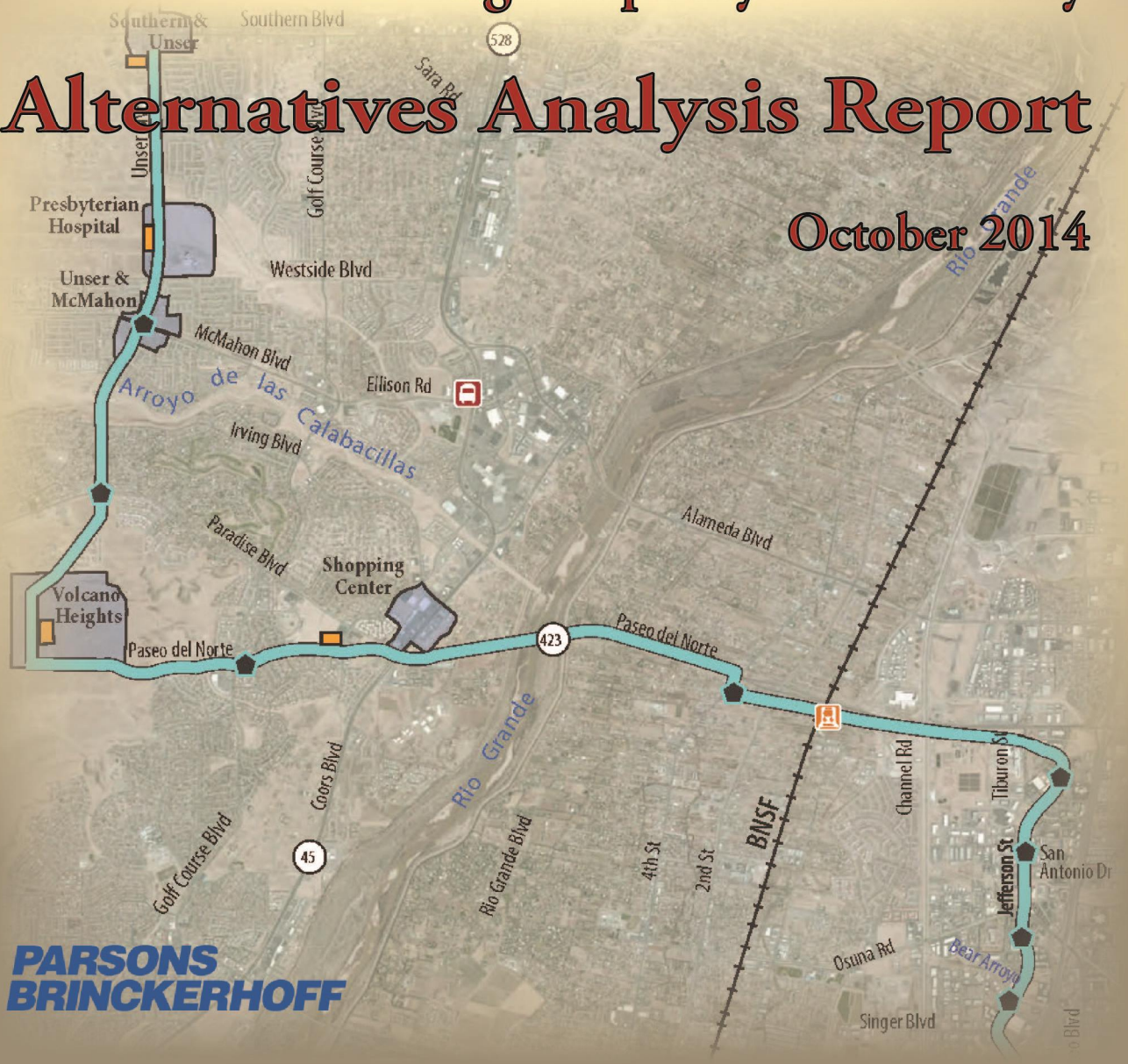
RIO METRO
REGIONAL TRANSIT DISTRICT

Paseo del Norte
High Capacity Transit Study

Alternatives Analysis Report

October 2014



PARSONS BRINCKERHOFF

Paseo del Norte High Capacity Transit Study (PDN HCTS)

ALTERNATIVES ANALYSIS REPORT

Submitted to the

Rio Metro Regional Transit District

Submitted by

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Acronyms and Abbreviations

AA	Alternatives Analysis
AMPA	Albuquerque Metropolitan Planning Area
BAT	Business access and transit
BRT	Bus rapid transit
DRM	Direct ridership models
FTA	Federal Transit Administration
GIS	Geographic information system
HCT	High-capacity transit
HCTS	High-Capacity Transit Study
I-25	Interstate 25 freeway
LPA	Locally Preferred Alternative
MRCOG	Mid-Region Council of Governments
MTP	Metropolitan Transportation Plan
NEPA	National Environmental Policy Act
NMDOT	New Mexico Department of Transportation
PDN	Paseo del Norte
O&M	Operating and maintenance
RMRTD	Rio Metro Regional Transit District
SCC	Standard Cost Categories
Section 4(f)	Section 4(f) of the U.S. Department of Transportation Act
TRAM	Transportation Accessibility Model
U.S.	United States
UNM	University of New Mexico

Executive Summary

Within the northerly portion of the Albuquerque metropolitan region, the Paseo del Norte corridor connects an area of predominately residential development west of the Rio Grande with employment, educational, and other opportunities east of the river. The resulting cross-river travel, especially for peak-period trips between home and work, creates serious traffic congestion. Travel conditions along the corridor are projected to deteriorate further as the metropolitan area grows. Peak-period, peak-direction traffic is projected to increase by more than 80 percent between 2008 and 2035.

Only three crossings of the Rio Grande serve the north Albuquerque region. Paseo del Norte is the major crossing and the one that could most effectively be expanded to increase capacity. While options to add single occupant automobile capacity within the Paseo del Norte Corridor are limited, alternatives such as Bus Rapid Transit (BRT) are being considered as a possible choice for travel in the corridor that can effectively supplement the available automobile capacity.

BRT as a capacity enhancement in the Paseo del Norte corridor

BRT is already a component in the regional metropolitan transportation plan. It is a proven transit mode capable of attracting riders who would otherwise use private automobiles. The successful implementation of BRT in the Paseo del Norte corridor will depend on how well the service is adapted to travel behavior in the area. The Northwest study area covers a broad subregion and is and will be highly dependent on the automobile for most travel into the foreseeable future. Enticing riders to use a new BRT service will require that access to the system be convenient, frequency be high, and cost and travel times be reasonable compared to the private automobile. Under these circumstances, BRT service will need to attract drivers through:

- Well-located park-and-ride lots
- Attractive and convenient station locations and environments that include convenient and safe pedestrian access to final destinations
- Effective integration with existing and proposed local and regional bus routes and Rail Runner service
- Competitive travel times to key destinations (e.g., UNM and CNM are a key destinations from the Northwest area)
- Delivered at an acceptable cost to the transit user

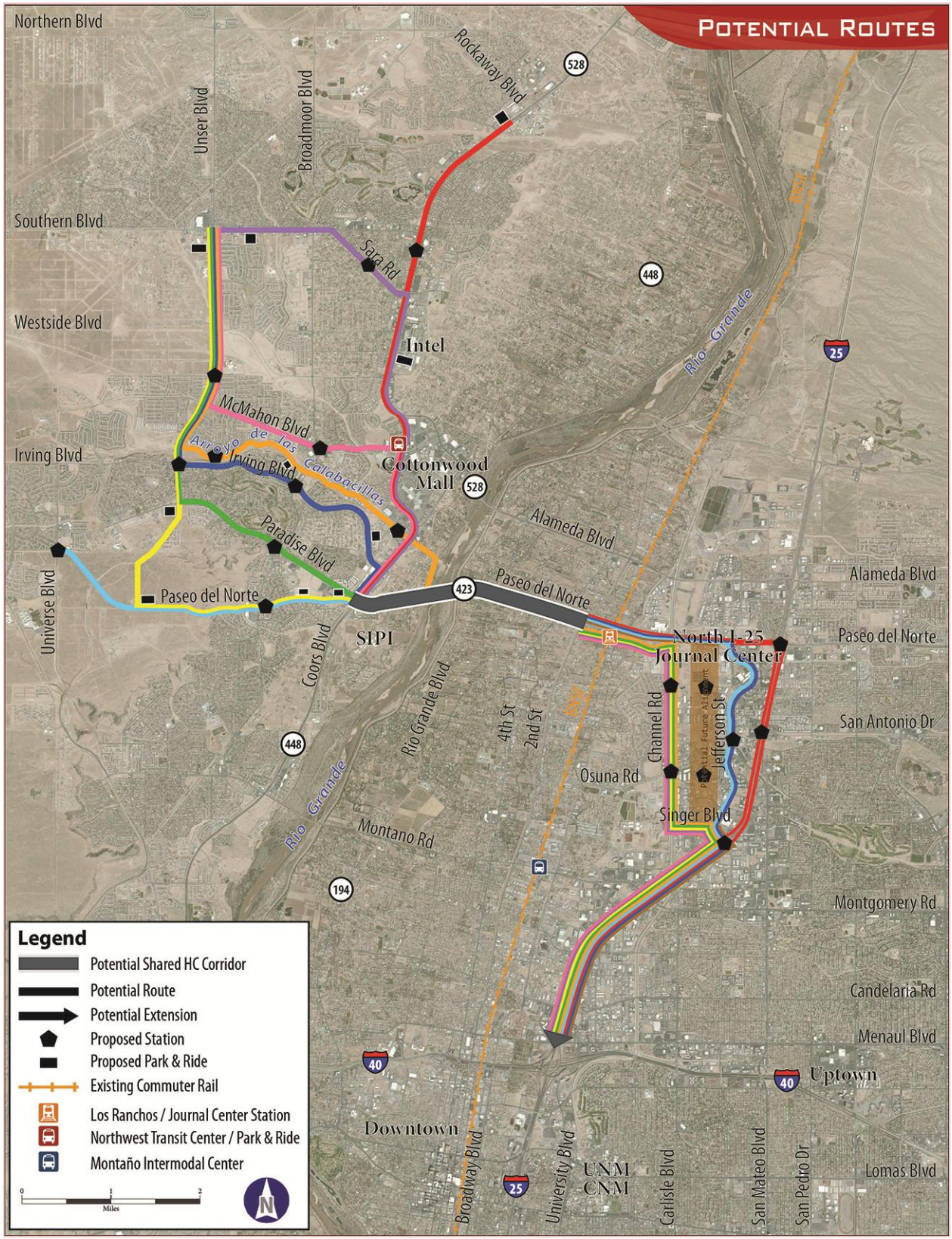
Alternatives considered

Various BRT route alternatives were evaluated within the corridor, as shown in Figure ES-1. Routings relied primarily on existing roadways, but also included other linear features such as the Calabacillas Arroyo and a possible new roadway corridor in the Journal Center. The criteria applied in the evaluation ranged from potential environmental effects and land use impacts to ridership forecasts and capital and operating costs. The public and an agency technical team were also asked to weigh in on the process to shape the manner in which the alternatives were defined and compared. These factors were used to reduce the number of alternatives and, upon refinement, recommend a Locally Preferred Alternative (LPA) for implementation.

Evaluation of alternatives

The evaluation of the screening-level alternatives compared the impacts and productivity of each route. The evaluation itself was conducted independently for three sections of the corridor: northwest, river crossing, and Journal Center. This approach was taken because the west and east sections of the routes were effectively independent of each other because they are all connected by a common river crossing segment. By selecting the best performing route in each section, the best combined route could be readily identified.

Figure ES-1. Screening-level (Long List) alternatives



Using a high-level assessment of quantitative and qualitative factors, Rio Metro, in consultation with a technical committee and based on stakeholder input, decided on the best long-term choice for the corridor.. Some comparison factors, such as environmental effects, had only a minor differentiating consequence on the selection. By contrast, the ability to effectively serve areas of potentially high travel demand in growth areas as well as help influence land use decisions to make more efficient use of available and proposed infrastructure, while minimizing impacts on existing traffic patterns, was a significant positive variable.

There were few environmental effects and they were similar for all options. The primary impacts were to endangered species in the Rio Grande crossing area common to all routes. Property impacts varied among the alternatives, but they were minor and were not significant enough among the route choices to affect the evaluation.

Ridership was forecast for a transit corridor extending from the northwest to UNM (UNM is a major attraction for the Northwest area as it is for the entire region) while the emphasis on the implementation details covered the northwest to Journal Center segment. Without the longer connection to UNM, ridership is substantially lower for all routes. The UNM connection also has the potential to reach UNM more quickly than other transit options while providing access to the underserved east-west demand across the Rio Grande. In 2035, ridership on the least traveled alternative route was estimated at about 6,000 per day, while the most traveled alternative route was near 7,000. Given the limits of travel forecasting, this is not a major difference, but it does provide an indication of future potential for patronage. All routes show ridership of between 2,300 and 3,000 in the opening year.

The Station Specific Land Use Analysis completed as part of this study indicates that the transportation and economic development benefits of an investment in BRT can be maximized by increasing density, improving the pedestrian environment, reducing parking requirements, improving roadway connectivity (grid network), and providing a range of incentives for development in the neighborhood of the station.

Capital costs of the final three alternatives ranged from $59 million to $77 million (not including escalation, vehicles and professional services), while annual operating costs ranged from $7.6 million to $15.6 million in 2035 (opening-day service operating costs were between $2 million and $3 million). The variation in costs among the alternatives is attributable to the unique characteristics of each route. The longer routes carried understandably higher costs for construction and operation, as did those that included opportunities for acquiring park-and-ride lots adjacent to the route. Along some routes, the introduction of BRT service would require removing or modifying existing travel lanes to avoid major impacts to adjacent property. This helped keep costs down but limited the functionality of the proposed service or detracted from current traffic operations. In others, the available right-of-way of the roadway lent itself readily to the accommodation of a new BRT guideway. Building a new guideway increases costs but offers a more independent operation that provides a higher level of service more likely to attract riders.

Recommended Locally Preferred Alternative

The recommended LPA resulting from the evaluation process takes advantage of wide rights-of-way along Unser Boulevard and Paseo del Norte to accommodate a BRT-dedicated guideway within the median. A median running guideway was selected because it affords the highest reliability of service and, because of its permanence, could help stimulate or strengthen adjacent land development that is compatible with transit. The guideway also provides for a grade-separated crossing of Coors Boulevard to avoid heavy congestion at the interchange and a new transit-only bridge adjacent to the existing Paseo del Norte crossing of the Rio Grande with the guideway extending as far east as 4th Street. The guideway provides an advantage over other routes in that it affords the service an opportunity to travel essentially independent of congestion for long stretches of its route. From 4th Street eastward, where rights-of-way are at a premium, the LPA runs in side-running lanes or mixed flow and, where appropriate, in queue jumps at intersections designed to provide business and residential access.

While the LPA is not the least costly option, it provides the best long-term growth potential, has moderate impacts, and was favored by the public and the project Technical Team.

The routing for the recommended LPA, shown in Figure ES-2, is as follows:

- Unser Boulevard from Southern Boulevard to the Volcano Heights Transit Street
- Paseo del Norte from the Volcano Heights Transit Street to 4th Street along the north side of Paseo del Norte
- Over Paseo del Norte on 4th Street to El Pueblo Road
- El Pueblo Road to Jefferson Street
- Jefferson Street from El Pueblo Road to I-25

Continuing on to the UNM/CNM area, the route would utilize the I-25 frontage road to Menaul Boulevard and University Avenue to Central Avenue and the University of New Mexico. (The details of this segment were not analyzed beyond the ridership potential it contributes to the full route.)

Funding

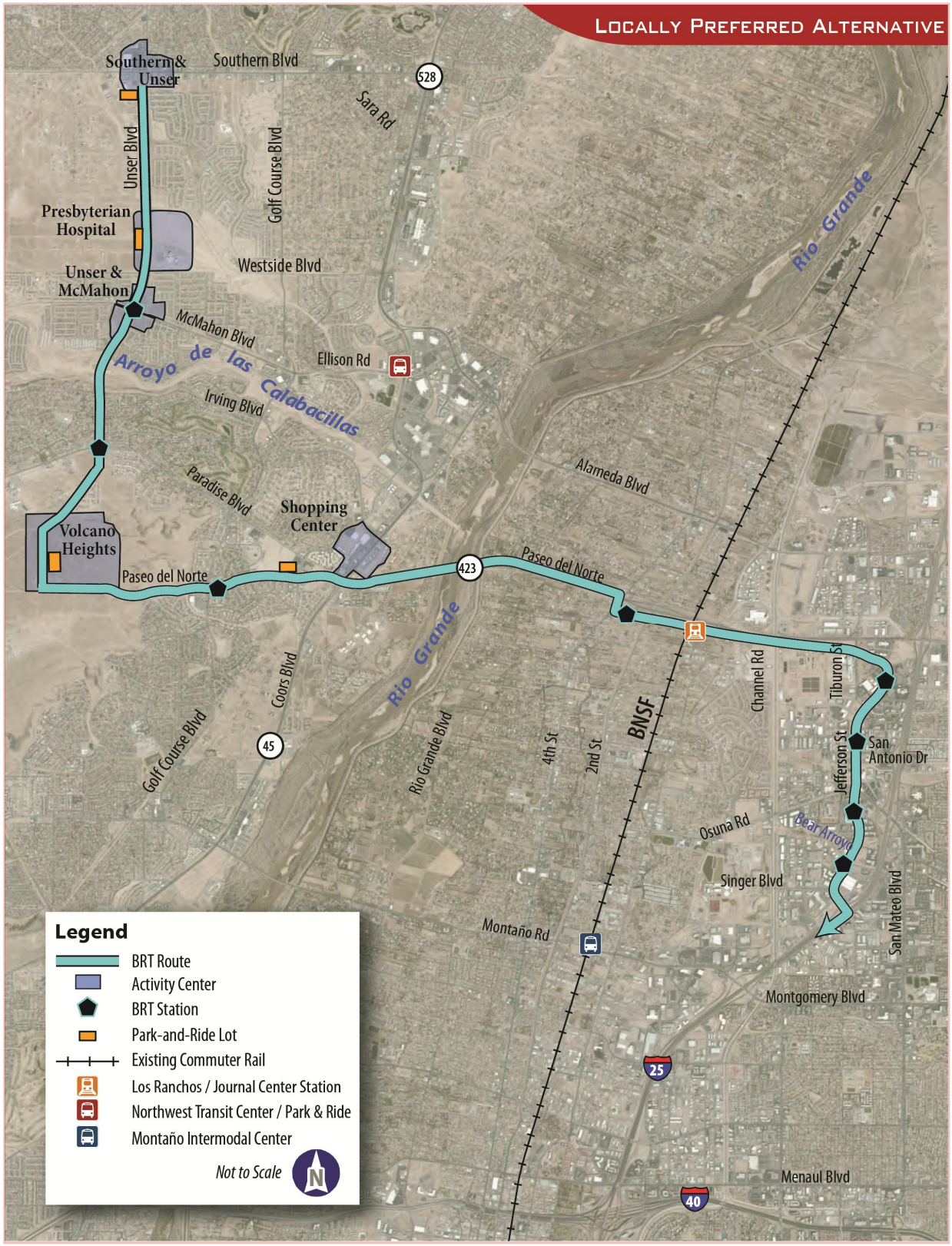
The implementation of BRT in the Paseo del Norte Corridor will depend on the availability of funding, primarily additional local funding. At present, the local funding source identified for project implementation is the allocation of federal support for BRT development in the Rio Metro budget. This source will need to be supplemented to build the guideway and acquire the needed vehicles to operate the proposed LPA BRT service effectively. While possible financing concepts are presented in this AA, they are illustrative only and all rely on new local revenue and assistance from the Federal Transit Administration (FTA). Additional local revenue commitments will improve the competitiveness of the project (and that of all Albuquerque region projects) for FTA funding grants.

Funding for the ongoing operations costs of the service will also need to be identified, though the ultimate sources will most likely be the RMRTD or ABQ RIDE. While early operations are substantially lower at under $3 million a year, BRT service requires robust operations and operation costs could possibly reach $8 million a year in 2035.

Other considerations

The work completed in this analysis has been designed to establish an alignment and identify the requirements to implement a feasible and effective BRT service that can offer a viable alternative to the automobile within a very congested corridor. However, there are key steps yet to be completed to obtain all legal and environmental clearances and to position the project to obtain federal funding. Among other considerations, the project will require addressing physical and policy elements that are integral features of the existing roadway. This includes recognizing local agreements regarding the original approvals associated with Paseo del Norte (i.e., Agreement and Settlement Paseo del Norte Crossing and Corridors, 1986), respecting the sensitive environments in various parts of the proposed LPA corridor (e.g., Rio Grande and Petroglyphs) and taking advantage of opportunities to position the service for success (i.e., working with the local communities and development interests to set aside transit streets and park-and-ride or station locations). This will require close coordination and issue resolution with local stakeholders, residents and business interests, and commitment to a design that can effectively address sensitive service and environmental issues. Agencies and the public will be afforded substantial participation in the project as it moves into more detailed phases of development.

Figure ES-2. Recommended Locally Preferred Alternative



1 Introduction/Background

The Paseo del Norte High-Capacity Transit Study (HCTS) evaluates the opportunities for implementing specialized, high-quality transit service in the main northerly east–west corridor in the Albuquerque region between Northwest Albuquerque/Southern Sandoval County and the Journal Center. The limited options for expanding single-occupant capacity in the corridor suggest an alternative mode, such as high-capacity transit (HCT), is an appropriate option to improve travel in the corridor. Such a system can help expand travel capacity and offer benefits to the traveling public with limited infrastructure improvements and a comparatively low investment. This Alternatives Analysis (AA) considers the possible choices to offer transit as a competitive alternative within the Paseo del Norte Corridor and selects a Locally Preferred Alternative (LPA).

1.1 Project context and study area definition

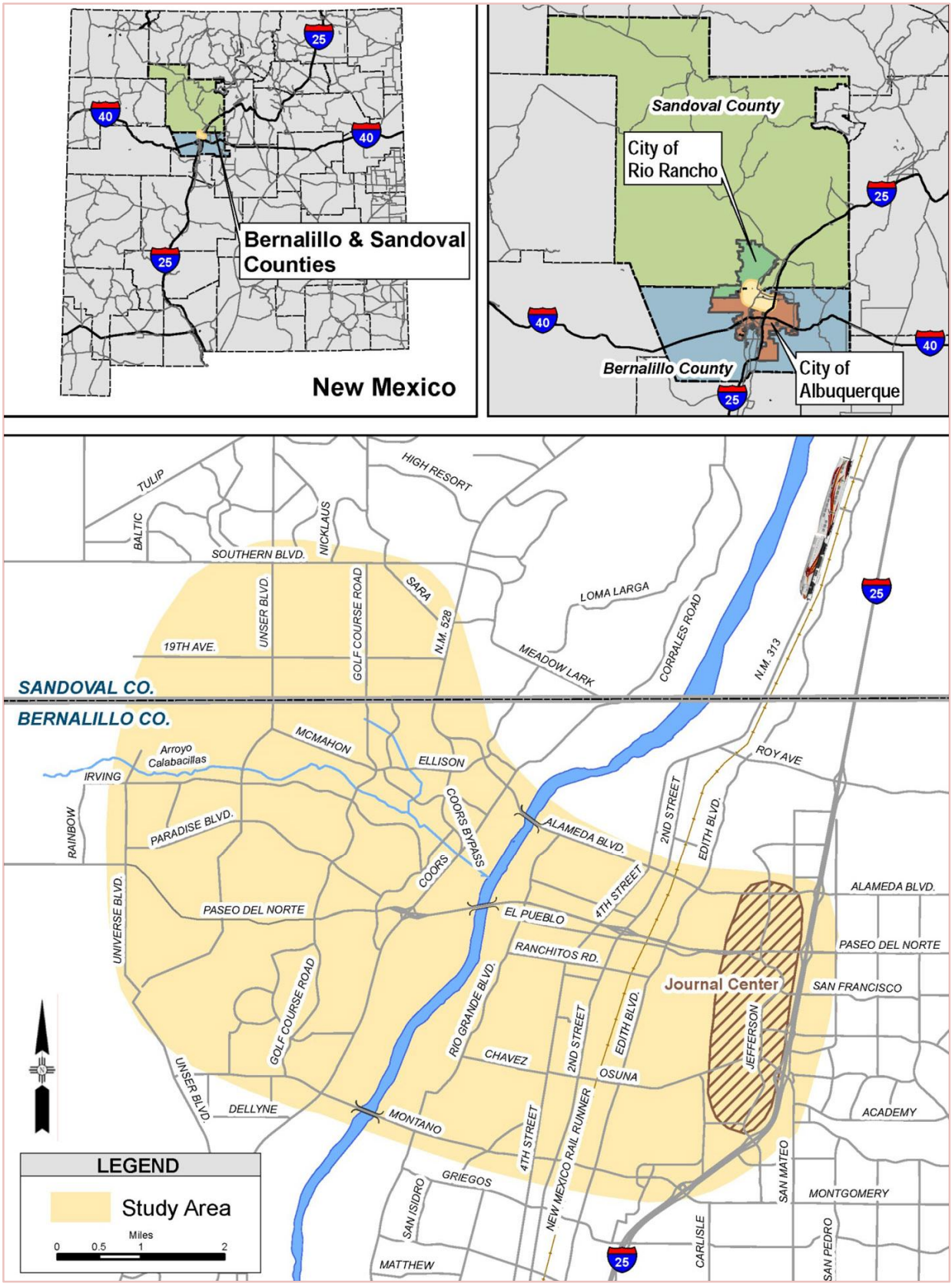
The geographic coverage of the Paseo del Norte HCTS is illustrated in Figure 1-1. The study area includes Northwest Albuquerque and Southern Sandoval County eastward to the I-25 corridor. The study area is centered along Paseo del Norte—an east–west limited access principal arterial highway that spans the northern portion of the Albuquerque Metropolitan Planning Area (AMPA). This route is the highest volume non-interstate facility within the Albuquerque region. It is also the primary thoroughfare that connects outlying residential communities to the Journal Center, a large employment district along North I-25. The Journal Center is home to 38,000 jobs and is the City's largest employment center in both geographic size and number of employees. The imbalance between the labor force to the west of the Rio Grande and jobs to the east of the Rio Grande is what defines the primary transportation issue in the Paseo del Norte Corridor.

1.2 Reasons for travel in the corridor

As in any community, the demand for travel revolves around a need to get to work, visit friends and relatives, shop, go to school, or seek entertainment or recreation opportunities. In Northwest Albuquerque, travel to and from employment during weekday peak periods is one of the primary drivers of transportation demand. Although other needs are important, they tend to be less time-dependent and have the flexibility to use the transportation system at times of day and along routes that are less constrained by capacity. Within the Northwest area, the Cottonwood Mall area provides one of the few employment opportunities. This major retail center serves not only the Northwest, but Rio Rancho and much of the metropolitan region. Intel, in southern Rio Rancho, is one of the largest employers in the region and draws employees from the entire region, not just from the Northwest.

Other pockets of employment are beginning to emerge in the Northwest, such as health care and government centers, at key locations. However, those will be insufficient in the foreseeable future to offset the anticipated demand for jobs by residents in the Northwest.

Figure 1-1. General coverage for the Paseo del Norte High-Capacity Transit Study



2 Purpose and Need

2.1 Purpose statement

The purpose of the proposed improvements is to provide enhanced transportation capacity linking Northwest Albuquerque and Southern Sandoval County with activity centers in the AMPA. The proposed improvements would represent one of the initial efforts in the AMPA to implement an element of the HCT system identified in the 2035 Metropolitan Transportation Plan (MTP).

Because river crossing capacity is the foremost transportation deficiency within the AMPA, a major focus of the proposed improvements is on the Paseo del Norte corridor, which is the largest of only three river crossings within Albuquerque north of Interstate 40. Constructing new river crossings has been viewed unfavorably in the past for various reasons, including difficulty finding acceptable alignments without severe effects on existing homes and businesses or the river environment. In view of these circumstances, a logical next step is to evaluate the case for expansion of public transportation service and use, possibly with operational and limited widening of roads and bridges that serve the area. These improvements are documented in this AA report and have been planned using methods that are consistent with Federal Transit Administration (FTA) guidance.

The primary objectives for the AA were defined as follows:

- To expand transit service in the north Albuquerque area
  - Connect Northwest Albuquerque and Southern Sandoval County to other major activity centers in the city by means of premium transit service.
  - Provide a system consistent with the overall premium transit service plan for the AMPA.
  - Encourage transit ridership on PDN to relieve the Alameda Boulevard and Montaño Road congestion.
- To provide enhanced transportation capacity across the Rio Grande
  - Initial phase to provide enhanced capacity without building significant new structures.
  - Subsequent phases to implement improvements needed for sustainable premium transit service in the PDN corridor.
  - All phases to be consistent with applicable policies for the PDN corridor.
- To improve connectivity between housing and employment in the north Albuquerque
  - Link Northwest area with the Journal Center employment center, and ultimately the UNM area, via premium transit service.
  - Improve transportation choice for residents in Northwest Albuquerque and Southern Sandoval County.
  - Encourage Transit-Oriented Development (TOD) in PDN corridor and along other transportation corridors comprising the PDN HCTS to help manage future travel demand.
- To provide services and construct infrastructure cost-efficiently
  - Rely on existing facilities as much as possible.
  - Build new facilities that emphasize and foster transit usage.

2.2 Demonstration of need

The need for the project arises from the recognized extent and pace of development in Northwest Albuquerque and Southern Sandoval County and the extent to which that development is dependent upon access to the metropolitan area east of the Rio Grande. The need is demonstrated by the following:

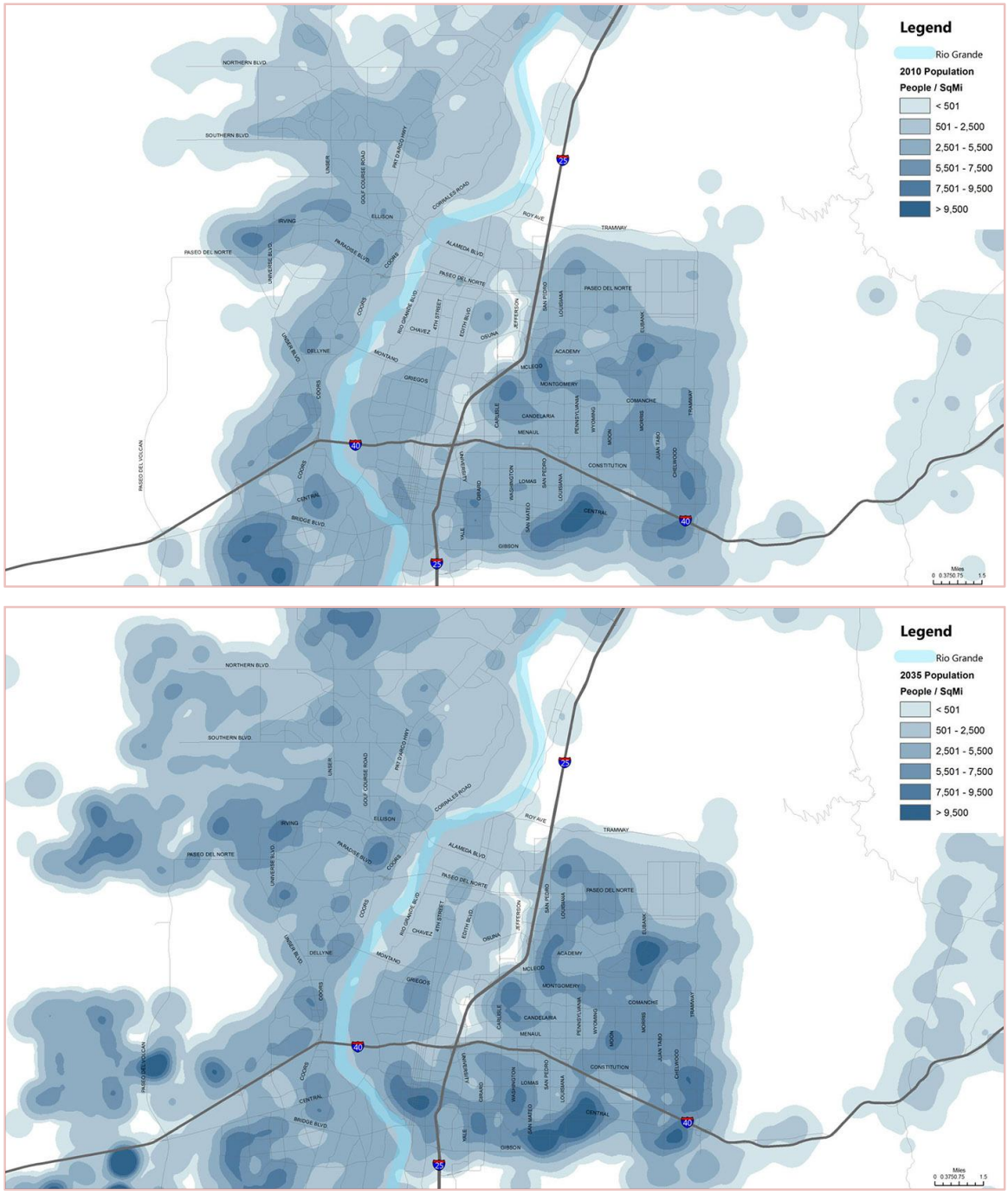
- There is a large and growing imbalance between workers west of the river and employment east of the river, with the result that many trips to and from work and other activities entail cross-river travel. The population west of the Rio Grande is projected to double between 2008 and 2035. By the same token, the ratio of jobs to west side labor force is now, and is projected to continue to be approximately twice as high east of the Rio Grande as it is on the Westside.
- Economic development emphasis will need to be on balancing the disparities in land uses. A new high capacity transit service could be a part of meeting that objective and strengthening the appeal of the Westside for new business.
- Use of the available river crossings already results in traffic congestion that is severe during peak periods, particularly within the Paseo del Norte, Alameda Boulevard, and Montaño Road corridors.
- Travel demand is projected to grow within the near future to levels far beyond available transportation capacity. Paseo del Norte peak-period peak-direction travel demand is projected to increase by more than 80 percent from 2008 to 2035. Travel delay and accident frequency are already undesirable and will grow worse with time, potentially weakening the economic health of the region.

2.2.1 Westside population growth and jobs/housing imbalance

Growth forecasts in the region show that the imbalance noted above will worsen over the years. Projected rapid and extensive development in the Northwest will achieve only a small increase in the number of jobs per capita. At the same time, the Journal Center and other destinations east of the Rio Grande will continue to be the primary attractions for employees from the Northwest. This means the challenges of travel today, particularly related to river crossings, will become much more pronounced in the future.

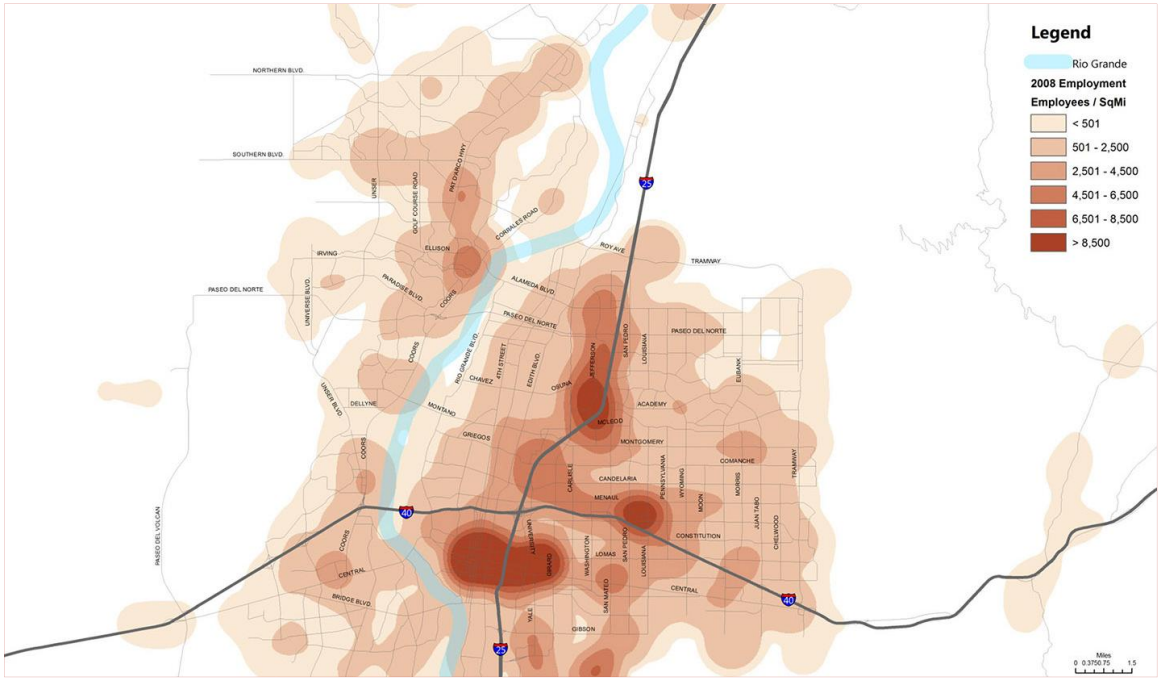
Regional planners and decision makers have recognized the transportation problems that stem from the unbalanced current trend of housing and employment center locations. Projections by the Mid-Region Council of Governments (MRCOG) indicate over 36,000 acres (56 square miles) of new development will occur on the metro Westside by the year 2035, adding 257,000 people to the regional population. In fact, almost half (46 percent) of all population growth projected for the four-county metro area is expected to occur on the metro Westside (Figure 2-1). In contrast, the overwhelming majority of jobs and major employment centers will continue to be located across the river valley in the eastern part of the metropolitan area (Figure 2-2). This imbalance in jobs and housing results in heavy west-to-east, home-to-work commute patterns that will increase substantially in the future.

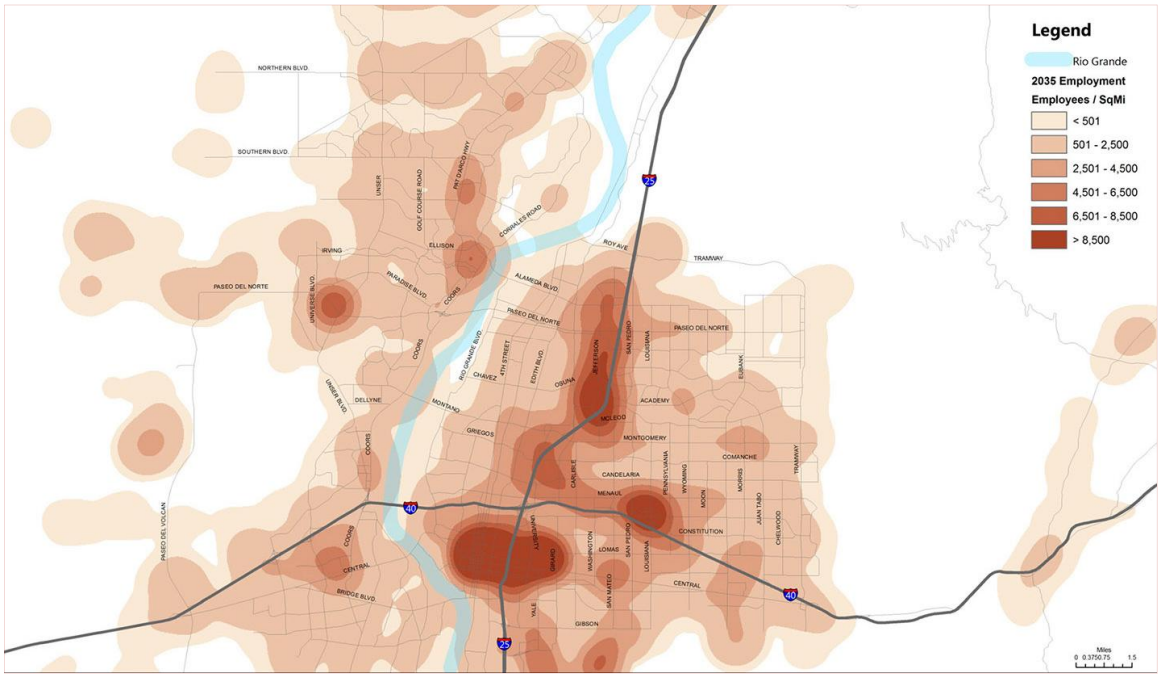
Figure 2-1. Population density in the Albuquerque region, 2010 and 2035



Source: MRCOG Land Use Model

Figure 2-2. Employment density in Albuquerque region, 2008 and 2035



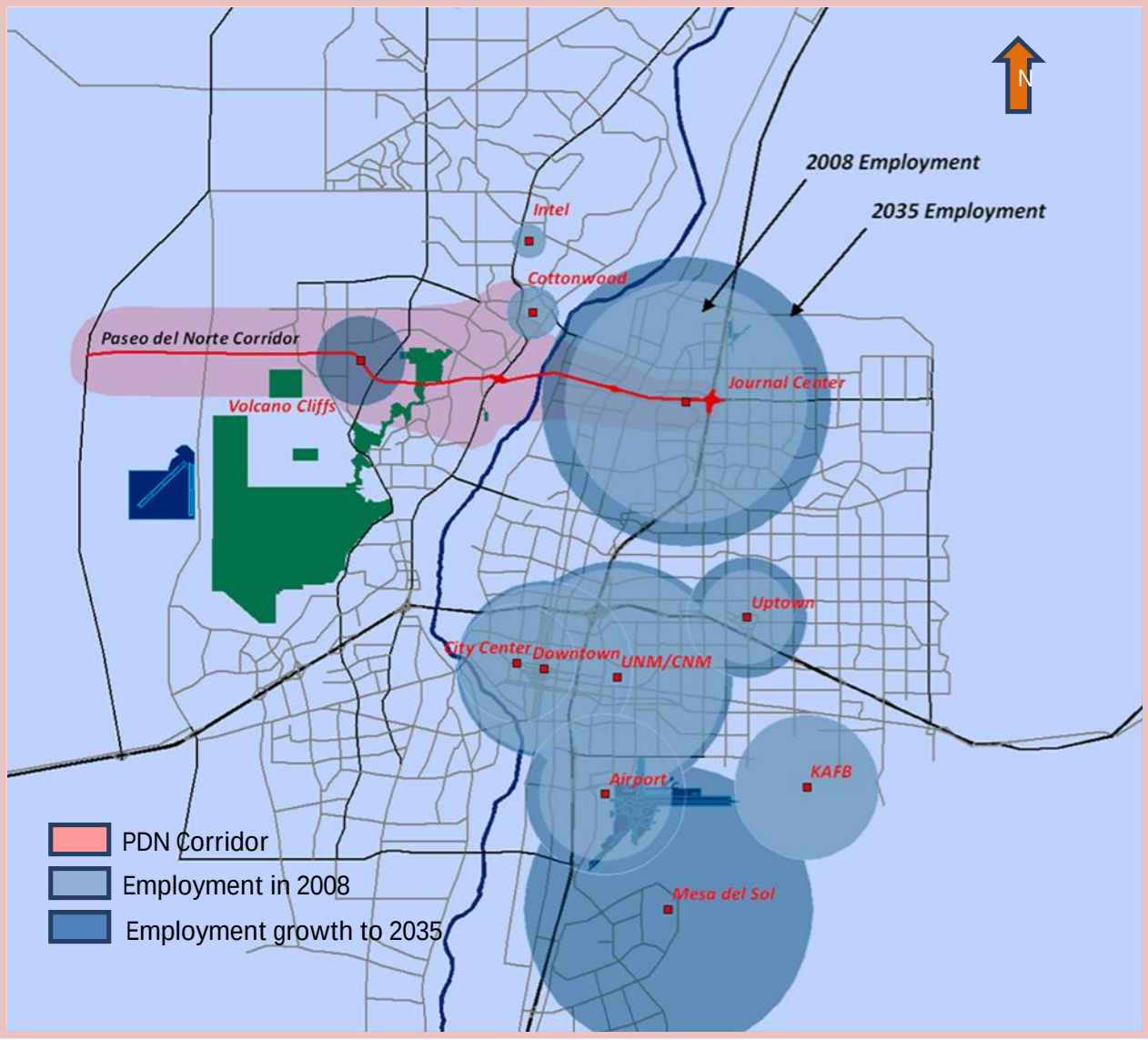


Source: MRCOG Model

Figure 2-3 shows that employment growth in major activity centers is generally on the east side of the river while most of the population growth is on the west side. This leads to the transportation challenges addressed in this study.

Efforts are currently underway to add more and larger employment centers to the Westside. However, significant shifts in the existing patterns and trends will take many years to realize. As a result, existing and projected land use patterns and jobs and housing distribution, combined with the limited number of river crossing roadways within the metro area, result in very high future travel demand on Paseo del Norte. The growth in travel demand cannot be accommodated without significant improvements.

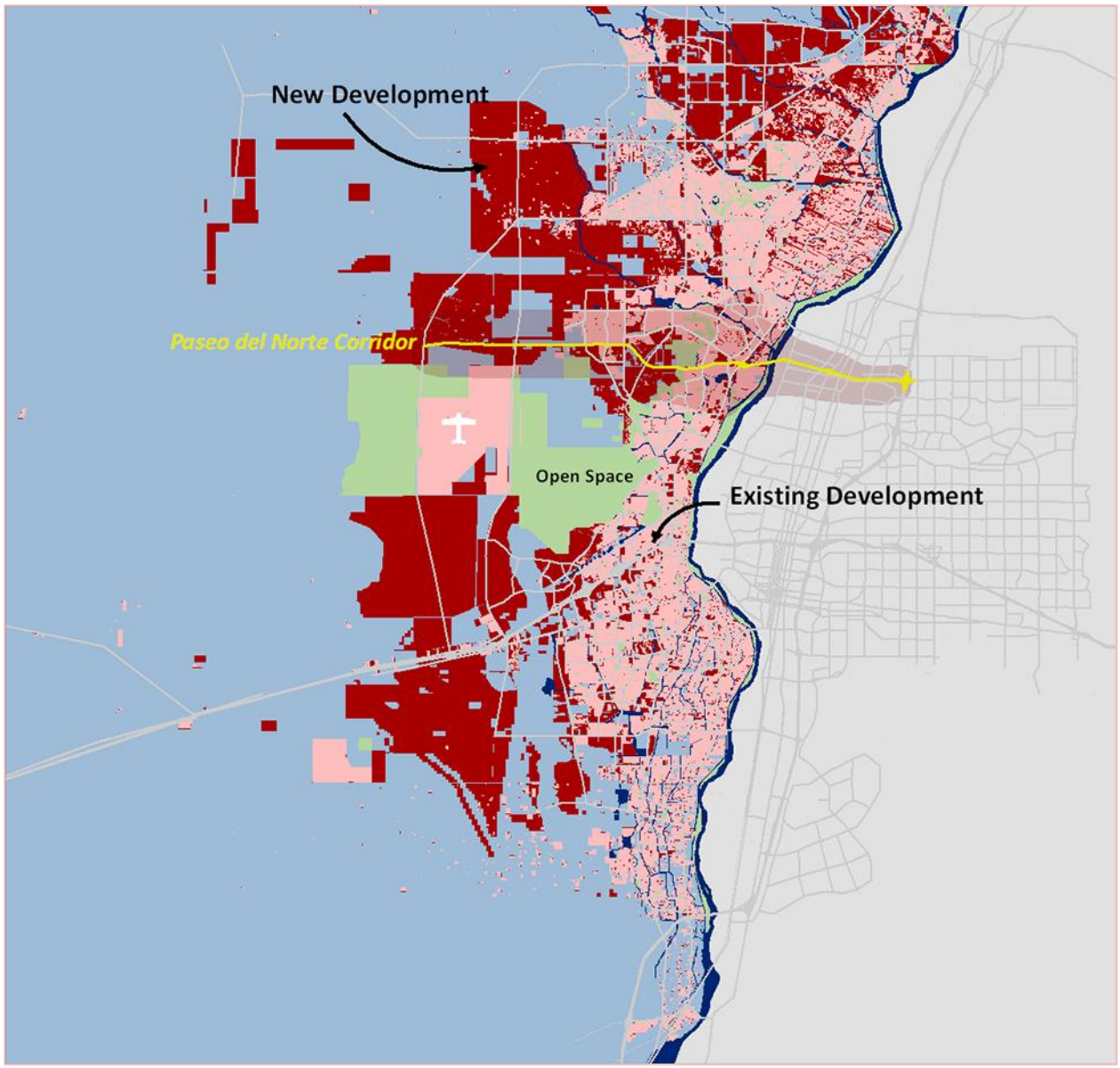
Figure 2-3. Major employment center locations within the Albuquerque metropolitan area, 2008 and 2035



2.2.2 Capacity constraints across the Rio Grande

Understanding the capacity limitations in the Paseo del Norte Corridor is essential to recognizing the opportunities transit offers to help improve travel in the corridor. The Rio Grande bridge crossings effectively "ration" east-west travel. River-crossing capacity is unlikely to be increased in the near future because of policy and environmental constraints; all proposals for transportation improvements may be reduced to accepting this condition. Even if additional crossings were to be built, they would perpetuate the challenge faced today by continuing to rely exclusively on the car. Adding capacity by leveraging public investment and offering a viable alternative to the auto offers the dual benefit of improved access and a more sustainable solution. Without a substantial increase in the number of jobs on the west side of the river to balance residential growth (see Figure 2-4), there is an urgent need to find alternative ways to move people across the river.

Figure 2-4. New development projected for the Albuquerque metropolitan area by year 2035



Area in red represents new growth areas; pink shading represents existing development.

2.2.3 River crossing deficiencies and increasing travel demand

Existing and projected land use patterns and jobs and housing distribution, combined with the limited number of river crossing roadways within the metro area, result in very high travel demand on Paseo del Norte. In 2012, Paseo del Norte carried a daily traffic volume of 79,100 and an evening westbound peak-hour volume of approximately 5,000 (Figure 2-5). Projections by MRCOG indicate that the demand on this route will continue to increase over the next 20 years to over 180,000 daily and 9,000 westbound evening peak-hour vehicle trips using the Paseo del Norte river bridge by year 2035.

Figure 2-5. Existing and future peak hour river crossing travel demand

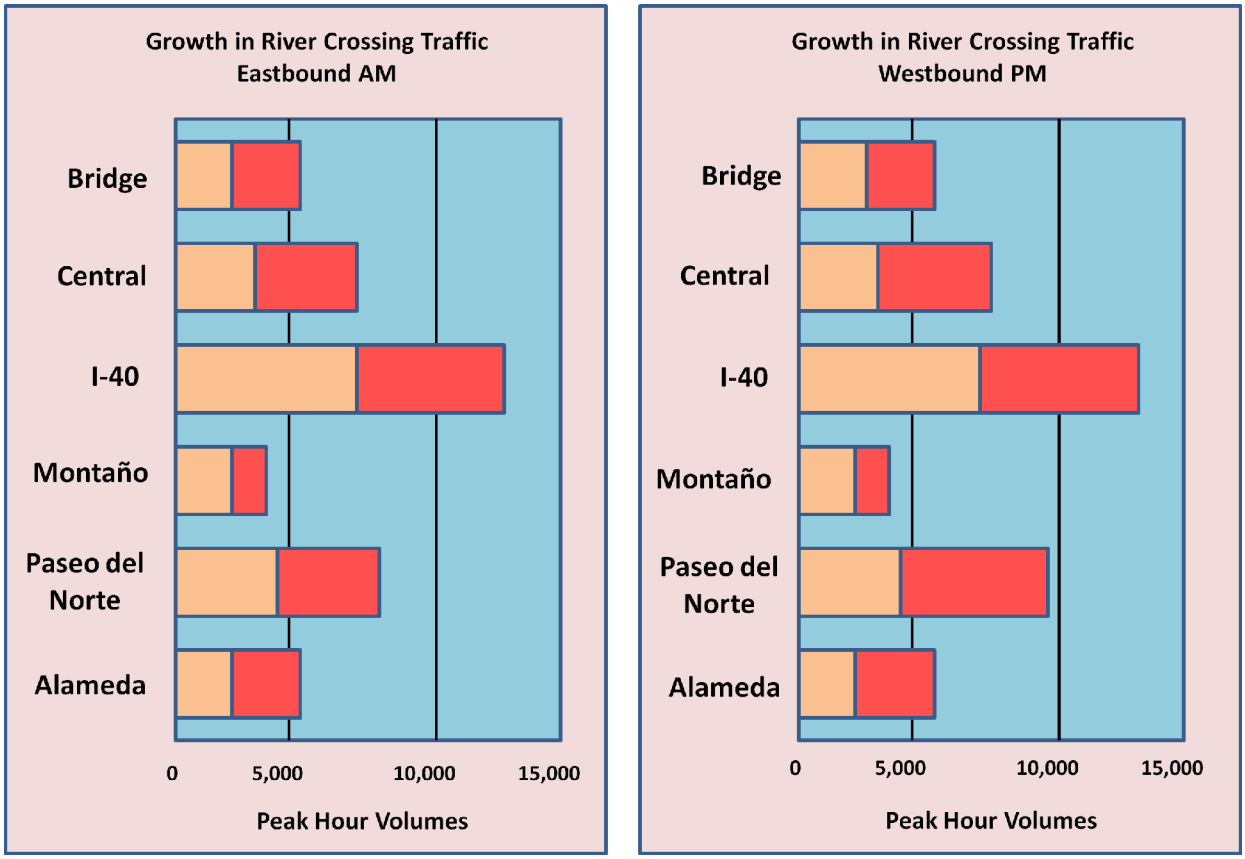


Figure 2-6 indicates current traffic congestion levels within the study area, demonstrating that there are already travel capacity problems. It is apparent that the projected growth in demand for travel will exceed what can be accommodated by means of single-occupant vehicles. In the case of the Paseo del Norte Corridor itself, the problems are located primarily at bottleneck locations—on and near Coors Boulevard west of the Rio Grande and in the Jefferson Street/I-25 area east of the river.

In addition, the travel speeds summarized in Table 2-1 are predicted for the three river crossings within the study area based on the MRCOG regional travel demand model. These low travel speeds are the product of the MRCOG travel demand model in response to extreme congestion. Whether or not the speeds materialize as shown, they represent a clear indication of the significance of the capacity deficiencies along the river crossing routes.

Figure 2-6. Observed congestion levels in the study area, 2010

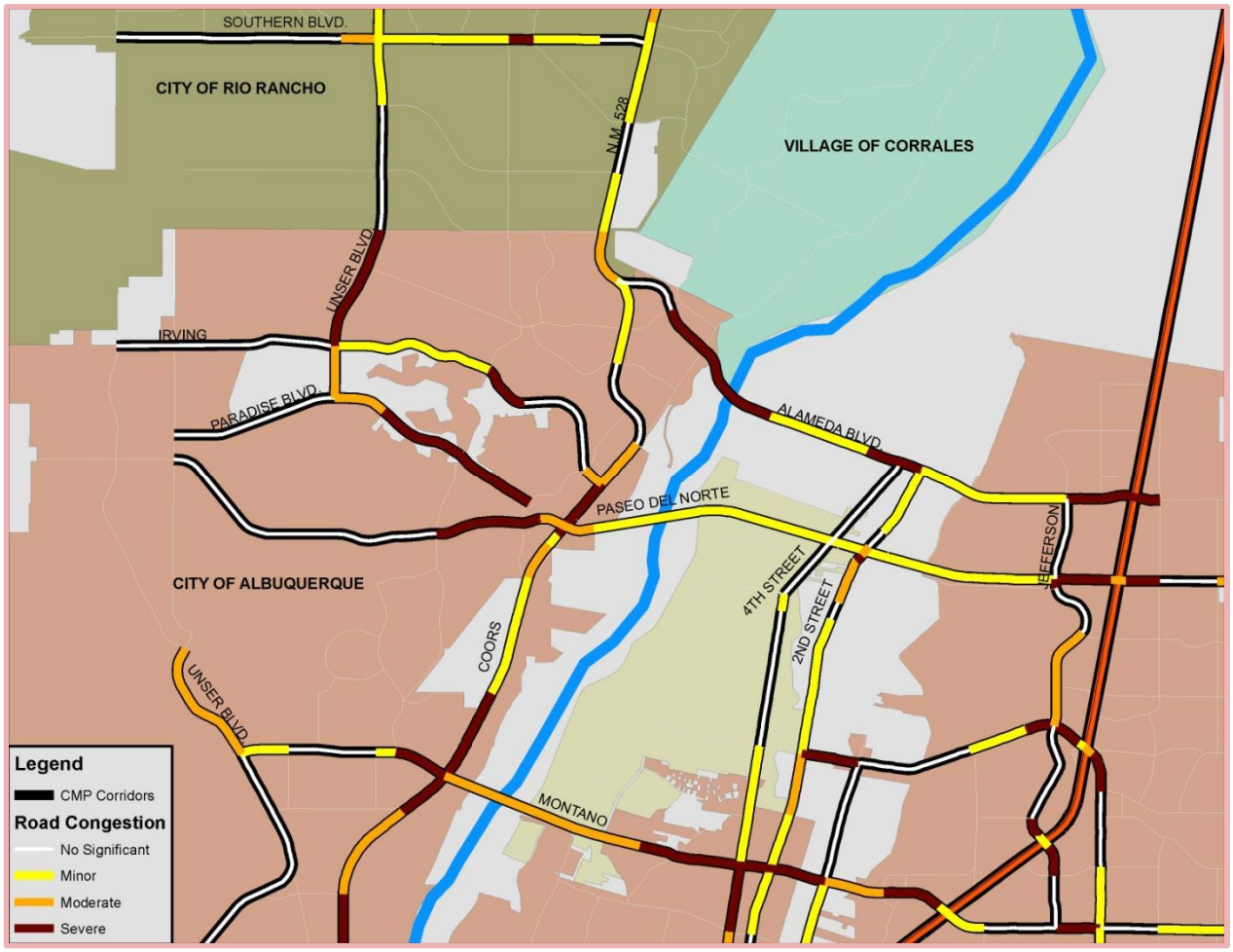


Table 2-1. Predicted travel speeds by corridor at river crossings (miles per hour)

River Crossing	Posted Speed (mph)	2025		2035	
		AM Eastbound	PM Westbound	AM Eastbound	PM Westbound
Montaño Road	35	4.2	4.4	2.7	2.5
Paseo del Norte	60	7.1	5.3	3.7	3.1
Alameda Boulevard	40	2	1.9	1.4	1.3

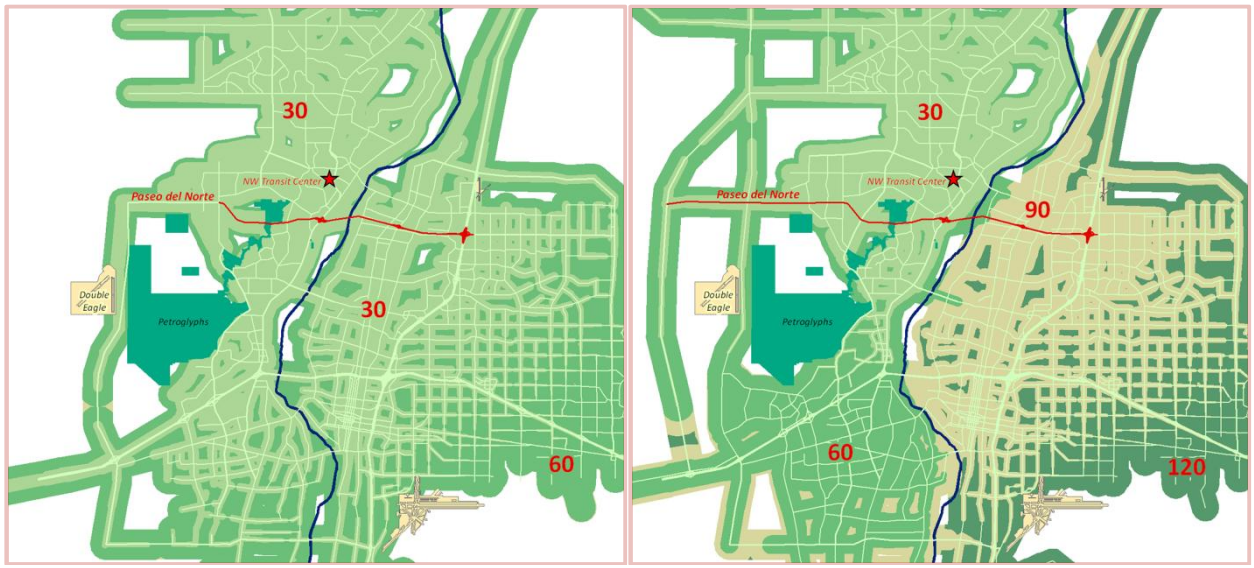
The study area contains some of the most congested facilities in the Albuquerque metro area: Paseo del Norte is #3 (of 30); Alameda Boulevard is #1; Coors Boulevard is #8; Jefferson Street is #9; and Montaño Road is #2. In other words, the alternative river crossings within the broader Paseo del Norte corridor—Alameda and Montaño—have even higher levels of congestion. Figure 2-6 highlights congestion levels across the project area based on 2010 observed conditions, which is the reason for the investigation of transit and premium transit alternatives to address regional and local mobility issues.

New transportation connections across the Rio Grande have proved difficult to develop due to environmental constraints and community concerns. This condition has resulted in only one new river crossing in the last 25 years even though population and traffic demand have increased substantially.

Trend line analysis indicates that the capacity of Paseo del Norte and all other river crossings within the metro area will be reached within the next 2 years and there will be a net shortfall of 75 to 80 percent by year 2035. Assuming no improvements are made, severe impacts to mobility will result and travel times will increase sharply. Travel time analysis indicates commute times from trips originating in the northwest portion of the metro area and destined to the Downtown and University of New Mexico (UNM) areas will almost triple. The current travel time of 30 minutes will increase to about 90 minutes by year 2035 (Figure 2-7).

Because the capacity deficiency affects all river crossings and policy restrictions placed on the Paseo del Norte Corridor to minimize impacts on adjacent properties make adding more general purpose lanes difficult, the unmet demand must be addressed by means other than adding single occupant vehicle capacity. A transit alternative such as BRT will require construction to be effective, but could provide substantial new capacity on Paseo del Norte and remain an acceptable implementation choice within the corridor.

Figure 2-7. Comparison of travel time contours, 2010 (left) and 2035 (right)



Color shades indicate travel time isobars from the Northwest Transit Center

2.3 Bus rapid transit

BRT is a bus-based mass transit system that can offer added capacity within constrained or congested corridors, such as Paseo del Norte. BRT systems have been introduced in various cities across the U.S., from dense urban centers in New York City to more typical urban-suburban areas such as Kansas City. BRT systems generally consist of specialized design, services, vehicles, systems, and infrastructure to improve system quality and remove the typical causes of bus delay. BRT aims to combine the capacity and speed of a light rail or metro system with the routing flexibility and potential lower infrastructure and vehicle cost of a bus system. An effective BRT route can significantly increase the number of people that can use the roadway, compared with reliance on predominantly single-occupant automobiles.

The MTP includes a proposed BRT network as a means to deliver improved bus service throughout the region. The MTP BRT map is shown on Figure 2-8. The Paseo del Norte Corridor is one of the identified routes to be improved and is shown as a green line on the MTP map. Similarly, Central Avenue and Coors Boulevard already boast BRT service from ABQ RIDE as two elements of the Rapid Ride network.

The successful implementation of BRT in the Paseo del Norte Corridor will depend on how well the service is adapted to travel behavior in the area. The Northwest area covers a broad area and is highly dependent on the automobile for most travel, as it will continue to be into the foreseeable future. If the traveling public is to be enticed to use a new BRT service, it must offer convenient access, high frequency of service, and competitive, comfortable, reliable travel times compared to driving, delivered at reasonable cost. Given these requirements, BRT service will need to attract drivers through well-located park-and-ride lots, attractive and convenient station locations and environments with comfortable and safe pedestrian linkages to final destinations, and competitive travel times to key activity centers. In keeping with this premise, a Paseo del Norte BRT system will include the following elements:

- Park-and-ride facilities along Unser Boulevard and Paseo del Norte (to encourage drivers to leave cars in a safe environment in favor of bus service through congested areas).

A guideway alignment in the center of the road along Unser Boulevard and Paseo del Norte to avoid typical curb-side delays and provide for the most efficient and reliable operation. The busway would run along the northerly side of Paseo del Norte between Coors Boulevard and 4th Street where additional capacity is needed and in mixed flow with queue jumps along El Pueblo Road and Jefferson Street where rights-of-way are more limited. Sample cross-sections of BRT median and curbside configurations are shown on Figure 2-9 through Source: VTA Sustainability Policy 2007

- Figure 2-14. More detailed discussion of BRT design standards is covered in Appendix 1.
- High frequency service (to reduce wait times and encourage patronage).
- Stations with off-board fare collection throughout the corridor or an on-board fare collection device (to avoid boarding delay when having to pay the driver).
- Station platforms level with the bus floor (to reduce boarding and alighting delay caused by steps and to improve accessibility for disabled patrons).
- Bus priority at intersections, such as those along Jefferson Street, where traffic signal delay could seriously impact bus operating schedules.

Other than the construction of the guideway element, most of these features can be accommodated readily in the corridor at modest investment and with high potential for effective service despite the anticipated congestion in the corridor.

Figure 2-8. 2035 MTP BRT system

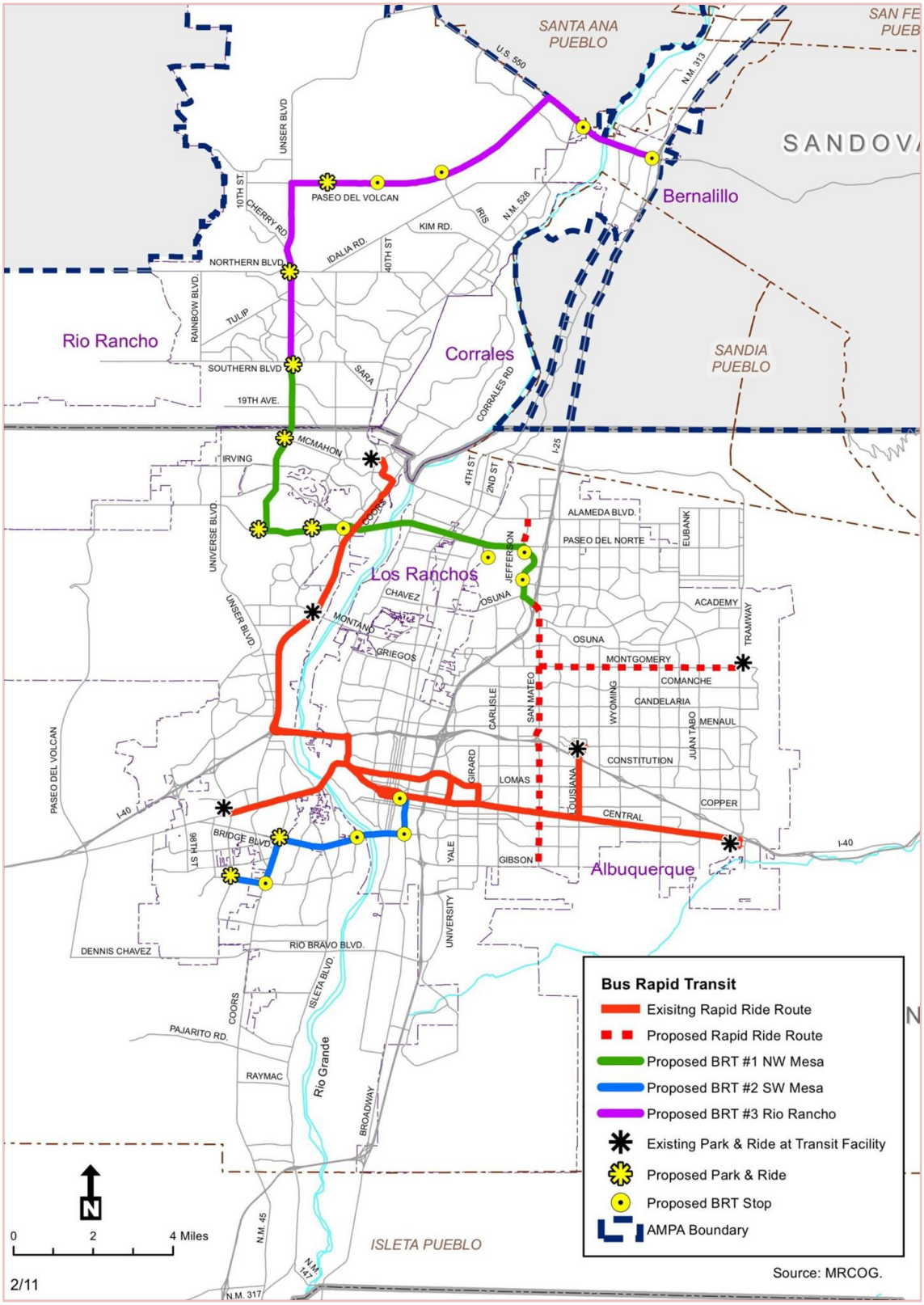
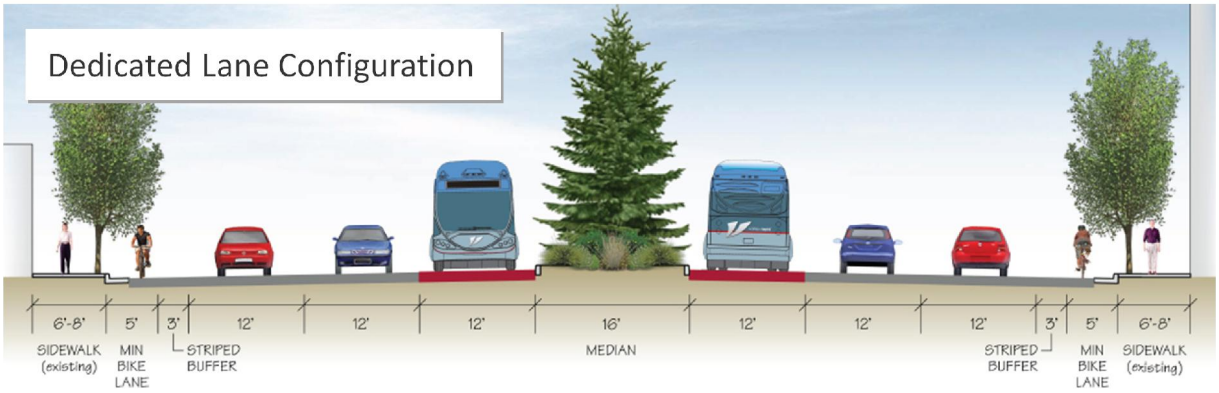
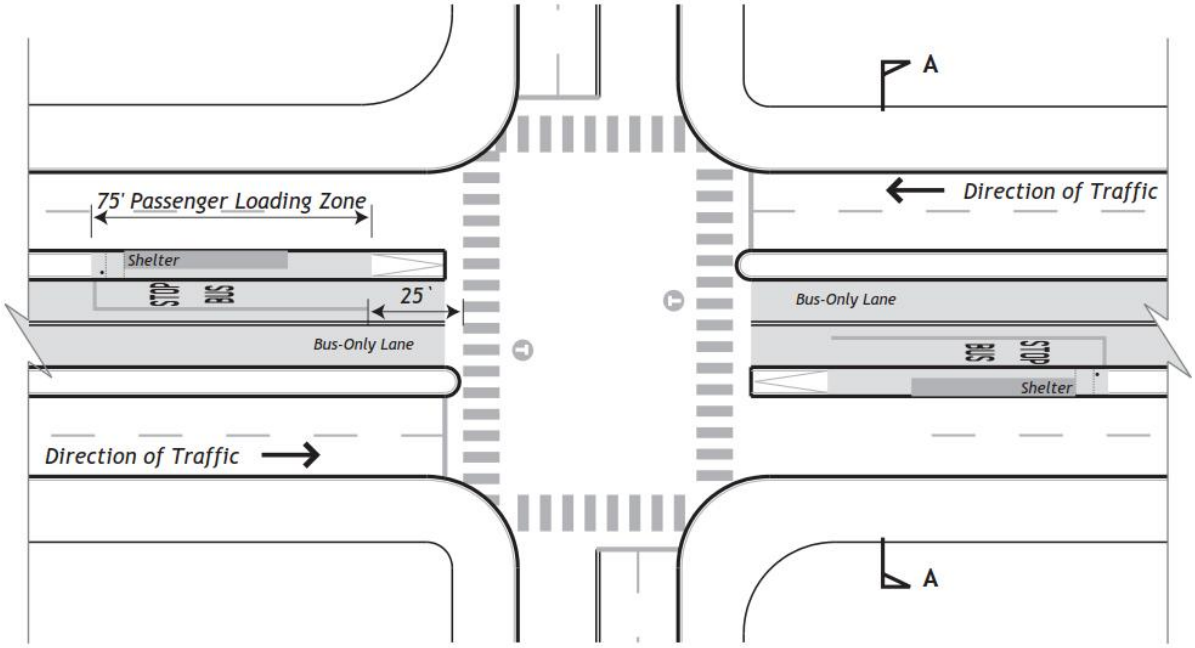


Figure 2-9. Sample BRT center guideway configuration (Paseo del Norte/Unser Boulevard)

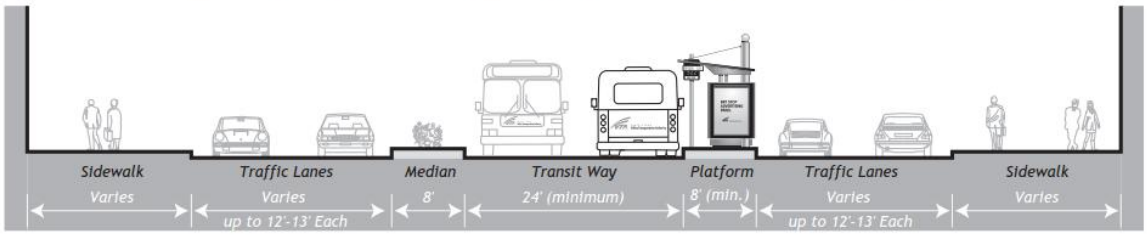


Source: VTA 2012

Figure 2-10. Sample center guideway station configuration (Paseo del Norte/Unser Blvd)



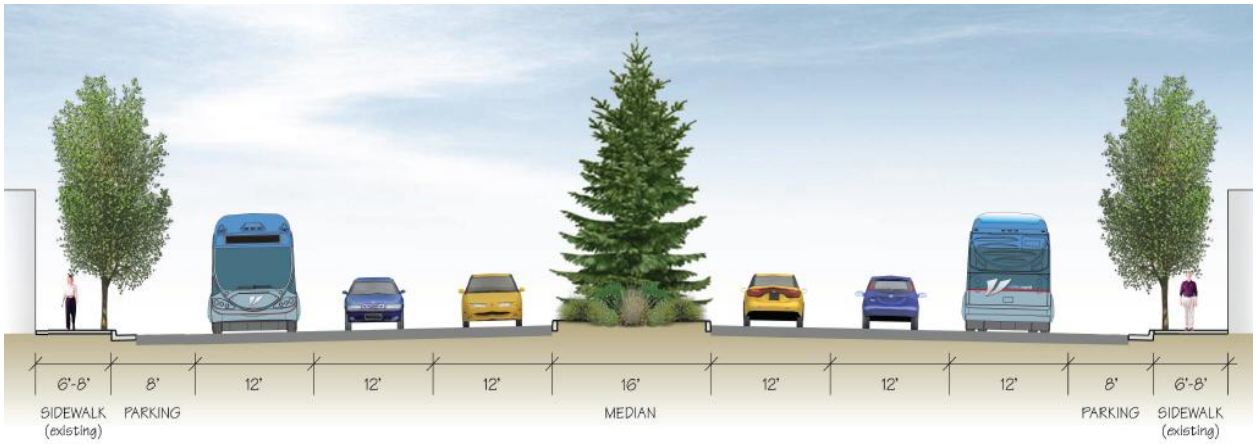
Notes:
1.) For the layout and details of the passenger loading zone, refer to Figure X.
2.) A 75' loading zone is sufficient for a standard (40') or an articulated (60') bus.
3.) A 55' loading zone is sufficient for a standard (40') bus.
4.) A 120' loading zone is sufficient for serving two standard buses simultaneously.
5.) A 140' loading zone is sufficient for serving a standard and an articulated bus simultaneously.



Source: Bus Rapid Transit Design Guidelines—VTA Transit Sustainability Policy 2007

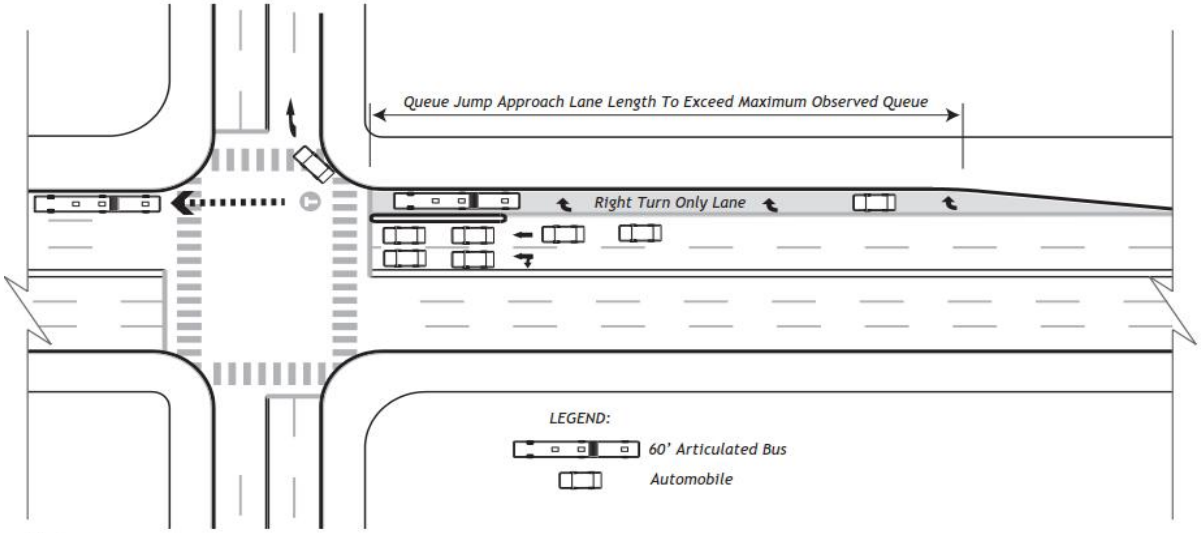
Figure 2-11. Far-side median station concept (Los Angeles Orange Line)

Figure 2-12. Sample BRT curbside guideway configuration (e.g., El Pueblo Rd/Jefferson St)



Source: VTA 2012

Figure 2-13. Right-turn only lane as queue jump with transit exemption



Notes:
1.) Only transit vehicles permitted to make straight-ahead movement out of the right-turn lane.
2.) Effectiveness will be improved if the queue jump lane is integrated with transit signal priority.

Source: VTA Sustainability Policy 2007

Figure 2-14. Curbside bus-only lane (Las Vegas MAX)

3 Methods and Approaches

3.1 Travel forecasting—direct ridership model

Traditional methods of forecasting transit ridership often employ regional travel demand models to predict ridership. Such models are relatively unresponsive to changes in station-level land use and transit service characteristics. In the case of Albuquerque, the large sizes of the traffic analysis zones in the metro travel demand model and the unproven ability to properly forecast transit travel patterns preclude detailed transit forecasting. In addition to poor transit travel forecasting, the regional travel demand model has not been tested or validated to forecast BRT ridership. Utilizing the travel demand model for forecasting BRT ridership would require calibration and validation of a new BRT mode of travel in the model in addition to calibration and validation of the existing bus and rail modes. Therefore, for the purposes of the AA, a combination of the MRCOG travel demand model and a direct ridership model (DRM) were chosen for forecasting ridership for the BRT alternatives within the Paseo del Norte corridor. The regional model was used to identify total person-trip demand between origins and destinations along the study corridor for park-and-ride demand. A direct ridership model was calibrated and validated for BRT ridership forecasting at the station level. The strengths of each tool were used based on scale and level of validation.

DRM are directly and quantitatively responsive to land use and transit service characteristics within the immediate vicinity and within the collection area of transit stations. They can predict ridership at individual stations based on local station area and system characteristics. DRMs are based on empirical relationships found through statistical analysis of station ridership and local station characteristics.

The effects of station-level variables are expected to be highly significant in accurately forecasting BRT ridership. While BRT systems are used for traditional commute trips similar to other buses, research with transit agencies suggests they provide a better level of service and better user experience than traditional buses. It was also expected that individual station-area characteristics would greatly affect boardings and overall ridership projections. Recognizing that the variables affecting BRT ridership are different from those for regional transit systems, the basis for analysis draws from the characteristics of existing BRT and rapid ride systems in Eugene (OR), Los Angeles (CA), Cleveland (OH), Seattle (WA), and the San Francisco Bay Area (CA). These systems were chosen because they are most similar to the proposed Albuquerque BRT system. The model derived from these systems was calibrated to Albuquerque by creating an error adjustment equation which adjusts results for trip making characteristics specific to Albuquerque.

Opening Day and 2035 ridership forecasts were made. Opening Day figures assume certain improvements to be made within the corridor to aid the delivery of service; 2035 ridership figures assume all improvements are in place and the system is operating under mature conditions. Based on the proposed implementation plan, the improvements assumed for Opening Day are consistent with the corridor improvements to be in place between 2016 and 2018, once significant guideway construction has been completed. Ridership forecasts do not thoroughly account for the effect of a free-flowing transit guideway adjacent to a highly congested roadway. That condition tends to have a positive effect on ridership.

More detail about the ridership forecasting procedure is included in Appendix 2.

3.2 Conceptual cost estimates

3.2.1 Capital cost analysis methods

The capital cost analysis of the Paseo del Norte Corridor generally follows the structure of the FTA's Small Starts program to maintain compatibility with a primary potential funding source. While it is likely the project could be built with local funding in the early stages, it is important to retain the ability to seek federal assistance by complying with the requirements of the FTA's approach. The rules are, however, changing with the adoption of the latest surface transportation program (MAP-21) and the details could be modified over

the coming months and years. Even if federal funding is not sought for the project, the Standard Cost Categories (SCC) breakdown is an accepted and logical way to present capital cost information.

Under the current requirements, the AA capital cost estimate is organized in FTA's SCC format, which includes the following components: guideway elements, stations, support facilities, sitework and special conditions, systems, right-of-way, vehicles, professional services (including administrative costs), contingency, and finance charges.

Prices for individual elements were taken from recent project unit pricing and entered into the estimate. The project was estimated in phases, which affords the opportunity for an early implementation of service at relatively low cost and a long-term plan that covers the full burden of the program in the Paseo del Norte Corridor. Both phases must be balanced against regional needs in terms of timing. As a final step, the base estimates are escalated from 2013 dollars by adjusting for price inflation over the anticipated period of project implementation.

In general, there is limited detailed analysis in an AA capital cost estimate, but where there is a need to more specifically differentiate costs, information about local labor rates or material costs were used to augment estimates and provide a greater understanding of the program implications. Equipment costs are based on recent vendor quotations in other locales and on industry standard publications.

The total costs are shown in current and year of expenditure dollars for the FTA SCC. These are detailed in a table that compares the final alternatives. This table excludes finance charges as the timeframe for implementation is not defined. The largest cost item is generally for guideway construction. Professional services and sitework and special conditions, in the case of the Paseo del Norte Corridor, can also be relatively high cost items depending on how the project is finally configured (e.g., does it include adding sidewalks and local street features that would typically not be part of a transit project but of the underlying street system?). All other cost items generally comprise smaller shares of total capital costs. Table 3-1 shows the categories as defined by FTA for New Starts/Small Starts.

Table 3-1. FTA standard cost categories

#	Standard Cost Category	Description for Paseo del Norte
10	Guideway construction	Any dedicated lanes or special structures along the selected route
20	Stations	Park-and-ride lots, stations/stops service the route
30	Yard, shops, support facilities	Any new or expanded maintenance facilities needed to accommodate vehicles for the service
40	Sitework, special conditions	Preparation of facilities included in the project (e.g., sidewalks to stops, landscaping, park-and-ride improvements)
50	Systems	Control systems for buses, automated vehicle location, other ITS or traffic management systems
60	Right-of-way	Where needed to accommodate the service at guideways or stops
70	Vehicles	Cost of vehicles for proposed HCT service
80	Professional services	Cost of design, construction administration, insurance, etc.
90	Unallocated contingency	Project-level contingency based on overall risk
100	Finance charges	Cost of borrowing (if any)
Total Project Cost		

3.2.2 Contingencies

The cost estimates include a variety of contingencies to allow for potential additional expenses related to each cost category. Contingencies are described in terms of both allocated and unallocated figures to allow for both SCC categorical risks and changes and those that can affect the project as a whole. Considerations such as the nature of a construction process for building a difficult project element (e.g., bridge improvements or a guideway along Paseo del Norte) can have an effect on the contingency requirement. Unallocated contingency corresponds to contingency that has not been spread among the various cost categories.

The amount of the contingency is associated with the level of risk a cost category or the project faces but is typically not detailed in an AA level analysis except as a general percentage of the total project costs, essentially an unallocated contingency that can apply to any category.

3.2.3 Cost escalation

Escalation rates used for the capital cost estimate was taken from documented sources in the Albuquerque area for costs that extend over a prolonged period of time. Forecasting methodologies used to develop escalation rates identify key cost drivers and make assumptions as to how these drivers will affect costs over the forecast horizon. Key drivers can include international and national market dynamics, local market dynamics related to labor or materials, supply chain/transportation factors, and one-time events that temporally change the market structure (e.g., the demand for materials after Hurricane Katrina). However, since the greatest effect on capital costs is construction related, the local construction cost index accounts for most of the considerations that need to be included in the estimate.

3.2.4 Project capital cost and schedule

The implementation program schedule is defined around the corridor need and funding availability. For Paseo del Norte, barring an influx of currently unidentified funding, the expectation is that the program will be phased over a period of years into the full program described in this AA. The information related to the capital schedule and how funds may be allocated by year, with appropriate escalation applied over time, is shown in the LPA discussion of the Implementation Plan and associated Capital Funding Tables in Section 7.

3.2.5 Operating cost estimating method

This portion of the AA report describes the plan to estimate operating and maintenance (O&M) costs associated with the project. The report briefly summarizes the O&M cost estimating method. At the AA level, the details are not as critical as they are at implementation, but they must be accurate enough to convey a clear understanding of the service and its costs to permit discrimination among the transit improvement alternatives being considered and ultimately support allocating funds for planning and design and construction.

O&M costs are estimated in conformance with FTA guidance, specifically *Procedures and Technical Methods for Transit Project Planning,* Chapter 4.0, Operating and Maintenance Costs. For this AA, the method, as developed under this guidance, was simplified and relied as much as possible on data from local sources such as ABQ RIDE to ensure applicability to the Paseo del Norte Corridor. In general, available data from existing operations recognize objectives such as:

- O&M cost components such as labor wages and salaries, energy and fuel prices, and certain elements of labor fringe benefits (e.g., health and welfare costs)
- Cost effects of new or expanded implementation of transit technologies, operating strategies, and physical features
- Changes in the mix of transit vehicle sizes and fuel types
- Sensitivity to changes in average transit vehicle speed
- Effects on existing transit services and their O&M costs

Operating costs for the alternatives considered were developed in close cooperation with ABQ RIDE and Rio Metro to establish a reasonable basis for overall project estimates.

3.2.6 Operating costs

O&M cost estimates were developed for the project, accounting for costs associated with operating and maintaining a proposed service based on available cost information. As noted above, the data are based on typical labor, materials and supplies, fuel, and electricity for the bus and the supporting facilities, such as stations and park-and-rides. The method and estimates used in the analysis were consistent with guidance from the FTA for O&M cost modeling. Cost drivers in the O&M cost model are:

- Revenue vehicle miles, non-articulated buses
- Revenue vehicle miles, articulated buses
- Revenue vehicle hours
- BRT directional route miles
- Number of BRT stations
- Maximum vehicles in service
- Passenger boardings

O&M costs were escalated over time, consistent with inflation forecasting from the City of Albuquerque, to reflect the anticipated increase in ongoing costs to deliver the service. Past experience (i.e., five years or since the commencement of the service) of ABQ RIDE's Rapid Ride service served as a good basis to gain an understanding of the cost of providing a Paseo del Norte HCT service. As with the capital estimate, a short-term estimate and a long-term or ultimate estimate are provided.

Project O&M services are assumed to be delivered by ABQ RIDE as they are with existing Rio Metro routes. In addition to the appropriate revenue vehicle hourly cost of delivering service, which includes many of the O&M elements listed above, costs will also include an estimate of:

- Guideway structure inspections and maintenance (if appropriate)
- Security (if appropriate)
- Fare revenue collection and equipment servicing
- Fare inspection and enforcement
- Station and park-and-ride maintenance
- Costs associated with staffing of administrative and management personnel, including overhead, for Rio Metro/ABQ RIDE

Many of these are available from data developed by ABQ RIDE for similar services and facilities.

The methodology assumes that ABQ RIDE/Rio Metro include the necessary positions to cover any operating needs of the new service. The interim or short-term annual O&M costs are substantially smaller than the O&M costs of longer-term, full-service operation with higher levels of service and all new facilities in place.

3.2.7 Level of service

Levels of service will be a primary determinant of the cost to operate the new route and influence the cost assumptions mentioned above. Any resulting changes to the underlying bus network precipitated by the Paseo del Norte HCT service will need to be accounted for in the overall system operating cost analysis as the Paseo del Norte HCT route takes shape and gains riders. If the route attracts riders from or increases ridership on other routes, it can have an effect on how the other routes operate and may demand adjustments to frequency, operating hours or both. Rio Metro and ABQ RIDE will need to monitor the proposed route on the overall transit system as service levels change on Paseo del Norte to be able to adapt and deliver the best coordinated system service. This will affect overall costs, but those costs will also recognize the opportunity

to share equipment or facilities where possible to minimize added operating costs associated with the new high capacity service.

3.3 Environmental overview

The environmental overview provides an introduction to environmental issues pertinent to the National Environmental Policy Act (NEPA) process that informs the Paseo del Norte HCTS AA. It defines issues of consequence, discusses how these issues will be analyzed, and identifies the principle issues of concern when evaluating the various alternatives. As the project moves forward, more detailed environmental analysis under NEPA will be required and the entire environmental process will be subject to public review and comment. This aspect of the process is essential to a full understanding of the effects of the project and providing appropriate solutions to identified effects.

Because the Paseo del Norte HCTS study area is within the urbanized Albuquerque metropolitan area, there are few environmental resources present. The project alternatives are similar in terms of their effects on the environment. Most of the study area consists of the existing paved highway and adjacent development with plans for much of the project to remain within the rights-of-way of the selected roadways.

Land use compatibility, noise, and Section 4(f) resources will be the major considerations in developing premium transit improvements. Natural resource concerns, such as water quality and wetlands, general habitat and threatened and endangered species, may be applicable in open space areas and at the river crossing but affect all alternatives equally. Additional issues, such as farmlands, hazardous materials, cultural resources, and air quality, will need to be addressed in the NEPA documentation but are not expected to have a major influence on project decisions.

Based on this preliminary evaluation of environmental and cultural issues, significant impacts are not anticipated and environmental issues are not a primary decision factor in project evaluation. There are environmental issues that must be addressed as the project is more fully defined, but they do not affect the decision about which alternative is preferred because they affect all alternatives equally. This commonality of effect is noted in Section 6, Evaluation of Alternatives, within the comparison tables. A concluding section describes the anticipated level of effort for a NEPA document as well as the various agency consultation requirements. The results of the overview are presented in Appendix 3.

3.4 Land use considerations

This AA is focused on ways to improve mobility options for residents connecting from the Westside to Journal Center and central Albuquerque. The Westside is projected to absorb a great deal of new growth in the future, worsening already difficult connectivity between the east side and west side of the metropolitan area. Key objectives of this initiative are to encourage sustainable, transit-supportive land uses and promote economic development.

The land use study which was completed as part of the AA echoed findings from around the country that the transportation and economic development benefits of an investment in BRT can be maximized by increasing density, improving the pedestrian environment, reducing parking requirements, improving road way connectivity (grid network), and providing a range of incentives for development in the station areas.[1] This study analyzed land use designations and development patterns within a half-mile radius of potential transit stations to evaluate whether these could become transit-supportive station areas. General market conditions and real estate trends were considered in developing this alternative growth analysis. For instance, the general trend toward increased number of households renting versus those owning factored into assumptions about apartments. These data represent an independent analysis, differing from the one

[1] FTA Perspectives on Development of BRT Concept in the United States, March 27, 2012. USDOT, Federal Transit Administration

completed as part of the MTP. This analysis provides related data from the MTP to illustrate the differences in projected outcomes.

Data were analyzed on a parcel-by-parcel basis using geographic information systems (GIS). Half-mile radius buffers were projected upon the potential station areas, centered on the station location. Vacant parcels and under-performing parcel data within or touching the half-mile buffer were incorporated in the analysis.

While zoning was considered in the development of alternative alignment scenarios, accepted market-rate development prototypes were used to calculate the potential build-out of a site. In other words, the calculations are based on residential and commercial configurations that are viable for the Albuquerque area.

Current land values and perceived public perception regarding accepted densities do not support high-rise construction. Wood frame, three-level structures push the envelope for height. At current densities, parking structures are not feasible except for a few unique locations. For residential products, densities are driven more by parking requirements than by height or maximum dwelling units allowed by zoning. Similarly for commercial development, estimated developable densities assume realistic demands for surface parking. Employment numbers per square foot use multipliers commonly observed in the region. Estimated growth comparison used in this alternative scenario is listed in Table 3-2. More details of the land use analysis are available in Appendix 4.

Table 3-2. Alternative scenario general development potential

Station Area	MTP 2035		Alternative Scenario	
	Employment	Dwelling Units	Employment	Dwelling Units
Unser @ Southern	433	207	1,133	140
Rust Medical Center	1,205	988	4,884	1,485
Volcano Heights	6,520	2,056	4,576	6,765
Paseo del Norte @ Coors	1,000	44	968	804
Journal Center	5,757	521	8,500	2,487
Totals	14,915	3,815	20,061	11,681

4 Alternatives Development

The alignment alternatives for BRT service in the Paseo del Norte Corridor were defined around addressing the demands of the corridor needs as noted in Section 2, Purpose and Need. Identifying key origins, destinations, major activity centers, and the most effective ways to link them on the roadway system provided insight into the best options for delivering HCT service in the corridor.

The evaluation process for the Paseo del Norte HCTS followed a multi-step, progressively refined analysis of the alternatives, eliminating the least productive options at each step. The first level screening documented herein is a qualitative and limited quantitative assessment to determine which of the "Long List" of alternatives would qualify for further consideration as "Conceptual" alternatives or the "Short List." The second level of analysis compared the conceptual alternatives in more detail, leading to an LPA. At both evaluation levels, the categories of investigation were similar, although the criteria in each category differed in the number and the detail to which the component measures were defined.

4.1 Alternatives formulation process

The initial screening evaluation was performed at a preliminary planning level to eliminate the alternatives that did not meet the Purpose and Need or did so ineffectively compared to other choices. The objective was to identify and eliminate alternatives with obvious disadvantages or fatal flaws.

Alternatives were developed in sufficient detail to evaluate them at the screening level. The evaluation was concerned primarily with the following:

- Route alignments by segment—The basic route and its relevant characteristics
- Locations of park-and-ride lots and stations—General locations to help evaluate the accessibility and ridership market for the basic routes

Each route required consideration of various methods to provide premium transit service, including roadway widening, mixed-flow lanes, separate transit guideways, and other management methods, such as ITS applications and queue-jumps. Because the features varied from one route to another and the objective was to treat all alternatives equally, the screening evaluation did not address special features at this level of detail.

4.1.1 Route alignments

The screening evaluation was performed for three primary subareas within the study area including:

- Northwest Albuquerque/Southern Sandoval County to Coors Boulevard (Northwest subarea)
- Coors Boulevard to 2nd Street (River Crossing)
- 2nd Street to the Journal Center and other key destinations (Journal Center subarea)

These subareas are unique and each will serve a different function in the ultimate transit route. Therefore, the evaluation criteria were somewhat different for the three segments. In all cases, the focus was on the long-term plan rather than the initial start-up service, which is described as an initial phase of implementation and is addressed in later study activities and in the implementation phasing plan.

Northwest subarea routes

There are three basic routes—NM 528/Coors, Unser Boulevard, and Paseo del Norte—based on where the routes begin in the north or west. For the routes that begin at the Unser/Southern intersection, there were several alternative routes providing east-west connections from Unser Boulevard to Coors Boulevard: Southern Boulevard-Sara Road, McMahon Boulevard, Calabacillas Arroyo, Irving Boulevard, and Paradise Boulevard in addition to Paseo del Norte. These east-west routes were essentially options to the Yellow Route (Unser/Paseo del Norte) to investigate alternative paths through the Northwest subarea, potentially serving different markets.

River crossing routes

The river crossing routes for this study considered only variations on the configuration of Paseo del Norte. Other than a widening or adding to the existing Rio Grande bridge or building a parallel bridge immediately adjacent to the existing bridge, no new river crossing corridors were considered outside the Paseo del Norte Corridor because of the difficulty of introducing additional crossings of the Rio Grande. The variations on Paseo del Norte were a north side guideway, a south side guideway, and a modification of the existing roadway.

Journal Center subarea routes

There were four primary routes serving the Journal Center in the Screening Alternatives—Channel Road, Jefferson Street, I-25 Frontage Roads, and a potential new transit-only alignment located between Channel Road and Jefferson Street. At this time, connections to the northern portions of the Journal Center/I-25 Business Center north of Paseo del Norte are not included in the evaluation because they would be out of direction and would not continue to other destinations efficiently. All routes would continue south to serve major activity centers such as UNM/Central New Mexico Community College or other destinations.

The alternatives access the Journal Center in three ways—at the 2nd Street/Paseo del Norte Interchange via El Pueblo Road, at the Jefferson Street/Paseo del Norte intersection via Jefferson Street, and at the I-25/Paseo del Norte Interchange via the I-25 northbound and southbound frontage roads. A possible new transit-only interchange was not thoroughly defined but was considered as another choice for service within the Journal Center.

Park-and-ride lots and stations

Park-and-ride lot locations will be a vital component of the proposed transit service in the Northwest area. For purposes of the screening-level evaluation, park-and-ride lots were identified for evaluation using the Transportation Accessibility Model (TRAM) model to investigate the accessibility and potential ridership market for the basic routes. Adjustments to the lot and station locations should be expected as a result of the evaluation. However, the availability of land is a key decision factor which may limit available opportunities for park-and-ride lots and will also result in cost impacts.

Land requirements for park-and-ride lots were assumed to be 3 to 5 acres in close proximity to the alternative routes. Terminal lots and intermediate lots will be needed along each route. Potential lot locations were identified based on undeveloped lands per March 2012 aerial photography[2] and in existing parking lots where a parking structure could be considered.

Station locations were spaced from one-half to one or more miles apart at opportune locations such as adjacent to an activity center or a centrally located access to the adjacent residential areas. Figure 4-1 identifies the park-and-ride lot and station locations used in the screening-level evaluation.

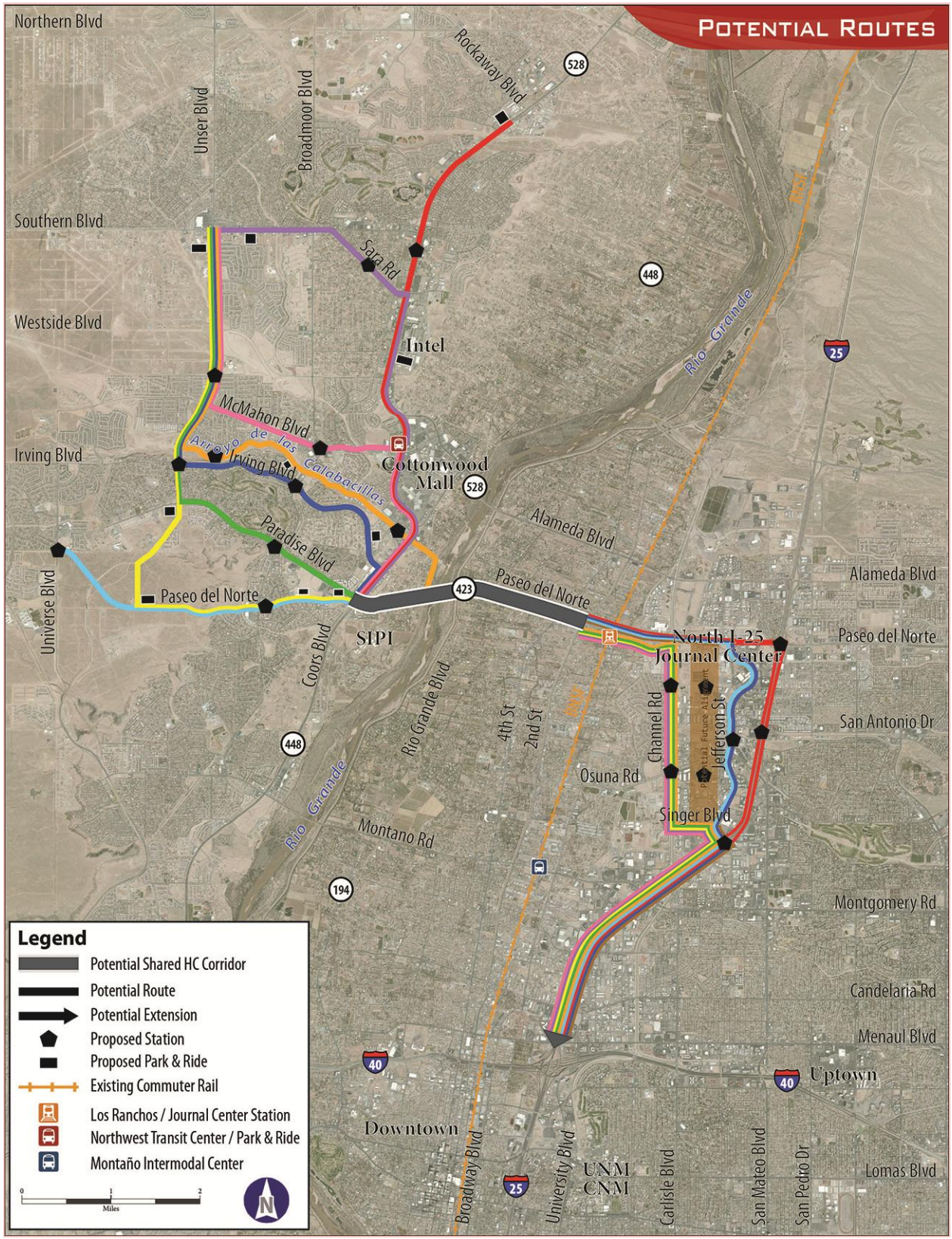
4.1.2 Screening level (Long List) alternatives

The first set of alternatives, the Long List shown in Figure 4-1, considered as many realistic route choices as possible recognizing that many of those would be eliminated for various reasons upon further evaluation.

The initial set of project alternatives was developed in keeping with the Purpose and Need of the project. It recognizes the critical limitations of crossing the Rio Grande and linking the population centers in the Northwest area to employment in the Journal Center and other locations east of the river and introduces a travel choice through the corridor chokepoint—the Rio Grande. The many routes serve different areas and, in some cases, could be combined or refined to access a larger percentage of the population and employment in the corridor. Such revisions will depend on the ability to attract riders and on operational realities as the alternatives are better defined.

[2] Source: Google Earth

Figure 4-1. Screening level (Long List) alternatives



The focus of the route alignments to cross the Rio Grande was on Paseo del Norte. While Paseo del Norte is already heavily congested during certain times of the day, the two nearest alternatives, Montaño Road and Alameda Boulevard, have narrower rights-of-way, experience similar congestion levels, and offer less opportunity to introduce a specialized transit service than Paseo del Norte. The Montaño and Alameda alternative routes were not further considered as part of the high-capacity service for this effort.

Today, the study area is almost exclusively reliant on automobile travel. There is bus service across the river within the corridor, but it is infrequent and not yet sufficiently developed to provide an effective alternative to driving. The intent of the alternatives in this study is to identify where enhanced transit service can attract riders by offering improved travel times and reliability. That, in turn, will encourage riders to utilize transit and make more efficient use of constrained space to help manage the challenges of connecting population and jobs in the area.

4.1.3 Short List alternatives

As a result of the Screening Analysis (see Section 6, Evaluation of Alternatives), public input, and deliberation within the Technical Team a short list of alternatives was developed for further analysis (Figure 4-2). The Short List reflects those options that are best able to satisfy the Purpose and Need for the project. Alternatives that were eliminated were unable to provide acceptable service within the corridor or, at least in part, duplicated the chosen short-listed alternatives. Additional information on each of the short listed alternatives is presented in the "Working Paper on Detailed Evaluation of Short-Listed Alternatives (May 2013)."

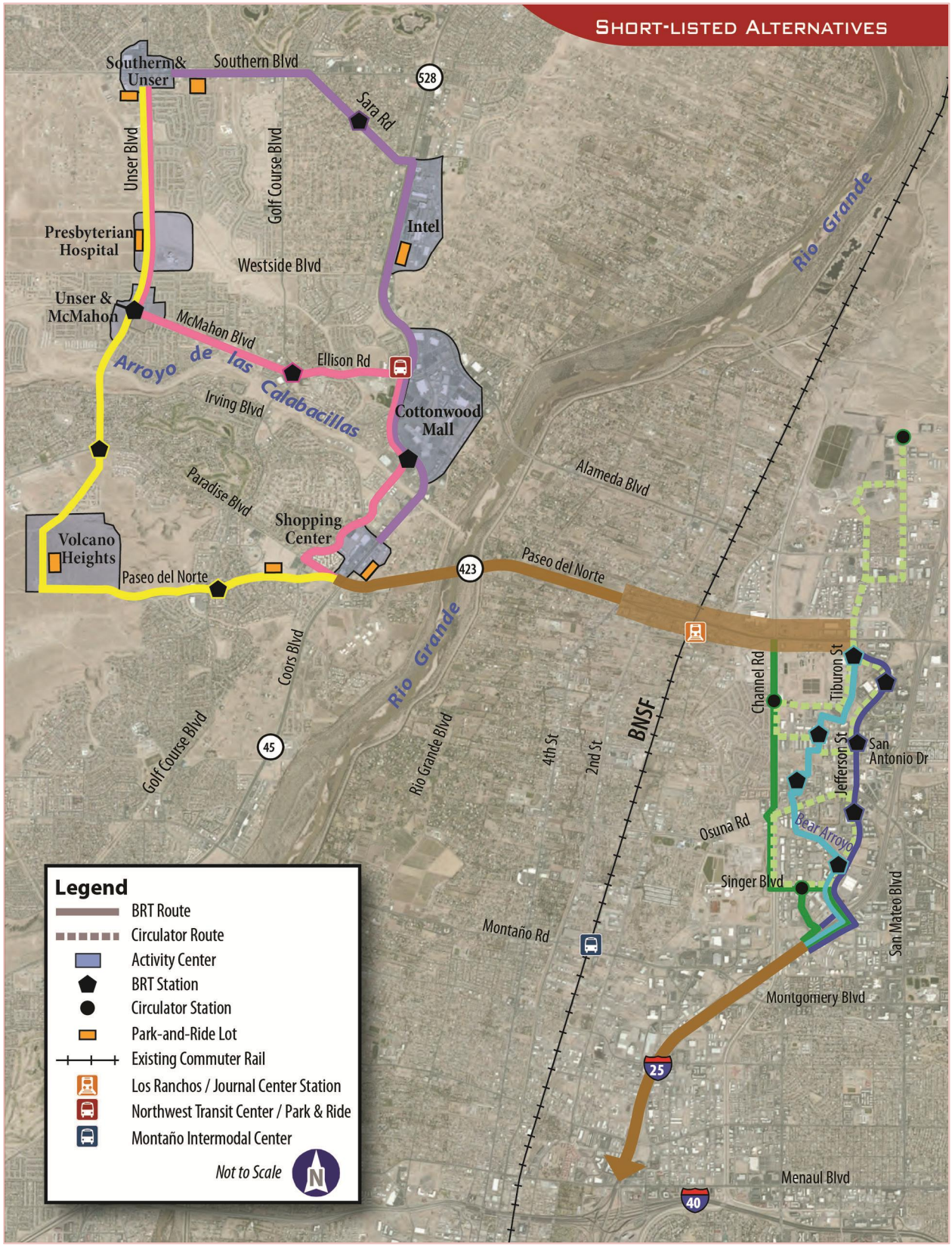
Northwest subarea

Yellow Route

The Yellow Route in the Northwest benefits from access to newly developing areas of the metropolitan region. Future growth is most likely to occur in this version of the corridor with a number of projects already in the works (though timing is not fully known for many of them). This corridor also has a built-in phasing option since Unser Boulevard and Paseo del Norte are major roadways with somewhat limited access. Depending on available funding and need, the Paseo del Norte portion can be built before the extension to the north to Southern Boulevard or any point in between. The Paseo del Norte component will provide access at Volcano Heights to riders north and west (and, to a lesser degree, south) in the short term. The extension to the north would need to be protected for future implementation.

The Yellow Route also features favorable geometrics and currently relatively low traffic volumes for a significant portion of its length. The wide rights-of-way and manageable demand make the development of a separate guideway for BRT a feasible and desirable option for the Paseo del Norte segment from Volcano Heights east as far as Eagle Ranch Road. The northward segment along Unser Boulevard to Southern Boulevard also has generally wide rights-of-way but is more restricted in terms of the addition of a guideway. There are more access points and the segment between Paradise Boulevard and Irving Boulevard would require some potentially significant modification to introduce a BRT guideway. Other choices would need to be considered in lieu of a guideway, such as queue jumps and appropriate ITS treatments for this portion of the route.

Figure 4-2. Short List alternatives



Purple Route

The Purple Route follows Southern Boulevard, Sara Road, and Coors Boulevard/NM 528 to Paseo del Norte. It is a fairly direct route and serves significant activities, such as Intel and Cottonwood Mall, but suffers from heavy access demands and very high congestion during a large portion of the day. Recent studies have identified a need for significant improvements to Coors Boulevard, including transit enhancements such as identified in the Coors Corridor Plan. The interchange of Coors Boulevard and Paseo del Norte is a critical problem area that the Purple Route would need to negotiate to access the east-west portion of the route along Paseo del Norte. That would most likely require a deviation from the Coors Boulevard alignment near the interchange to allow for more expeditious BRT travel through the area. ABQ RIDE Rapid Ride Route 790 provides service from the Northwest Transit Center to downtown Albuquerque and UNM and experiences relatively high ridership. Because the Purple Route and Route 790 overlap for a portion of their course, they would need to work in a coordinated fashion to maximize ridership in north-south and east-west directions.

Pink Route

The Pink Route coincides with the Yellow Route from Southern Boulevard to McMahon Boulevard, where it turns southeasterly toward Coors Boulevard. The alignment serves the Northwest Transit Center and park-and-ride lot directly. The largest challenge with this route is the inability to incorporate a BRT guideway onto the McMahon Boulevard right-of-way. Once on Coors, it experiences similar limitations to the Purple Route, but turns off Coors Boulevard to follow Eagle Ranch Road toward Paseo del Norte to avoid the access and congestion issues approaching the Paseo del Norte interchange. Eagle Ranch Road provides better access, but is also congested and not able to readily accommodate a BRT guideway, which would require the service to run in mixed flow with general purpose traffic. This routing does, however, provide direct access to a number of high density properties along the way.

River crossing

Use of existing Paseo del Norte roadway

Paseo del Norte does not readily lend itself to a BRT guideway. The width of the existing roadway and bridges (over the Rio Grande and between the abutments of the cross-streets) is too narrow to accommodate an additional lane, much less two. For a portion of the alignment, between 2nd Street and Coors Boulevard, a single reversible lane could be accommodated with modified standards to reduce all lane widths. This raises questions about how closely the lane edge can be allowed to approach bridge abutments and other obstructions without impairing functionality or safety. This option could function as a temporary measure until a permanent BRT guideway can be built, though it is too narrow to provide the full-lane width required for BRT. In light of the limitations, the following options have been defined that better address the needs of the proposed service.

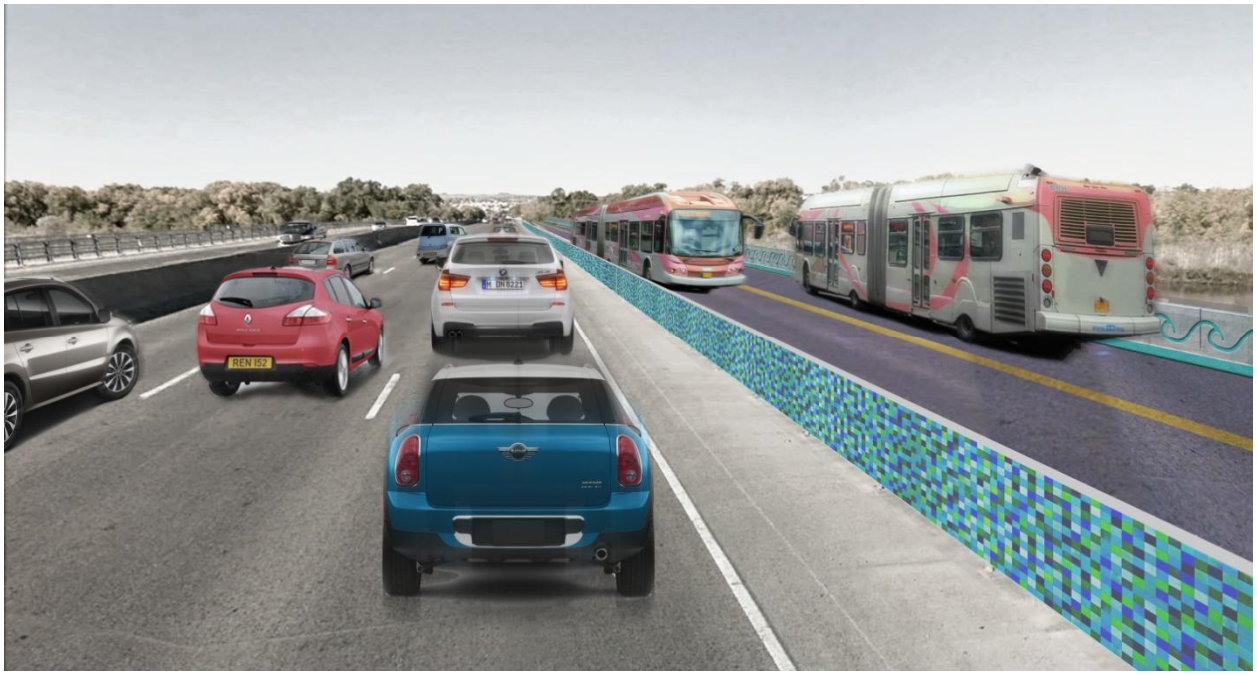
Paseo del Norte north side guideway

The connection between the Northwest and the River Crossing segments will need to negotiate a very heavily used Coors Boulevard/Paseo del Norte interchange. There is limited ability to modify the overpass in any substantial way (except perhaps for temporary construction mitigation transit service) because of limiting geometrics. NMDOT has considered updating the interchange itself, which could offer possible solutions to the BRT option, but there is no current timetable for that project. Until such time, the BRT route will have to travel through the congested location by another means. The most effective option identified is the construction of a guideway-only bridge linking Paradise Boulevard and Paseo del Norte with a new BRT guideway running parallel to and north of Paseo del Norte within the Paseo del Norte right-of-way. All three Northwest routes could benefit from this facility if needed.

The north side of Paseo del Norte has sufficient rights-of way to accommodate a BRT guideway, but it faces challenges associated with the San Juan Chama Water Transmission Line and the policy agreements (i.e.,

Agreement and Settlement Paseo del Norte Crossing and Corridors, 1986) between the NMDOT and the Village of Los Ranchos, the North Valley Neighborhood Association, and the Rio Grande Valley Preservation Society regarding the use of Paseo del Norte and its right-of way. The waterline would not directly impact the design of the guideway but would need to be accounted for in how and where the guideway is placed to permit continued access and service to the line for the Albuquerque Bernalillo County Water Utility Authority. The policy agreements are not specific as to how a transit project with relatively minor impacts, designed to address growing congestion, would be interpreted regarding the use of the rights-of-way, the bridge over the Rio Grande, or affected cross-streets.

Figure 4-3. Conceptual north side BRT Guideway at Rio Grande

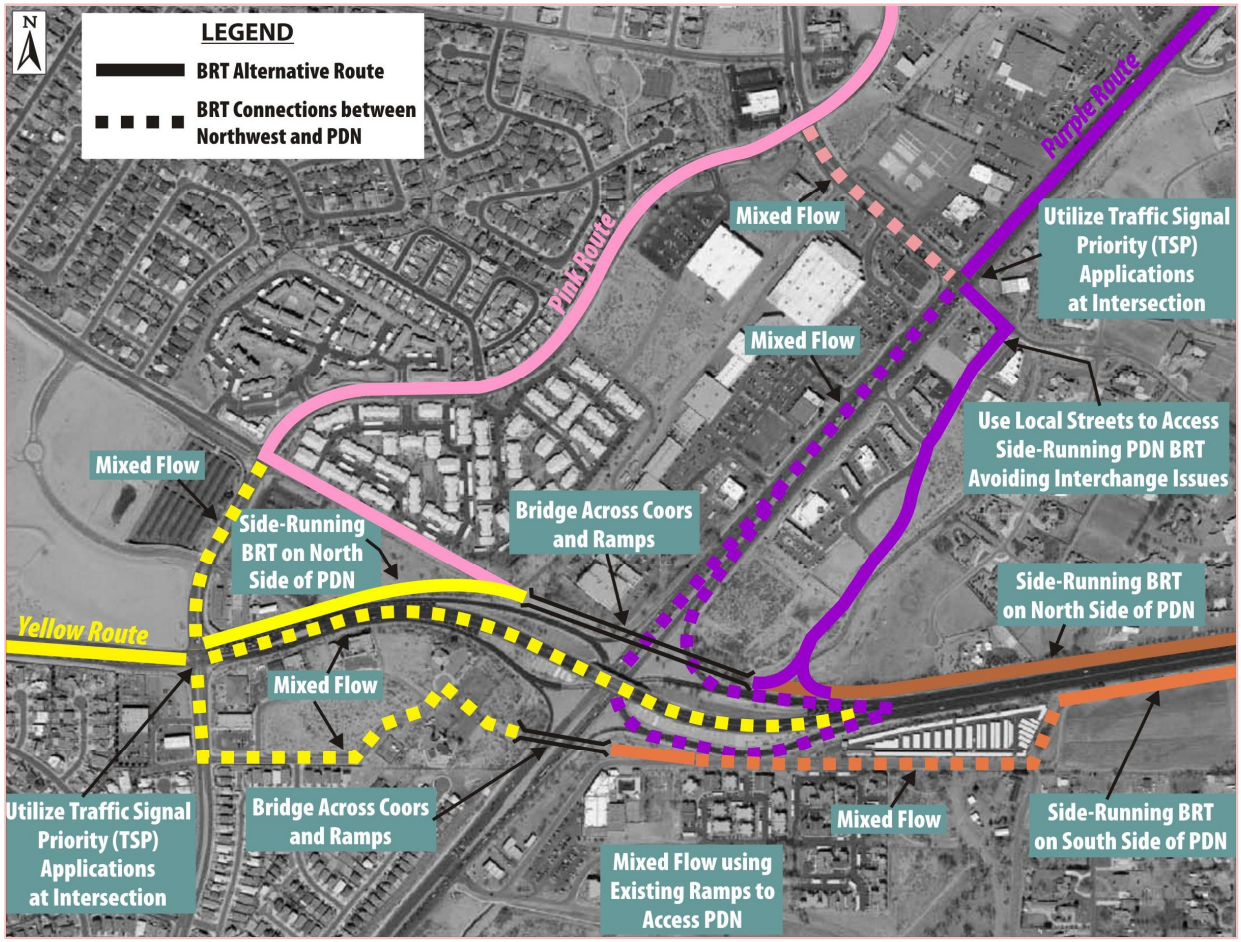


The guideway could be carried all the way to the Journal Center to link to Jefferson Street but, for the first phase project, it was decided to move the BRT operation from Paseo del Norte onto El Pueblo Road at 4th Street from where it would continue to the Journal Center. This offers access to a high-density residential project and a direct at-grade connection to the Rail Runner station as well as ready access into the Journal Center just south of Paseo del Norte. The exit at 4th Street avoids the complexity of the 2nd Street interchange with Paseo del Norte and may reduce the cost of the project by shortening construction of a special guideway along Paseo del Norte.

Paseo del Norte south side guideway

A BRT crossover bridge at Coors Boulevard (Figure 4-4) could also be constructed on the south side of the interchange, but the conditions are not as favorable there with potential impacts to a residential area and a church. The access from Paseo del Norte to the crossover bridge would also be more circuitous than on the north side, though the bridge itself would be shorter because it would cross Coors Boulevard at less of an angle. Complexities would be expected with the ramp roadway from the overpass to the at-grade facility.

Figure 4-4. Concept of Paseo del Norte and Coors Boulevard Interchange transit configuration



Once on the east side of Coors Boulevard, the BRT guideway would need to adapt the existing multiuse path around the new guideway alignment. At a minimum, this would have an impact on the bridge over the Rio Grande.

The south side guideway would face the same policy challenges of the north side guideway, but it does not have a waterline to contend with. The southerly alignment would also access El Pueblo Road at 4th Street but without the need to cross Paseo del Norte to get there. This is a possible benefit related to policy agreements, but this routing places the guideway closer to a row of existing houses.

Journal Center subarea

All Journal Center alternatives were carried into the Short List except for the I-25 frontage road option. The frontage road did not work well with the northbound BRT route located across the freeway from the Journal Center and much of the employment activity in the area.

Blue Route

The Blue Route utilizes the Jefferson Street corridor from Paseo del Norte or El Pueblo to I-25. It is a challenging alignment and potentially expensive because significant right-of-way may need to be acquired to accommodate a business access and transit (BAT) lane as shown in Figure 4-5. The BAT lane would be limited to accessing property and transit service only. If such a change is implemented, it will be expensive and potentially time-consuming but will dramatically improve BRT service potential in the area. A more immediate alternative approach would be to take advantage of queue jumps and ITS improvements at the

intersections. Analysis indicates this option could provide good service for a long time before a full BAT lane property acquisition program would be needed.

Figure 4-5. Conceptual BRT plan for Jefferson Street in the Journal Center (BAT Lane)

Green Route

The Green Route along the Channel Road would travel quickly through the Journal Center, which is beneficial to the overall BRT route ridership. However, Channel Road is far from employment activities in the area. As a result, a shuttle system would take customers to their final destination, but this adds substantial time to a trip (discouraging use) and increases operating costs.

Cyan Route

The Cyan Route follows a series of small streets and new connections across private property, channels, and other physical features within the Journal Center to offer more direct access to destinations from the BRT. It serves many employers but requires such a circuitous path that it poses operating concerns for buses. Some of the concerns could be mitigated with modifications to local street geometrics, but the changes required would be substantial and costly.

5 Public Involvement

The public outreach element of the project included formation of a Technical Team representing the affected and interested agencies in the corridor, a series of public open houses to elicit perspectives from the public regarding the proposed plan and process, and meetings with affected neighborhood associations and community groups. The results of these interactions are accounted for in the evaluation process and in the final selection of the LPA.

5.1 Paseo del Norte Technical Committee

The Technical Committee consisted of representatives from the cities of Albuquerque and Rio Rancho, NMDOT, Bernalillo County, ABQ RIDE, MRCOG, and Rio Metro. The Committee's role was to assess materials developed for the project and offer guidance related to their responsibilities within the corridor. They represented owner of right-of-way, affected representative of the public in the corridor, or provided information about developments underway in the corridor. The Technical Committee held regular meetings to help direct the project and make recommendations on the preferred alternatives for further development. Most meetings were structured as workshops to engage the participants in the specifics of the corridor and to identify the weaknesses in any considerations that were part of the alternatives under study. The Technical Committee was able to come to consensus on a recommendation for the LPA after extensive deliberation about the alternatives and the needs of the service.

5.2 Public engagement

Three rounds of public input were held to gain insight and provide updates on the best ways to formulate the alternatives and make a preferred alternative selection. Perspectives from the traveling public were instrumental in assessing the viability of the proposed service and were a significant factor in decision-making within the project team. Individual comments by the public received during the public outreach process are included in Appendix 5.

5.3 First round of public meetings/open houses

The first set of open houses was held on May 8, 2012, and introduced the proposed service and the approach to be taken. Meetings took place at the Albuquerque Journal Building and at the Albuquerque Police Department Northwest Substation and were open to the public. Members of the Technical Committee and other public officials were encouraged to attend to gauge public interest and points of view. The topics pursued during the meetings and presented as part of a project presentation included:

- Why this study is being conducted
- The types of transit strategies and solutions being considered
- Potential route alignments identified by an interagency scoping meeting
- Requests for public input on issues, concerns, and ideas

Meeting overview

The format for the open houses included a presentation by Project Team representatives followed by a question and answer period. The presentation covered the following topics:

- Background of the study, including agencies involved in the study and boundaries of the study area
- Objectives of the study, including addressing current and future congestion problems
- Explanation of HCT and how it can help relieve some congestion problems
- Invitation for stakeholder and public input and request to provide comments and fill out a questionnaire

Key comments

At the first meeting, the comments received were highly varied and ranged from providing as direct a service as possible to encouraging higher density development that would be built around transit to encourage ridership.

There was also an emphasis on a system that could grow over time as demand increased and that could better leverage the services available from Rail Runner and park-and-ride lots along Paseo del Norte.

Some comments referenced the Paseo del Norte/I-25 interchange improvements project and saw the project as a possible mitigation measure.

5.4 Second round of public meetings/open houses

The second outreach effort took place on March 28, 2013, and was held at the offices of Dekker-Perich-Sabatini on Jefferson Street in the Journal Center and at the Albuquerque Police Department Northwest Substation. These meetings were designed to review the project purpose and present the alternatives identified based on analysis completed to date, and to seek public preferences and concerns about which alternatives should be further developed and which would not serve public needs effectively. The structure of the meetings included:

- Why this study is being conducted and how it will help with river crossing commuters
- Features of BRT (enhanced transit) and how it works
- Findings of the evaluation of potential routes being studied in the corridor

The public showed a preference for one alternative over all others, which was incorporated into the evaluation process.

Meeting/open house overview

The open houses had the same purpose, provided similar information, and were organized in the same fashion. The purpose of the open houses was to:

- Share the latest information about the project with the public
- Describe types of transit strategies, explain solutions being considered, and describe potential route alignments
- Solicit comments from stakeholders and the public relating to the short-listed route alignments as well as other aspects of the proposed BRT improvements

The open houses included the display of project boards provided at stations as described below. Project representatives were available at each station to guide attendees, explain the materials, and answer any questions that arose. Collectively, the stations explained why the project is important and the alternatives being considered.

Key comments

During the second set of meetings, the public was asked about specific preferences regarding the alternatives under study. Most of the participants were from the west side of the river and opted, by a large margin, for the Yellow Alignment in the Northwest and the Blue Alignment in the Journal Center. They also favored the Volcano Heights park-and-ride as an access point for their trips.

While most were destined to the UNM area, there was a variety of destination locations identified.

The primary comment under “other important issues” related to making the service available as soon as possible. There were many other notes, including park-and-ride locations, pedestrian-friendly design, and a desire to retain the existing Route 790 service.

5.5 Third round of public meetings/open houses

The third set of outreach meetings was held at the same locations as the second round on October 28, 2013, and was built around a presentation of more detailed development of the recommended LPA. Meeting objectives included sharing information about:

- Details of the Yellow-River Crossing-Blue Alternative (the LPA)
- Station and park-and-ride locations
- How the service may operate and how it would integrate with other transit services in the region
- Video simulation to illustrate operational characteristics and provide visualization of benefits relative to traffic congestion

The public was asked to provide comments on these and any other elements of interest on the project.

Comments received

The people in attendance reviewed the boards, maps, and conceptual design drawings to gain a better understanding of the project now with better definition of some of the key details. Only one written comment was received which was in reference to how the meetings were advertised rather than comments on the LPA.

5.6 Other public involvement activities

Stakeholder groups

There were other outreach efforts conducted as part of the study, including meetings with stakeholder groups and discussions with the leadership of various affected community groups in the corridor, such as the Village of Los Ranchos (see letter in Appendix 5) and the Westside Coalition of Neighborhoods. The results of all these contacts were considered in the final plan for the corridor and still require further consideration of some specific issues. Additionally updates were provided to RMRTD Board, COG Board, ABQ RIDE Transit Advisory Committee and other relevant organizations.

Media

Mass media (i.e., TV, newspaper) also participated in sharing the project objectives and the findings of the analysis at appropriate times during the study, which substantially broadened the reach of the public outreach effort.

6 Evaluation of Alternatives

This section describes the steps taken to reduce the Long List of alternatives to the Short List and the more detailed evaluation that was performed to select an LPA from the resulting Short List.

6.1 Screening level (Long List) assessment of alternatives

The screening-level analysis was performed by subarea to better reflect the characteristics of the transit service that could be implemented in each subarea. The subareas defined for the study and the basis of the early evaluation process were:

- Northwest subarea routes
- Park-and-ride locations
- River Crossing
- Journal Center subarea routes

A simple screening evaluation was sufficient for the River Crossing alternatives because conditions are comparable for all alternatives considered. Multiple evaluation criteria were applied to the Northwest and Journal Center subareas and the park-and-ride locations.

6.1.1 Northwest subarea routes

The three primary routes (i.e., Coors Boulevard/NM 528, Unser Boulevard, and Paseo del Norte) are all viable routes for transit service, and many of the east-west connections are suitable multi-modal corridors. The objective of this screening evaluation was to identify the routes and connections that should be eliminated from further consideration and to select those that offer the best opportunity to meet the Purpose and Need of the project. The routes advanced were evaluated in more detail as the initial premium transit route connecting the Northwest subarea with destinations east of the river (i.e., the best starter route for an initial premium transit investment in Northwest Albuquerque/Southern Sandoval County).

An evaluation matrix was used to assess the alternative routes in the Northwest subarea. The criteria are summarized in Table 6-1.

Park-and-ride locations

The evaluation of park-and-ride lots was performed only for the Northwest subarea routes. Park-and-ride lots for the Northwest subarea routes were located largely based on available property along the alternative route alignments as of March 2012. At the screening level, they were primarily evaluated based on a TRAM analysis to investigate accessibility for the basic routes. The ease of circulation between the transit route and the park-and-ride lot for auto access was considered, including the need for signalization to expedite auto and bus access to and from the lot location. The screening-level evaluation measures are as follows:

- Surface lot or structure?—Indicate what is anticipated
- What is the anticipated accessibility for the lot?—Measured by TRAM analysis for each route and lot configuration
- Is auto and bus access expedited to and from the transit route?—Direct route access, signalized access to major street, distance off the route
- What is the spacing between successive park-and-ride lots?—Distance in miles
- Is the lot located upstream of key congested corridors?—Yes or No

The results of the park-and-ride lot screening evaluation are summarized in Table 6-2.

Table 6-1. Northwest subarea route alignment screening evaluation matrix

Category	Criterion		Measure	Alternative Route							
				Red	Yellow	Light Blue	Purple	Pink	Orange	Dark Blue	Green
				NM 528 at Rockaway to PDN to I-25 Frontage Roads to UNM	Unser at Southern to PDN to Channel Road to UNM	Paseo del Norte at Universe to Jefferson to UNM	Unser at Southern to Sara Rd to 528 to PDN to Channel Rd to UNM	Unser at Southern to McMahon to PDN to Channel Rd to UNM	Unser at Southern to Calabacillas Arroyo to Bosque to PDN to Channel	Unser at Southern to Irving to Coors to PDN to Jefferson to UNM	Unser at Southern to Paradise Blvd to PDN to Channel Rd to UNM
Mobility and Access	1	Improve connectivity between housing and employment in north Albuquerque	TRAM analysis of 2008 west side station/park and rides within 10 minute drive or walk access and within 10 minute walk at Journal center and at UNM	132,400	140,500	105,700	141,600	137,400	127,600	126,400	131,600
				12,100	13,000	10,600	12,800	12,500	11,600	11,500	12,100
			TRAM analysis of 2035 west side station/park and rides within 10 minute drive or walk access and within 10 minute walk at Journal center and at UNM	189,000	230,600	145,500	214,500	216,100	206,300	202,600	220,900
				14,900	17,600	12,700	16,200	16,200	15,300	15,100	16,700
	2	Integration with long term transit plan	Qualitative assessment based on Functional Class	NM 528/Coors Boulevard	Unser Boulevard	Paseo del Norte	Sara Road	McMahon Boulevard	None (at this time)	Irving Boulevard	Paradise Boulevard
				Identified High Capacity Corridor	Identified High Capacity Corridor	Identified High Capacity Corridor	Minor Arterial	Multi-modal Corridor		Collector/Minor Art.	Minor Arterial
	3	Increase mobility options for all populations in project area (Entire Length of Route)	Number of potential riders (all population) within 1/2 mile of all stops and average number of potential riders per station/stop	14,700	19,000	10,200	15,100	15,398	18,900	18,300	18,100
				1,633	1,900	1,457	1,510	1,711	2,363	2,033	2,011
			Number of potential riders (all population) within 3 miles of west side park-and-ride/stations and potential riders per PNR	145,400	162,900	118,300	153,100	155,331	144,200	155,800	155,600
				36,350	54,300	59,150	38,275	51,777	144,200	77,900	51,867
			Number of persons below poverty (transit dependent) within 1/2 mile of all stops and average number of transit dependents per station/stop	880	850	460	840	717	750	760	910
				98	85	66	84	80	94	84	101
			Number of persons below poverty (transit dependent) within 3 miles of west side park-and-ride/stations and number of persons below poverty per station/stop	6,710	7,470	5,060	7,290	7,349	6,910	7,350	7,290
				746	747	723	729	817	864	817	810
			Number of persons in a 0 car household (transit dependent) within 1/2 mile of all stops and number of 0-car households per station/stop	890	450	220	600	432	470	380	470
				99	45	31	60	48	59	42	52
			Number of persons in a 0 car household (transit dependent) within 3 miles of west side park-and-ride/stations and number of zero-car households per PNR	4,130	4,000	2,430	4,290	4,042	3,720	3,930	3,920
				1,033	1,333	1,215	1,073	1,347	3,720	1,965	1,307
	4	Expandability (NW subarea only)	Number of Existing Lanes	4-lane to 8-lane	2-lane to 4-lane	2-lane to 4-lane	2-lane to 4-lane	4-lane	Not a Roadway Corridor	2-lane to 4-lane	2-lane to 4-lane
			Approximate Roadway Width	74 to 140 feet	24 to 104 feet	24 to 104 feet	38 to 62 feet	80 to 100 feet		24 to 84 feet	52 to 72 feet
			Right-of-Way Policy	156 to 200 feet of ROW	156 feet of ROW	156 feet of ROW	86 to 124 feet of ROW	106 to 156 feet of ROW		106 feet of ROW	106 to 124 feet of ROW

Table 6-1. Northwest subarea route alignment screening evaluation matrix (continued)

Category		Criterion	Measure	Alternative Route							
				Red	Yellow	Light Blue	Purple	Pink	Orange	Dark Blue	Green
				NM 528 at Rockaway to PDN to I-25 Frontage Roads to UNM	Unser at Southern to PDN to Channel Road to UNM	Paseo del Norte at Universe to Jefferson to UNM	Unser at Southern to Sara Rd to 528 to PDN to Channel Rd to UNM	Unser at Southern to McMahon to PDN to Channel Rd to UNM	Unser at Southern to Calabacillas Arroyo to Bosque to PDN to Channel Road to UNM	Unser at Southern to Irving to Coors to PDN to Jefferson to UNM	Unser at Southern to Paradise Blvd to PDN to Channel Rd to UNM
Land Use and Community Development	5	Serve major activity centers	Identify activity centers along route	Intel, Cottonwood Mall	Unser Hospital Complex, Volcano Heights	Volcano Heights, Volcano Cliffs	Intel, Cottonwood Mall	Unser Hospital Complex, Cottonwood Mall	Unser Hospital Complex	Unser Hospital Complex	Unser Hospital Complex
	6	Encourage transit supportive land uses along transit corridors	Developable land within 1/4-mile radius of stations (acres)	74	225	229	70	130	118	141	154
	7	Serve future UNM/CNM students	Students within 1/2 mile of HCT (2008)	2,560	3,020	2,630	2,770	2,800	2,570	2,820	2,310
Operational Characteristics	8	Consistency with roadway policies	Identify any key obstacles	Taking a Lane for dedicated BRT lanes	Segment between Paradise and Irving where widening will be difficult (1/2 mile)	No real obstacles	Not identified as a transit corridor	McMahon a Major Transit Corridor in the ABQ/BC Comp Plan	Designated Open Space by City of Albuquerque; identified in NW Bus Rapid Transit	No transit designation in the ABQ/BC Comp Plan	No transit designation in the ABQ/BC Comp Plan
	9	Provide time-competitive transit alternatives	Northwest distance (miles)	8.1	8.2	3.7	6.7	8.2	6.5	6.9	6.8
			Travel time with auto trip in Northwest (minutes)	14.9	14.5	7.2	12.7	13.4	10	9.7	12.6
			Travel time per mile in Northwest (minutes)	1.84	1.77	1.95	1.90	1.97	1.54	2.11	2.14
			Normalized Intersection Score based on functional classification	22.6	15.5	14.3	19.6	22.3	12.9	14.7	17.2
Financial Feasibility	10	Comparative cost assessment plan for capital improvements and operations for NW	Estimated Preliminary Annual Operating Costs (number of buses @ 15 min headway over 12 hr)	$1.425 million	$1.420 million	$0.875 million	$1.435 million	$1.410 million	$0.845 million	$1.425 million	$1.425 million
			Based on route length and parametric costs per lane-mile of roadway, stations, park-and-rides	8.1 miles, 5 stations, 4 park-and-rides	8.2 miles, 7 stations, 3 park-and-rides	3.70 miles, 5 stations, 2 park-and-rides	6.7 miles, 6 stations, 4 park-and-rides	8.2 miles, 6 stations, 3 park-and-rides	6.5 miles, 7 stations, 1 park-and-ride, new roadway construction	6.9 miles, 7 stations, 2 park-and-rides	6.8 miles, 6 stations, 3 park and rides
Environment	11	Minimize negative effects on surrounding physical and human environments	Residential dwelling units within 1/8 mile of route (entire route) based on 2010	2,430	3,080	1,590	2,780	3,160	3,360	3,060	3,350
				300	376	430	415	465	517	665	568
			Segment length (miles) in sensitive environments (Nat'l Mon, bosque, open space)	none	0.27	0.27	none	none	3.4	none	none
Ranking				5	1	8	3	2	7	6	4

Table 6-2. Park-and-ride evaluation matrix

Park-and-Ride Lot Location	Applicable Routes *	Surface Lot or Structure	TRAM Results (2035 work trips to JC)	Direct Route Access for Transit	Approximate Distance Off Route (feet)	Signalized Access	Spacing to Adjacent Lot (miles)	Upstream of Congested Corridors	Overall Assessment
Unser/Southern – along Premier Parkway in southwest quadrant	yellow, Pink, Orange, Dark Blue, Green	surface	Y – 1,920 Pk – 1,870 O – 1,810 DB – 1,920 G - 2,010	no	500 to 1,000	yes to Southern, no to Unser	Y - 4.2 miles Pk – 4.2 miles O - 3.8 miles DB - 5 miles G - 3 miles	yes	Good Potential
Southern/Western Hills – south of Southern Boulevard between Western Hills and 24th Street	Purple	surface	1,390	no	700	yes to Southern	3 miles	yes	Good Potential
NM 528/Rockaway – southwest quadrant of intersection	Red	surface	1,080	no	600	yes to NM 528	3.2 miles	yes	Low Potential use
NM 528/Intel – shared space in south part of Intel parking lot, east of NM 528	Red, Purple	structure	R – 700 P - 880	yes	0	no	1.1 miles	yes	Low Potential Use
Coors Bypass/Ellison – existing NW Transit Center, northwest quadrant of intersection	Red, Purple, Pink	surface	R – 710 P – 670 Pk – 1,190	no	R, P - 1,200 Pk - 430	yes to Coors Bypass	2 miles	no	Existing Lot
Golf Course/Calabacillas Arroyo – west of Golf Course Road, south of arroyo	Orange	surface	4,100	yes	0	no	NA	yes	Good Potential
Irving/Eagle Ranch – north side of Irving across from Eagle Ranch/Westside intersection	Dark Blue	surface	3,890	yes	0	no	NA	yes	Good Potential
Unser/Paradise – southwest quadrant of intersection	Green	surface	2,190	no	500 to 1,000	no	2.2 miles	no	Good Potential
Paseo del Norte/Volcano Heights – north side of Paseo del Norte near planned transit street	Yellow, Light Blue	surface	Y – 2,350 LB – 2,580	yes	0	no	2 miles	yes	Good Potential
Paseo del Norte/Eagle Ranch – northwest quadrant of intersection	Yellow, Light Blue	surface	Y – 2,290 LB – 2,410	yes	0	no	NA	no	Good Potential
Paradise/Coors – northwest quadrant of interchange	Pink, Green, Red, Purple	surface	Pk – 3,170 G – 2,180 R – 3,370 P – 3,300	yes and no, depending on route	Pk, R, P - 1,800 to 2,000 ft. G - 0 ft.	no	NA	no	Good Potential; Difficult to access for most

6.1.2 River crossing routes

The evaluation of river crossing options during the screening process was a simple, fatal-flaw type assessment considering the following general descriptors of the alternatives:

- Alignment connecting the Northwest metro area with the Journal Center
- Existing access management conditions and posted speed limit in the corridor
- Potential of the corridor to satisfy the objectives of this project
- Availability of right-of-way, ease of implementation

Project Team and Technical Committee input were also key decision factors. The focus was on the corridor rather than the type of facility to be provided (i.e., a separate or a shared facility).

6.1.3 Journal Center subarea routes

Alternative routes within and through the Journal Center were screened using the following measures:

- Employment within walking and bicycling distance—Measured by TRAM analysis
- Accessibility to the Paseo del Norte Corridor—Direct versus indirect access
- Anticipated travel feasibility within and through the Journal Center—Travel time from Paseo del Norte/2nd Street to south of Osuna Road/Jefferson Street
- Connection to Los Ranchos Rail Runner Station—Direct access from the route, yes or no
- Compatibility with continued service to the south—Expandability of the transit route to UNM/Central New Mexico Community College, Uptown, etc.
- Existing/planned street characteristics—Right-of-way, street section, congestion levels

The results of the screening evaluation of Journal Center route alternatives are summarized in tabular format in Table 6-3.

6.2 Evaluation of final alternatives—Short List

Once the alternatives were narrowed to the most likely options, the evaluation was refined. Many of the same criteria were applied, but the alternatives benefited from more detailed information about the most feasible candidate routes. The tables in this section carry forward those data that remain unchanged and include more refined information resulting from the additional analyses completed. The key additional detail revolves around ridership potential, operating plans, and operating and capital costs. As in the Screening Evaluation, the study area remains divided into three primary sections for analysis. Following this analysis, the LPA will be developed with further refinement of the route specifics and costs.

Based on Figure 4-2 and the descriptions in Section 4, Alternatives Development, each Short List alternative route is identified by the colors of its component segments. For example, Yellow-Blue is the Paseo del Norte and Jefferson Street route.[3] The Short List is also limited to the portion of the route between the Northwest area and the Journal Center, though all routes continue to UNM. For analysis purposes, some of the evaluation metrics (e.g., ridership) cover the entire Northwest to UNM route as a basis of comparison.

[3] The River Crossing (a.k.a., Brown) segment is common to all routes and is not noted separately in the description of the Short List routes in the evaluation tables but identified only where such information clarifies results.

Table 6-3. Journal Center screening evaluation matrix

Category	Criterion		Measure	Alternative Route			
				Channel Road	Jefferson Street	I-25 Frontage Roads	New Transit-Only Street
Mobility and Access	1	TRAM Analysis of Journal Center Jobs Access	Jobs within walking distance (2008)	7,520	7,650	8,400	9,710
			Jobs within biking distance (2008)	42,100	43,200	48,400	43,100
			Jobs within walking distance (2035)	8,020	8,290	9,330	10,420
			Jobs within biking distance (2035)	46,700	47,700	54,100	48,200
	2	Integration with long term transit plan	Connect to Los Ranchos Rail Runner Station	Yes From El Pueblo	Yes as north side separated guideway; No as shared route on PDN	Yes as north side separated guideway; No as shared route on PDN	Yes From El Pueblo
	3	Expandability	BRT System Expansion Potential	Medium	High	High	Medium
			Existing/Proposed Right-of-Way	100 ft on east side of N. Div. Channel	86 feet	Included in overall I-25 ROW	36 feet
			Existing/Proposed Street Section	3 lanes	5 lanes	2 lanes, one-way pair	2 lanes
Operational Characteristics	4	Provide time-competitive transit alternatives	Travel time from PDN/ 2nd to Osuna/Jefferson (minutes)	14.8	15.7	19.4	~ 14 to 15
			Access to Paseo del Norte	Indirect	Direct	Direct	Indirect
			Congestion Level	Low	High	Medium	Low
Financial Feasibility	5	Comparative cost assessment plan for capital improvements	Based on route length and parametric costs per lane-mile of roadway, station, park-and-ride and buses	4.1 miles, 3 stops new roadway construction	3.5 miles, 2 stops	4.9 miles, 3 stops, requires pedestrian bridges to connect across I-25	3.5 miles, 3 stops, new transit-only corridor construction
Land Use and Community Development	6	Encourage transit supportive land uses along transit corridors	Developable land within 1/4-mile radius of stations (acres)	42	14	45	7
Environment	7	Nothing critical at screening level	N/A	N/A	N/A	N/A	N/A

6.2.1 Ridership

Ridership was developed using the DRM process described under Section 3, Methods and Approaches. The process links the likely number of BRT users to factors related to the configuration of the route and its ability to serve potential markets. The figures in Table 6-4 reflect travel for Opening Day service (based on use of 2010 information and modest assumptions of level of service for a new route) and 2035 (based on a high level of service for a mature operation) between the intersection of Unser and Southern Boulevards and UNM. The forecasts assume a comparable level of development of the BRT service for all alternatives in each of the two timeframes shown to provide a basis of comparison among the alternatives. A more refined forecast is reflected in the LPA that focuses on the preferred alternative.

Table 6-4. Travel forecasts for 2010 and 2035

Northwest Alternatives	Yellow			Pink			Purple		
East Alternatives	Blue	Cyan	Green	Blue	Cyan	Green	Blue	Cyan	Green
Weekday Passengers Carried (Opening)	2,830	2,600	2,330	3,000	2,800	2,480	2,960	2,760	2,450
Weekday Passengers Carried (2035)	7,292	6,700	6,050	6,850	6,800	6,150	6,650	6,600	5,950

6.2.2 Operating plans

The service to be provided in the Paseo del Norte Corridor will ultimately be determined by the demand in the corridor. For purposes of the analysis, the operating plan was developed using ridership based on the forecasts in Table 6-5. This addresses service and the cost implications for the implementation of the project. To evaluate the Short List against a common operating assumption, the most costly option was used, based on 6-minute peak-period headways and 7.5-minute off-peak headways.[4] Table 6-5 shows the headways used and, given the ridership forecasts, the effect of those headways on the number of vehicles needed and, in the next section, the cost of the associated service level.

Table 6-5. Operating plan summary

Northwest Alternatives	Yellow			Pink			Purple		
Journal Center Alternatives	Blue	Cyan	Green	Blue	Cyan	Green	Blue	Cyan	Green
Round Trip Running Time (min.)	97.1	105.1	94.9	99.8	107.7	97.5	99.1	107.0	96.8
Opening Day									
Weekday Passengers, Opening	2,830	2,600	2,330	3,000	2,800	2,480	2,960	2,760	2,450
Peak-Period Headway (Policy)	10	10	10	10	10	10	10	10	10
Off-Peak Headway (Policy)	15	15	15	15	15	15	15	15	15
Peak Buses, Opening Day	11	12	11	11	12	11	11	12	11
Spare Buses, Opening Day	3	3	3	3	3	3	3	3	3
2035									
Weekday Max Psngrs., 2035	7,292	6,700	6,050	6,850	6,800	6,150	6,650	6,600	5,950
Max Passenger Load, 2035 Pk Hr	730	670	605	685	680	615	665	660	595
Peak-Period Headway, 2035 Max	6	6	6	6	6	6	6	6	6
Off-Peak Headway, 2035 Max	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Peak Buses, 2035 Max	19	20	18	19	20	18	19	20	18
Spare Buses, 2035 Max	4	4	4	4	4	4	4	4	4

6.2.3 Operating and maintenance costs

The cost of operating BRT service in the Paseo del Norte Corridor is linked directly to key variables such as the number of trips offered during the course of a day, the type of equipment used, and, generally, the number of riders served. Those costs, for the assumptions used in this analysis, are shown in Table 6-6. The analysis was prepared for both 40- and 60-foot buses and shows that it is substantially less expensive to operate larger vehicles despite the higher initial capital cost if the ridership justifies their use. The cost of the vehicles is included in the capital cost estimate.

[4] This level of service represents a true high-capacity BRT and is used as a basis of comparison of the alternatives, but it will need to be phased in over time as the area grows and demand rises.

Table 6-6. 2035 annual operating cost estimate—Short List alternatives (thousands of 2013 $)

Vehicle Scenario	Yellow			Pink			Purple		
	Blue	Cyan	Green	Blue	Cyan	Green	Blue	Cyan	Green
2035 MAX PAX 40' BUSES	$ 8,943	$ 9,320	$ 15,679	$ 8,977	$ 9,225	$ 15,583	$ 8,830	$ 9,078	$ 15,436
2035 MAX PAX 60' BUSES	$ 8,024	$ 8,102	$ 12,512	$ 7,780	$ 8,012	$ 12,554	$ 7,643	$ 7,875	$ 12,417

Not shown in Table 6-6, but also subject to discussion, is what effect the level of service has on operating costs. The service frequency assumptions used here are likely high given forecast ridership levels. If the ridership is accurate, the operating plan could be modified substantially at a significant cost savings while still providing a high level of service in the corridor. This determination will be made with more refined ridership figures on the LPA.

6.2.4 Capital costs by route segments

The estimate of how much it will cost to build improvements and purchase equipment is divided among the Short List segments similar to other analyses. Table 6-7 shows the cost of each segment including three options for the River Crossing segment. The total cost (including a 35% contingency) is for the individual segments and the main component costs are shown separately to indicate how the cost factors influence the total. For example, the park-and-ride element, which is primarily a property acquisition component, is a significant contributor to the total amount.

Table 6-7. Capital cost estimate for Short List alternatives by segment (thousands of 2013 $)

BRT ROUTE SEGMENT	CONSTR. COST ESTIMATE	ROW	P&R ROW COST ESTIMATE	TOTAL COST
Yellow Route	$20,000	$1,000	$11,600	$32,600
Pink Route	$18,200	$4,100	$4,500	$26,800
Purple Route	$10,800	$2,900	$2,600	$16,300
Brown Route - North Side (Frontage Option)	$13,600	$0	$0	$13,600
Brown Route - North Side (El Pueblo Option)	$13,200	$0	$0	$13,200
Brown Route - South Side (El Pueblo Option)	$12,900	$0	$0	$12,900
Blue Route	$1,800	$825	$0	$2,625
Cyan Route	$4,900	$3,800	$0	$8,700
Green Route	$4,000	$1,000	$0	$5,000

6.2.5 Capital cost by complete BRT route option

The capital costs for the segments in Table 6-7 can be combined to create nine full corridor routes that link the Northwest with the Journal Center, including three options for crossing the Rio Grande. The results of the combinations are shown in Table 6-8, including the cost of an appropriate vehicle fleet. These figures are based on conceptual designs for each alternative and include significant contingency amounts. However, they provide a fair comparison among the choices.

6.2.6 Capital cost considerations

The routes range in capital cost from a low of $58 million to a high of $77 million. The lowest cost option is shorter and includes limited park-and-ride capacity, which is a critical factor in planning for this service in the Northwest travel environment. The highest cost route follows the longest alignment and makes provisions for significant park-and-ride access.[5]

Table 6-8. Capital cost estimates by BRT route option (thousands of 2013 $)

Alternative	Yellow			Pink			Purple		
	Green	Cyan	Blue	Green	Cyan	Blue	Green	Cyan	Blue
Cost with North Guideway to Journal Center	$ 51,200	$ 54,900	$ 48,825	$ 45,400	$ 49,100	$ 43,025	$ 34,900	$ 38,600	$ 32,525
Cost with North Guideway to 4th/El Pueblo	$ 50,800	$ 54,500	$ 48,425	$ 45,000	$ 48,700	$ 42,625	$ 34,500	$ 38,200	$ 32,125
Cost with South Guideway to 4th/El Pueblo	$ 50,500	$ 54,200	$ 48,125	$ 44,700	$ 48,400	$ 42,325	$ 34,200	$ 37,900	$ 31,825
Other Costs									
Shuttle Costs for Green Routes	$ 6,000			$ 6,000			$ 6,000		
BRT Vehicle Costs for Service in 2035	$ 19,800	$ 21,600	$ 22,000	$ 19,800	$ 21,600	$ 20,700	$ 19,800	$ 21,600	$ 20,700
TOTALS	$ 76,600	$ 76,100	$ 70,425	$ 70,800	$ 70,300	$ 63,325	$ 60,300	$ 59,800	$ 52,825
Possible Bridge Cost for Purple Route							$ 6,000	$ 6,000	$ 6,000
Purple Route Totals with Coors Bridge Costs							$ 66,300	$ 65,800	$ 58,825

The total uses the cost figures north side guideway as a basis of comparison
Figures do not include cost of vehicle replacements after 12 years of life.

The Yellow Route costs the most—15 percent of that is in park-and-ride lot acquisition costs. If this number can be reduced through better land acquisition opportunities or even dedication in transit-friendly plans, the total cost of the Yellow Route will be more in line with less expensive alternatives.

The Green Route requires the added element of a shuttle service to distribute passengers to a final destination because of its remote location from most employment in the Journal Center. The additional cost makes this option more expensive. Similarly, the cost of a bridge over Coors Boulevard is added to the Purple Route to reflect a more effective routing in negotiating heavy congestion at the Coors/Paseo del Norte interchange.

In all cases, the cost of vehicles of about $20 million is based on a very high frequency of service of 6 minutes in the peak period by 2035 as noted in the Operating Plan. In the short term, that kind of frequency is not needed. A lower frequency will translate into lower capital and operating costs for all routes.

6.2.7 Short List route comparison

Northwest subarea

Table 6-9, below addresses the comparison of routes in the Northwest portion of the corridor. Based on ridership growth potential, right-of-way for BRT guideway development, and operating characteristics, the Yellow Route performs most effectively in the Northwest subarea. The cost of the Yellow Route is higher than the others but largely because of the need to acquire property for park-and-ride lots. Some of this cost can likely be reduced through negotiations with interested property owners who would benefit from the transit service.

[5] This difference is significant because parking access is one element that could drive the implementation program for the new route. If property acquisition can be coordinated with interested property owners who derive benefit from an effective transit program, the land acquisition cost could be lowered substantially. At the same time, acquisition of property in the critical portions of the corridor may be an important and even critical first phase of an implementation plan to preserve options as the area develops.

The Purple Route is less expensive and serves areas already developed so it may have less potential for ridership increases over time. It does offer good access to the major employers in the Northwest, such as Intel and the Cottonwood Mall area.

Table 6-9. Northwest subarea Short List routes evaluation matrix

Category	Criterion		Measure	Short-Listed Alternative Route		
				Yellow	Purple	Pink
				Unser at Southern to PDN to Channel Road to UNM	Unser at Southern to Sara Rd to 528 to PDN to Channel Rd to UNM	Unser at Southern to McMahon to PDN to Channel Rd to UNM
Mobility and Access	1	Improve connectivity between housing and employment in north Albuquerque	TRAM analysis of 2008 pop. at west side station/park-and-rides within 10 minute drive or walk access and within 10 minute walk at Journal Center and at UNM	140500	141600	137400
				13000	12800	12500
			TRAM analysis of 2035 pop. west side station/park and rides within 10 minute drive or walk access and within 10 minute walk at Journal center and at UNM	230600	214500	216100
				17600	16200	16200
	2	Integration with long term transit plan	Qualitative assessment based on Functional Class	Unser Boulevard	Sara Road	McMahon Boulevard
				Identified High Capacity Corridor	Minor Arterial	Multi-modal Corridor
	3	Increase mobility options for all populations in project area (Entire Length of Route)	Potential riders (all population) within 1/2 mile of all stops and average number of potential riders per station/stop	19000	15100	15398
				1900	1510	1711
			Potential riders (all population) within 3 miles of west side park-and-ride/stations and potential riders per PNR	162900	153100	155331
				54300	38275	51777
			Persons below poverty (transit dependent) within 1/2 mile of all stops and average number of transit dependents per station/stop	850	840	717
				85	84	80
			Persons below poverty (transit dependent) within 3 miles of west side park-and-ride/stations and number of persons below poverty per station/stop	7470	7290	7349
				747	729	817
			Persons in a 0 car household (transit dependent) within 1/2 mile of all stops and number of 0-car households per station/stop	450	600	432
				45	60	48
			Persons in a 0 car household (transit dependent) within 3 miles of west side park-and-ride/stations and number of zero-car households per PNR	4000	4290	4042
				1333	1073	1347
	4	Expandability (NW subarea only)	Number of Existing Lanes	2-lane to 4-lane	2-lane to 4-lane	4-lane
			Approximate Roadway Width	24 to 104 feet	38 to 62 feet	80 to 100 feet
			Right-of-Way Policy	156 feet of ROW	86 to 124 feet of ROW	106 to 156 feet of ROW

Table 6-9. Northwest subarea Short List routes evaluation matrix (continued)

Category	Criterion		Measure	Short-Listed Alternative Route		
				Yellow	Purple	Pink
				Unser at Southern to PDN to Channel Road to UNM	Unser at Southern to Sara Rd to 528 to PDN to Channel Rd to UNM	Unser at Southern to McMahon to PDN to Channel Rd to UNM
Land Use and Community Development	5	Serve major activity centers	Identify activity centers along route	Rust Center Hospital Complex, Volcano Heights	Intel, Cottonwood Mall	Rust Center Hospital Complex, Cottonwood Mall
	6	Encourage transit supportive land uses along transit corridors	Developable land within 1/4-mile radius of stations (acres)	225	70	130
	7	Serve future UNM/CNM students	Students within 1/2 mile of HCT (2008)	3,020	2,770	2,800
Operational Characteristics	8	Consistency with roadway policies	Identify any key obstacles	Segment between Paradise and Irving where widening will be difficult (1/2 mile)	Not identified as a transit corridor	McMahon a Major Transit Corridor in the ABQ/BC Comp Plan
	9	Provide time-competitive transit alternatives	Northwest distance (miles)	8.2	6.7	8.2
			Travel time with auto trip in Northwest (minutes)	14.5	12.7	13.4
			Travel time per mile in Northwest (minutes)	1.77	1.90	1.97
			Estimated Park and Ride Spaces Available	2100	1340	1300
			Normalized Intersection Score based on functional classification	15.5	19.6	22.3
Financial Feasibility	10	Comparative cost assessment for capital and operations for NW	Estimated Preliminary Annual Operating Costs (number of buses @ 10 min headway peak and 15 min off-peak)	$4.7 million	$4.5 million	$4.65 million
			Conceptual Cost Estimate for Route, including ROW	$31.2 million	$16.3 million to $22.5 million	$26.8 million
Environment	11	Review of 9 Environmental Factors	Ranking based on Comparison of the Alternatives (Score of 27 is Highest Possible)	21	18	20

The Purple Route faces an already highly utilized roadway so the introduction of a new facility, if possible at all, will have to be made in a manner compatible with the conditions along the route.

The Pink Route is the only one that directly serves the Northwest Transit Center and its park-and-ride lot. Its alignment along Unser Boulevard coincides with the Yellow Route but turns eastward at McMahon Boulevard, which is a primarily residential area that does not offer many prospects for change over the near term. Once the Pink Route reaches Coors Boulevard, it follows a similar path to the Purple Route but deviates from Coors at Eagle Ranch Road to avoid the heavy congestion at the Coors Boulevard/Paseo del Norte interchange. While the intent is to avoid congestion (Eagle Ranch Road serves some high density developments), the roadway is limited in its ability to carry an expeditious BRT service. Nonetheless, the Purple Route might also need to consider using this route as a result of the issues at the Coors/Paseo del Norte interchange.

River crossing

The segment of the route between Coors Boulevard and Jefferson Street has been evaluated in a variety of ways. The alternatives are listed in Table 6-10. This segment has a number of challenges regardless of which option is selected. The main issue is whether a new or widened bridge can be accommodated across the Rio Grande. A second factor is existing agreements in place with the Village of Los Ranchos and others regarding the use of Paseo del Norte as well as the treatments along the roadway and on the cross streets in the segment. A determination will need to be made about how these affect a transit improvement designed to mitigate against growing congestion along the roadway.

Mixed flow operation would not contribute to the Purpose and Need for the project leaving bus service subject to the same conditions faced by the car. There is insufficient width on the Rio Grande River bridge deck and under the overpass structures to provide for a separate lane in each travel direction for buses under the existing configuration. Modification of the outside lanes of the roadway to carry BRT service cannot be accommodated near overpasses because of the limitations in the existing design geometrics. The existing roadway would not readily accommodate a full standard dedicated lane for BRT. For a portion of the segment, a single reversible lane could be fit into the bridge cross-section that would allow service to operate in both directions with proper timing controls if lane design standards can be moderately relaxed. This could be a reasonable temporary measure to help with anticipated congestion associated with the construction of the new Paseo del Norte/I-25 interchange.

The most effective option requires the use of the wide rights-of-way along the segment to introduce a dedicated guideway on the north or south side of the existing roadway. This will require modification to the bridge across the Rio Grande but would not necessitate modifying existing cross structures. In the analysis for this report, the north side option offers more flexibility because it does not contend with the existing multi-use path that parallels the roadway on the south. The north side is also the location of the San Juan Chama water line, but it is not expected to pose design problems for the guideway.

How far the dedicated facility is carried is also a subject of discussion. As a first phase of the guideway implementation, terminating the facility at 4th Street and continuing the route along El Pueblo Road is a compromise that maintains good access to the Rail Runner station west of Edith Boulevard, opens access to high-density residential development, takes advantage of available rights-of-way along El Pueblo, and provides for favorable access into the Journal Center. There could be a potential for disagreement within the community with this alignment depending on how the design is developed. Other guideway termination points (e.g., Second Street, Edith Boulevard) were considered, but all posed greater challenges for completion.

Long term, it may be appropriate to extend the guideway to Jefferson Street along the north side of Paseo del Norte. The connection into the Journal Center will be decided by the final configuration of the Paseo del Norte/I-25 interchange and its relationship to the Jefferson Street intersection. A preliminary assessment of the choices proposed connecting the north side guideway to Jefferson Street from a street along the Domingo Baca channel north of Paseo del Norte.

Table 6-10. Paseo del Norte BRT alignment options between Coors Boulevard and Jefferson Street

Feature	BRT Route Alignment Option				
	Mixed Flow	North Side BRT Guideway	South Side BRT Guideway	Median BRT Guideway	Side-Running BRT Lanes
Type of BRT Facility	Shared	Separated Guideway	Separated Guideway	Median Lanes	Outside Lanes
Level of Operation Expected	Low	High	High	High	High
Separation from PDN General Purpose Lanes	None	Concrete Barrier Wall	Concrete Barrier Wall	Concrete Barrier Wall	Paint
Treatment at Coors Interchange	Use Existing Facilities	New Bridge Structure; Space Available	New Bridge Structure; Landing Constraints on East Side	Widen Existing PDN Bridge	Widen Existing PDN Bridge
River Crossing Structure Issues	None	New Parallel Bridge Preferred	New Bridge Needed; Trail Accommodation Required	Widen Existing PDN Bridge	Widen Existing PDN Bridge
Bosque Trail Impacts	None	Extend Underpass CBC Structure	Extend Underpass CBC Structure; May Need to Modify Profile Grade	Extend Underpass CBC Structure on Both Sides	Extend Underpass CBC Structure on Both Sides
Rio Grande Boulevard Crossing	As Exists	Underpass Preferred; At-Grade Transit-Only Intersection Possible	Underpass Preferred; At-Grade Transit-Only Intersection Possible	New, Wider Structure Required	New, Wider Structure Required
Chamisal Lateral Ped Bridge	As Exists	Modify North Side Access	Realign PDN Trail and Access	Wider Structure Required	Wider Structure Required
Paseo del Norte Trail Impact	None	None	Modifications Required	Minor Adjustments May Be Required	Minor Adjustments May Be Required
Fourth Street Crossing	As Exists	Underpass Preferred; At-Grade Transit-Only Intersection Possible	At-Grade Transit Only Intersection	Wider Structure Required	Wider Structure Required
Impacts on Adjacent Properties to Fourth Street	As Exists	Large Lot Residences 3,100 feet	Apartments 950 feet	Less Noticeable	Less Noticeable
Other Considerations	Does Not Meet Project Purpose and Need	San Juan Chama Water Line	Difficult to Stay in PDN Alignment Past Fourth Street	Left-Side Ramp Issues at Second Street Interchange	May Preclude Future Widening for General Purpose Lanes

Journal Center subarea

The main objective in a Journal Center routing is to provide direct access to employment. The Blue Route accomplishes that most effectively without substantial new infrastructure. While it is the most expensive choice under the assumptions used herein, it has the best potential to attract riders to BRT. The assumptions on which the route was based include a significant amount of right-of-way acquisition to widen the roadway. If that widening can be curtailed and less expensive traffic management devices used in its place, the cost can be dramatically reduced.

While the Green Route along Channel Road is easier to implement, it does not serve employment centers well. To offset this limitation, a shuttle was incorporated into the Green Route to help passengers reach their destinations. This adds travel time through a transfer and potentially significant operating cost for the additional distribution/circulation service.

The Cyan Route follows a circuitous path through the Journal Center to bring riders as close as possible to their destinations, but the physical features of the route make it difficult for large buses to negotiate and add travel time and operating costs. This option would also introduce a significant new physical element and potentially disruptive change in the middle of the employment complex.

Table 6-11 shows the comparison among the three alternative routes in the Journal Center.

Table 6-11. Journal Center Short List alternatives

Category	Criterion		Measure	Short-Listed Alternative Route		
				Green Route	Blue Route	Cyan Route
				Channel Arterial	Jefferson Street	Existing Local Streets
Mobility and Access	1	TRAM Analysis of Journal Center Jobs Access	Jobs within walking distance (2008)	7,520	7,650	9,710
			Jobs within biking distance (2008)	42,100	43,200	43,100
			Jobs within walking distance (2035)	8,020	8,290	10,420
			Jobs within biking distance (2035)	46,700	47,700	48,200
	2	Integration with long term transit plan	Connect to Los Ranchos Rail Runner Station	Yes From El Pueblo	Yes as north side separated guideway;	Yes From El Pueblo
	3	Expandability	BRT System Expansion Potential	Medium	High	Medium
			Existing/Proposed Right-of-Way	100 ft on east side of N. Div. Channel	86 feet	36 feet
			Existing/Proposed Street Section	3 lanes	5 lanes	2 lanes
Operational Characteristics	4	Provide time-competitive transit alternatives	Travel time from PDN/ 2nd to Osuna/Jefferson (minutes)	14.8	15.7	~14 to 15
			Access to Paseo del Norte	Indirect	Direct	Indirect
			Congestion Level	Low	High	Low
Financial Feasibility	5	Comparative cost assessment plan for capital improvements	Conceptual Cost Estimate	$5.0 million	$14.9 million	$8.7 million
Land Use and Community Development	6	Encourage transit supportive land uses along transit corridors	Developable land within 1/4-mile radius of stations (acres)	42	14	7
Environment	7	Review of 9 Environmental Factors	Ranking based on Comparison of the Alternatives (Score of 27 is Highest Possible)	23	18	22

7 Locally Preferred Alternative Recommendation

The analysis and discussions with the public and the Technical Committee all point to the Yellow-Blue Route as the preferred choice among the Short List alternatives. The Yellow and Blue segments would be linked by a separate guideway along the north side of Paseo del Norte between Coors Boulevard and 4th Street and a portion of El Pueblo Road from 4th Street to Jefferson Street. Ridership is comparable to, or higher than, other alternatives and there is more opportunity to grow ridership over time as the areas along Unser Boulevard and Paseo del Norte evolve. This also presents the opportunity to integrate transit supportive land use elements and infrastructure into the future build out of the areas around the stations. The limited access design of those two roadways and their wide rights-of-way also contribute to the ability to design and build a guideway that can operate separately from other vehicles and provide a much higher level of service that will more effectively compete with the automobile and entice riders to avoid growing congestion across the Rio Grande.

As a result, the Yellow-Blue route shown in Figure 7-1 with the cost information presented in Table 7-1 is recommended as the LPA within the Paseo del Norte Corridor.

Table 7-1. Locally Preferred Alternative refined cost estimate (FTA Standard Cost Categories)

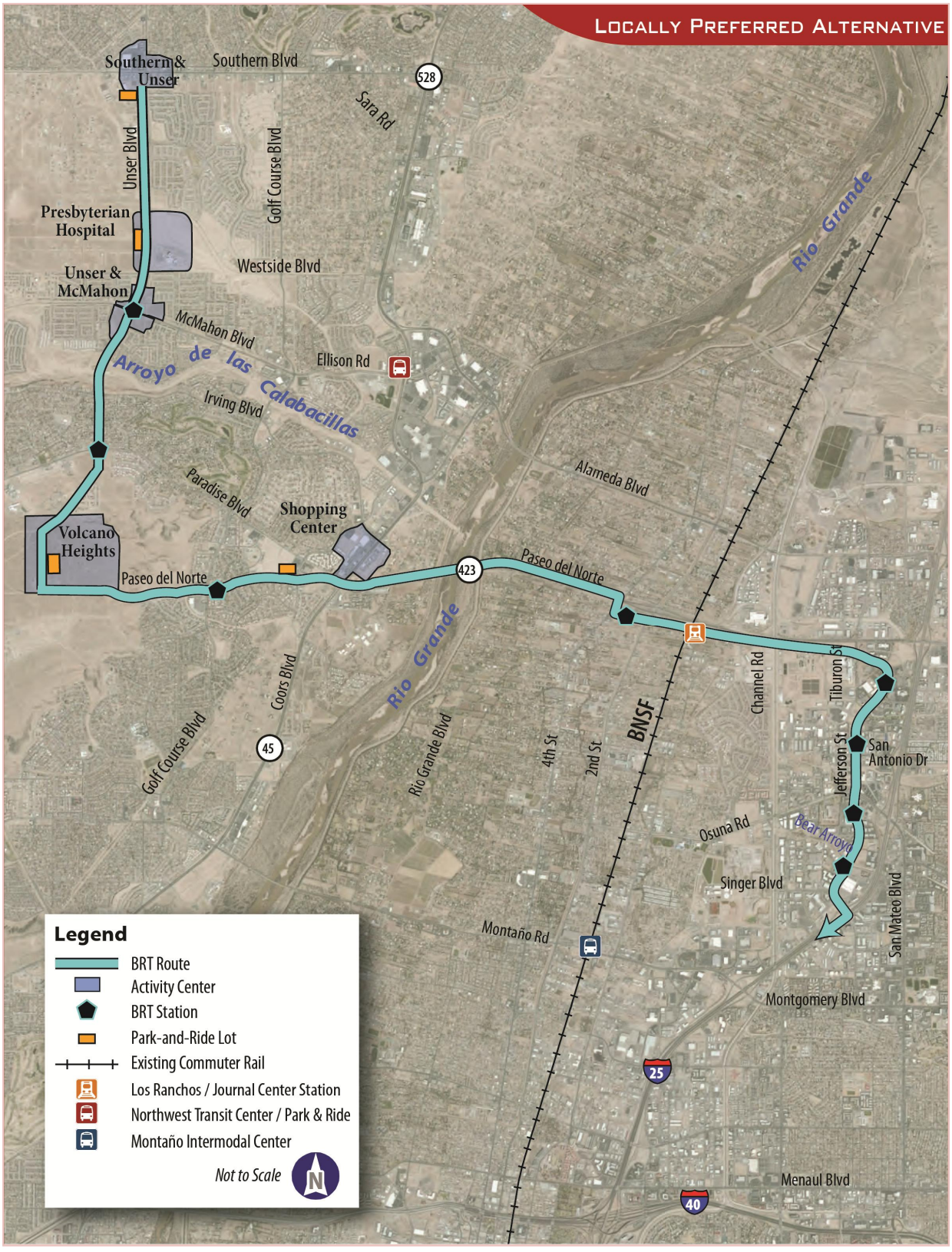
#	Standard Cost Category Items	Category Total
10	Guideway : At Grade Semi-Exclusive	$33,800,000
20	At-Grade station, stop, shelter, mall, terminal, platform	$8,700,000
30	Yard, Shops, Support Facilities	$0
40	Pedestrian/bike access and accommodation, landscaping	$20,250,000
50	Systems (ITS, control systems for buses, AVL, etc.)	$9,400,000
60	Purchase or lease of real estate	$14,900,000
70	Vehicles	$12,000,000
80	Professional Services	$6,000,000
90	Unallocated Contingency	
100	Finance Charges	
Total Project Cost		$105,050,000

7.1 LPA service plan concept

The concept behind delivering BRT is ensuring that the service can compete with the car. In general, the primary improvements that set this project apart are the park-and-ride lots and the dedicated guideway elements. They afford the service a significant advantage over using a heavily congested roadway to deliver bus service. Hence, the operating plan is designed to grow with the completion of the improvements with a full operation in place at the time the primary improvements are completed. The capital cost to build the recommended LPA is $105 million in 2013 dollars through the implementation period (2016 through 2025, in this analysis). Including capital needs beyond the implementation period (2022 through 2035), primarily in the form of additional vehicles for increased service and vehicle replacements as they reach their useful life, the total cost is $127 million.

The new route will begin with modest frequency of service and only ramp up operating levels as improvements come on line. Thirty-minute headways in the beginning are primarily provided to offer an alternative to the car for those who need it or prefer not to drive. Over time, as the BRT service level improves

Figure 7-1. Recommended Locally Preferred Alternative



and traffic congestion in the corridor worsens, the objective will be for the BRT to help alleviate congestion by attracting riders from their cars. By the time most critical improvements are built (i.e., the dedicated bridges and guideway), headways are projected to be reduced to 10 minutes during the peak periods. Headways will be reduced further (less than 7 minutes) after full implementation of the improvements as ridership growth warrants.

The proposed frequency has implications for operating costs. At headways of 6 minutes in the peak and 10 minutes in the off-peak, the annual operating cost is about $8 million. Lengthening headways to 10 minutes in the peak and 15 minutes in the off-peak would reduce the annual operating cost to about $5.4 million. The appropriate level of service will be determined by ridership once the service is in operation. The proposed operating plan concept is provided as Appendix 6.

7.2 LPA cost estimate

The cost estimate for the LPA was refined substantially once the alignment recommendation was made. The high level estimates used in the evaluation process were expanded and detailed to better understand the full project and its requirements. The cost of the project, conservatively developed assuming a 35 percent contingency in all construction categories, presented in FTA SCC format, is $105 million. Details of the LPA cost estimate are in Appendix 7.

7.3 Proposed LPA implementation phasing

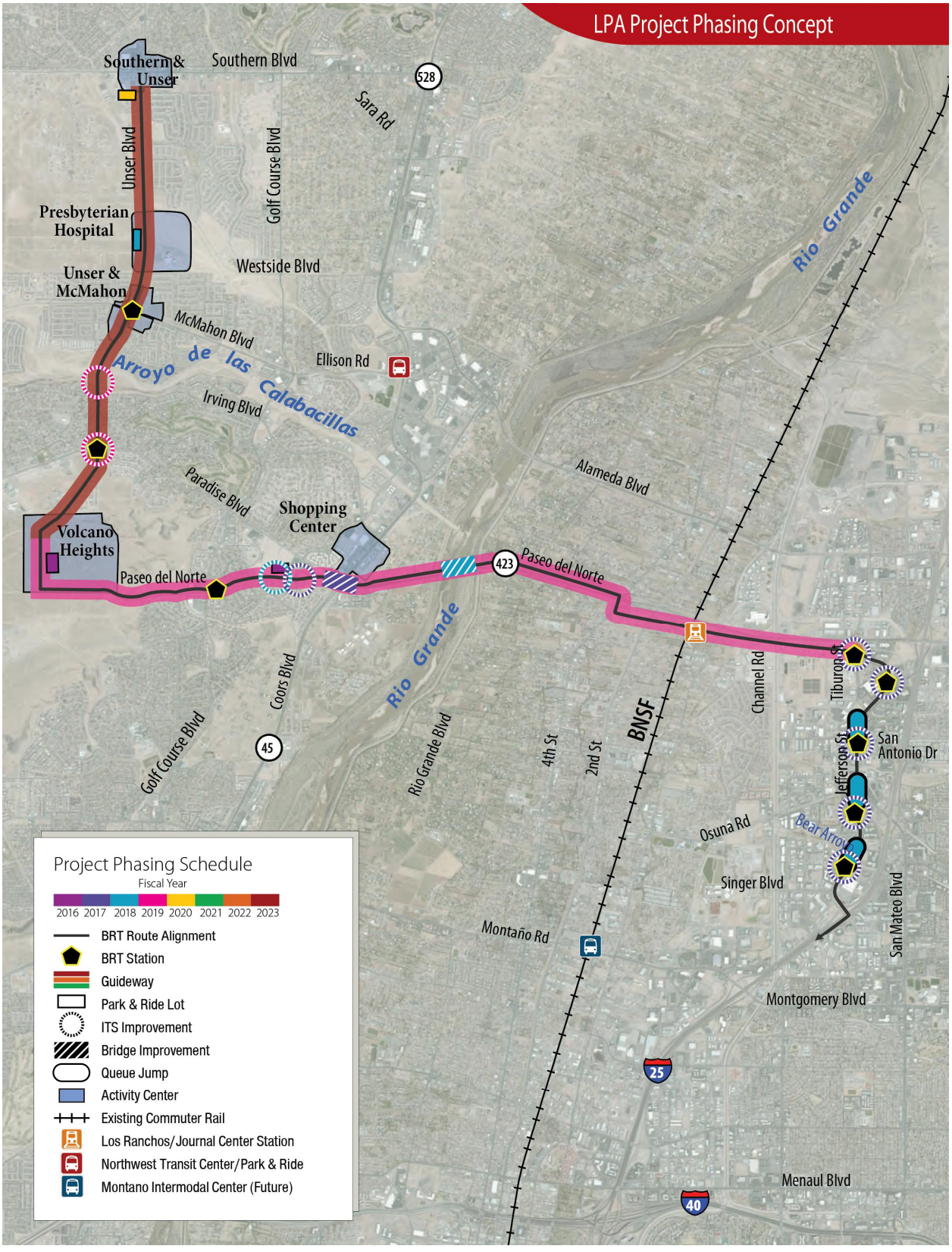
The basis for establishing the implementation plan for the project is opportunity as much as it is need and available funding. Given the characteristics of the corridor, providing access to potential riders who can drive to a park-and-ride location will positively impact ridership. It will be most effective to focus efforts on acquiring or implementing features that might otherwise become unavailable or exceedingly costly if delayed, such as land needed for park-and-ride lots. If available, though demand may be low in the early years, it is worth the investment to secure a critical element of the proposed system.

The recommended implementation of improvements in the corridor, in general, follows a logical progression that allows each phase to visibly move the project toward completion while satisfying the recognized need for capacity in the corridor. Implementation of the Paseo del Norte Corridor BRT improvements is a progression of projects that encourages ridership immediately and grows it over time as the remaining phases are completed. As shown in this plan, the implementation phase could extend over 10 years depending on the financing approach used. That timeframe can be readily changed as funding opportunities present themselves.

This implementation phasing plan assumes complete implementation of the Paseo del Norte BRT route following the above ridership-building premise and attempts to align the elements to maximize overall benefit to the project and, most importantly, to the travelling public. This sequence of work assumes funding is available within the identified timeframe. Funding will be the primary decision-making influence in any of the implementation steps. Priorities for plan elements can be defined by opportunity and need and they can be aligned in an optimal sequence, but the order will ultimately be shaped by when fund become available.

Even with the relatively relaxed implementation schedule shown here, given current funding sources, it will be very difficult to build the Paseo del Norte improvements without additional revenue. The implementation plan calls for capital costs that exceed available BRT implementation funding by a substantial amount each year during the project implementation phase. At this point, BRT implementation funds is the only identified capital funding source. If funding cannot be made available, the plan can be modified to reduce the capital improvements to be made but it would have a negative effect on potential ridership.

Figure 7-2 Conceptual Implementation Phasing Plan based on Table 7-2



On the capital side of the plan, the project will need to seek additional local funding or federal assistance to bond against anticipated revenues to support the most expeditious implementation of the improvements. A federal grant of $65 million would provide sufficient funding to complete the project by the proposed timeframe of 2025. That is a large Small Starts grant, but well within the allowable grant program. Higher levels of funding would be needed from a bond program to pay for the interest that would accrue during the period of the indebtedness.

The operating plan would require a new allocation of local resources for most operating costs above the currently available transit operating funds of $11 million a year. Starting at about $2.3 million in 2016, the operating costs rise to about $8 million in 2035 under the service level assumptions used in this report. Modifying those assumptions will change the operating funding needed.

Figure 7-2 And Table 7-2 identify the elements with highest priority for implementation and the associated costs. This conceptual phasing plan is designed primarily as a sequencing tool to maximize the utility of the improvements as they are built. As noted on Table 7-2, short term improvements should include the relatively straightforward implementation of the ITS improvements along the route and on the mixed flow segments on El Rancho Road and Jefferson Street, in particular, These improvements are of value not only to the BRT service eventually, but to all who use those roadways and a partnering approach to their implementation will reduce the burden on any one agency. Purchase of the land for park and rides and queue jumps is also an important early implementation action because the sites may not be available for long as development activity and the economy improve. However, even with such early stage investments, there is limited ability to attract ridership without the guideway component of the system. The service can flourish only if it competes with the car. The linkage from Eagle Ranch Road to 4th Street is critical to the success of a BRT service because it allows buses to bypass the congested portion of the corridor. While there may not need to be a full development of the separated guideway from Eagle Ranch west or, preferably, from Paseo del Norte north along Unser Blvd, the proposed service depends heavily on the guideway over Coors Boulevard and across the Rio Grande. The early critical phase improvements are a substantial portion of the total cost at about $70 million. A portion of that could be funded by a Small Starts grant.

The ultimate financial plan will identify how closely this phasing plan can be adhered to as well as the specific timing of implementation. The implementation schedule of some elements may need to be modified to better match available funding as the funding details become clearer.

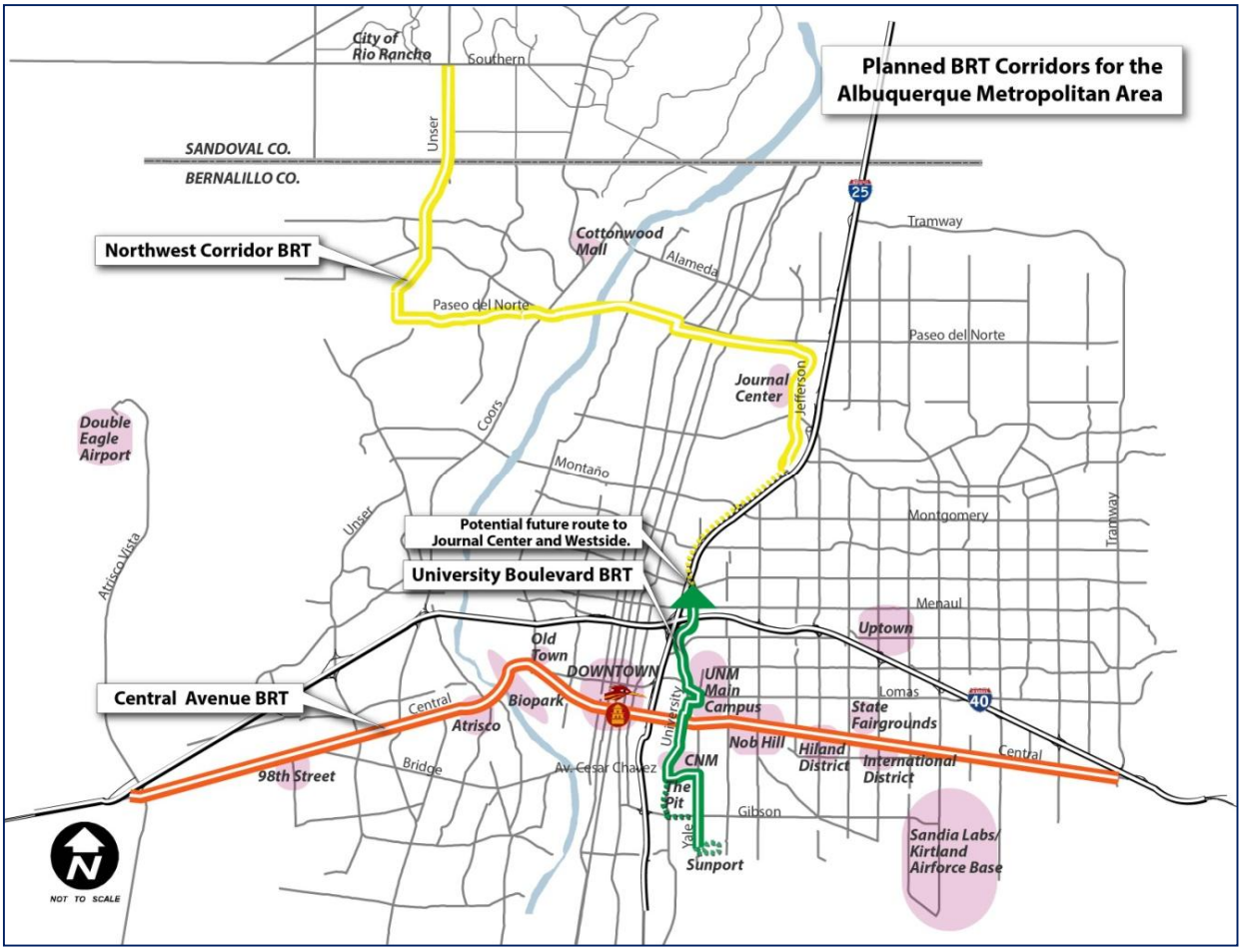
Table 7-3 is one possible financing plan for the capital improvements using local revenue, federal grants and bonding to complete the project in five years.

7.4 Integration with other transit services—regional transit strategy

Another consideration in shaping the operating plan is integrating the new BRT service with other ABQ RIDE, Rio Metro services and the Rail Runner. The latter is directly accessible from the proposed BRT route and opens access to Santa Fe or Belen. Almost immediately, a link between the Paseo del Norte BRT and the ABQ RIDE Route 790 will need to be established. The connection would ideally occur in the proposed Eagle Ranch Road transit facility/park-and-ride and would require some route modifications to the existing service to provide a seamless connection between east-west and north-south routes that would extend the regional reach for both. The benefit would be substantially expanded non-automobile travel choices in the region and a potentially more efficient ride to UNM/CNM from the west side. Similarly, a connection to services on the east side of the river will expand the reach of premium transit beyond the Paseo del Norte route itself. A good example would be a connection to the proposed new BRT services on University Boulevard and Central Avenue. The southerly portion of the proposed LPA could also be interlined with the proposed UNM/CNM/Sunport BRT route to gain further benefit in terms of regional coverage (see Figure 7-3) and provide connection with the already heavily used transit services on Central Avenue, which is currently in

BRT project development. These are steps toward a broader concept that can be extended over time to additional connecting routes as proposed in the MTP BRT system, eventually to cover most of the metropolitan region. Other linkages would include Route 157 on Montaño/Montgomery and 140 and 141 on San Mateo and Jefferson Street through a portion of the Journal Center. Additional information on connecting transit routes in contained in "Working Paper on Detailed Evaluation of Short-Listed Alternatives (May 2013)."

Figure 7-3. Potential BRT Corridors in Albuquerque



The routes that were not selected in this AA were not eliminated because they do not have merit. A preferred route was selected as the best opportunity to introduce the BRT service to the Northwest area with the best long-term prospects for ridership growth. The other routes, however, also offer advantages in terms of service to underserved areas that can be developed as demand and funding prospects improve. The more ubiquitous the service is, the more readily it can meet people's needs and become a viable alternative to the car as congestion levels increase.

In support of the long-term objective of the region's transit strategy, improvements made for the Paseo del Norte BRT system guideway connecting across the Rio Grande would offer improved service to any transit route that can access it. This will, in turn, expand the reach of all such routes and help implement the coordinated regional transit strategy.

Table 7-2. Proposed implementation sequencing of capital expenditures (thousands)

Project		Annual Distribution of Expenditures ('000s)																				
Segment Number	Independent Project Segments	Pre Project		Project Implementation										Post-Implementation Improvements								
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
0	*Buses (New Flyer DE60LF) - new*			$ 4,500	$ 7,000			$ 3,000	$ 2,000			$ 1,000				$ 4,000						$ 5,000	
	Replacements															$ 6,000		$ 1,000		$ 3,000	$ 2,000		
1	*Unser Boulevard - Southern to PDN*																						
	a. Guideway/roadway										$ 10,000	$ 6,200	$ 5,000										
	b. ITS improvements									$ 2,800													
	c. Park and ride lots (2)						$ 3,200			$ 4,225													
2	*Paseo del Norte - Unser to Coors*																						
	a. Guideway/roadway (from Volcano Heights)							$ 6,000	$ 5,700														
	b. ITS improvements				$ 2,000																		
	c. Park and ride (2, Volcano Heights and Eagle Ranch)			$ 5,000																			
3	*Paseo del Norte/Coors Blvd Interchange area*																						
	c. PDN Overpass over Coors				$ 2,000	$ 4,800																	
	d. ITS improvements			$ 700																			
4	*Paseo del Norte/El Pueblo Blvd - Coors to Jefferson*																						
	a. Guideway (Coors Blvd to 4th Street)						$ 3,000	$ 3,000															
	b. Rio Grande bridge improvements					$ 3,000	$ 5,500																
	c. 4th Street - guideway to El Pueblo (over PDN)									$ 500													
	d. El Pueblo Guideway/BAT lanes (4th St to Jefferson St)								$ 4,500	$ 5,000													
5	*Jefferson Street - El Pueblo to I-25*																						
	a. Queue Jumps/Guideway			$ 1,700		$ 3,300																	
	b. ITS			$ 1,500																			
Totals				$ 13,400	$ 11,000	$ 11,100	$ 11,700	$ 12,000	$ 12,200	$ 12,525	$ 10,000	$ 7,200	$ 5,000	$ -	$ -	$ 10,000	$ -	$ 1,000	$ -	$ 3,000	$ 2,000	$ 5,000	$ -

Table 7-3. Capital funding plan for Paseo del Norte BRT project (5-year construction, 10-year bond)

PDN CAPITAL FUNDING TABLE			Escalation Assumptions			Bond Period (Years)	Bond Interest					
			Escalation Rate for Capital	2.5%		10	4.0%					
Implementation Funding Cycle		1	2	3	4	5	6	7	8	9	10	11
PASEO DEL NORTE BRT	TOTAL	BRT Implementation Period						BRT Maturation Period				
Uses of Funds	2016-2035	2,016	2,017	2,018	2,019	2,020	2,021	2,022	2,023	2,024	2,025	2,026
Capital Costs												
PDN Debt Service	49,316,378		4,931,638	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638
Paseo del Norte BRT Capital Costs (escalated)	110,945,331	23,150,000	38,400,344	37,610,405	6,070,971	3,394,225	2,319,387	0	0	0	0	0
Total Capital and Financing Costs	160,261,709	23,150,000	43,331,982	42,542,043	11,002,609	8,325,862	7,251,025	4,931,638	4,931,638	4,931,638	4,931,638	4,931,638
Sources of Funds												
Capital Revenues												
Local Sources												
Local	25,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000						
Paseo del Norte BRT												
FTA Section 5309 Small Starts	40,000,000		40,000,000									
Federal Funds allocated to BRT Implementation	55,458,000	5,467,000	5,892,000	2,990,000	6,203,000	6,203,000	6,203,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Bond Proceeds	40,000,000	40,000,000										
Other (e.g., Private)												
Subtotal, Local, Federal and State Capital Sources	160,458,000	50,467,000	50,892,000	7,990,000	11,203,000	11,203,000	6,203,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Other Capital Sources	0											
Total Capital Revenue	160,458,000	50,467,000	50,892,000	7,990,000	11,203,000	11,203,000	6,203,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Project Capital Surplus or Shortfall	*196,291*	*27,317,000*	*7,560,018*	*(34,552,043)*	*200,391*	*2,877,138*	*(1,048,025)*	*(431,638)*	*(431,638)*	*(431,638)*	*(431,638)*	*(431,638)*
Annual Capital Surplus or Shortfall (Project Carryover)		27,317,000	34,877,018	324,976	525,367	3,402,505	2,354,480	1,922,842	1,491,204	1,059,567	627,929	196,291

8 Conclusions and Next Steps

As noted in the report, the analysis and discussions with the public and the Technical Committee support the Yellow-Blue Route as the preferred choice among the Short List alternatives. At this early stage, ridership is forecast to be higher than other alternatives and it serves a growing area of the metropolitan region where growth is anticipated to be strong. The areas along Unser Boulevard and Paseo del Norte provide access to large, potentially developable lands. That growth can translate into increased ridership if transit services are deployed in a way that supports new residents' and employees' travel needs. The character of these roadways in terms of their design specifications and role in moving people also contributes to the ability to design and build a guideway that can operate in a largely independent and reliable manner and provide a level of service that can compete effectively with the automobile and attract riders away from traffic congestion across the Rio Grande. While the Journal Center portion of the route faces difficulties because of a narrower configuration and potentially greater right-of-way impact, the Jefferson Street segment of the corridor is considered a key element in providing premium BRT service to the Journal Center.

Among the next steps required to bring the Paseo del Norte BRT to reality are some important considerations that range from funding to local relations.

8.1 Capital funding

This AA shows two ways to pay for this project: pay-as-you-go or issuance of bond indebtedness backed by a reliable revenue source. The first is a longer process and relies effectively on all-cash payments. The latter expedites the implementation but increases overall project costs and also depends on access to additional sources of revenue. The best approach will need to contrast the desired construction timeline against available funding resources. Under any circumstances, funding will be the most significant consideration in this type of program.

The funding plan shown in this report assumes that all federal funding currently shown to be allocated to BRT development over the next five-year period will continue to be allocated to BRT development into the foreseeable future and dedicated to this project. The financing plan relies on this continued funding source to pay for capital improvements. The plan also identifies the need for additional capital funding through new local revenue sources, bonds/loans and federal Small Starts grants to pay for the needed improvements if the project is to be built within a reasonable timeframe such as the 6-year timeframe presented in Table 7-3 or even the longer period shown in Table 8-1. The only funding currently identified to pay back loans and bonds is the annual RMRTD BRT allocation (shown at an unescalated $6.2 million annually through 2035). Given that this revenue may not be allocated to a single project over the entire period (2016 through 2021), that is an optimistic assumption and may limit financing options.

Table 7-3, a bonding approach to financing will deliver the project in five years. The timeframe for implementation of a pay-as-you-go (Table 8-1), Paseo del Norte BRT begins in 2016 and extends through 2025 for most major improvements. The viability of this schedule depends on access to the requisite funding, primarily additional local funding. Federal grants could be available, but there are two other BRT projects in development within the MRCOG region—the Central Avenue BRT and the UNM/CNM Sunport route—which may command a higher priority in terms of attracting federal grant funds because of high existing ridership or the potential for high ridership within a relatively short timeframe. If the other projects precede Paseo del Norte, funding availability could delay implementation unless substantial new local funding is identified.

As noted above, in the absence of a new or expanded funding source and the commitment of most existing funding to operations, Rio Metro may have limited ability to bond against current revenues. In order to deliver the Paseo del Norte BRT without federal funding, any new revenue would have to be available to pay for improvements directly or to finance a loan or bond program that would expedite the construction of the

improvements. This will require a committed ability to make the requisite periodic payments which requires a predictable and reliable source of funding.

Federal funding from a Small Starts grant would most likely have to wait until after similar applications for the Central Avenue or University Boulevard projects should those projects move ahead of Paseo del Norte BRT seek federal support. That could delay Paseo del Norte chances for federal funding until 2017 or later.

Alternative funding packages that could build the project sooner are shown in Table 8-1 and Table 8-2. As presented, these would build the project more quickly but require additional up-front local funding, higher grant amounts and between $35 and $40 million in bond indebtedness to be paid over a ten or fifteen year period. The total cost, including the debt service would be higher, but transit service could be delivered sooner.

8.2 Operations funding

The cost of operations will depend on the level of service to be offered. Recognizing that a true BRT implementation relies on reliably high frequencies (at least during the peak periods) to attract ridership, operations funding will likely be high. As with capital improvements, Paseo del Norte operations will compete for the available resources with other services currently funded by Rio Metro or planned to be funded by Rio Metro (e.g., University BRT). At a possible $8 million a year for a high level service on Paseo del Norte by 2035, funding availability could present challenges that will need to be addressed systemically given current (2014) operating revenues of about $11 million a year.[6] Early operations are substantially lower at under $3 million a year through 2019 (rising as service frequency increases) but still represent a major contribution from a limited funding source.

8.3 Land use changes within the corridor

One of the key opportunities in the Paseo del Norte Corridor is to integrate the plan for BRT as well as other transit services into the land use changes anticipated in the Northwest Albuquerque and Rio Rancho areas. Some of the proposed projects in the Volcano Heights area will incorporate transit-exclusive busways, which can help establish a transit-oriented commuting pattern within that district and offer more options for general travel. The jobs-housing imbalance within the Paseo del Norte Corridor, however, will need to be treated with more than transit service. It will be important to bring additional employment to the west side of the Rio Grande and even to look for housing opportunities within the Journal Center. Some possible balancing opportunities are addressed in Section 3.4, Land Use Considerations.

Over the long run, better balance in land uses will not only shorten trips, but make them more amenable to transit usage as they cluster closer to attractive transit services. While the potential BRT system offers many regional transportation benefits, achieving full land use (and economic development) potential depends on the ability of affected local governments to support land use policies and ordinances that encourage development that strengthens transit options. The Station Specific Land Use Analysis completed as part of this study, notes the transportation and economic development benefits of investment in BRT can be maximized by increasing density, improving the pedestrian environment, easing parking requirements, improving roadway connectivity (grid network), and providing incentives for development in station areas.

[6] The long term cost of Paseo del Norte BRT service could be reduced by reducing frequency of service with a likely reduction on ridership.

Table 8-1. Capital funding table for Paseo del Norte BRT project (pay-as-you-go)

PDN CAPITAL FUNDING TABLE		Escalation Assumptions			Bond Period (Years)	Bond Interest					
		Escalation Rate	2.5%		0	4.0%					
Implementation Funding Cycle	1	2	3	4	5	6	7	8	9	10	11
PASEO DEL NORTE BRT	TOTAL	BRT Implementation Period									
Capital Uses of Funds	2016-2035	2,016	2,017	2,018	2,019	2,020	2,021	2,022	2,023	2,024	2,025	2,026
Capital Costs												
PDN Debt Service	0		0	0	0	0	0	0	0	0	0	0
Paseo del Norte BRT Capital Costs (escalated)	120,014,684	13,400,000	11,556,875	11,953,486	12,914,611	13,576,899	14,148,260	14,888,289	12,184,029	8,991,813	6,400,423	6,560,435
Total Capital and Financing Costs	120,014,684	13,400,000	11,556,875	11,953,486	12,914,611	13,576,899	14,148,260	14,888,289	12,184,029	8,991,813	6,400,423	6,560,435
Capital Sources of Funds												
Capital Revenues												
Local Sources												
Local	40,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000			
Paseo del Norte BRT												
FTA Section 5309 Small Starts	21,000,000		3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000			
Federal Funds allocated to BRT Implementation	63,973,001	5,467,000	5,892,000	2,990,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,001
Bond Proceeds,	0											
Other (e.g., Private)												
Subtotal, Local, Federal and State Capital Sources	84,973,001	10,467,000	13,892,000	10,990,000	14,203,000	14,203,000	14,203,000	14,203,000	14,203,000	6,203,000	6,203,000	6,203,001
Other Capital Sources	4,000,000	4,000,000										
Total Capital Revenue	122,770,000	14,467,000	13,892,000	10,990,000	14,203,000	14,203,000	14,203,000	14,203,000	14,203,000	6,203,000	6,203,000	6,203,001
Project Capital Surplus or Shortfall	*2,755,316*	*1,067,000*	*2,335,125*	*(963,486)*	*1,288,389*	*626,101*	*54,740*	*(685,289)*	*2,018,971*	*(2,788,813)*	*(197,423)*	*(357,434)*
Annual Capital Surplus or Shortfall (Project Carryover)		1,067,000	3,402,125	2,438,639	3,727,028	4,353,130	4,407,870	3,722,581	5,741,552	2,952,739	2,755,316	2,397,882

Table 8-2. Capital funding table for Paseo del Norte BRT project (5-year construction, 15-year bond)

PDN CAPITAL FUNDING TABLE		Escalation Assumptions			Bond Period (Years)	Bond Interest												
		Escalation Rate	2.5%		15	4.0%												
Implementation Funding Cycle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PASEO DEL NORTE BRT	TOTAL	BRT Implementation Period					BRT Service Maturation Period											
Uses of Funds	2018-2035	2,016	2,017	2,018	2,019	2,020	2,021	2,022	2,023	2,024	2,025	2,026	2,027	2,028	2,029	2,030	2,031	2,032	2,033
Capital Costs																			
PDN Debt Service	47,219,078		3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	0	0
Paseo del Norte BRT Capital Costs (escalated)	114,611,022	17,015,000	16,442,281	17,499,473	30,272,069	19,233,940	14,148,260	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital and Financing Costs	161,830,099	17,015,000	19,590,220	20,647,411	33,420,007	22,381,878	17,296,198	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	3,147,939	0	0
Sources of Funds																			
Capital Revenues																			
Local Sources																			
Local	35,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	5,000,000												
Paseo del Norte BRT																			
FTA Section 5309 Small Starts	28,000,000				28,000,000														
Federal Funds allocated to BRT Implementation	70,176,000	5,467,000	5,892,000	2,990,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000						
Bond Proceeds	35,000,000	35,000,000																	
Other (e.g., private)																			
Subtotal, Local, Federal and State Capital Sources	133,176,000	46,467,000	11,892,000	8,990,000	40,203,000	12,203,000	11,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	0	0	0	0	0	0
Other Capital Sources	0																		
Total Capital Revenue	168,176,000	46,467,000	11,892,000	8,990,000	40,203,000	12,203,000	11,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	6,203,000	0	0	0	0	0	0
Project Capital Surplus or Shortfall	*6,345,901*	*29,452,000*	*(7,698,220)*	*(11,657,411)*	*6,782,993*	*(10,178,878)*	*(6,093,198)*	*3,055,061*	*3,055,061*	*3,055,061*	*3,055,061*	*3,055,061*	*3,055,061*	*(3,147,939)*	*(3,147,939)*	*(3,147,939)*	*(3,147,939)*	*0*	*0*
Annual Capital Surplus or Shortfall (Project Carryover)		29,452,000	21,753,780	10,096,369	16,879,362	6,700,484	607,286	3,662,347	6,717,409	9,772,470	12,827,532	15,882,593	18,937,655	15,789,716	12,641,778	9,493,839	6,345,901	6,345,901	6,345,901

8.4 Changing travel behavior

In addition to balancing land uses within the corridor, development of BRT service is consistent with changing travel practices among younger population cohorts. Many young adults (between the ages of 18 and 35) have avoided automobile ownership and driver's licenses for financial, environmental, health, or personal reasons and prefer to travel by public transportation, by bicycle, or on foot. This has been a growing trend across the country[7] and, while a state-by-state breakdown has not been analyzed here, it is important to watch the trends locally to remain aware of pertinent changes and their potential to impact transportation decisions at the regional level. The transportation system needs to be matched to the travel preferences of the users to work effectively, and following the changing patterns will be essential in the speed and character of the roll-out of new transportation services. This could affect the timetable for implementation of this and other projects in the region.

8.5 Regional competition

Monitoring changing conditions as indicated in 8.4, above, also has implications for the economic competitiveness of the region. One of the key factors in new business locating in an area is the quality of the transit system and workers ability to use it. With more Gen X and Millennial participation in the workplace and the changing nature of their preferences for travel, the assimilation of transit into the fabric of the regional transportation culture could have an influence on future economic development decisions. This will be particularly true in competition with other regions with which Albuquerque typically vies for employment prospects (i.e., El Paso, Phoenix, Denver, etc.) and who are investing heavily in transit systems that will be attractive to prospective employers and employees.

8.6 Paseo del Norte agreements

When the roadway was built by NMDOT, there were agreements that specified a certain character for the roadway and placed certain limitations on how the Paseo del Norte Corridor could be used. These agreements are between NMDOT and the Village of Los Ranchos, the Rio Grande Valley Preservation Society, and the North Valley Neighborhood Association. Rio Metro has addressed these organizations regarding possible changes that could result from a BRT project implementation, but no final resolution is yet in hand. The proposed LPA may provide a compatible alternative to new general purpose lanes to help manage congestion and it may require mitigation actions, but the assessment of the project in the context of the agreements will need to be completed in a cooperative fashion with the signatory entities.

8.7 Property acquisition

There is little need for right-of-way acquisition in the proposed LPA because much of the guideway will be located within existing road rights-of-way (either city or state). However, there are individual elements that could carry a relatively high cost such as the park-and-ride lots. As noted in the report, these are important features in the success of the service in a highly car-oriented community. There are also privately owned lands that may need to be purchased at market value. In at least one case, dedication of at least a portion of the needed land for a park-and-ride lot may be obtained from future development interests. Other rights-of-way include property acquisition to build queue jumps at identified intersections and in places where some limited widening may be necessary. The cost estimate identifies right-of-way costs as part of the capital improvement cost for the project.

[7] According to a February 2013 Pew Research Center analysis of Federal Reserve Board and other government data.

8.8 Coordination with other projects

NMDOT plans to redesign the interchange at Paseo del Norte and Coors to improve its performance in light of growing congestion. The timing of the project is not yet defined, but because a key feature of the Paseo del Norte BRT project is a grade-separated crossing of Coors Boulevard to avoid automobile congestion, coordination with the NMDOT redesign effort could result in economies of scale and reduce capital costs for the BRT project. The design of the interchange itself could be developed to accommodate a BRT connection as part of the new interchange. The advantages would be subject to the timing of the interchange project and the desired deployment timeframe of the BRT service, but congestion can be expected to increase in the Coors/Paseo del Norte interchange area upon completion of the I-25/Paseo del Norte interchange project currently being built.

8.9 Engineering and design activities

The nature of the work completed to date addresses the identification of a feasible corridor, but does not specify details of the design and implementation process. As the project advances, the intricacies of the design and engineering elements will be further developed and provide a more comprehensive understanding of how individual aspects of the project will need to be addressed. Some examples of the activities that will be required include:

- How access to the Del Norte Open Space will be maintained
- The exact configuration of access for the BRT service entering and exiting the proposed guideway segment (e.g., design of the Eagle Ranch Boulevard and 4th Street access points to minimize effects on other traffic at those locations)
- Station access and turn movement design for BRT that will minimize interference with traffic flow
- Ensuring complementary design of facilities and operations among all modes that will minimize or eliminate negative impacts on active transportation features such as bike and pedestrian facilities

There will be many other elements of the project that will be further refined in a design process and subjected to a complete environmental review. This process, which includes a technical analysis and a public review program, will very likely propose changes to the project configuration to minimize issues, improve design and mitigate environmental challenges. The operation of the system will also be structured to comply with best practices related to how the project interacts with the community and adjacent features.

8.10 Implementation phasing

The implementation plan in Table 7-2 identifies the timeline of priority elements in the context of attracting ridership. While the two bridges and the guideway in the plan are critical to the long range success of the service, there are modifications that can and should be accomplished as soon as possible and which do not cost as much as the major infrastructure elements. Some of these, such as the introduction of ITS enhancements and queue jump improvements on Jefferson Street can be started soon even in the absence of the funding for the larger improvements.

Similarly, the acquisition of land needed must precede any construction activity, so park-and-ride lots or acquisition of property along the route needed to build stations or guideway improvements can be assessed and funded early to expedite the construction effort later. Any early implementation or acquisition, subject to FTA approval, could also be considered for a valid match for federal funding of a Small Starts grant.

Appendices (included on compact disk)

Appendix 1—BRT Conceptual Design Standards

Appendix 2—Direct Ridership Model

Appendix 3—Environmental Overview

Appendix 4—Land Use Analysis

Appendix 5—Public Outreach

Appendix 6—Operating Plan

Appendix 7—Cost Estimate

Appendix 8—LPA Plan Sheets

CD Pocket