	5	5	5	7	7	Pending (likely 2)
	Features	Northernmost route, Serves S. Jordan. Better connection to northern FrontRunner station	Generally through established neighborhoods. More northern route.	Central route through Riverton. Serves established neighborhoods	Southern route through Riverton	Route through Herriman and Riverton	Connects FrontRunner station to Draper TRAX end of line
Ridership Indicators	Future Population and Employment within ½ mile	Lower (39,000)	Lower (40,000)	Lower (39,000)	Higher (53,000)	Highest (58,000)	Pending
	Support for Future Development Plans/ Employment Centers	One planned employment center west of Bangerter	Two lower density residential areas planned	One lower density residential development planned	Proximity to possible PRI office/residential center	Supports Herriman Towne Center Development	Supports future prison redevelopment and planned project just south of FrontRunner station
	Travel Time	Shorter distance, more direct, operate at higher average speeds (25.8 mph)	Medium distance, several 90-degree turns, slowest average operating speeds (21.2 mph)	Moderately direct, fastest overall operating speeds (28.1 mph)	Moderately direct, some out of direction travel moderate overall operating speeds (24.2 mph)	Least direct, some out of direction travel (24 mph)	N/A

TABLE 4
SUMMARY COMPARISON OF ALTERNATIVES

		11400 S. Route	11800 S. Route	12600 S. Route	13400 S. Route A (Utility)[1]	13400 S. Route B	Draper Route
Cost Indicators	Physical Characteristics	Under construction, possibly requiring separate project for future expansion.	Greenfields /narrow streets	Few constraints	Would share utility corridor, minimal home setbacks on 13400 South, and western portion through possible wetlands. Difficult connection to FrontRunner station, several Bangerter crossings	Bangerter Hwy crossing, minimal home setbacks on 134 South	Crossing FrontRunner and I-15

1. Assumes new right of way west of Redwood Road, however this route may also follow Route B to avoid new ROW.

Figure 7 shows the 2040 population and employment within a half-mile of potential stations for each alignment in the Long List. Population and employment totals were summarized using the adopted WFRC 2040 demographic data. The areas of high population and employment concentrations include the western portion of the Study Area, in both Herriman and Riverton. In addition, the areas surrounding the Daybreak TRAX station and the Draper FrontRunner station also show strong population and employment served by the alternatives.

During the evaluation of alignments, Fehr & Peers and Steve Greene & Associates (SGA) conducted field visits to identify physical challenges, constraints, and barriers associated with each of the alignments in the Long List. The field visits identified street widths, presence of sidewalks, signal spacing, access control, major roadway intersections, and other general observations to help establish where construction constraints are expected. Figure 8 shows the Long List of Alignments with potential construction constraints.

Upon reviewing the characteristics and performance of the Long List of Alignments with the Stakeholder Committee, the routes on 11400 South and 11800 South were eliminated. Both routes are in the northern portion of the Study Area and therefore are less compatible with the goals of this project. Also, the 11400 South alignment terminates at the 10600 South FrontRunner station; the Stakeholder Committee felt a connection to the 12800 South FrontRunner station would better serve the Study Area.

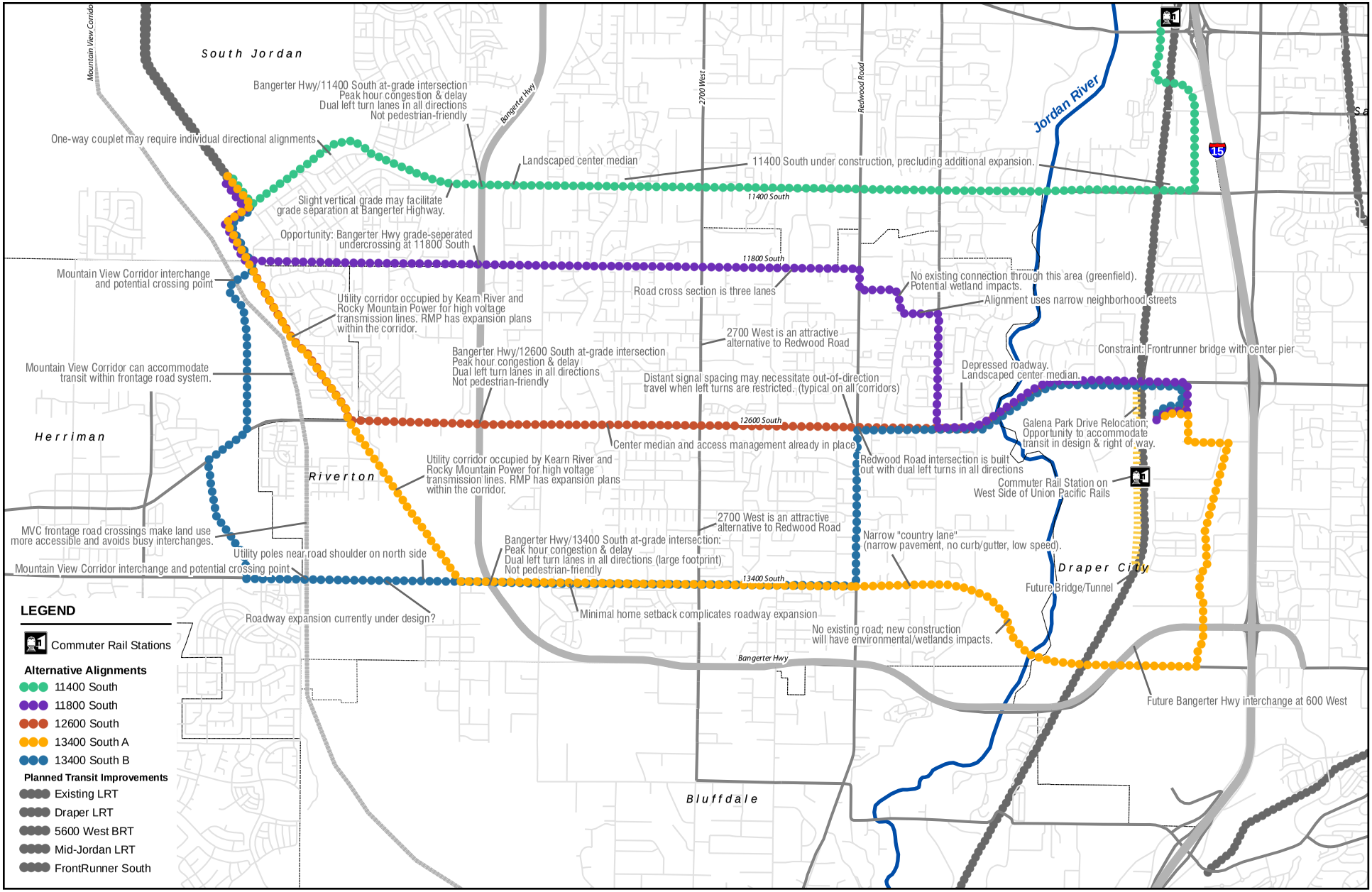
Based on discussions during this evaluation process, the Stakeholder Committee modified portions of the remaining alignments on 12600 South and 13400 South. These changes were done to avoid major physical constraints or better serve important destinations, including:

- Future Herriman Towne Center
- Future Salt Lake Community College (SLCC) Herriman Campus
- Property Reserve, Inc. (PRI) parcel east of Herriman Towne Center
- Planned TOD area near 12800 South FrontRunner Station
- Various parcels with good potential for development or redevelopment.

The alignments carried forward after this initial screening and refinement were paired with transit modes and defined as the Short List of Alternatives, which is discussed in Chapter 5.

PHYSICAL CONSTRAINTS

Physical constraints on any major capital improvement project have the potential to drive costs higher and should be considered carefully when selecting an alignment. The following summary provides an overview of common physical constraints encountered. In Section 5 of the report, a review of the specific constraints expected for the Selected Alternative is provided.



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Physical Characteristics of Long List Alignments

FIGURE 8

Right of Way

Securing property for a project can be one of the most costly elements of a linear project due to the consistent nature of the impact. The width or footprint of a transit corridor sets the stage for the amount of right of way needed. The operational characteristics of the transit line (one lane with passing lanes or two lanes) establish the footprint. In other words, to understand what the right of way impacts will be, a project owner must first determine the operational characteristics of the transit line.

Right of way along an existing roadway can be reduced by utilizing existing space currently in use for other purposes such as bike lanes, park strips, shoulders, and sidewalks. Sacrificing these types of facilities must be thought through fully to prevent solving a right of way impact issue but creating others. For instance, if bike lanes are sacrificed to reduce right of way impacts, an alternative and acceptable bike route should be available for the community reasonably close.

In the event the operational needs for the transit corridor mandate the full width and the jurisdictional agencies are unable to sacrifice the elements discussed above, usually a significant amount of right of way will need to be secured. In commercial areas, this usually lends itself to lost parking. In residential areas, in a worst case scenario, residential units must be purchased.

Utilities

Utilities can be a major physical constraint to a major capital improvement project. Overhead utilities are problematic if a corridor requires a widening of the roadway and the above ground features (poles) are in conflict with the widened roadway. Buried utilities are less problematic however, utility owners do not want to be under a transit corridor with concerns for future access and maintenance. BRT transit corridors provide more operational flexibility than a light rail corridor hence this issue is lessened significantly.

A BRT transit corridor can function with a pavement cross section comparable to roadway pavement cross sections – this lessens the need to relocate utilities with the implementation of a transit corridor.

Transmission power lines can be major obstacles if the implementation of the transit corridor requires the relocation or addition of transmission poles.

Major Structures

Major structures such as bridges and box culverts are typically needed to avoid freight railroads, water ways/rivers, canals, freeways, and/or major roadways. Any of these major structures are reasonably straight forward unless the transit corridor is running in the center of the roadway as it approaches the physical constraint and then climbs independently to cross the physical constraint while the roadway stays at-grade. This scenario creates the need to have walls supporting the bridge embankments, which correlates to significant widening and right of way.

5. ANALYSIS OF FINAL ALTERNATIVES

The Long List of Alignments presented in Chapter 4 were refined and paired with transit modes – these are the Short List of Alternatives:

- Alternative A – Standard bus operating on 12600 South
- Alternative B – BRT to Herriman Towne Center, 3600 West, 12600 South
- Alternative C – BRT using the Power Utility Corridor, 12600 South
- Alternative D – BRT to Herriman Towne Center, 13400 South, Bangerter Highway
- Alternative E – Mid-Jordan TRAX extension to Herriman Towne Center with BRT on 3600 West and 12600 South

All Short List Alternatives connect the Mid-Jordan TRAX Daybreak station to the 12800 South FrontRunner station, and include a separate transit route connecting the 12800 South FrontRunner station to the planned 14800 South TRAX station in Draper. Table 10 shows a comprehensive summary of all the Short List Alternatives under 2040 conditions. It should be noted that the data reflected below may differ from the results shown in the Level 1 screening, as analysis at this stage has become increasingly detailed.

ALTERNATIVE A

Alternative A represents a scenario that requires minimal capital investment but still improves transit mobility in the Study Area. In the FTA New Starts and Small Starts evaluation process, this alternative is referred to as a Transportation System Management (TSM) alternative. Alternative A is standard local bus service, which operates in mixed-flow traffic and offers frequent stops. From west to east, the route includes Daybreak Parkway, 5600 West, Herriman Parkway, and 12600 South. This route accesses the FrontRunner Station via Galena Park Drive. Figure 9 illustrates the alignment of Alternative A.

Alternative A traverses an 8.6-mile route in 32 minutes at 15-minute frequency. The daily ridership and the UTA system ridership increase for Alternative A is very low relative to other alternatives. No capital investment in busway infrastructure is required; as such, it is less likely that major redevelopment will occur as a result of this transit alternative. Operating in mixed flow traffic during peak periods is expected to reduce travel time and reliability. The advantage of this alternative is the low cost and reasonably good ridership potential for a standard bus route. The attributes of Alternative A are summarized in Table 5.

FIGURE 9 SHORT LIST ALTERNATIVE A

TABLE 5 ALTERNATIVE A PERFORMANCE	
Distance in miles (one way)	8.6
Travel time (one way)	32 minutes
Frequency	15 minutes (peak and off-peak periods)
Daily Ridership Range	400-800
UTA System Ridership Increase	700-1,100
Conceptual Capital Cost (millions)	Minimal
Cost/Benefit (Ridership + Cost)	N/A
Support for TOD plans	Does not support TOD development
Construction Challenges	No new construction needed
1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers	

ALTERNATIVE B

Alternative B is a BRT service, which will operate primarily in exclusive transit lanes. From the Daybreak subdivision, the route travels south in a preserved transit right-of-way to Herriman Towne Center. At the Herriman Towne Center, the alignment turns due east and crosses MVC at roughly 13000 South; this grade-separated crossing will also serve as an intermediate interchange for the planned MVC collector-distributor system. After passing through the PRI property, the alignment intersects the Rocky Mountain Power Corridor and Bangerter Highway. At 3600 West, the route turns north and operates in-street as exclusive or partial mixed-flow. At 12600 South, the route turns due east and operates in-street until turning south on Galena Park Drive (550 West). The route will use Galena Park Drive to access the FrontRunner station. Figure 10 illustrates the alignment of Alternative B.

The route serves the future Salt Lake Community College (SLCC) Herriman campus, the planned Herriman Towne Center, multiple redevelopment areas between 12600 South and 13400 South, Riverton Hospital, Riverton High School, and Riverton City Hall.

Alternative B route distance is 9.3 miles. End-to-end travel time is approximately 20 minutes, which is roughly average compared to the other Alternatives. The ridership estimate for this alternative is second highest of all alternatives. Ridership forecasts assumed Alternative B functions as an extension of the planned 5600 West BRT route. The UTA system ridership increase is comparable to the other alternatives. The attributes of Alternative B are summarized in Table 6.

Alternative B serves numerous high-ridership areas such as the proposed Herriman Towne Center and the 3600 West employment area. Proposed development along the alignment has the potential to increase ridership and improve the cost benefit of this alternative. Alternative B faces major physical constraints crossing Mountain View Corridor and Bangerter Highway.

FIGURE 10 SHORT LIST ALTERNATIVE B

TABLE 6 ALTERNATIVE B PERFORMANCE	
Distance in miles (one way)	9.3
Travel time (one way)	20
Frequency	15 min (peak and off-peak periods)
Daily Ridership Range[1]	3,100-3,500
UTA System Ridership Increase	2,600-3,000
Conceptual Capital Cost (millions)	$140-$187
Cost/Benefit (Ridership + Cost)	Medium
Support for TOD plans	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. High likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	Crossings at Mountain View Corridor (2) and roadway congestion crossing Bangerter Highway.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers

ALTERNATIVE C

Similar to Alternative B, Alternative C is a BRT extension of the 5600 West BRT line. Alternative C follows the Rocky Mountain Power utility corridor to 12600 South, where it continues to the 12800 South FrontRunner station. Key points along Alternative C are the Mid-Jordan LRT end-of-line station, Riverton Hospital, Riverton High School, and Riverton City Hall. No transfer will be required from the 5600 West BRT, but a transfer is required from the Mid-Jordan TRAX. Figure 11 illustrates the alignment of Alternative C.

Alternative C is the most direct of the Alternatives; route distance is 7.4 miles. End-to-end travel time is approximately 17 minutes, which is the shortest travel time compared to the other Alternatives. The relatively short route length also reduces overall costs which are estimated between $111-148 million. However, Alternative C has few TOD plans along its alignment and utilizes the power utility corridor, which poses both political and physical hurdles. The power utility corridor is a geographic collection of non-contiguous parcel ownership. Working to resolve these issues would be both time consuming and costly to the project. The attributes of Alternative C are summarized in Table 7.

FIGURE 11 SHORT LIST ALTERNATIVE C

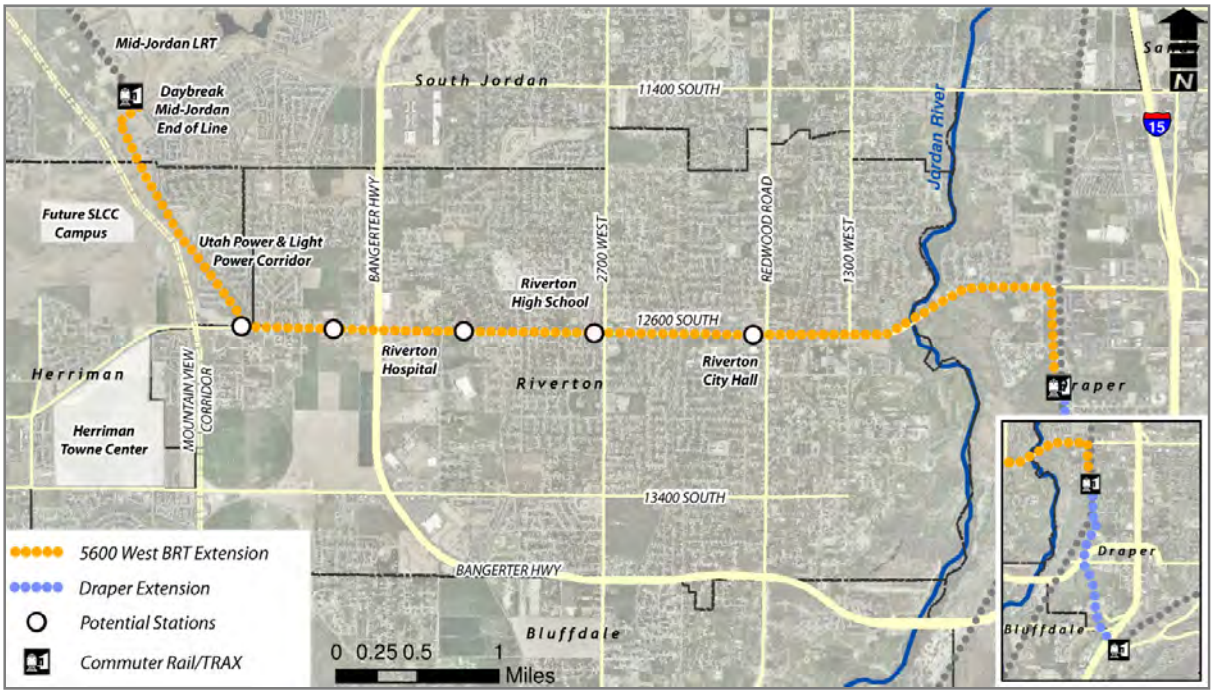


TABLE 7 ALTERNATIVE C PERFORMANCE	
Distance in miles (one way)	7.4
Travel time (one way)	17 minutes
Frequency	15 minutes (peak and off-peak periods)
Daily Ridership Range[1]	2,800-3,200
UTA System Ridership Increase	2,400-2,800
Conceptual Capital Cost (millions)	$111-$148
Cost/Benefit (Ridership + Cost)	High
Support for TOD plans	Few TOD plans on this alignment
Construction Challenges	Challenges associated with utility corridor, Bangerter crossing

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers.

ALTERNATIVE D

As with Alternatives B and C, Alternative D is a BRT service extending the 5600 West BRT line. The route serves many of the same land areas as Alternative B in Herriman, but then follows 13400 South and Bangerter Highway, and continues to the 12800 South FrontRunner station. Figure 12 illustrates the alignment of Alternative D.

At 9.9 miles, Alternative D is the longest alternative. Its travel time at 22 minutes is slightly higher than the other alternatives, with the exception of Alternative E. Alternative D conceptual cost and cost benefit is middle range compared to the other alternatives. However, Alternative D services many proposed developments such as the future SLCC campus, Herriman Towne Center, PRI parcel, a mixed-use development planned for the parcel at 2700 West/13400 South, as well as high employment areas along 3600 West. This land use support will likely increase ridership and provide an improved cost effectiveness. Additional analysis has been completed using Direct Ridership Forecasting to measure the increased ridership effectiveness of potential development, including the Salt Lake Community College Campus. The attributes of Alternative D are summarized in Table 8.

The advantage of Alternative D is service to major redevelopment sites and service in the southern part of the Study Area. Constraints along this alternative exist at the crossing of Mountain View Corridor, operations along Bangerter Highway, and shared FrontRunner corridor.

FIGURE 12 SHORT LIST ALTERNATIVE D

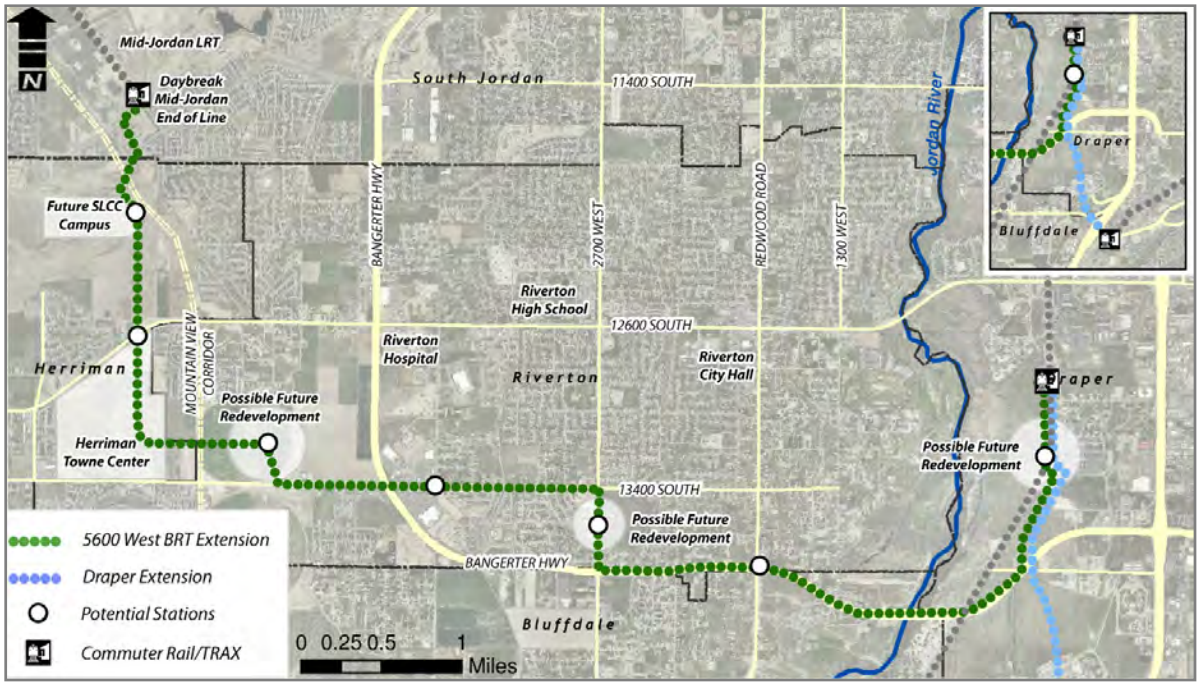


TABLE 8 ALTERNATIVE D PERFORMANCE	
Distance in miles (one way)	9.9
Travel time (one way)	22
Frequency	15 min (peak and off-peak periods)
Daily Ridership Range[1]	2,400-2,800
UTA System Ridership Increase	3,000-3,400
Conceptual Capital Cost (millions)	$149-$199
Cost/Benefit (Ridership + Cost)	Medium
Support for TOD plans	Service to Herriman Towne Center, PRI parcel, employment area on 3600 West, and parcel at 2700 W/13400 S. High likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	Crossings at Mountain View Corridor (2), Bangerter Highway, FrontRunner corridor.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers.

ALTERNATIVE E

This alternative is a LRT/BRT hybrid, extending the Mid-Jordan LRT south to a possible redevelopment area in western Riverton. A transfer to BRT extends this route to the 12800 FrontRunner station. Alternative E follows the same route as Alternative B and serves the same key destinations. Figure 13 illustrates the alignment of Alternative E.

Route distance is the same as Alternative B at 9.3 miles, mid-range among the alternatives, but travel time is higher due to the five-minute assumed transfer from LRT to BRT. This alternative results in the highest route ridership, as well as the highest UTA system ridership increase. With the highest conceptual capital cost at $217- $280 million, cost benefit is low compared to the other alternatives. The cost effectiveness may improve once development at the Herriman Towne Center, SLCC campus, and other sites occurs and ridership increases. Like Alternative B, the main construction challenges are physical constraints crossing Mountain View Corridor and Bangerter Highway. The attributes of Alternative E are summarized in Table 9.

FIGURE 13 SHORT LIST ALTERNATIVE E

TABLE 9 ALTERNATIVE E PERFORMANCE	
Distance in miles (one way)	9.3 (LRT=3.1, BRT=6.2)
Travel time (one way)	26 min, incl. 5 min transfer (LRT=7, BRT=14)
Frequency	15 min (peak and off-peak periods)
Daily Ridership Range[1]	5,500-5,900 (LRT=3,700-4,100, BRT=1,600-2,000)
UTA System Ridership Increase	2,900-3,300
Conceptual Capital Cost (millions)	$217-$280 (LRT=$124-$156, BRT=$93-$124)
Cost/Benefit (Ridership + Cost)	Low
Support for TOD plans	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. Some likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	Crossings at Mountain View Corridor (2), and Bangerter Highway.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers.

TABLE 10
SUMMARY COMPARISON OF ALTERNATIVES (2040)

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Distance in miles (one way)	8.6	9.3	7.4	9.9	9.3
Travel time (one way)	32	20	17	22	26 min (incl. 5 min transfer)
Daily Ridership Range[1]	400-800	3,100-3,500	2,800-3,200	2,400-2,800	5,500-5,900
UTA System Ridership Increase	700-1,100	2,600-3,000	2,400-2,800	3,000-3,400	2,900-3,300
Conceptual Capital Cost (millions)	Minimal	$140-$187	$111-$148	$149-$199	$217-$280
Cost/Benefit (Ridership + Cost)	N/A	Medium	High	Medium	Low
Support for TOD plans	Does not support TOD development	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. High likelihood development will increase ridership, and cost effectiveness will improve.	Few TOD plans on this alignment	Service to Herriman Towne Center, PRI parcel, employment area on 3600 West, and parcel at 2700 W/13400 S. High likelihood development will increase ridership, and cost effectiveness will improve.	Service to Herriman Towne Center and PRI parcel Some likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	No new construction	Crossings at Mountain View Corridor (2), and Bangerter Highway.	Challenges associated with utility corridor	Crossings at Mountain View Corridor (2), Bangerter Highway, FrontRunner corridor.	Crossings at Mountain View Corridor (2), and Bangerter Highway.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers. Ridership estimates do not include additional off-model forecasts which were prepared using Direct Ridership Forecasting.

6. PREFERRED ALTERNATIVE

The selection of Preferred Alternative was guided by the application of the established criteria, a Stakeholder meeting to discuss the merits of each of the alternatives, and one-on-one discussions with each Stakeholder. In addition, each of the alternatives was presented at a public workshop, and was available for comment on the WFRC website. The Preferred Alternative is Alternative B (from the Short List of Alternatives) with additional refinements made to the alignment. These revisions included:

- Refinement of the alignment exiting Daybreak and continuing to Herriman
- Re-routing of the alignment to avoid a grade-separated crossing of Bangerter Highway between major intersections while still accessing the planned transit oriented development at the PRI property.
- Addition of a short and long term alignment to connect the FrontRunner station in Draper to either 12400 South/900 East TRAX station (short-term) or future Draper TRAX end of line.

The Preferred Alternative is a BRT system, which operates between the Daybreak Mid-Jordan TRAX station and the 12800 South FrontRunner station. Figure 14 illustrates the Preferred Alignment. The BRT is assumed to be 26' feet in width, and will travel in exclusive lanes in each direction (2 lanes).

ROUTE DESCRIPTION

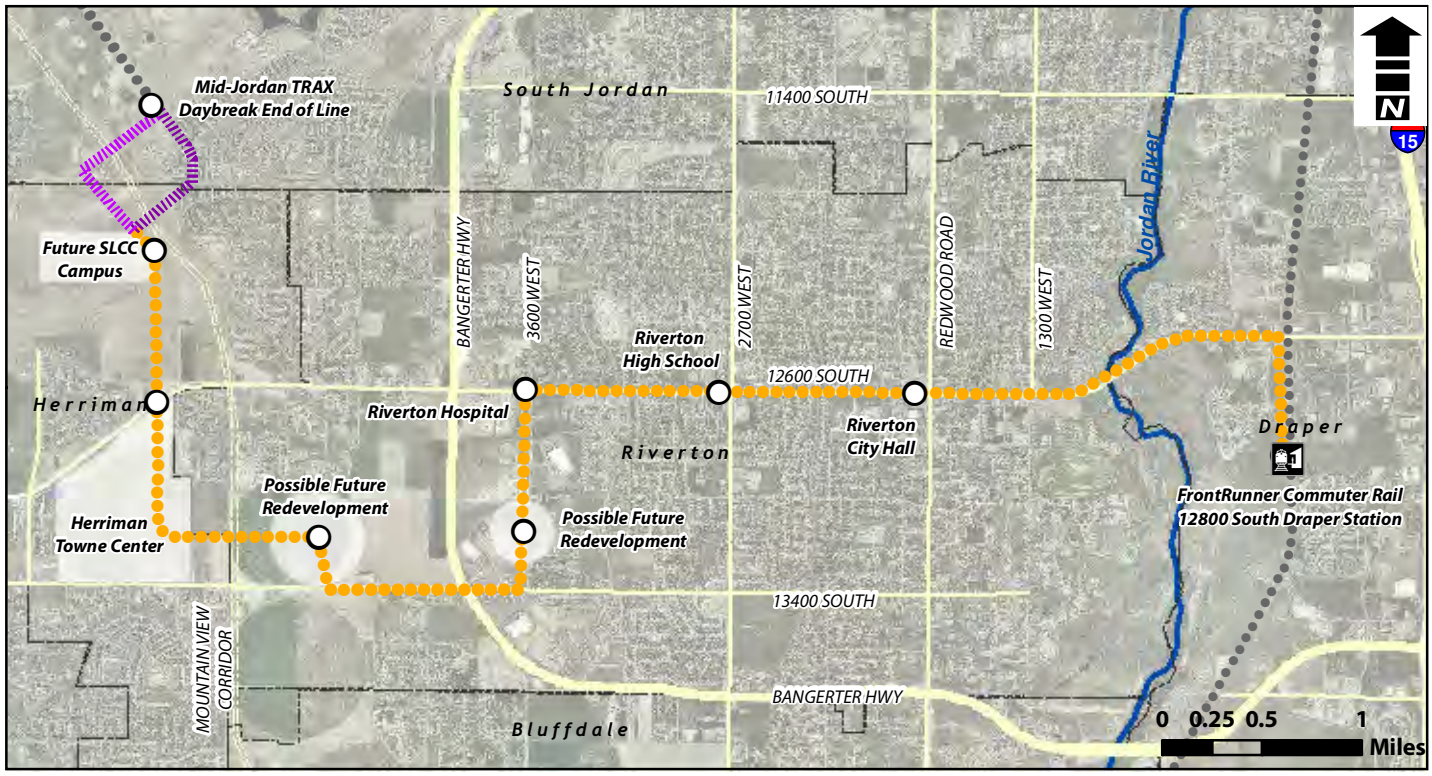
The Preferred Alternative alignment is approximately 9.8 miles in length. A one-way end-to-end trip will take 23 minutes at an average speed of 26 miles per hour. From the Daybreak Mid-Jordan TRAX station the alignment goes south to cross the under-construction Mountain View Corridor (MVC) using either the Daybreak Parkway interchange or 11400 South interchange. Once on the west side of MVC the alignment turns due south and uses a preserved transit right-of-way through Herriman. At the Herriman Towne Center, the alignment turns due east and crosses MVC at a roughly 13000 South; this grade-separated crossing will also serve as an interchange for the planned MVC collector-distributor system. After passing through the PRI property, the alignment shifts onto 13400 South. At 3600 West, the route turns north and operates in-street as exclusive or partial mixed-flow. At 12600 South, the route turns due east and operates in-street until turning south on Galena Park Drive (550 West). The route will use Galena Park Drive to access the FrontRunner station.

The route has a total of seven proposed intermediate stops between the end stations.

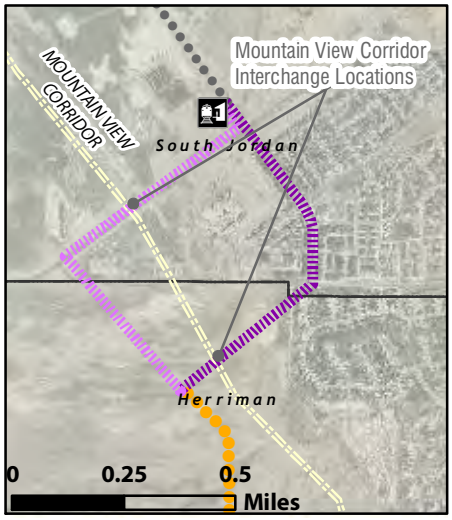
STATION LOCATIONS

Stations along the Preferred Alternative are placed roughly ½-mile to 1-mile apart, and are situated to best take advantage of existing and future ridership opportunities.

- Daybreak Station
- Salt Lake Community College Station
- Herriman Towne Center Station
- PRI Station



PREFERRED ALTERNATIVE



WESTERN TERMINUS OPTIONS

EASTERN TERMINUS OPTION #1

EASTERN TERMINUS OPTION #2

- Preferred Alignment
- Western Terminus Options
- Eastern Terminus Option #1
- Eastern Terminus Option #2
- Potential Stations
- Commuter Rail/TRAX Station

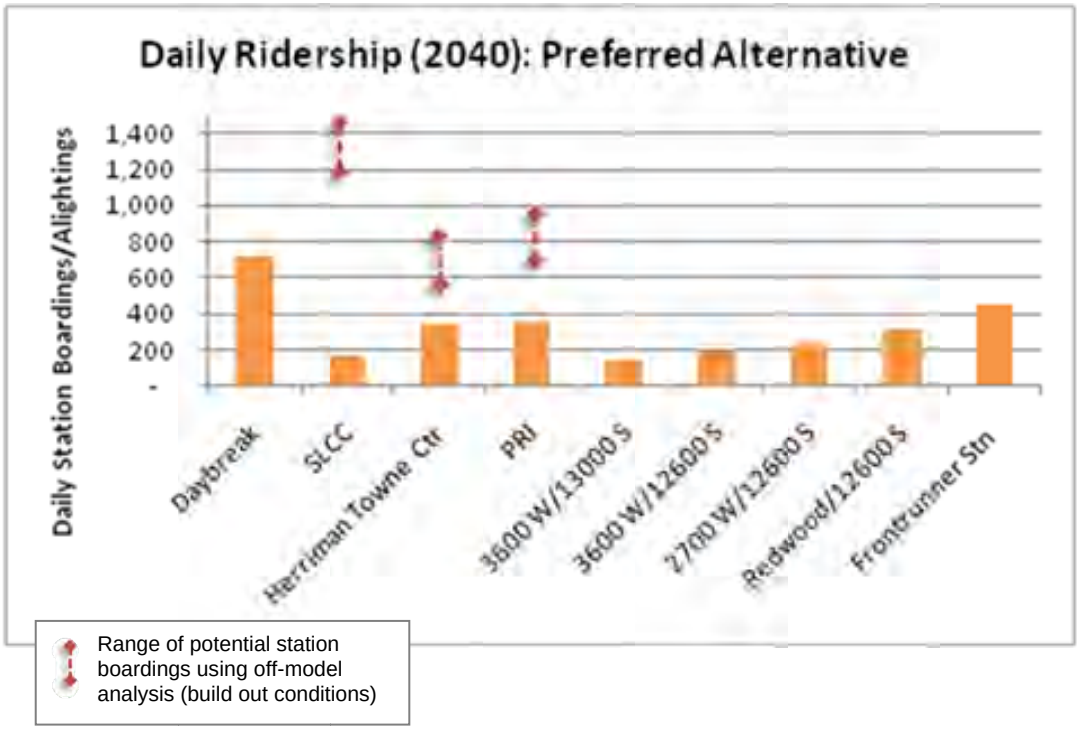
SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Preferred Alternative

FIGURE 14

- 3600 West Station
- 3600 West/ 12600 South Station
- 2700 West/ 12600 South Station
- Redwood Road/ 12600 South Station
- 12600 South Draper FrontRunner Station

Projected ridership at each station is shown below.



OPTIMIZATION AND OFF-MODEL FORECASTING

The station-level boardings shown above include both model based projections, as noted by the orange bars, as well as off-model projections, as noted by the red dashed lines. The goal of the off-model projections is to include additional factors to predict ridership, including demographic changes which might not be reflected in the WFRC model, special generators such as the Salt Lake Community College, and improved access to transit with an enhanced walkable network. Part of this analysis includes an examination of alternative development assumptions for three of the stations noted above. These development assumptions were made in conjunction with the appropriate Stakeholder Committee members. The assumptions were made to be highly plausible based on land uses and intensities surrounding the station areas, but represented an upper-end forecast of eventual uses and intensities within the station areas. Stakeholder Committee members acknowledged that planning and eventual construction of transit facilities has the potential to increase development intensities.

These factors can be accounted for in a process called Direct Ridership Forecasting. With the use of Direct Ridership Forecasting, ridership projections can be prepared in parallel with model projections to predict a 'top range' of estimates which includes each of the factors which are known to influence rider behavior. Fehr & Peers used a model developed for a similar community and situation in Denver, Colorado to determine ridership that may not be captured by the WFRC model. Working with Herriman and Riverton, specific station areas were chosen to develop off-model estimates. The estimates were prepared for the following station areas:

- Salt Lake Community College
- Herriman Towne Center
- The potential PRI development in Riverton

An additional station area was analyzed in Riverton at 13400 South and 2700 West but is not included because it is not located on the preferred alignment. The ridership generated by this exercise is shown above by the red dashed lines.

PERFORMANCE

In addition to applying the criteria developed to compare among alternatives, an additional analysis reflects the ability of this alternative to meet some key sustainability measures in 2040. The tables below show the reduction of Vehicle Miles Traveled (VMT), and hence emissions, as a result of implementing this alternative. The BRT would reduce VMT by approximately 22,000 daily miles, and save over 3 million kilograms per year in carbon dioxide vehicle emissions.

TABLE 11
PREFERRED ALTERNATIVE PERFORMANCE

Distance in miles (one way)	9.8
Travel time (one way)	23 minutes
Frequency	15 minutes (peak and off-peak periods)
Daily Ridership Range[1]	2,700-3,100
UTA System Ridership Increase	2,800-3,200
Conceptual Capital Cost (millions)	$147-197
Cost/Benefit (Ridership + Cost)	Medium
Support for TOD plans	Service to Herriman Towne Center, PRI parcel, and employment area on 3600 West. Some likelihood development will increase ridership, and cost effectiveness will improve.
Construction Challenges	Crossings at Mountain View Corridor (2), and Bangerter Highway.

1. Ridership estimate from 2040 WFRC travel model, summarized by Fehr & Peers.

TABLE 12 REDUCTION IN STUDY AREA VMT	
Reduced Auto Trips (daily)	2,900
Average Trip Length[1]	7.7 miles
Daily VMT Reduction	22,330
Average Transit Days per Year[2]	290
Annual VMT Reduction	6,475,700

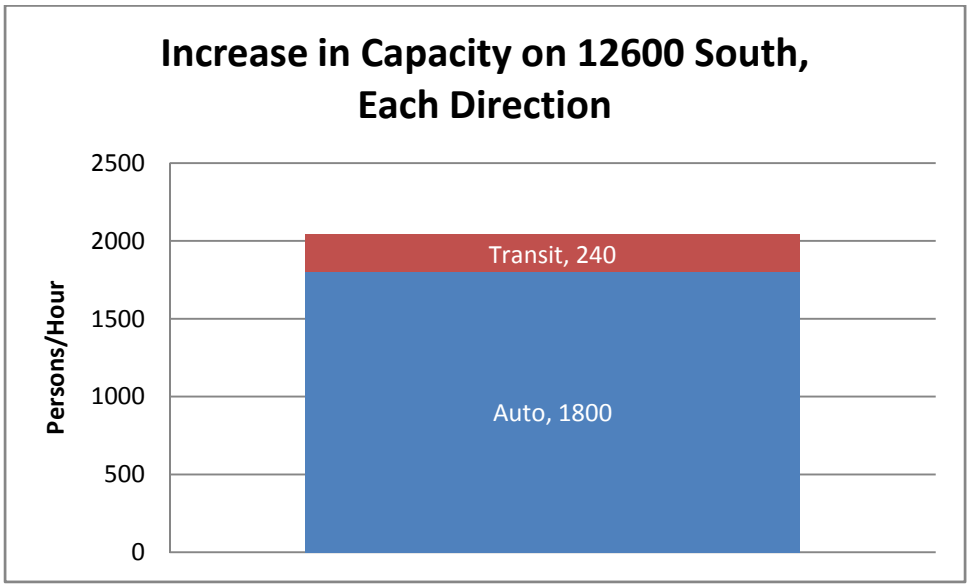
1. Average auto trip length for Study Area in 2040. Source: WFRC travel demand model.
2. Accounts for reduced transit use on weekends and holidays.

TABLE 13 REDUCTION IN VEHICLE EMISSIONS	
Carbon Monoxide (kg/year)	41,850
Nitrogen Oxides (kg/year)	1,200
Sulfur Dioxide (kg/year)	56
Carbon Dioxide (kg/year)	3,035,400

Source: Mobile 6 emissions factors summarized by Fehr & Peers

The Preferred Alternative improves east-west mobility in the Study Area by increasing the capacity to move people, whether in autos or on transit, on 12600 South by about 13 percent during the peak period. The Preferred Alternative increases capacity by 240 people per hour in each direction. This estimate is based on the following assumptions:

- Transit vehicles with 60 person capacity operating on 15 minute frequency
- 12600 South is two vehicle travel lanes in each direction
- The vehicle capacity of the 12600 South corridor is constrained at Redwood Road, where the left turns and north-south traffic require significant amount of signal time. Existing signal timing allocates approximately 44 seconds of green time (120 second cycle length) to the east-west movements. This equates to 700 vehicles per lane, or 1400 vehicle per hour for two lanes.
- Directional vehicle capacity on 12600 South is 1,400 vehicles per hour, or 1,800 people per hour
- Average automobile occupancy of 1.3 persons per vehicle.



DRAPER EXTENSION ALTERNATIVES

Connecting regional transit routes is one of the fundamental objectives of the Preferred Alternative. The extension of the North-South TRAX line through Draper offers additional opportunity to connect to light rail transit on the east side of the Interstate 15 corridor. The Draper Transit Corridor EIS recommends extending the TRAX light rail from the Sandy Civic Center 10000 South Station to Draper Town Center near 12400 South, with optional intermediate stations at 10600 South, 11400 South, and 11800 South. The Full Build scenario, which is expected to occur after implementation of the recommended extension to 12400 South, extends the light rail further through Draper to 14800 South near the I-15 corridor.

From the Draper FrontRunner station at 12800 South, the Preferred Alternative could extend east on 12600 South to either the planned light rail stations at 11800 South or Draper Town Center (12400 South). This extension would be 2.5 to 3 miles in length and increase route ridership of the Preferred Alternative by roughly 27% by attracting additional riders on the extension segment and also increasing ridership at stations west of FrontRunner.

Eventually the Draper TRAX Full Build scenario will extend to 14800 South, and provide another opportunity to link transit routes. This 2.5-to-3-mile alignment is highly dependent on the maturation of land use and infrastructure surrounding the FrontRunner station at 12800 South. This maturation includes among other things, a structure to cross the Frontrunner corridor and the future redevelopment of the Utah State Prison property.

PHYSICAL CONSTRAINTS

The construction challenges associated with a major capital improvement project, specifically the Preferred Alternative, are a function of the Physical Constraints encountered and as defined in Section 2.4 – Physical Constraints. The challenges of the Preferred Alternative are discussed below broken down

geographically along the corridor. At this stage of the project, specific impacts within the geographical areas have not been explored.

Construction challenges are a function of certain baseline assumptions. It is assumed the characteristics of the Preferred Alternative will generally be the same throughout the length of the project. Based on that assumption, the following additional assumptions are established:

Operational Characteristics:	Bus Rapid Transit
# of Lanes:	2 Lanes
Width/Footprint:	26' Wide

Mountain View Corridor Crossings

The Preferred Alternative will cross the Mountain View Corridor in two locations: 11400 South and 13000 South. At both locations, UDOT is intending to implement interchange facilities. Close coordination should be accomplished with UDOT prior to the interchange design to ensure the BRT corridor will have adequate space within the interchange to accomplish the operational needs of the Preferred Alternative.

West of Mountain View Corridor

For the portion of the Preferred Alternative west of the Mountain View Corridor, the alignment will likely be a dedicated alignment going through undeveloped property. There are very few construction challenges in this scenario however, coordination with local master plan concepts should be reviewed.

13400 South

The Preferred Alternative utilizes only a limited segment of 13400 South as it approaches the Bangerter Highway/13400 South intersection. West of Bangerter Highway, 13400 South is bracketed by agricultural and limited commercial development. The Preferred Alternative assumes mixed-flow operations at the Bangerter Highway/13400 South intersection meaning no additional widening or modifications would be necessary. However, if a dedicated corridor were to go through this intersection, impacts would most likely occur with the pedestrian ramp located south of the intersection and there would likely be an impact to the transmission line pole located in the southwest quadrant of the intersection (slightly west). A careful analysis would be needed to determine if the majority of the widening should occur on the north side, the south side, or a combination of both sides.

Between 13400 South and 12600 South

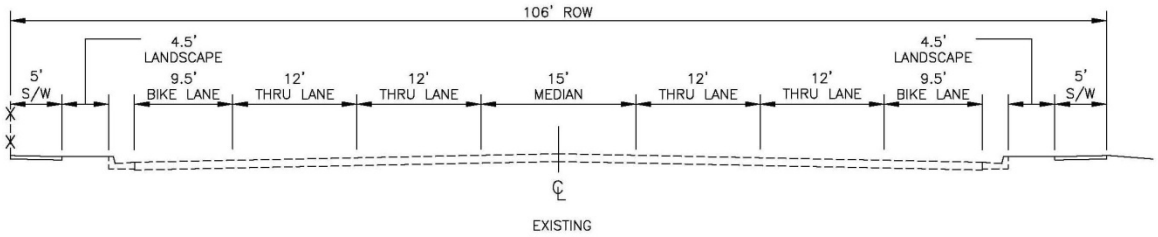
Construction challenges in this area will be solely a function of whether the corridor is dedicated or mixed use. Considering the limited amount of traffic, mixed use is suggested.

12600 South

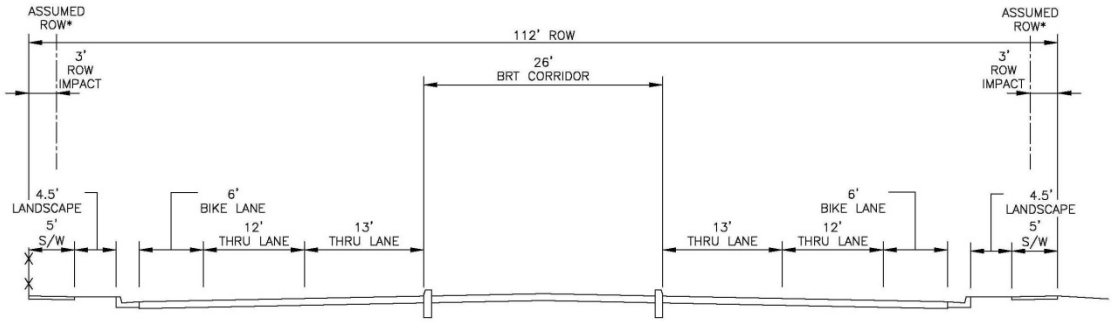
12600 South is residential on both sides of the roadway. The roadway currently has two 11.5' lanes in each direction with a 15' median, a 9.5' bike lane in each direction, curb and gutter, a 4.5' park strip, and a 5' sidewalk on each side for a total width of approximately 104'. Residential fencing is near the back of sidewalk. Introducing the Preferred Alternative and assuming the roadway lanes, bike lanes, and park strips must be maintained, the most significant construction challenge for the Preferred Alternative will be

the impacts to the residential properties. It is estimated the widening needs will be approximately 3' on each side assuming the proposed section shown. Decisions and further analysis will be needed to determine if all 6' of widening should occur on one side of the roadway or split between the north and south sides.

12600 SOUTH - EXISTING TYPICAL SECTION



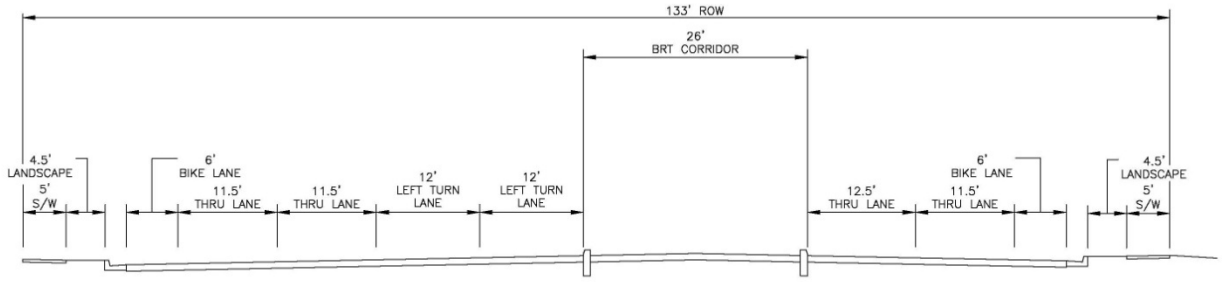
12600 SOUTH – TRANSIT TYPICAL SECTION



12600 South Intersections

Intersections create certain challenges for projects based on the numerous venues that must be supported. For this study, it is assumed the dedicated guideway continues through the intersection. This is the most conservative approach. An alternative is to allow automobiles to share the transit guideway area thus reducing the space needs. The different activities or venues around an intersection include pedestrians, automobiles, transit, left-turning vehicles, and bicycles. The section below illustrates the space needed to accommodate all venues. In this situation, the guideway is usually meandered within the right of way, as opposed to maintaining a centered position in the right of way. Impacts are reduced and shared with both sides of the roadway using this approach.

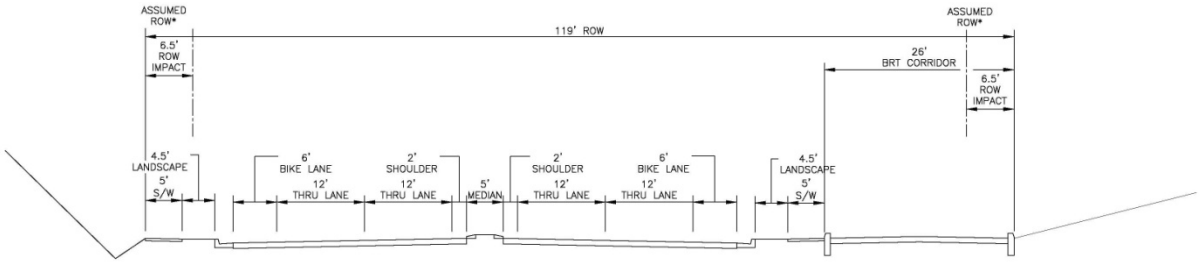
12600 SOUTH – TRANSIT TYPICAL INTERSECTION SECTION



12600 South (East of 1300 West)

East of 1300 West, the 12600 South roadway is primarily developed on the north side of the roadway. Assuming the transit corridor is a dedicated guideway and the roadway will need to be widened, the south side of the roadway is the best suited for widening as the development is limited. Serious consideration should be given to building the Preferred Alignment on the south side of 12600 South from 1300 West to 700 West, installing a signalized intersection at 700 West, and transitioning the alignment back to the center of the roadway. Assuming a south-side alignment, the Jordan River Bridge crossing is accomplished with an independent transit bridge south of the existing roadway bridge.

12600 SOUTH (EAST OF 1300 WEST) - LOOKING EAST



7. NEXT STEPS AND IMPLEMENTATION

FUTURE STUDIES NEEDED

This Feasibility Study is the first step towards implementing a transit project. Several subsequent studies will be necessary including:

Alternatives Analysis

For federal funding to be considered for this project, a formal Alternatives Analysis (AA) should be undertaken. While it may not be necessary to revisit many of the important decisions made during this feasibility study, the AA will formalize the comparisons between the Preferred Alternative and a Baseline or Transportation System Management Alternative, as required by FTA. This level of analysis will also include a more refined estimate of riders, cost, and conceptual engineering requirements. The AA can be paired with an environmental study, which is described below. For a project of this size, an AA would require approximately one year of study.

Financial Feasibility Study

Recent trends in the ability to obtain federal funding have prompted many communities and agencies to conduct independent financial feasibility studies to determine the most likely and feasible funding sources for their projects. The type of funding pursued would dictate the level of effort required, i.e. if federal funding were not pursued. Even in the event federal funding is pursued, a financial feasibility study is imperative to determine the most likely sources for local match funding, which may be as much as 50% of the project cost. Project funding can come from a variety of sources such as:

- FTA Section 5309. Funds transit capital improvement projects including buses and bus-related facilities, modernization of fixed-guideway systems, and New Starts. Beginning in 2007, part of the New Starts funding was redirected to Small Starts projects, which includes capital projects under $250 million.
- FTA Section 5307. Funds transit projects, including new construction, planning activities, and preventive maintenance. Eligible purposes include planning, engineering design and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention and security equipment and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guideway systems including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software. Formulas are based on population and density for areas with 50,000 - 199,999 population; based on population, density, and miles traveled by mode for areas over 200,000 population.
- Congestion Mitigation/Air Quality (CM/AQ). This Federal Highway Administration program is designed to reduce traffic congestion and improve air quality in non-attainment areas. It is administered by WFRC. Signal coordination, park-and-ride lots, ridesharing, bus service expansion, alternative transportation modes are eligible projects. CM/AQ funds could not likely pay for the entire project, but there could be elements that would be good candidates for this funding program.
- Local General Revenue Stream. UTA is currently paying for some major capital projects, such as the West Valley light rail line, through its general revenue stream. The local jurisdictions can and

should expect to be partners regardless of funding source by putting parts of the capital costs associated with the Preferred Alternative into their respective Capital Improvement Programs (CIP). Just like local roads, transit can and should be included in CIPs. At a minimum, local zoning authority can be used to support the project (e.g. through appropriate setbacks and good corridor preservation strategies). Consider joint development with other agencies, such as UDOT, or with the private sector.

- Private. With private development occurring along the corridor and developers willing to participate in city and transportation planning processes, the cities and UTA should discuss opportunities for public-private partnerships whereby developers can contribute to the cost in return for direct benefits to their developments. Another private funding option is a Developer-Builder-Owner-Manager which would allow a developer to take on the risks associated with the construction and operations of the line in return for any profits generated from the line.

Environmental Study

An Environmental Analysis will be required for this project. If federal funding is pursued an Environmental Assessment (EA) or possibly Environmental Impact Statement (EIS) would be required. If other non-federal funding sources are available or pursued, a State Environmental Study would be required. The EA/EIS is a process to evaluate the physical, social and economic impacts and benefits of this project, and would require additional public involvement and coordination. An EA/EIS for a project of this magnitude would require approximately 18 months to complete.

Preliminary Engineering

After completing an AA and EA/EIS, preliminary engineering is the next step towards building a project, and is followed by Final Design.

Incorporation into Local Plans

The Preferred Alternative should be included in all Local Municipal General and Transportation Plans. Cities should consider amending these plans to include the Preferred Alternative.

LAND USE CONSIDERATIONS (PREPARING FOR THE SUCCESS OF TRANSIT)

Throughout the study there has been a great deal of focus on transit-oriented development as a means to support a future high frequency/high capacity major transit investment. Cities in Southwest Salt Lake County will need to pursue transit-supportive plans and implement zoning (or other) ordinances in order to make this a cost-effective project. These following suggested steps are intended to aid cities as they develop and implement TOD planning in their jurisdiction in order to achieve a desired result. Steps include:

1. Clarify the vision for each potential station area – what type of place should it be?
2. Develop a planning approach for each station: is a small area plan, new zoning district, or overlay district the best approach?
3. Develop and consider approving the planning documents and ordinances before development applications are anticipated.
4. Analyze potential station area development opportunities from both the public and private perspectives. For example: 1) are there obstacles to transit supportive development that do not

serve an important public interest? 2) Will resulting private development be a community asset? If not, which objective standards can we incorporate into our implementing ordinances to create better community assets?

Several broader planning considerations should be explored in planning for TOD. They include:

- Consider overall city vision
- Consider Wasatch Choices 2040 centers
- Consider Market Demand for Various Uses and Densities
- Consider Financial Feasibility
- Successful TOD is more than just appropriate regulation: investments, partnerships, incentives

Appendix B includes a checklist specifying physical elements that contribute to the overall attractiveness and livability of a transit-oriented development, including land use, site design, and street and parking considerations. These elements encourage a positive pedestrian environment, encourage efficient land uses, and make TOD an asset to the community. Because specific station areas vary, this checklist is meant to be used as a guideline when evaluating a TOD ordinance or plan. The Appendix also includes additional information on the above recommendations.

PHASING CONSIDERATIONS

Because of the flexibility of BRT, this technology may be implemented in a variety of ways, and phasing options should be considered. In the short term, communities in the study area may consider beginning bus service along this route, and increasing frequency as it is warranted. Over time, and as demand increases, other amenities may be added, such as signal priority or station development. As demand increases and funding is secured, the project would evolve into its final state, which would include the following BRT III elements:

- Exclusive lanes
- Signal priority
- Branded buses
- Designed stations
- Off-board ticketing

With a vision towards the future, and if demand warrants such an upgrade, it may be advantageous to preserve additional right of way (a total of 28') to allow for a future light rail line.

ADDITIONAL STUDIES

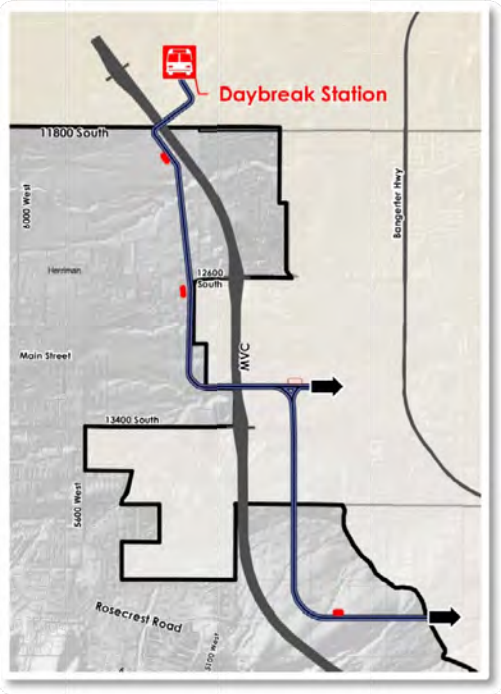
Through the Southwest Salt Lake County Feasibility Study Process, other ideas for transit were explored. These studies could be explored further in separate processes, and include:

- 10400 South Route in South Jordan – A study completed in 2009 identified a Fast Bus route connecting the Daybreak development in South Jordan, and the Commuter Rail Station at 10400

South. South Jordan should continue to explore this alternative, as it provides an additional east/west route to improve mobility through the Southwest part of the County.

- Herriman Transportation Master Plan and a Bluffdale Connection – The Herriman Transportation Master Plan includes a connection from the Towne Center and south and west into Bluffdale. Future studies should be undertaken to assess the feasibility of this connection. The concept is shown in Figure 15. Bluffdale has also expressed interest in connecting along the Porter Rockwell Trail to provide additional mobility further south than the current study area.

FIGURE 15 HERRIMAN TRANSPORTATION PLAN



Source: Herriman City

APPENDIX A:
PUBLIC COMMENT

Southwest County Transit Feasibility Study
Open House – Wednesday, June 16, 2010

Name	Phone Number	E-Mail Address
Meg Reber	916.220.3242	mreber@sbcglobal.net
José Guillemette	801-432-8079	
Chris. Johnson		J_Chris20@yahoo.com
Tyler Pierson	801-571-2335	Tyboy24@Gmail.com
Kolton Maes	801-446-8921	Koltmaes@hotmail.com
Adam Frampton	801-860-8154	adamframpton@gmail.com
Ethan Nielsen	(801) 254-7261	ebabe46@gmail.com
Jon Lilja	801 3103728	JonJL32@gmail.com
Tim Pierson	801-571-2335	mr.timmister@gmail.com
[illegible] Nielsen	801-254-7261	
Blake Nielson	801-254-1918	
Taylor Evans	801-400-4299	bru-freaky@hotmail.com

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Southwest County Transit Feasibility Study
Open House – Wednesday, June 16, 2010

Name	Phone Number	E-Mail Address
G.J. LaBonty	801 237 1979	~~G.~~ GLABONTY@RIDEUTA.COM
Aaron Mentzer	801 979 4834	AMENTZER@Rideuta.com
Jan R. Davis	801-558-3920	jan.r.davis@slcgov.com
Doug Hatheny	801-363-4250	dhatheny@wfrc.org
Nicole Christense	966 4524	UTA Bd
Don Christensen	966-4524	3rd Council DON.CHRISTENSEN@WVC-UT.GOV
Jeff Chappell	878-4693	jtmjbda@sbcglobal.net
Gail Williams	801-253-8560	bookfanatics3q.com
Mike Christenson	801-361-2305	mrc@cascadepeak.com
J. Martin	—	—
MIKE HATHORNE	801-321-8700	MHATHORNE@FRIPD.COM
STEVEN STOOKEY	801-569-8888	STEVE@KINGPEAK.com
Robert A. Hunter	801.726.8061	rh@uwnu.org
Joey Alsop	(801)597 3189	Jalsop@rideuta.com

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Southwest County Transit Feasibility Study
Open House – Wednesday, June 16, 2010

Name	Phone Number	E-Mail Address
Jory Johner	363-4250 x1110	jjohner@wfrc.org
TRACE ROBINSON	801 208-3137	TROBINSON@RIVERTONCITY.COM
NATHAN PAGE	801.208-3136	NPAGE@RIVERTONCITY.COM
Tauni Everett	801.824.0029	teverett@rideuta.com
BRYN & JOHN	801. 556. 3314	bmccarty@herriman.org
Sam Klemm - Riverton	801-651-7136	sklemm@WFRC.ORG
Laurel Price - Herriman	446-9409	laurelprice@gmail.com
Michelle Bagley Herriman UTA BOARD	801-254-4921	michelleannebagley@yahoo.com
Steve Catmull	801-253-5132	steve.catmull@ymail.com
Calvin Eastman	8015561915	crossley.tory@yahoo.com
Christian Hill	801878-4285	TiffanyHil@Hotmail.com
David A.	801-782-0284	
Tyler Crum	(801)-302-1171	Tyler_A_Crum@yahoo.com
Spencer Lillywhite	8013103728	JonL320@ymail.com

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

OPEN HOUSE SUMMARY

A public open house for the Southwest Salt Lake County Transit Feasibility Study was held on Wednesday, June 16th from 6:00 to 8:00 p.m. at the Riverton Community Center. Attendance, as typical with the start of a large area planning study, was low (see attached sign-in sheets).

Information boards (copies attached) outlined the project background, current and future travel, issues and goals of the study, overview of various transit modes, and potential alignments with land use. Representatives from UTA and WFRC provided additional information on future, planned transit for the open house attendees.

In addition to the comment cards, there were two interactive areas of the open house where public comment was recorded. Summary of all comments are listed below.

Sticky Wall w/Post-it Comments
Participants at the sticky wall location were asked to place their answers/comments on large post-it paper in response to two questions; "What are your transit needs" and "What are the current issues?" and place on the sticky wall. Summary of all comments below:

- What Are Your Transit Needs?
  - Mid-day and weekend transit service
  - Express service between Herriman and SLC Airport along Bangerter with at least one early (5:30 am) and one late (11:00 pm); including Saturdays
  - An alignment should be considered to get people from CRT to the corridor on 3600 West and then feeding into the Mid-Jordan Daybreak Stations. People will be commuting from Utah and Weber/Davis counties to the offices on 3600 West.
  - Mass transit that gets used - buses have a stigma that Light Rail does not. Light Rail gets used by a wider cross section of the community. Wealthy and poor alike will hop the Rail to downtown, where higher middle income persons tend to avoid buses until economic conditions force their use. I would love to see Rail to downtown from high density living areas (like Herriman, Eagle Mountain). This would be great. P.S. The public hates empty buses rolling around burning diesel.
  - I'm ready for some better north-south corridors on the west side. For example, 4000 W & 5600 W. Trax will help, but with most of the feeders going east-west, it is a challenge once you get past prime hours. We are a 1-car family so I bike or walk year-round.
  - Regular daily service – this would help the entire community by decreasing traffic, decreasing pollution, provide for transportation to and from before and

after school programs, provide transportation for medical and other needs for the elderly.
    - Does UTA even care?
    - We need enough connectivity in the network to encourage ridership. Without it, people won't use it. Obviously, this takes time but please hurry.
- What Are The Current Issues"
    - Bluffdale transit service – no one knows about it or understands how it works.
    - Limited service oriented towards commuters leaves me stranded.
    - Have the planners of UTA come and spend a week out in Herriman using only public transit. They will get an extremely small taste of our situation.
    - The feeling of being stuck i.e. downtown all day because the lack of service is frightening. If we miss that one hour time range, we're pretty much sorry out of luck. We're also getting extremely congested w/traffic. We have students and elderly that also need some way to get around. We are stuck!
    - Bangerter Highway doesn't go far enough west. It should fork and connect to Mountain View Corridor when it comes in.
    - Currently not enough connections to encourage use.
    - Based on your "Alignments Being Considered" board, it shows little to no population south of 13400 South. I'd like to show UTA just how big it is myself. We are bigger south of 13400 than north. No wonder we can't get service.
    - There are no stations on Bangerter Highway.

Alignments Map

Participants at the map location were asked to place stickers on a map where they thought a transit station would be most effective. They were also asked for feedback on alignments. Common themes from this location were:

- "The District" and surrounding area was the most popular location for a transit station
- Based on stickers representing where attendees lived, most participants live in the neighborhood to the west of The District and south of Daybreak
- Herriman Town Center and the PRI property in Riverton were popular locations for future stations
- 13400 South A and B were tagged as popular routes
- No alternative routes were suggested
- Connecting commuter rail to TRAX (both mid-jordan and draper) was important.

Comment Box (one card received)

- "Extending the Mid-Jordan TRAX line to Herriman would be a relatively easy way to benefit Herriman."

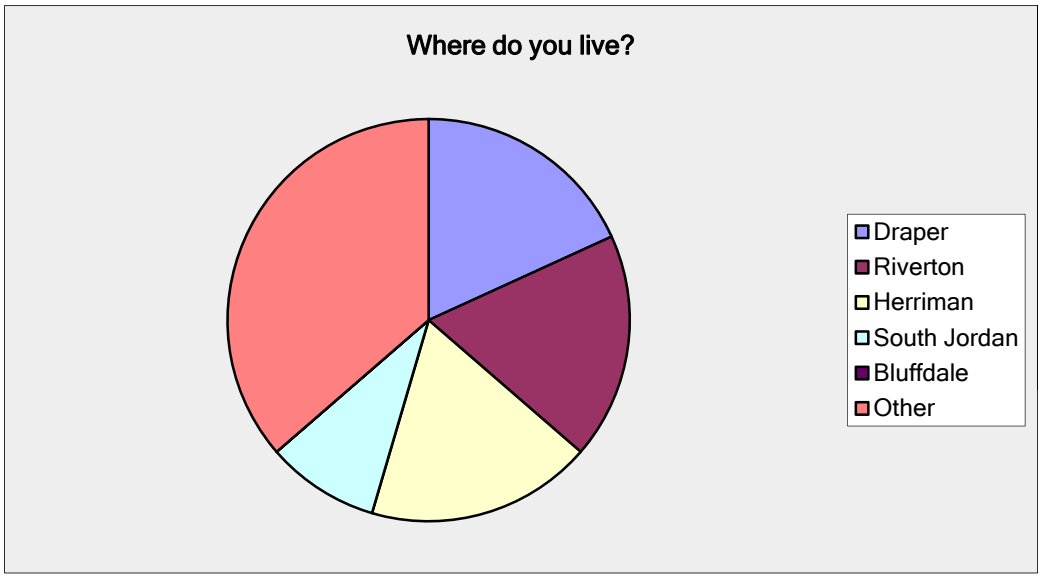
Southwest County Transit Feasibility Study
Public Workshop – Wednesday, September 15, 2010

Name	Phone Number	E-Mail Address
MIKE DAY HERRIMAN CITY COUNCIL	801-833-3728	MikeDayHerriman@live.com
Shane Greenwood	801 254-3742	sgreenwood@sje.utah.gov
Steve Catmull		steve.catmull@gmail.com
Marlo Jenkins	801-571-9861	added 568 Cephus Rd Draper Ut-84020
Sandra Jenkins	801-571-9861	
Howard Nielsen	801-254-6888	none
MAX JOHNSON	801-468-3337	MRJOHNSON@SLCO.ORG

SOUTHWEST SALT LAKE COUNTY
TRANSIT FEASIBILITY STUDY

Southwest Salt Lake County Transit Study Workshop

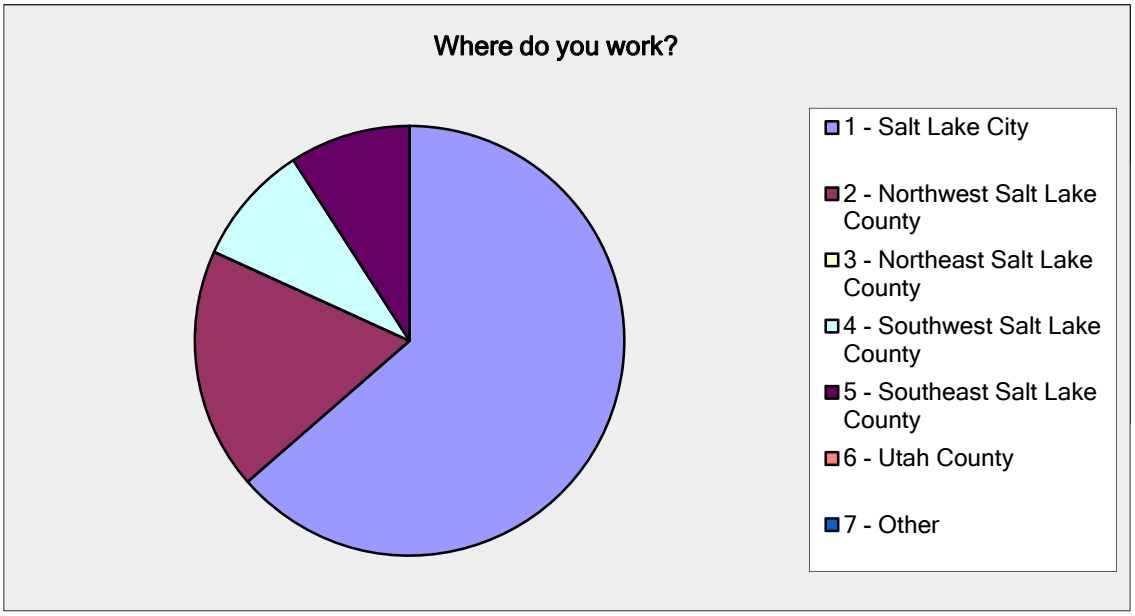
Where do you live?		
Answer Options	**Response Percent**	**Response Count**
Draper	18.2%	2
Riverton	18.2%	2
Herriman	18.2%	2
South Jordan	9.1%	1
Bluffdale	0.0%	0
Other	36.4%	4
	answered question	11
	skipped question	0



Southwest Salt Lake County Transit Study Workshop

Where do you work?

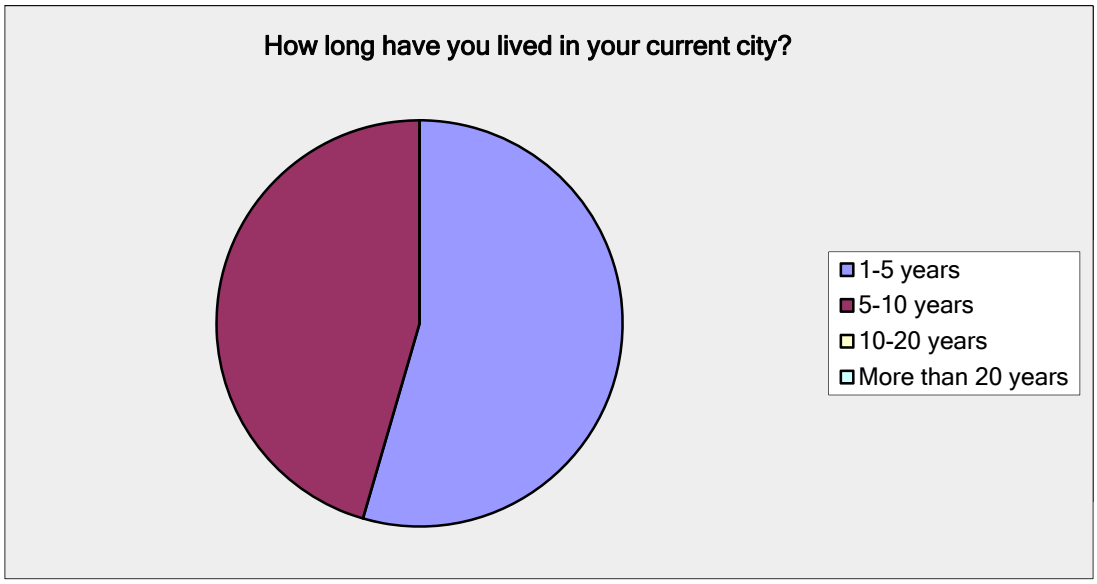
Answer Options	Response Percent	Response Count
1 - Salt Lake City	63.6%	7
2 - Northwest Salt Lake County	18.2%	2
3 - Northeast Salt Lake County	0.0%	0
4 - Southwest Salt Lake County	9.1%	1
5 - Southeast Salt Lake County	9.1%	1
6 - Utah County	0.0%	0
7 - Other	0.0%	0
answered question		11
skipped question		0



Southwest Salt Lake County Transit Study Workshop

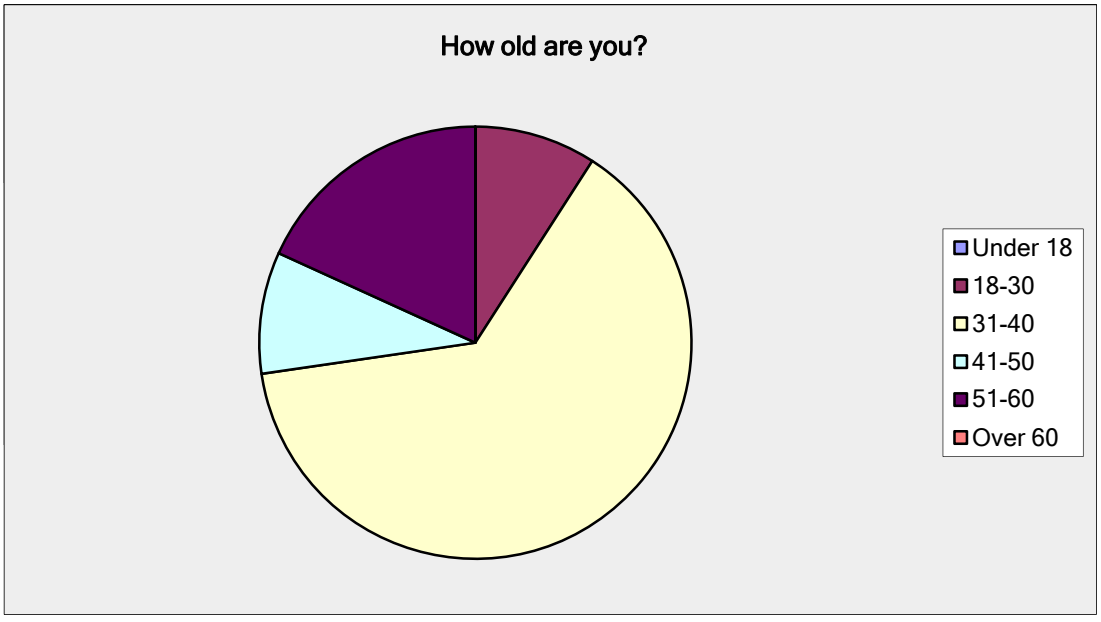
How long have you lived in your current city?

Answer Options	Response Percent	Response Count
1-5 years	54.5%	6
5-10 years	45.5%	5
10-20 years	0.0%	0
More than 20 years	0.0%	0
answered question		11
skipped question		0



Southwest Salt Lake County Transit Study Workshop

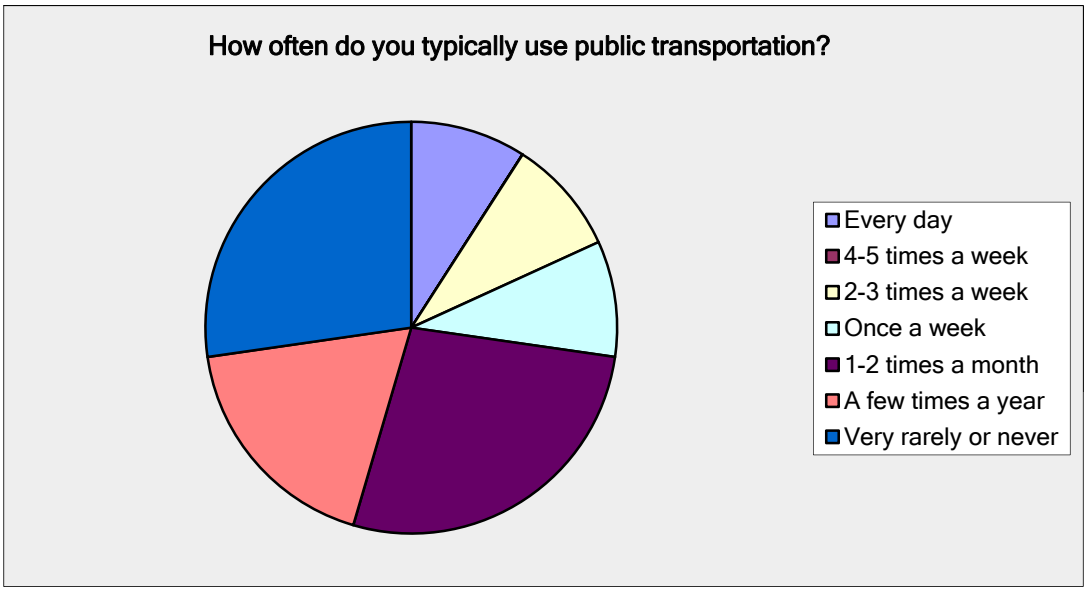
How old are you?		
Answer Options	**Response Percent**	**Response Count**
Under 18	0.0%	0
18-30	9.1%	1
31-40	63.6%	7
41-50	9.1%	1
51-60	18.2%	2
Over 60	0.0%	0
	answered question	11
	skipped question	0



Southwest Salt Lake County Transit Study Workshop

How often do you typically use public transportation?

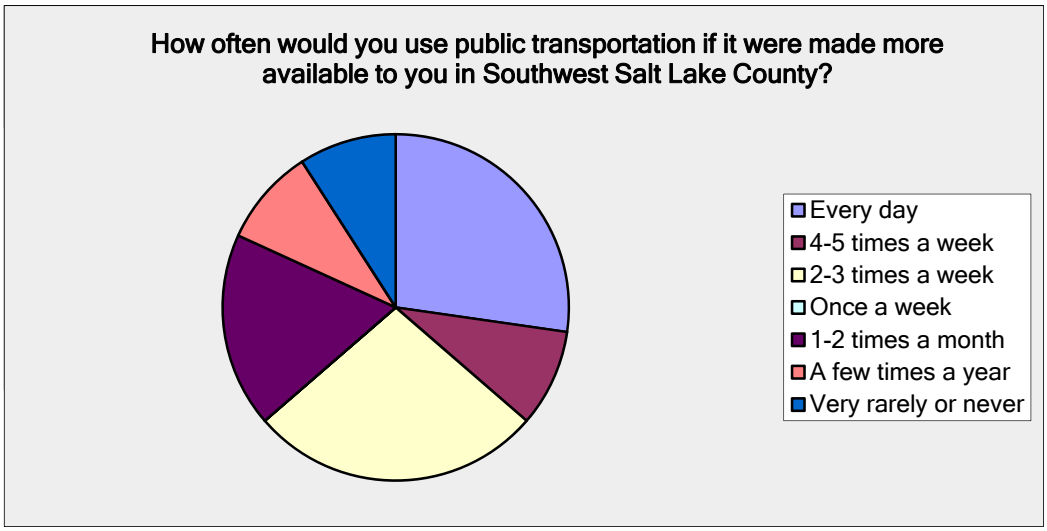
Answer Options	Response Percent	Response Count
Every day	9.1%	1
4-5 times a week	0.0%	0
2-3 times a week	9.1%	1
Once a week	9.1%	1
1-2 times a month	27.3%	3
A few times a year	18.2%	2
Very rarely or never	27.3%	3
	answered question	11
	skipped question	0



Southwest Salt Lake County Transit Study Workshop

How often would you use public transportation if it were made more available to you in Southwest Salt Lake County?

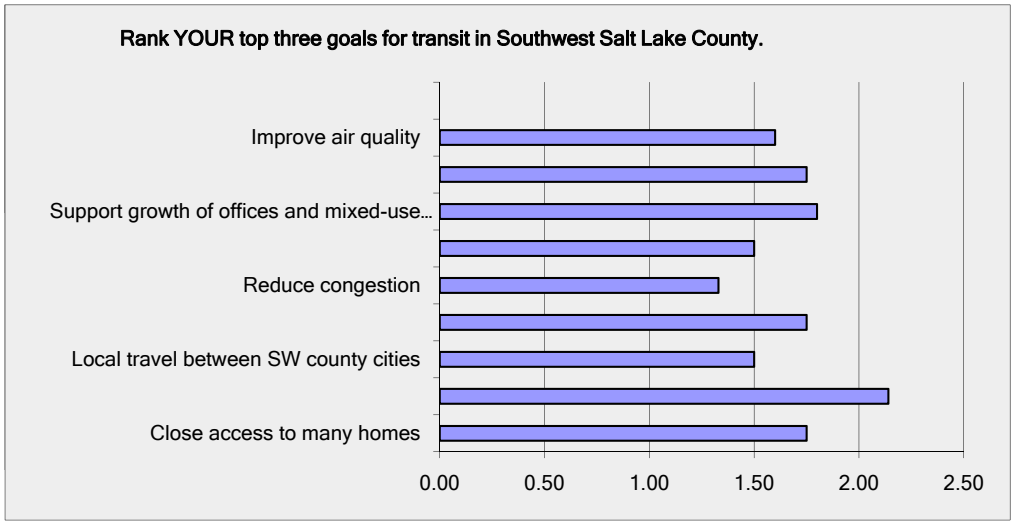
Answer Options	Response Percent	Response Count
Every day	27.3%	3
4-5 times a week	9.1%	1
2-3 times a week	27.3%	3
Once a week	0.0%	0
1-2 times a month	18.2%	2
A few times a year	9.1%	1
Very rarely or never	9.1%	1
answered question		11
skipped question		0



Southwest Salt Lake County Transit Study Workshop

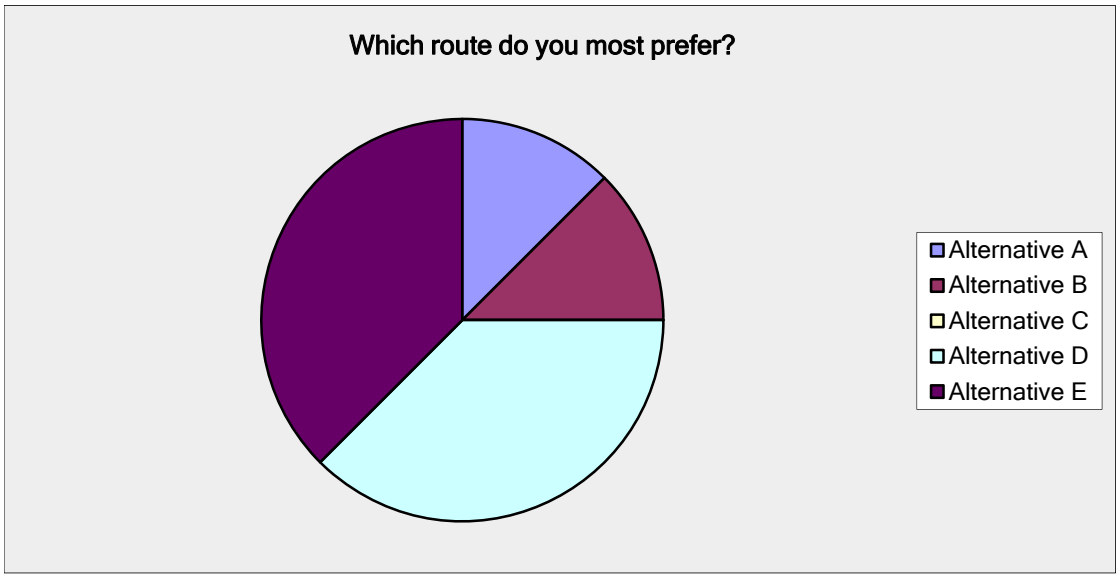
Rank YOUR top three goals for transit in Southwest Salt Lake County.

Answer Options	Most Important	Second Most Important	Third Most Important	Rating Average	Response Count
Close access to many homes	1	3	0	1.75	4
Reach major destinations	2	2	3	2.14	7
Local travel between SW county cities	1	1	0	1.50	2
Add more travel options (modes)	2	1	1	1.75	4
Reduce congestion	2	1	0	1.33	3
Bypass Congestion	3	0	1	1.50	4
Support growth of offices and mixed-use development	2	2	1	1.80	5
Fast service	1	3	0	1.75	4
Improve air quality	3	1	1	1.60	5
Other	0	0	0	0.00	0
If other, please tell us your goal?					0
				answered question	**9**
				skipped question	**2**



Southwest Salt Lake County Transit Study Workshop

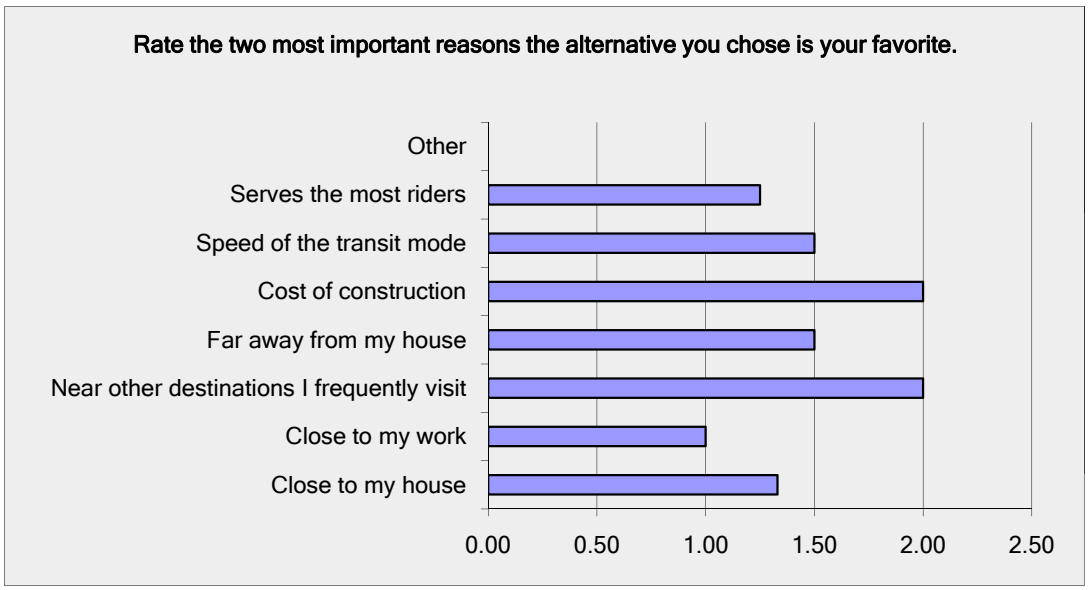
Which route do you most prefer?		
Answer Options	**Response Percent**	**Response Count**
Alternative A	12.5%	1
Alternative B	12.5%	1
Alternative C	0.0%	0
Alternative D	37.5%	3
Alternative E	37.5%	3
	answered question	8
	skipped question	3



Southwest Salt Lake County Transit Study Workshop

Rate the two most important reasons the alternative you chose is your favorite.

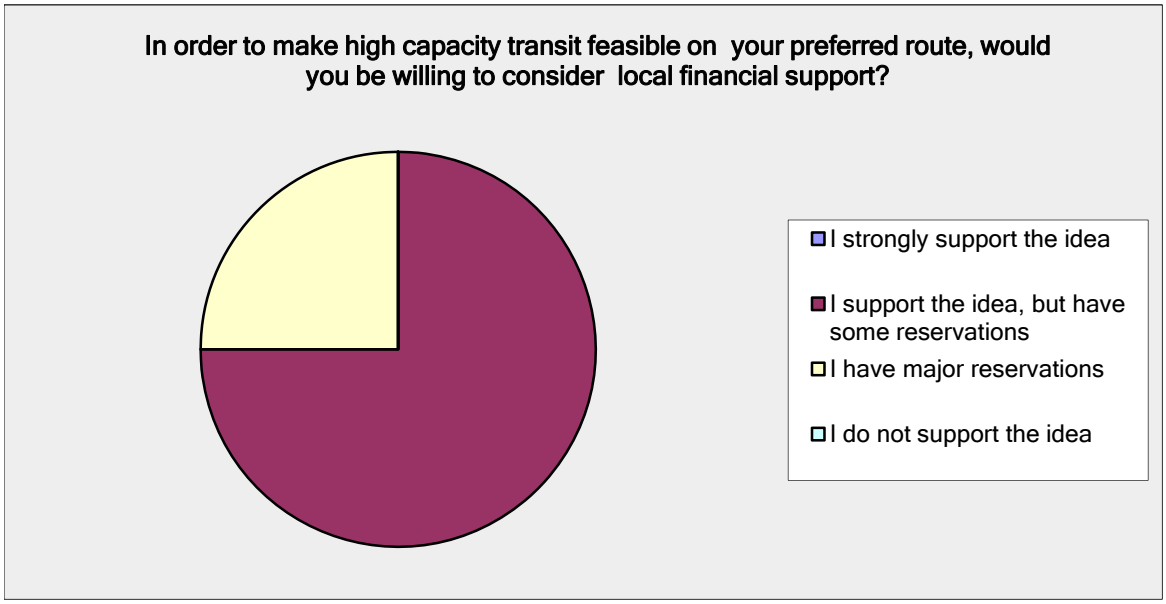
Answer Options	Most Important	Second Most Important	Rating Average	Response Count
Close to my house	2	1	1.33	3
Close to my work	3	0	1.00	3
Near other destinations I frequently visit	0	3	2.00	3
Far away from my house	1	1	1.50	2
Cost of construction	0	1	2.00	1
Speed of the transit mode	2	2	1.50	4
Serves the most riders	3	1	1.25	4
Other	0	0	0.00	0
If other, please tell us why?				0
			answered question	8
			skipped question	3



Southwest Salt Lake County Transit Study Workshop

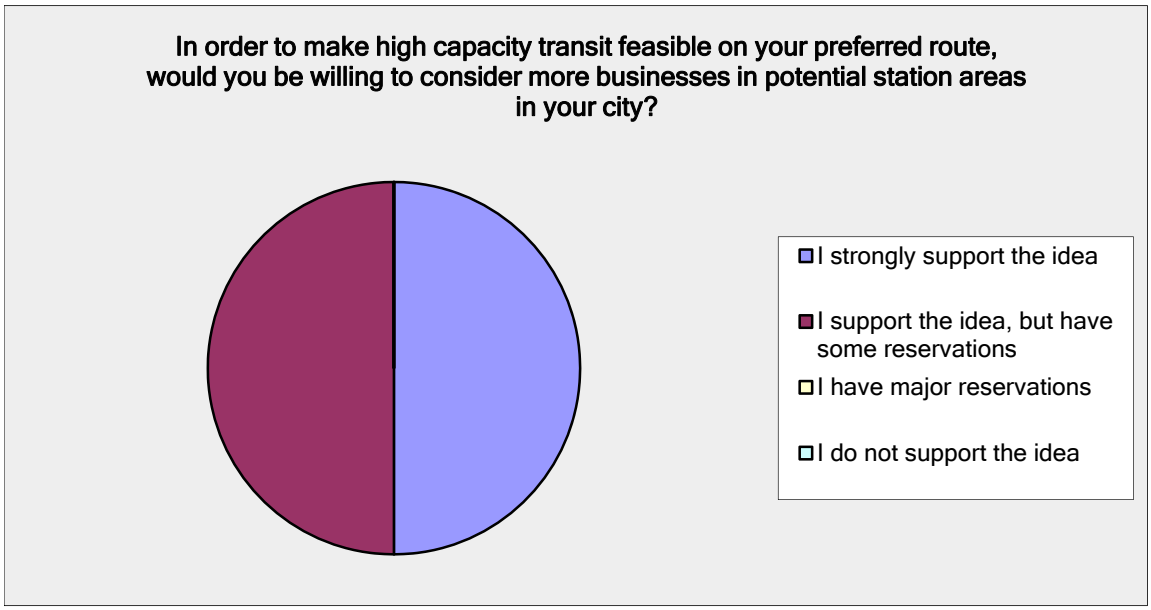
In order to make high capacity transit feasible on your preferred route, would you be willing to consider local financial support?

Answer Options	Response Percent	Response Count
I strongly support the idea	0.0%	0
I support the idea, but have some reservations	75.0%	6
I have major reservations	25.0%	2
I do not support the idea	0.0%	0
answered question		8
skipped question		3



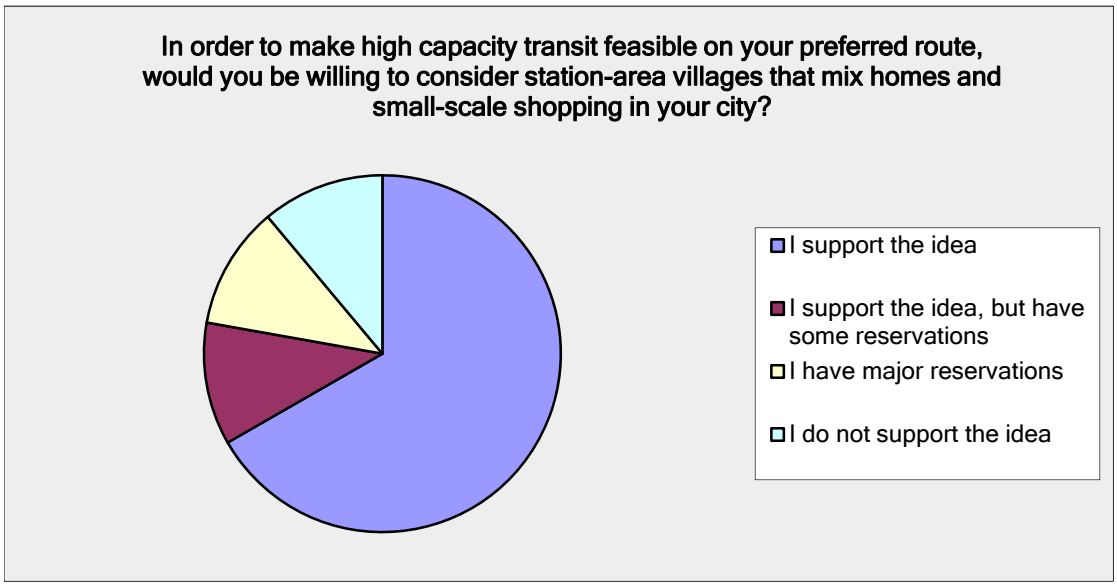
Southwest Salt Lake County Transit Study Workshop

In order to make high capacity transit feasible on your preferred route, would you be willing to consider more businesses in potential station areas in your city?		
Answer Options	**Response Percent**	**Response Count**
I strongly support the idea	50.0%	4
I support the idea, but have some reservations	50.0%	4
I have major reservations	0.0%	0
I do not support the idea	0.0%	0
answered question		8
skipped question		3



Southwest Salt Lake County Transit Study Workshop

In order to make high capacity transit feasible on your preferred route, would you be willing to consider station-area villages that mix homes and small-scale shopping in your city?		
Answer Options	**Response Percent**	**Response Count**
I support the idea	66.7%	6
I support the idea, but have some reservations	11.1%	1
I have major reservations	11.1%	1
I do not support the idea	11.1%	1
answered question		9
skipped question		2



From: Robin Hutcheson
Sent: Monday, September 20, 2010 3:47 PM
To: Mardi Pearson
Subject: FW: Study on 123rd Expansion

Please save and file

From: Kelly Ballard [mailto:mkmdj@hotmail.com]
Sent: Monday, September 20, 2010 1:09 PM
To: Robin Hutcheson
Subject: Study on 123rd Expansion

Dear Robin Hutcheson,

Thank you for the city meeting the other night where you shared the ideas on the 123rd expansion. I have studied them all out and just want to share my opinion. I am excited for the residents to eventually have a bus system, especially the youth. I do hope it will provide a safe alternative for them to get around and hope it stays upkept and clean.

I am concerned about having the 4 alternatives for 123rd expansion. It is already so conjested and after dealing with all the expansion in Sandy from 700 east and 1300 east, it seams almost impossible to get around up there. I do not want that to happen to 123rd and chase people away from that street. So many busses there will add the hectic traveling there.

I am in support of the Alternative D - expanding it to Bangerter. I feel that road can handle to extra traffice and will help aid in the congestion of 123rd.

Thank you so much for your time. Appreciate all that you do for our city!

Kelly Ballard
Galena Hills Resident

From: Robin Hutcheson
Sent: Wednesday, September 22, 2010 9:17 AM
To: Mardi Pearson
Subject: FW: West side, southbound commuters

From: Mentzer, Aaron (Community Involvement Splist) [mailto:AMentzer@rideuta.com]
Sent: Wednesday, September 22, 2010 9:10 AM
To: Robin Hutcheson
Subject: FW: West side, southbound commuters

Hi Robin,

I received the email below last Friday, and I responded that I'd forward it on to the SW Salt Lake County Transit Study team.

Thanks,

Aaron

Aaron Mentzer
Community Involvement Specialist | Utah Transit Authority
O: 801.236.4783
M: 801.739.1839
amentzer@rideuta.com

UTA

From: Kristi Winegar [mailto:kristi@agemni.com]
Sent: Friday, September 17, 2010 6:53 PM
To: Mentzer, Aaron (Community Involvement Splist)
Subject: West side, southbound commuters

Hi there,

I am not positive I have the right contact person, but would you please forward this opinion to the right people?

I personally would love to see the mid jordan trax line head south and east to connect up with commuter buses/trains headed south. Here's why:

I have been a commuter for about the last 10 years and am excited about the coming changes with front-runner and trax and for bike commuters. I have commuted from South Jordan or Herriman, in SL County, to Provo, in Utah county, *daily*. Since there are not a lot of bus routes on the west side that head southward I've had to be creative with using bikes cars, etc.

But now that I live in Herriman I have given up on public transportation entirely... It seems that there are no routes that go from the West Side of salt lake Valley that head southward - it seems all of the routes, all of the future front runner/trax lines, feed people to Salt lake City. All of the routes turn north. If I take

any bus routes, The furthest point I can connect to one of the commuter buses or future southbound trains will be at 126th south and involve several transfers - I cannot use public transportation to go to work in under 3.5 to 4 hours one way. It's a little frustrating...

I would really be nice if there was one route that cut across the west side of the valley from the northwest to southeast (this direction: "\") so that commuters to Utah County have some options. I know at least 10-20 people in my church group alone that drive or bus to UVU or BYU daily. When I used to ride the 811 and other commuter buses, many if not most of the riders on those full buses were from the west side of the valley. We all have to drive to some stop along I-15. Unless there are any buses that that get off the freeway going south at Bangerter Highway, the only stop I can go to without heading too far north (which is silly when your purpose is to go south) is in Lehi.

Are there any possibilities for the mid jordan trax line head south and east to connect up with commuter buses/trains headed south along I-15?

Do you know if any studies have been done on a project like this? It seems like it would be very profitable to me with the massive growth in the west side communities. How could I go about promoting this idea (I could probably get some group at BYU to perform a study)?

Thanks!

--

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APPENDIX B:
TOD TYPOLOGY

Southwest Transit Feasibility Study

SUGGESTED NEXT STEPS IN STATION AREA PLANNING

Throughout the Southwest Transit Feasibility study there has been focus on transit-oriented development as a means to support a future high frequency/high capacity major transit investment. In order for high capacity transit improvements, such as BRT, to occur within the study area, the potential transit improvement must fare well in cost benefit analyses relative to other potential transit corridors in the Wasatch Front and other potential projects nationwide. Planning for transit-supportive land uses near potential station area is one key method to create a highly competitive transit project.

This document outlines suggested next steps for cities in Southwest Salt Lake County that wish to develop transit-supportive plans and implementing ordinances such as zoning. Included in this document are excerpts and links to example TOD plans, references to planning tools such as development pro-forma spreadsheets, and a checklist that may be useful as plans, ordinances, and development applications are reviewed. These steps, considerations and tools are provided as a resource for local governments. They are not intended to limit the decisions local governments make regarding the types of station area places to plan for, how to develop your plans, nor which key considerations should be addressed in the planning process.

1. CLARIFY AREAS TO EXPLORE STATION AREA PLANNING

As a city, first clarify which locations you would be willing to consider modifying your land use plans to be more transit supportive. As you do this, incorporate the following considerations:

a. Preferred Corridor from the Southwest Transit Feasibility Study.

b. Consider Southwest Transit conceptual station locations.
Not every location along the preferred route makes sense as a transit station. The preferred route includes initial station location assumptions. These locations are approximate and can move by approximately ¼ mile in any direction. Stations are generally unlikely to be closer than ½ mile from each other and should be located near large pools of potential riders, and in convenient locations for north/south bus lines may.

c. Work with UTA to approximate reasonable locations

UTA can provide initial assistance in determining if a location along the preferred route makes technical sense as a potential station location.

d. Consider long-term development hot-spots
   Explore areas that are currently vacant, where new roadway infrastructure may ignite interest in development or redevelopment, or where you know a developer has interest in transit supportive uses.

2. CONCEPTUALIZE POTENTIAL STATION AREAS BY TYPE

Not every potential station location will have the same potential mix of uses or intensities. The character of future station areas should be a function of the city's vision, what land uses surround the location, the landowner's interests and what the market can bear long-term. To help inform your city planning discussions in potential station areas, it may be useful to think of stations in southwest Salt Lake County becoming one of six TOD types.

The following TOD typology suggest station area roles and character that may fit the context of Southwest Salt Lake County while working toward a goal of have sufficient potential riders at future station areas. These TOD types are a function of the eventual 1) intensity of the site (as in dwelling units per acre or commercial floor-to-area ratio) and 2) the mix of land uses.

Primarily Residential TOD Types

i. **Transit Neighborhood:** 24 dwelling units per acre target

ii. **Suburban Neighborhood**: 12 dwelling units per acre target

Mixed Live/Work/Retail TOD Types

iii. **Mixed Use Center:** 16 dwelling units per acre and 0.5 non-residential floor-

to-area ratio target

iv. **Neighborhood Center:** 8 dwelling units per acre and 0.35 non-residential

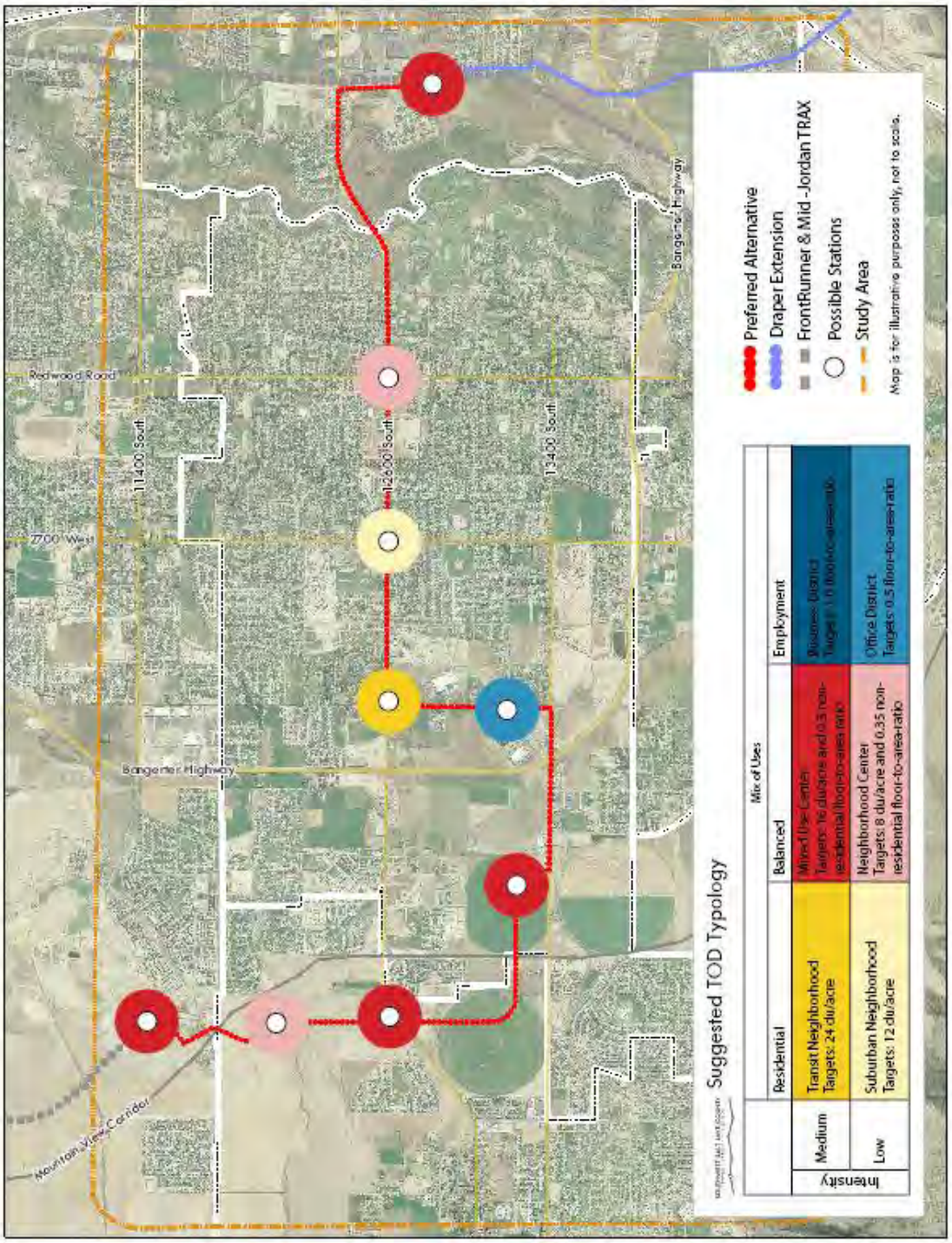
floor-to-area ratio target

Primarily Work/Retail TOD Types

v. **Business District:** 1.0 floor-to-area-ratio target

vi. **Office District**: 0.5 floor-to-area ratio target

SUGGESTED TOD TYPOLOGY MAP: The following TOD typology map suggests an initial way of



conceptualizing the character of potential station areas in Southwest Salt Lake County.

3. DEVELOP YOUR PLANNING APPROACH FOR EACH STATION TYPE

Overlay District

Overlay zoning is a regulatory tool that creates a special zoning district, placed over an existing base zone(s), which identifies special provisions in addition to, or as a modification to, those in the underlying base zone. The overlay district can share common boundaries with the base zone or cut across base zone boundaries. An overlay is best used when most of the regulatory content of the underlying base zone(s) is still valid. For example, the underlying zoning may be appropriate with regard to permitted and conditional uses, but fail to provide pedestrian-oriented site design standards and transit-appropriate intensity and density.

Excerpt from Massachusetts Government Model TOD Overlay, MA

2. Building Facades.

a. All buildings must provide a main entrance on the façade of the building facing the transit station or streets leading to the transit station.

b. The main entrance of any building shall face the street. The main entrance shall not be set back more than five feet from the front property line, unless a public seating area or plaza is provided in front of the building.

c. Facades over fifty feet in length shall be divided into shorter segments by means of façade modulation,

District

Utilize a new district if you need to explore changes to the majority of regulatory content of the underlying base zoning. A district approach is also useful if you plan to utilize the prospective district in more than one location. If your long range planning suggests that you will only plan for one-to-two high capacity station areas, then a small area plan approach may be more appropriate (there are other advantages and disadvantages to small area planning discussed below).

Small Area Plan

A small area plan provides you with the ability to custom fit the planning of a station area to the particular characteristics of the site such as the adjacent land uses and the character of the streets. A small area plan can also be the basis for a development agreement with one or more landowner. It can address the appropriate placement or siting criteria for future parks and trails, the layout of streets (or guidelines for such), and tie land uses and densities to street character or to particular areas within the broader station. As such, a small area plan can lead to a more integrated, better functioning community and help the city avoid a station area that is simply a collection of unrelated developments.

"Discouraged" office development siting from the Hunter Town Center Small Area Plan

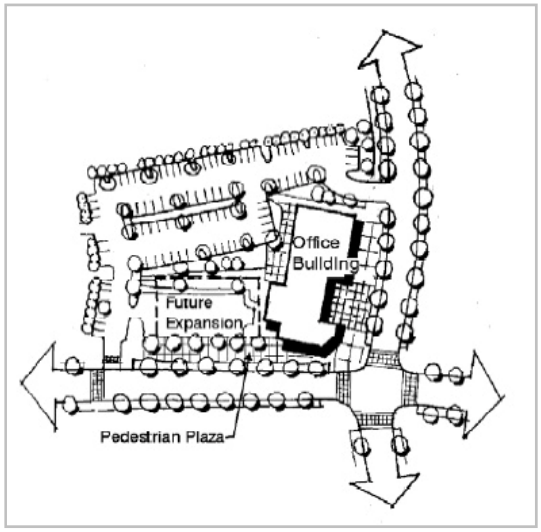
The downside of small area planning is that it can be a greater initial timeframe and financial effort in planning and require a greater level of effort in long-term land use administration.

Here are suggested Elements of a small area plan.

1. Land use: what is the land use vision for the area? What is the appropriate placement for various land uses and intensity/ efficiency levels?

2. Intensity: what scale of buildings are appropriate?

3. Street types: what is the character of the streets? A small area plan can specify the street type of each street in the station area. A street types is a function of the classification and cross section of the street, the planned adjacent land use, and the adjacent urban design approach (#4). Thus a collector street might be a 'Main Street,' lined with pedestrian oriented retail, or a 'Residential Boulevard,' lined with townhouses or live/work buildings.



4. Urban form (built environment): how should buildings be sited, what bulk and form requirements

and restrictions will be set, how will the façade interact with pedestrians?

5. **Open space:** what are the appropriate general locations for various types of plazas and parks?

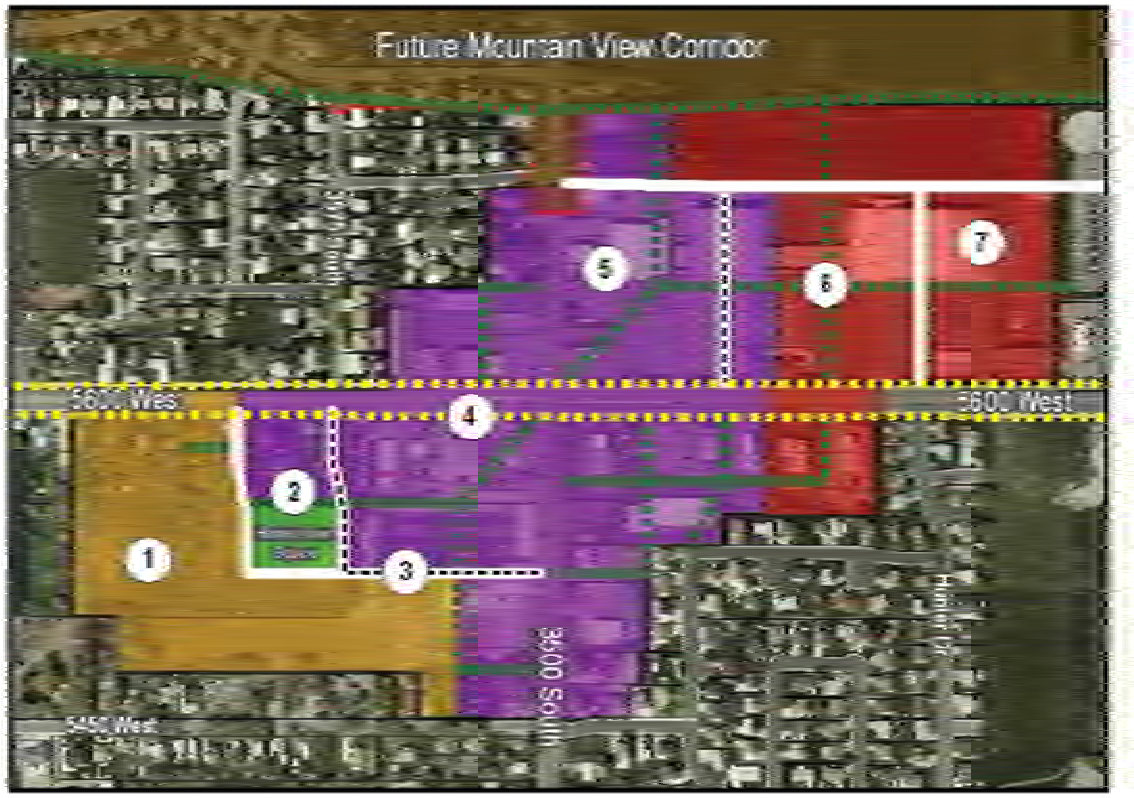
"Preferred" office development siting from the Hunter Town Center Small Area Plan

6. **Access:**
    a. Pedestrian routes and considerations
    b. Bicycling routes and considerations
    c. Transit facility design details (if appropriate)
    d. Street locations or connectivity standards (such as maximum block sizes)
7. **Parking:**
    a. What are appropriate parking requirements and alternative provisions (such as shared parking, in-lieu fees, or credits)

The Hunter Town Center Plan, West Valley City, Utah

"This plan will establish a long term vision from which to construct a new land use ordinance for the Hunter Town Center area… West Valley City will seek an ordinance that will establish design criteria and land uses that will encourage redevelopment and facilitate a transition to higher densities, a greater mix of uses, and other transit-oriented characteristics when the market and the community are ready." **Hunter Town Center Small Area Plan, p. 1**

http://www.wvc-ut.gov/index.aspx?NID=728



The Hunter Town Center small area plan map specifies the location of land use subdistricts, future roads, pedestrian pathways, and the location of a public 'town square'.

4. DEVELOP PLANNING PRODUCTS (SUCH AS ZONING DISTRICTS) BEFORE DEVELOPMENT APPLICATIONS ARE ANTICIPATED.

For development of a new overlay zone or zoning district, develop the zoning language and adopt the language without application to the zoning map. This will enable you to implement map changes more efficiently.

For a small area plan, develop a list of small area plan elements and a workplan or RFP to be prepared before you undertake development of the small area plan.

Address regulatory obstacles to station area development while protecting public health, safety and general welfare.

a. Determine beforehand what design elements and amenities the community needs in order to embrace transit supportive development.

b. Refer to the Southwest TOD Checklist for suggestions on ways to make transit supportive development community-friendly, work well for pedestrians and bicyclists, while simultaneously maximizing potential transit trips.

c. Review draft regulatory products for obstacles

Examine your regulatory processes and standards from the perspective of a potential developer. Risk and time are two of the major factors considered by developers when contemplating the feasibility of a project. Will the developer see risk and uncertainly in the entitlement process? How likely is one set of densities or uses relative to another? How variable and lengthy is the land use review process. Many in the development community would trade certainty of use, intensity, and review timelines for better design and community amenity. Other factors to take into account include:

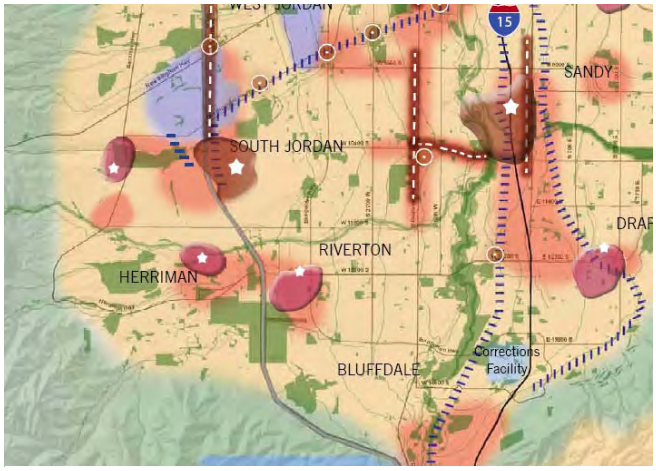
- Costs. Understand a potential developer's bottom line and seek to avoid zoning that is difficult or impossible to be reasonably profitable. See TOD Planning Considerations for more detail.
- Lock requirements into objective standards and avoid discretionary processes that lengthen the developer's approval timeframe and timing uncertainty.

5. TOD PLANNING CONSIDERATIONS:

The following are salient plans and considerations to reference as a city decides the path to take for potential station area(s):

a. **General Plan:** Context is important when planning for TOD. Cities should consider their overall city vision or general plan and how TOD fits with that vision. If the current general plan does not incorporate TOD, you may consider amending the general plan to support TOD locations or planning processes.

b. **Wasatch Choices 2040:** Wasatch Front Regional Council recently released updated Wasatch Choices 2040 approximate growth centers and planning targets, such as suggested dwelling units per acre and appropriate minimum non-residential floor-to-area goals. These targets and the Wasatch Choices 2040 map include town centers in the southwest portion of the county. The typologies included in this document reflect the center types specified in the Wasatch Choices 2040 map. Refer to the vision targets as you plan for TOD along the preferred alternative.



The southwest portion of Salt Lake County from the Wasatch Choices 2040 Vision Map.

c. **Land Use Market Assessments:** Consider long-term market demand for various land uses. Retail thrives when there is sufficient buying power in the nearby community. This is a function of housing units, employees, and traffic. In Salt Lake County there is significantly more land zoned for retail than the market can bear via buying power. A land use market assessment can compare existing and projected buying power with existing and projected supply to provide a city with a sense of the opportunity for more retail, or the appropriateness of exploring alternative land use arrangements.

> Retail market demand is the difference between the total amount of retail building space that spending by a trade area's households can support and the amount of retail building space already in the trade area. When the market demand is positive, the trade area can support more retail development without generating long-term vacancies. When the market demand is negative, the trade area must either attract

d. **Housing Needs:** Future housing demand is forecast to change from current patterns as a large percentage of county householders will reach retirement. Downsizing householders will generally seek to obtain downsized properties while simultaneously placing a significant amount of large-lot housing products on the market. TOD is an effective way to capture some of the demand for downsizing households while providing generally less costly choices for the workforce. In the coming years WFRC and the University of Utah will be working with cities to further explore housing market considerations and how to best anticipate changes via pro-active planning.

e. **Consider Financial Feasibility:** An understanding of the approximate financial feasibility of potential developments based on potential regulations can help a city avoid planning and zoning requirements that are difficult for a developer to pencil. The overall goal for a city is to ensure quality of place for the community, but if the vision is difficult for the private sector to build, the net result will be either vacant land or something other than the vision for the station area.

   i. **Real FAR analysis**

   Tools are available from WFRC to help cities calculate the potential floor-to-area ratios (FAR) of regulations. This analysis is not as simple as sometimes assumed; parking requirements and configurations can have a dramatic effect on buildable land area of a site which impacts FAR. Understanding FAR helps a city approximate ridership support various regulations and helps provide information for generalized development pro-forma calculations.

   ii. **Pro-Forma analysis**

   A pro-forma based GIS analysis will be made available through WFRC in 2011 to help cities understand the approximate financial feasibility of existing or potential planning requirements. An interim pro-forma spreadsheet is available through WFRC.

6. SOUTHWEST TOD CHECKLIST

The following checklist specifies physical elements that contribute to the overall attractiveness and livability of a transit oriented development. These elements help make TOD an asset to the community, help ensure a pleasant and safe pedestrian environment, and helps enable residents, employees and visitors to easily access public transportation. Because specific station areas vary, this checklist is intended as a guideline when evaluating a TOD ordinance or plan.

LAND-USE	Y	N	N/A
1. Are "transit-friendly" land uses permitted outright, not requiring special approval?			
2. Are higher densities allowed near transit? (See typology map)			
Example densities:			
a. Suburban Neighborhood: 12 du/ acre			
b. Transit Neighborhood: 18 du/acre			
c. Urban Neighborhood: 24 du/acre			
3. Are multiple compatible uses permitted within buildings near transit? (Vertical mixed use)			
Examples include (but are not limited to):			
a. Live/work spaces			
b. Residential above retail			
c. Office above retail			
4. Are ridership generating uses concentrated within ¼ mile of transit?			
Ridership generating uses include (but are not limited to):			
a. Office			
b. Higher density residential			
c. Unique or destination retail			
5. Are auto-oriented uses discouraged or prohibited within ¼ mile of transit?			

SITE DESIGN	Y	N	N/A
1. Are buildings and primary entrances sited to be easily accessible from the street?			
2. Do the designs of areas and buildings allow direct pedestrian movements between transit, mixed land uses, and surrounding areas?			
3. Is transit access maximized via connected streets, small blocks, and/or pedestrian pathways?			
4. Is parking organized into blocks to allow for the intensification of densities over time?			
5. Is landscaping organized into public and semi-public gathering spaces rather than private landscaping buffers?			
6. Are the first floor uses along key pedestrian corridors "active" and pedestrian-oriented?			
7. Are first floor facades permeable?			
8. Are amenities (windows, awnings, lighting, etc) provided to help create a pedestrian environment along and between buildings?			
Pedestrian amenities include (but are not limited to):			
a. Windows			
b. Awnings			
c. Lighting			
d. Street furniture			
9. Are there sidewalks along the site frontage? Do they connect to sidewalks and streets on adjacent and nearby properties?			
10. Are there trees sheltering streets and sidewalks?			
11. Is there ample street furniture?			
12. Is the lighting pedestrian-scaled?			

STREETS AND PARKING	Y	N	N/A
1. Are parking requirements reduced in close proximity to transit, compared to the norm?			
Examples of how to reduce parking requirements include (but are not limited to):			
a. Shared parking			
b. Allow on-street parking			
c. In-lieu fees			
2. Is shared parking possible/encouraged?			
3. Is most of the parking located to the side or to the rear of the buildings?			
4. Is there ample, accessible, sheltered bicycle parking?			
5. Are street patterns based on a grid/interconnected system that simplifies access?			
6. Are pedestrian routes buffered from fast-moving traffic and expanses of parking?			
7. Are there convenient crosswalks to other uses on-and off-site?			
8. Are there safe crosswalks across busy streets (adequate crossing time, pedestrian refuges, etc)?			
9. Can residents and employees safely walk or bicycle to a store, post office, park, café or bank?			
10. Does the site's street pattern connect with streets in adjacent developments?			