Bus Rapid Transit Route Planning Project

Executive Summary

JUNE 2010

IBI GROUP

THE PLANNING CENTER

Disclaimer

This is a project for the Western Riverside Council of Governments (WRCOG), Bus Rapid Transit Route Planning Project, with funding provided by the Southern California Association of Governments' (SCAG) Compass Blueprint Program. Compass Blueprint assists Southern California cities and other organizations in evaluating planning options and stimulating development consistent with the region's goals. Compass Blueprint tools support visioning efforts, infill analyses, economic and policy analyses, and marketing and communication programs.

The preparation of this report has been financed in part through grant(s) from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) through the U.S. Department of Transportation (DOT) in accordance with the provision under the Metropolitan Planning Program as set forth in Section 104(f) of Title 23 of the U.S. Code.

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1. Introduction and Purpose of Study

The BRT Route Planning Project was conducted under a SCAG Compass Blueprint grant to identify corridors in the WRCOG area of jurisdiction that would be suitable for bus rapid transit (BRT) service and determine the priority for BRT projects to be developed following implementation of the previously studied Magnolia Corridor BRT project. Based off of the 2035 growth projections, this report reflects a long range opportunity for BRT implementation.

This study is non-binding. Jurisdictions, and local transportation commissions and agencies, are not required to adopt this plan. In addition, no funding is available at this time to pursue BRT or any other element discussed in this report. However, as SB 375 and AB 32 move forward for implementation, local governments will be required to develop plans that reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions. BRT is one avenue that can be pursued towards the goal of GHG reductions and this study lays out possible routes and opportunities to pursue BRT in western Riverside County in the future.

In the event that there is a desire among the region's policy makers to explore BRT in the future, this study could be used and/or referenced as a potential starting point. Nothing in this report suggests or recommends that any future study be funded, or that any policy be changed to move in that direction. To advance the recommended corridors to implementation, each will require a feasibility study and financial plan. Service implementation will be subject to funding availability and the economic constraints at the time. The timing of their implementation will be determined through the planning and programming processes of WRCOG, the Riverside Transit Agency (RTA), and the Riverside County Transportation Commission (RCTC).

2. Study Process

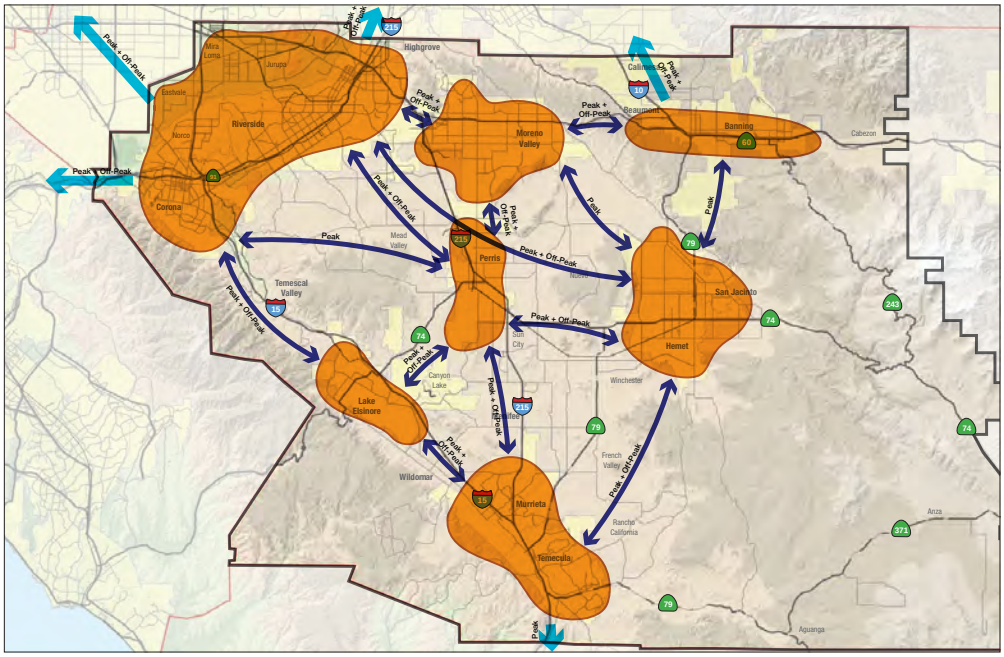
The study was conducted under the direction of an interagency project team with representatives of WRCOG, SCAG, RTA, and RCTC. Discussions with individual cities and Riverside County staff contributed to the information used in the study. The analysis was conceptual in nature and future in-depth studies would be required to determine if BRT service can be cost-effectively provided in the potential corridors. The evaluation considered the conceptual operational characteristics of the potential BRT services, but did not attempt to provide a detailed financial analysis.

The study was conducted through the completion of several individual tasks. Initial efforts focused on data gathering, research on the key characteristics of BRT that would attract riders, and case studies of existing BRT services. These activities enabled the development of an initial set of freeway and arterial corridors that were subjected to an initial screening. The highest rated corridors received additional analysis. The results of the additional analysis led to a set of recommended corridors, followed by a discussion of funding and the prospects for implementation. As the corridor analyses were taking place, an analysis of station development opportunities was conducted for six types of BRT stations. Separate technical memos, available under separate cover, were prepared to document each of the tasks.

3. Rider Profile

The Rider Profile task documented travel demands in the study area, and the key attributes that make BRT attractive to riders. The major travel demands are shown in Figure 1, followed by the BRT attractiveness attributes.

Figure 1 Major Regional Travel Patterns



Source: RTA Comprehensive Operational Analysis, 2007

The key elements of BRT found to attract riders include:

- Travel Time Savings
- Travel Time Reliability
- Service Frequency
- Unique Vehicles
- Enhanced Stations
- Branding
- Consistent Service Operation
- Service Design
  - Service to at least one activity center, more if possible
  - A simple, easy to understand route system
  - Service spans longer than most of the transit system
  - Limited number of stops
  - Connections to other services
  - Provision of local service in same corridor if warranted
  - Fare levels that are generally less than commuter rail service
  - Provisions for taking bikes on vehicles

4. Case Studies

BRT services in the five metropolitan areas listed below were researched to provide guidance for the type of BRT services that can be considered in the study area.

- LA Metro Rapid, Los Angeles, CA
- Swift Bus Route 99, Everett, WA
- York Region Transit VIVA York, Toronto, Canada
- Valley Metro RAPID, Phoenix, AZ
- Houston Park-and-Ride Express Service, Houston, TX

The review of these systems revealed several elements that could be part of the BRT system in Western Riverside County.

- Several of the systems have special treatments for their stops, stations, and vehicles as part of the branding of the system. These aspects identify the service as unique, enabling existing and prospective riders to easily identify them as the higher quality services.

- Almost all of the systems use newer vehicles with specialized design features and amenities. The use of these vehicles provides a higher level of comfort that supports the image that the BRT services are unique and high quality.

- Stops and stations have extra amenities, such as real time arrival information, to enhance the customer experience.

- Several of the systems have major park-and-ride facilities, in some cases with direct access to freeways. These facilities enable service provision to a large catchment area, especially for long distance commutes. They also provide parking for carpools and vanpools, enabling a leveraging of benefits for alternative transportation efforts.

- HOV lanes shared with buses enable BRT services to operate at a higher speed and provide faster travel times. Like the park-and-ride lots, the lanes enable several alternative transportation modes to take advantage of the capital investment.

- The arterial BRT systems use transit signal priority extensively to provide faster operating speeds and shorter travel times. While relatively low in cost, the use of TSP provides attractive benefits for commuters and other riders in congested corridors. Their use requires close coordination with local traffic engineers in both design and operation to minimize impacts to cross streets.

5. Initial Corridors

Based on discussions with the Project Team, review of previous reports, input from the region's planning directors, and field inspections, 13 corridors were identified for the initial screening as reported in Table 1 and Figure 2.

Table 1 Initial Screening Corridors

Corridor	Limits	Length (miles)
Freeway/Highway Corridors		
I-15	Corona Metrolink Station - Pechanga Resort	41.7
I-215	Perris Metrolink Station - Pechanga Resort	25.6
I-10	Calimesa - Beaumont	7.5
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9
SR-60/I-10 East	Moreno Valley (Redlands Blvd) to Morongo/Cabazon	19.9
SR-74	Perris Metrolink Station - Hemet	17.0
SR-79	Hemet - Pechanga Resort	17.2
Freeway/Highway Corridors		
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5
Van Buren Boulevard	Magnolia/Galleria - I-215/March AFB	12.7
Mid-Valley Parkway West	I-215 - Lake Perris	4.9
Mid-Valley Parkway East	Lake Perris - Hemet	15.8
Margarita/Ynez	Pechanga Resort - Loma Linda University Medical Center Murrieta	17.2
Jefferson Avenue	Pechanga Resort - Lake Elsinore Outlet Stores	24.7

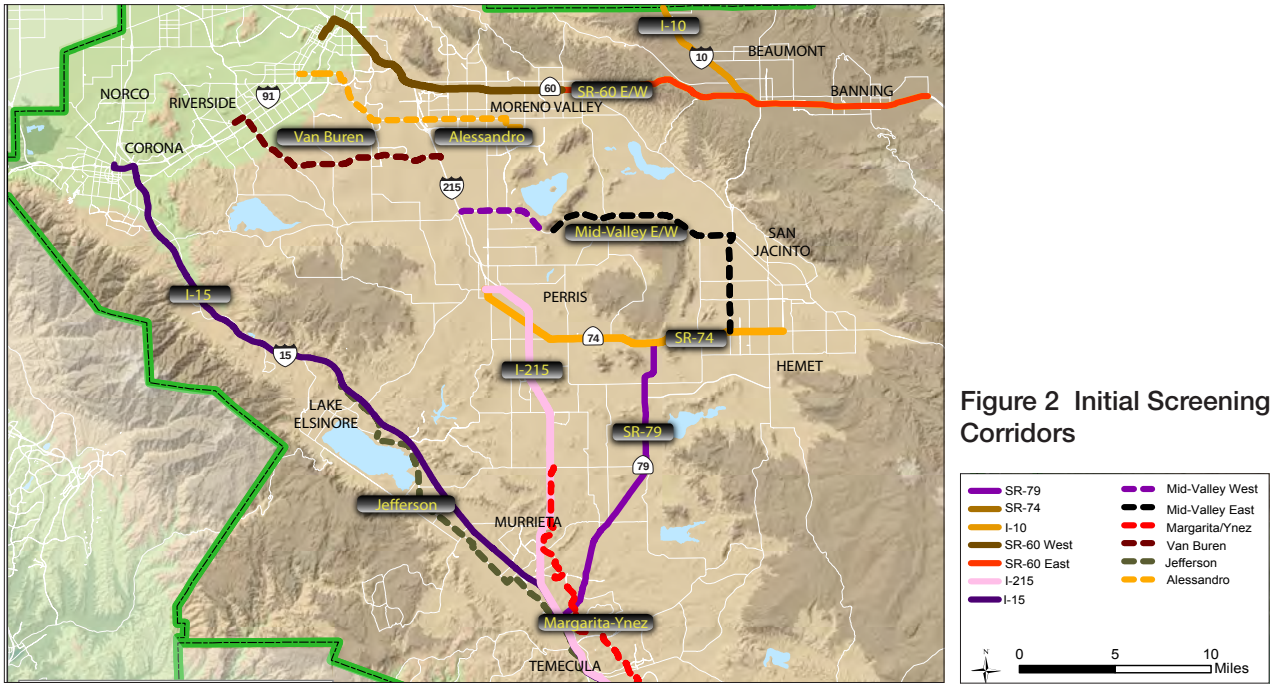


Figure 2 Initial Screening Corridors

Each one was evaluated using these criteria:

- Population Density
- Employment Density
- Activity Centers
- Smart Growth Opportunities
- Local and Regional Transit Connectivity
- Existing Local and Express Bus Service
- Potential for Transit Priority Treatments

Based on the results of the initial screening, five corridors were selected for additional evaluation. While the other corridors were not selected for further consideration of BRT service at this time, they remain candidates for other types of transit service improvements, including enhanced express services, increased frequency, and upgraded vehicles. Specific improvements will be determined as part of the annual short range transportation plan update conducted by RTA.

The Perris Boulevard corridor was added to the detailed evaluation after initial screening as a result of a review of ridership on existing routes in the RTA system. The Perris Boulevard corridor, is among RTA's most patronized routes. Its linear nature and service to key activity centers make it a suitable corridor for consideration of BRT service. Also, during the course of the detailed evaluation, opportunities in Temecula led to combining the Margarita-Ynez corridor with the I-215 corridor. The corridors considered in the detailed evaluation are listed in Table 2.

Table 2 Detailed Evaluation Corridors

Corridor	Limits	Length (miles)
Freeway/Highway Corridors		
I-15	Corona Metrolink Station - Pechanga Resort	41.7
I-215	Perris Metrolink Station - Pechanga Resort	25.6
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9
Arterial Corridors		
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5
Perris Boulevard	Moreno Valley Mall - Perris Transit Center	16.7

6. Additional Screening of Shortlisted Corridors

The three freeway and two arterial corridors with the highest rankings are described below.

Freeway/Highway Corridors

I-15 – The I-15 corridor extends from the Corona Metrolink Station to the Pechanga Resort near Temecula. HOV lanes are planned in the median north of I-215, providing an excellent opportunity for BRT travel time savings. Key stations in the corridor include Pechanga Resort, Temecula Transit Center, Railroad Canyon Road/Lake Elsinore, Dos Lagos, and the Corona Metrolink Station. Selected park and ride lots in the corridor would also be served.

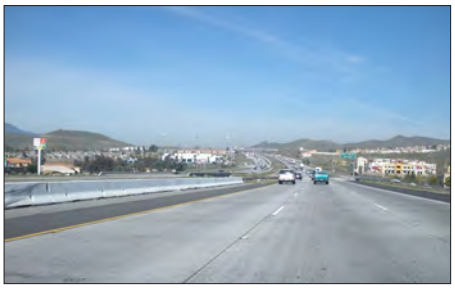
I-215 – This corridor stretches from the Perris Transit Center and future Metrolink station to the Pechanga Resort. Service would be provided to the Metrolink Station at SR-74, the park-and-ride lot at Newport Road, the new Loma Linda Medical Center at Murrieta, the future Temecula Transit Center, and Jefferson Avenue. Selected park and ride lots in the corridor would also be served.

SR-60 West Segment – This corridor extends from the Downtown Riverside Transit Center/Metrolink Station to the eastern end of Moreno Valley at Redlands Boulevard. Key stations include the Moreno Valley Mall and UCR.

Arterial Corridors

Alessandro Boulevard – This corridor extends from Magnolia Avenue to the Riverside County Medical Center in Moreno Valley. It would serve established areas near the Magnolia Corridor, along with developing areas west of I-215 and in Moreno Valley. Key stations include Magnolia Avenue, Mission Grove, the future Moreno Valley March Field Metrolink Station, and the Riverside County Medical Center.

Perris Boulevard – This corridor extends from the Perris Transit Center and future Metrolink station in downtown Perris to the Moreno Valley Mall. It would serve the Riverside Community College and future development at March Air Force Base, and would intersect with the Alessandro BRT corridor. The existing service in the corridor, Route 19, is one of the highest ridership routes in the RTA system.



Developed in collaboration with the Project Team, the following criteria were used to evaluate the shortlisted corridors.

- Population Density
- Employment Density
- Transit Dependency
- Service to Employment Centers & Redevelopment Areas
- Activity Centers
- High Speed Operation/Travel Time Savings
- Local and Regional Transit Connectivity
- Support of Regional & Local Transportation Plans
- Support of Regional & Local Land Use Plans
- Support of Smart Growth
- Effect on Traffic Operations
- Right of Way Availability
- Capital Improvements
- Operating Cost
- Phasing of Corridor into Ultimate System

Each criterion was scored using a scale of -2 to +2 using the following general scoring concept.

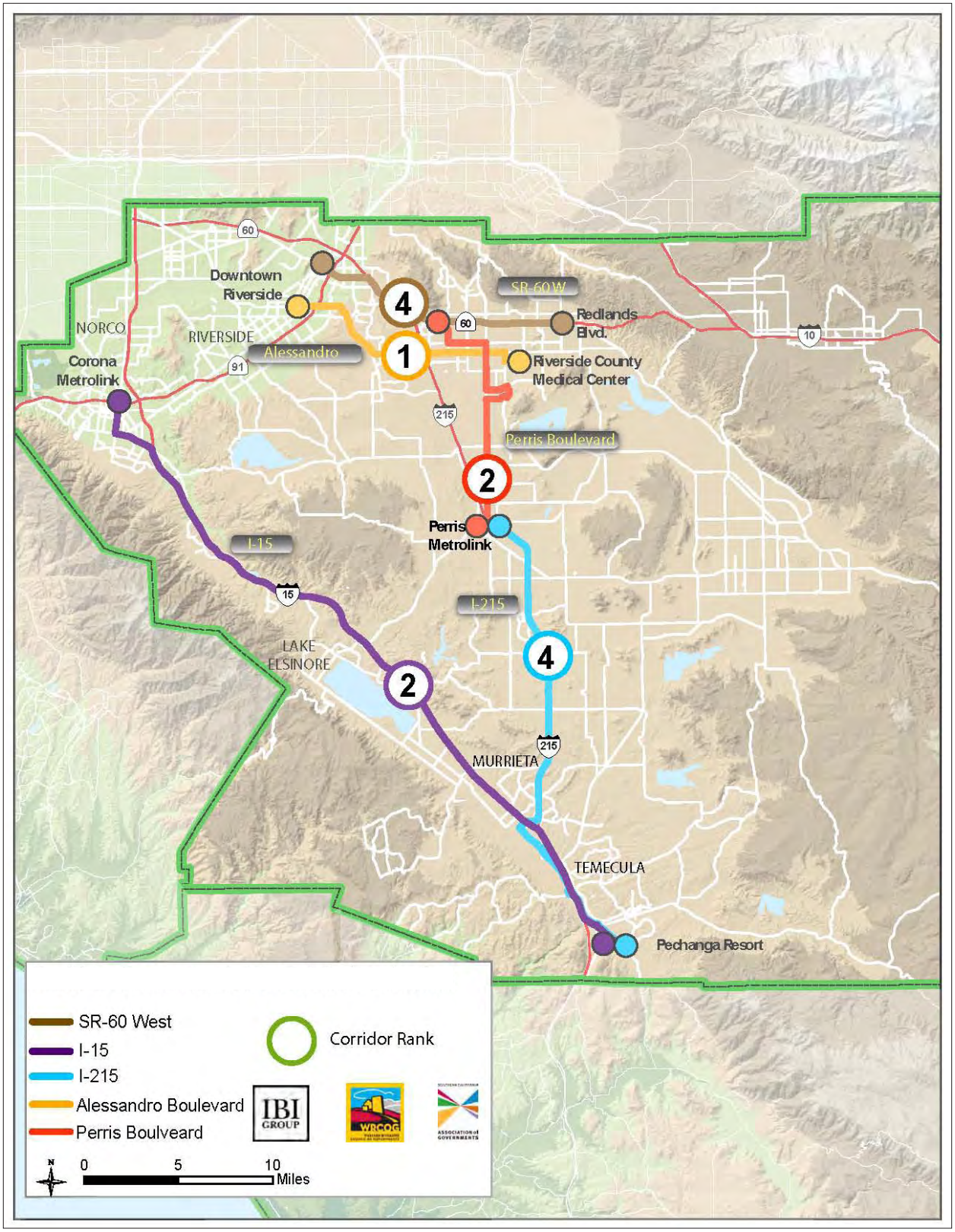
+2 Substantially Positive
+1 Somewhat Positive
0 Average
-1 Somewhat Negative
-2 Substantially Negative

Using the criteria and measurement methods described in Section 3, the corridors were scored for each of the criteria and totaled for an overall score, as summarized in Table 3 and shown in Figure 4.

Table 3 Corridor Scoring Summary

Corridor	Length (miles)
Alessandro Boulevard	15
Perris Boulevard	11
I-15	11
I-215	9
SR-60 West	9

Figure 3 Corridor Rankings



Source: IBI Group

7. Use of Study Results

To maximize its effectiveness and the use of capital investment, BRT service needs to provide frequent service and carry large numbers of passengers. Arterial routes usually serve a wide range of trips throughout the day, many of them short in length, that facilitates high ridership. Freeway routes often serve primarily commuters, leading to the need for frequent service on weekdays during peak periods, but less service during off peak times and weekends. As a result, true BRT service lends itself well to deployment in arterial corridors, while finely tuned, high quality express service can often serve transit demand in freeway corridors.

Implementation of BRT or enhanced express services will most likely be phased in nature. Improved commuter service can be the precursor to BRT particularly along the highway corridors. A similar approach of phased improvement can also used for the arterial corridors. An excellent example is the Route 1 service in the Magnolia corridor. With relatively high frequency service today, Route 1 is a strong candidate for upgrading to BRT service. The demonstrated high levels of demand in the corridor today indicate that BRT will be beneficial as the next step for service between Corona to Moreno Valley in the Magnolia corridor.

Freeway express service can likewise be upgraded in phases with increased frequency during peak hours, enhanced vehicles, and improved amenities at stops. The I-15 corridor, which already has strong commuter demand, could be the beneficiary of these improvements, especially with the future HOV lanes available to increase operating speeds and decrease travel time. Should demand throughout the day build to sufficient levels, service in this corridor could be upgraded to all day BRT type service with higher frequency.

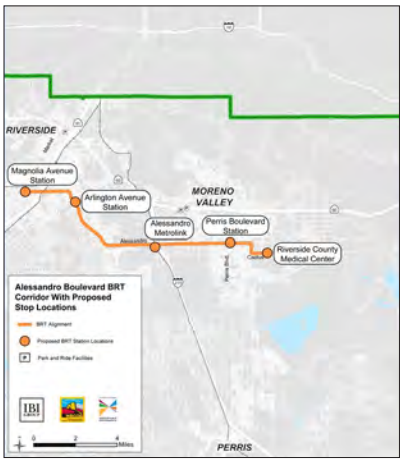
It is also important to note that the level of development density in these corridors will need to increase dramatically to justify and sustain BRT service levels and infrastructure improvements. Research has found that an urban area should have a density of at least 5,000 persons per square mile to support bus rapid transit (TCRP Report 90, Bus Rapid Transit Volume 2: Implementation Guidelines, Table 2-1, page 2-5, 2003). By 2035, the Alessandro and Perris corridors are expected to have population densities near the 5,000 level. The other corridors are projected to have substantially less. In addition, any type of federal grant will require a demonstrated need for service at levels that can support 10 to 15 minute headways for a BRT project to be eligible for funding.

Corridor Improvements

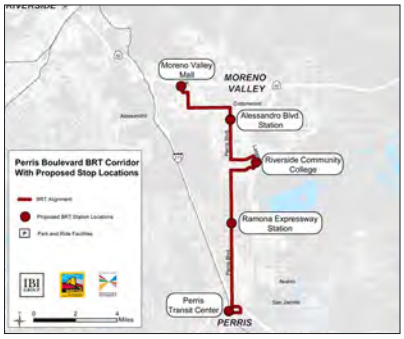
With the key attributes of BRT and express bus service in mind, the following recommendations are provided regarding the study corridors.

BRT Corridors

Alessandro Corridor – As an arterial corridor with strong existing and future travel demand, this highest ranked corridor lends itself well to phased implementation. It can be upgraded gradually, with priority treatments and branded shelters being added early, followed by traffic signal priority, queue jumps, higher frequency, and BRT vehicles. The first step involves incorporating this corridor into the region's programming documents, to secure funding and ensure it is the next BRT corridor to be developed after the both phases of the Magnolia project are completed.



Perris Boulevard –Tied with I-15 as the second highest corridor, BRT service in this arterial corridor can be implemented in a way that matches improvements with increases in demand over time. The start up of Metrolink service in late 2012, in addition to the routes currently serving the Perris Transit Center, will provide an important opportunity to begin the phased upgrade to BRT in this corridor. As March Air Force Base is developed, ridership in this corridor can be expected to grow and BRT service will help serve that demand.

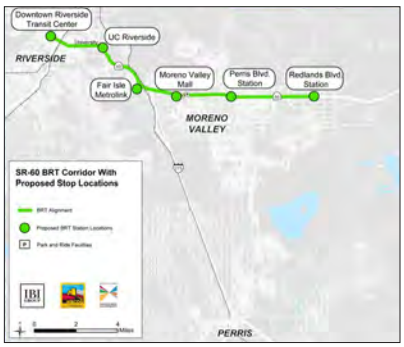


Express Bus Corridors

I-15 – As one of the second highest ranked corridors, I-15 has outstanding potential for upgraded transit service. Due to the long distances and commute nature of much of the corridor's travel, it is recommended that upgraded express service be provided. This upgraded service could be implemented in phases, by first operating on the planned HOV lanes when they are completed to increase operating speed and reduce travel time. Stations in the early phases could be provided on the shoulders, or on interchange on ramps. A stop at the Dos Lagos development could be implemented early, providing service to this high density, mixed use development. Over time, online stations with pedestrian overpasses could be provided to serve park and ride lots and minimize off line travel. Vehicles can be upgraded to highway coaches, similar to the services operated on I-15 in San Diego. Finely tuned scheduling to match work start and stop times would enable the service to be effective and help ensure it is provided at a reasonable cost.

I-215 – Like I-15, this corridor would be more suitable for upgraded express bus service rather than high frequency, all day BRT service. Since HOV lanes are not planned for in this corridor, there will be limited opportunities to improve mainline travel time. Queue jumps and TSP could be provide on the arterial portion of the route. Lower cost stations could be provided on the shoulders, with pedestrian bridges to link both sides of the freeway to the stops. Tying into the Perris Transit Center and the future Metrolink service, will provide a strong terminal connection, while service to the Temecula Transit Center will enhance travel opportunities in the southern part of the study area and assist in the redevelopment along Jefferson Avenue.

SR-60 West – This corridor also lends itself to upgraded express bus service to take advantage of the existing and future HOV lanes. The improved service would provide travel time savings through the congested SR-6-/I-215 interchange, and service to UCR and Downtown Riverside would be enhanced. While it is located near the Alessandro Corridor, its service can be tailed to avoid duplication by focusing on commuter travel, with lower frequency in the off peak periods.



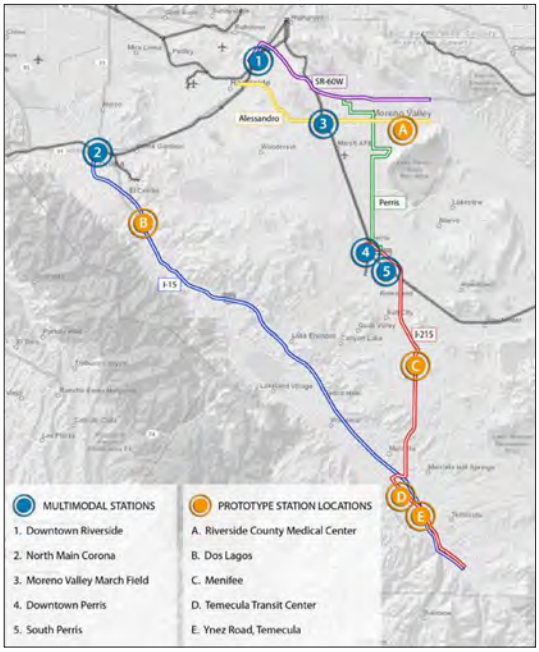
Funding Issues

Reduced tax revenues resulting from the economic slowdown and the changing nature of communities due to difficulties in the housing market, have resulted in a reduced amount of funding for the region's transportation infrastructure projects. Currently federal, state and local revenue streams that are available to fund transit operations have been significantly reduced. While this trend is expected to continue in the near-term, longer term funding solutions and sources may become apparent in the future as alternative transportation methods - such as BRT - may be more fully examined for the potential to reduce vehicle miles traveled and greenhouse gas emissions.

At this time it is not possible to define a timeline for the implementation of these services, as implementation of transit improvements in any of these corridors will depend on the availability of new or increased funding. Identifying specific existing and new funding sources would be an important part of the next phase of service development. The region's transportation partners, WRCOG, RCTC, and RTA, may incorporate these corridors into the region's transportation programs and seek to secure funding for their construction and operation in the future. Gradual upgrades in the highest ranking corridors will be required.

8. Station Area Planning

Focusing urban development around transit facilities is recognized as a significant way to improve the effectiveness of public transportation systems. Furthermore, the placement and design of transit stations can achieve other community planning and development objectives. The future transit stations associated with the BRT corridors in Western Riverside County have multiple roles to play. First, there is the transportation role, including providing safe and efficient interface between riders and buses. Next, and equally important, are the placemaking and land development roles that maximize the placement, size, and design of the station to add character, create place, and help foster surrounding development over time. With this perspective in mind, several BRT station concepts, including their relationship to existing or future potential development, were examined.

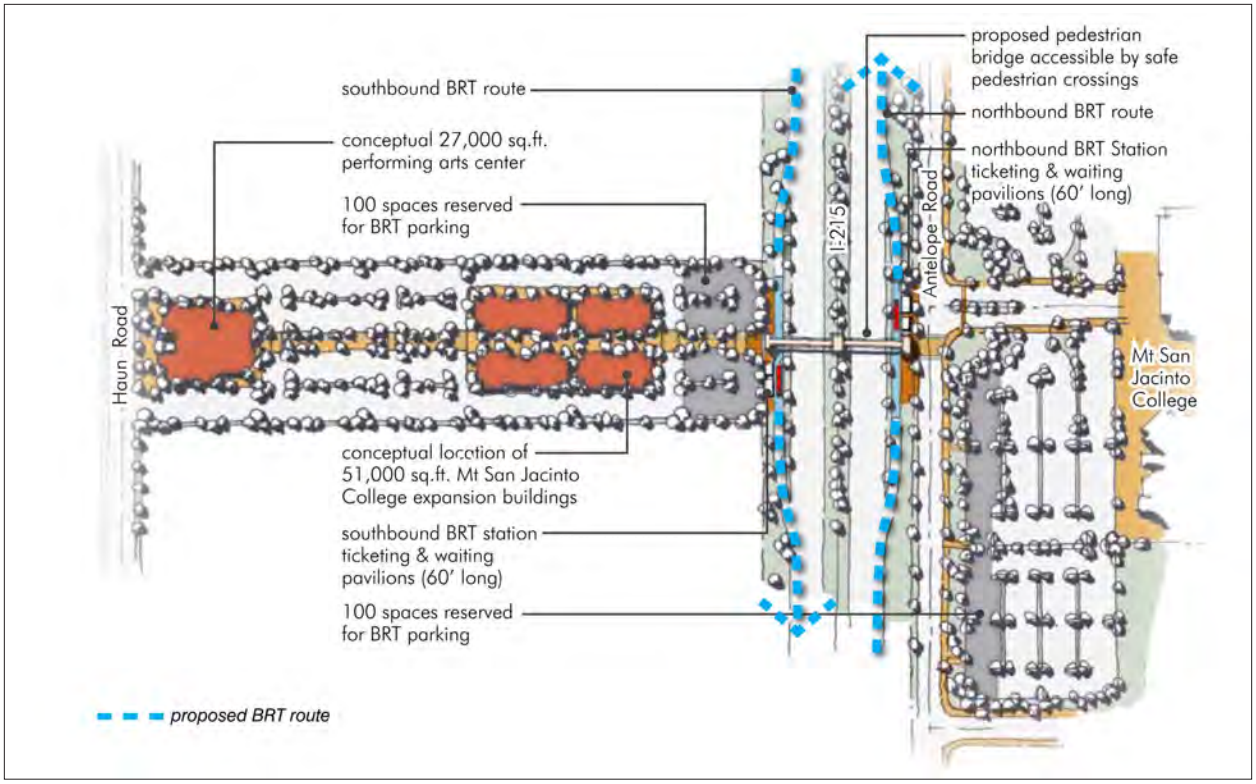


Six prototypical BRT station types were identified for the Western Riverside BRT corridors:

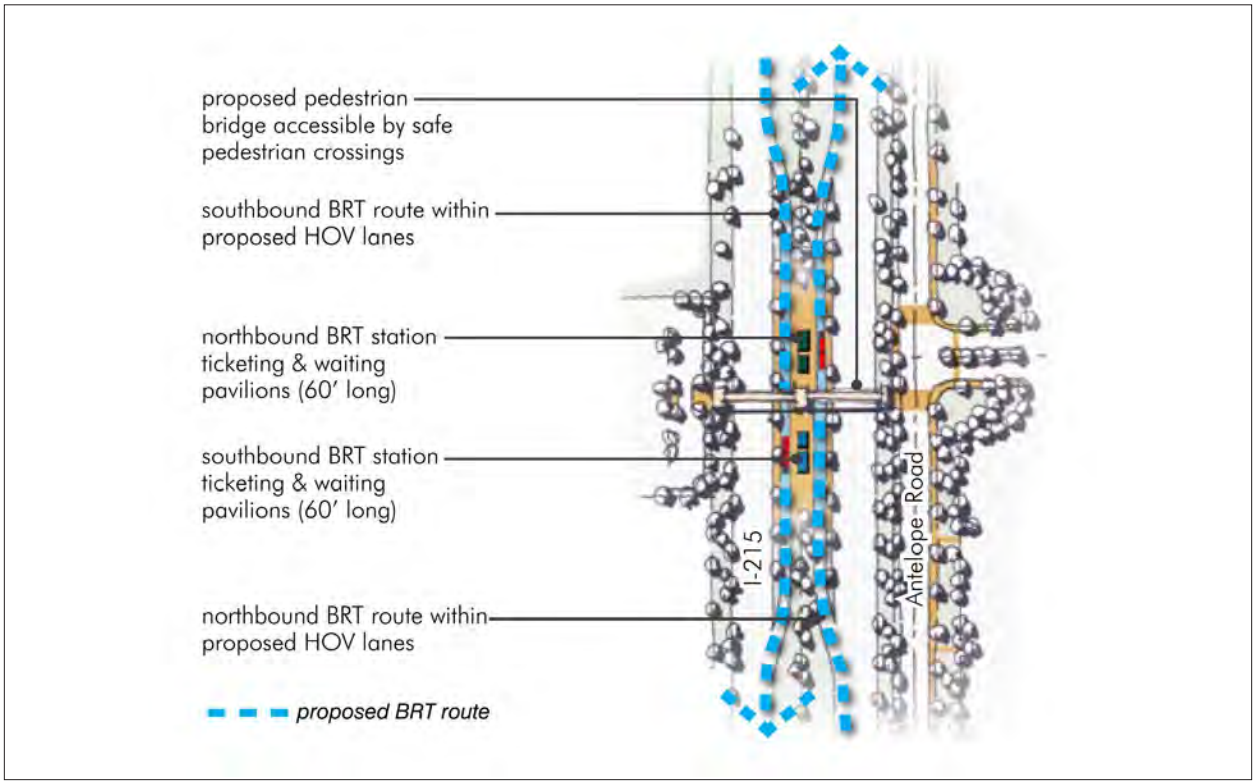
- Multimodal Station - Corona, Riverside, Perris
- Major Bus Transfer Station - Temecula Transit Center
- In-Line Station - Menifee
- End-of-Line Station - Riverside County Medical Center
- Village Center Park-n-Ride Station - Dos Lagos
- Walk-up Station - Abbott Labs

Each of these station types was examined, along with principles and design ideas for associated development, to illustrate the typical station requirements, layout, and integration with surrounding development. These are intended to be used as a guide for future station planning along each of the western Riverside BRT routes. Opportunities for future TOD will of course vary from station area to station area, but the basic principles and best practices for ensuring development that is "transit oriented" versus "transit adjacent" remain the same.

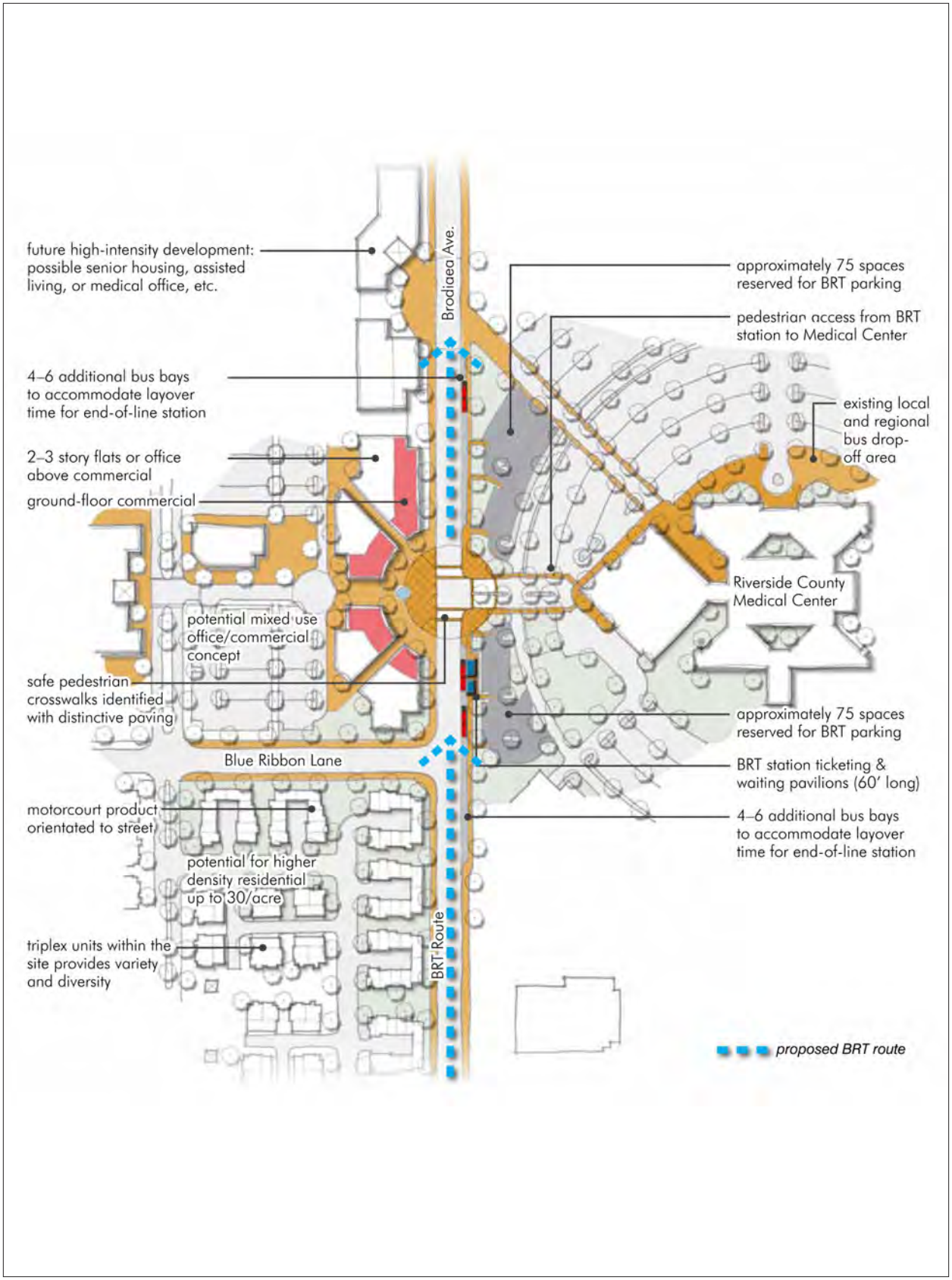
City of Menifee In-Line Station Conceptual Site Plan - Located along shoulder



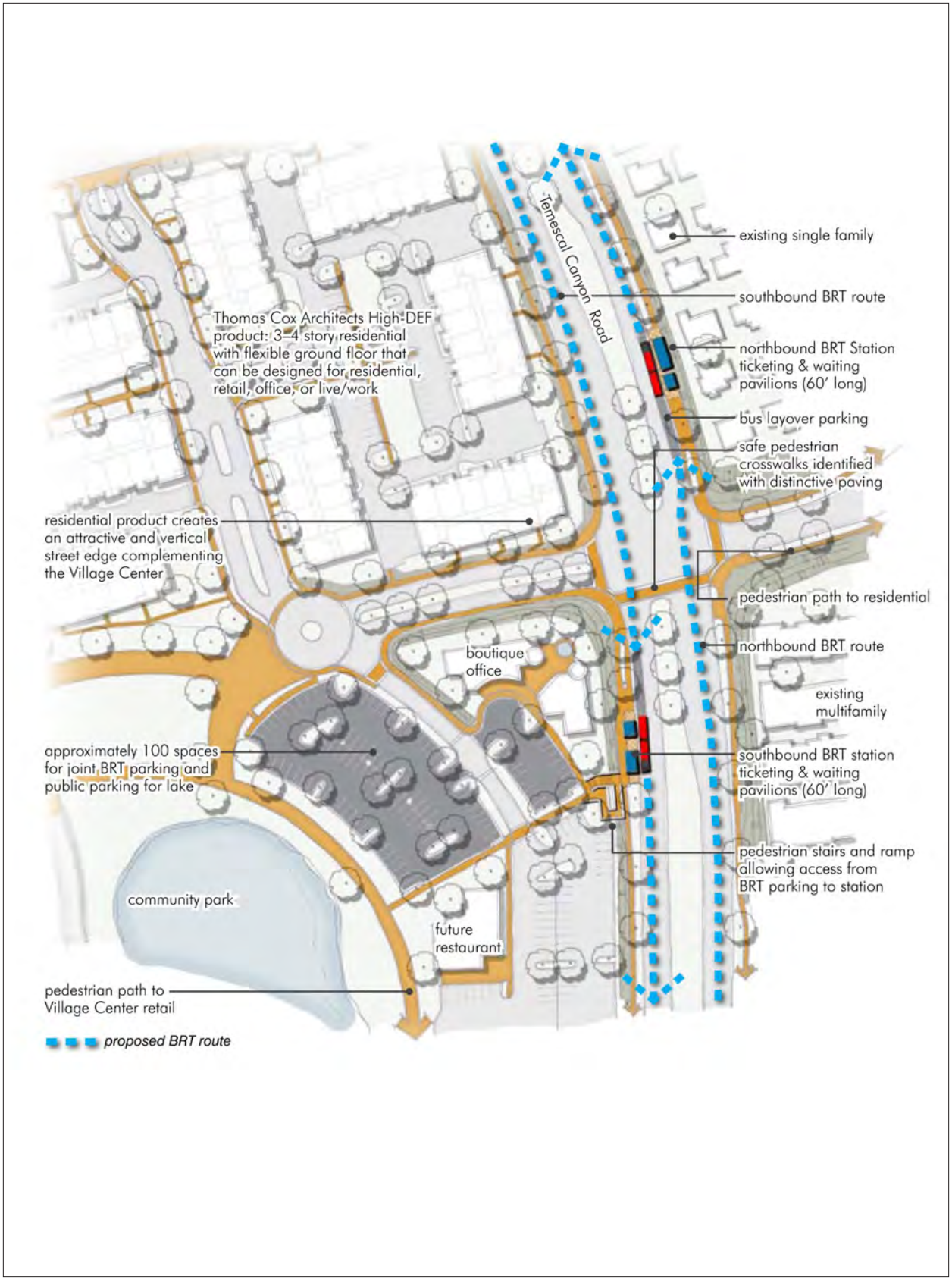
City of Menifee In-Line Station Conceptual Site Plan - Located within median



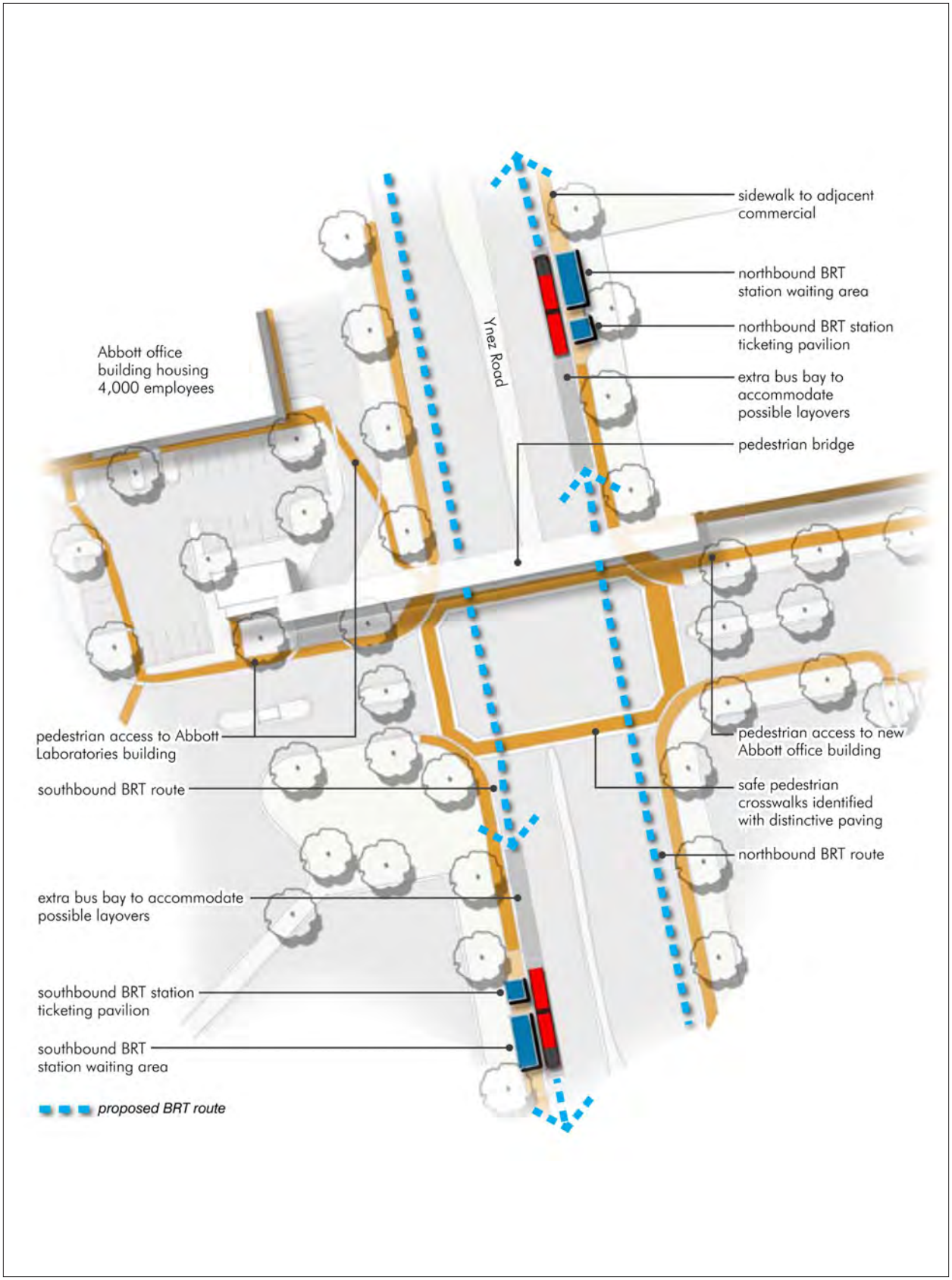
Riverside County Medical Center End-of-Line Station Conceptual Site Plan



Village Center Park & Ride Station Conceptual Site Plan



City of Temecula Walk-Up Station Conceptual Site Plan



BUS RAPID TRANSIT ROUTE PLANNING PROJECT

Rider Profile

Final Technical Memo

April 2010

with The Planning Center

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1. INTRODUCTION

The BRT Route Planning Project is being conducted under a SCAG Compass Blueprint grant to identify corridors in the WRCOG area that would be suitable for BRT service. The purpose of this report is to document the existing and future travel demand in the study area to help identify suitable BRT corridors, and to identify the factors of BRT service that would make them attractive to riders. Existing reports prepared by WRCOG, SCAG, and others were reviewed and their information summarized in this report.

2. TRAVEL DEMAND SUMMARY

This section examines the travel patterns of WRCOG residents and commuters, and identifies key travel destinations, routes, and commuter attitudes toward transit usage. The purpose of the analysis is to describe the characteristics of WRCOG travel demand with respect to its potential as a future Bus Rapid Transit (BRT) market. The focus is on attracting new riders from residents and commuters who do not use existing transit services, but could be amenable to doing so with the improvements inherent in BRT service, as well as serving existing transit users who could be better served by the conversion of existing RTA routes to BRT routes. The following sources were reviewed for this analysis.

- WRCOG Choices We Make: Commuting, Housing, and Employment Final Report 2008
- WRCOG Survey of Residents' Views on Land Use, Growth, Development April 2006
- SCAG State of Commute, 2006
- SCAG Regional Transportation Plan, 2008
- RTA Comprehensive Operational Analysis and Improvement Plan (COA) Final Report, 2007
- RTA FY2010-2012 Short Range Transit Plan
- RTA On-Board Bus Rider Opinion Survey Report: Weekday 2006

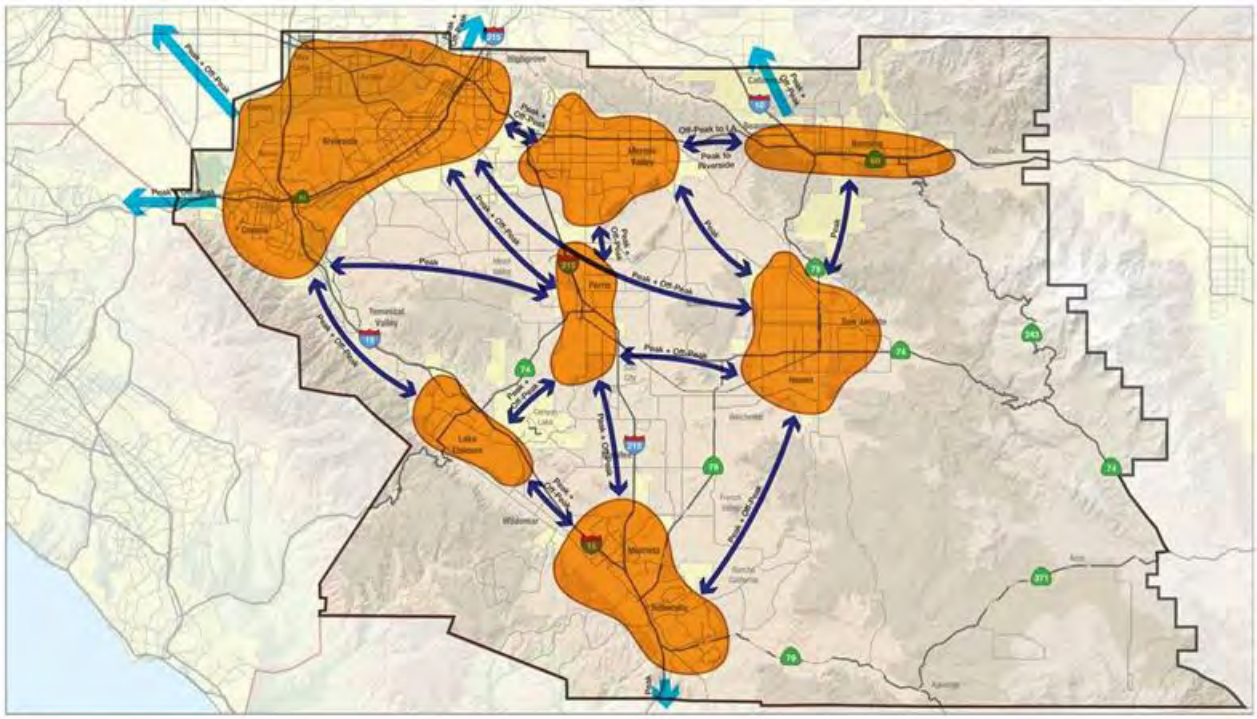
This information provides insight on the travel patterns of choice and transit-dependent users, local and long-distance commuters, and non-transit users.

2.1 SOV Commute Routes/Travel Flows

Figure 1 from the RTA COA shows the major travel patterns in the study area. Summary level findings of the 2008 Commuting, Housing and Employment Survey indicate the WRCOG population uses freeways for their commutes 80 percent of the time. Of the region's commuters, 31 percent use SR-91, followed by 28 percent using I-15, and 22 percent using I-215. SR-60 was the only other highway in the region to be used by at least 20 percent of commuters. Noteworthy was the finding that 32 percent of these commuters indicate that they alter their commute in response to external factors, with the desire to avoid traffic congestion the overwhelming reason.

The 2006 SCAG State of the Commute Report reported that Riverside County residents had the longest commutes in the SCAG region, with an average distance of 25 miles one-way, and an average one-way commute time of 46 minutes. In addition, Riverside County commuters were the most likely to commute outside of their home county, with 35 percent working outside of Riverside County.

Figure 1 - Major Regional Travel Patterns



Source: RTA Comprehensive Operational Analysis, 2007

Intercounty Travel Demand

Figure 2 provides origin-destination intercounty travel flows within Western Riverside, as well as travel to neighboring counties based on travel data from the SCAG household travel survey. There are significant regional or intercounty flows, representing out-commuting of Western Riverside workers to jobs outside the county:

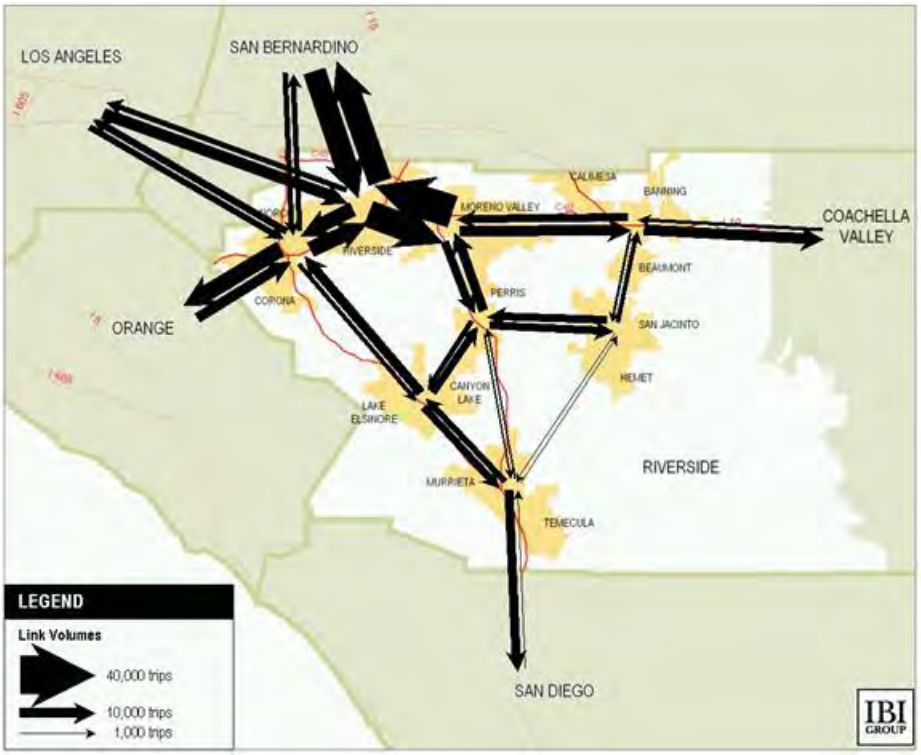
- San Bernardino County – This is the largest out-commuting flow, with strong linkages with Riverside, Corona, Norco and Mira Loma. There is also a sizeable in-commute from San Bernardino. At present, there are limited transit services between San Bernardino and Western Riverside.

- Orange County – Representing commuting flows to major employment areas in Orange County, with significant flows from workers residing in Riverside and Corona. The SR91 corridor linking the two counties is currently highly congested. Metrolink provides service from Riverside and Corona, and a commuter express bus operates from Riverside to Orange.

- San Diego County – Strong linkages exist between Temecula/Murrieta and Lake Elsinore with northern San Diego County, including Oceanside and Escondido. The survey conducted for the Choices We Make study found that 16.6 percent of southwest Riverside County commuters are headed to San Diego County. RTA currently provides service to Oceanside, where connections to the Coaster commuter rail service can be made, and Escondido, where connections to the Sprinter light rail are available.

- Los Angeles County – Due to the distance to Los Angeles, travel flows are not as significant as others, but still notable. Based on travel demand information developed for RTA's COA, there is a moderate in-commute from Los Angeles County.

Figure 2 - Inter-Market Area Travel Flows, 2001 AM Peak (6-9 AM) Person Trips



Source: RTA Comprehensive Operational Analysis, 2007

WRCOG Travel Profiles by Area

Figure 2 provides a breakdown of the overall travel flows from the major urban areas within western Riverside County. These flows reflect the significant commuter travel that occurs between the cities/employment areas within Western Riverside. They represent the primary opportunities to increase transit mode share with BRT services. The most significant intracountry travel flows include:

- Riverside/Corona/Norco/Mira Loma – Moreno Valley
- Riverside/Corona/Norco/Mira Loma – Perris
- Riverside/Corona/Norco/Mira Loma – Moreno Valley – Banning/Beaumont
- Riverside/Corona/Norco/Mira Loma – Lake Elsinore
- Perris – Hemet/San Jacinto
- Lake Elsinore – Murrieta/Temecula
- Lake Elsinore – Perris

Riverside/Corona/Norco/Mira Loma are major draws for workers from the rest of the County, while a significant proportion of the residents from this service area also out-commute to San Bernardino and Orange Counties. In addition, a significant regional travel flow is also found from Murrieta –Temecula out-commuting to employment in San Diego County.

An extensive analysis of travel patterns within the WRCOG area was undertaken by SCAG and its results were used in the RTA Comprehensive Operational Analysis for RTA. This analysis examined overall travel trends in general, and transit travel trends in particular, using several data sources to obtain the most recent and comprehensive picture of land use, demographic and travel characteristics in Western Riverside County.

Summary-level breakdowns of commute trips based on SCAG data developed from the agency's Post-Census Regional Household Travel Survey are provided below. While these analyses do not identify the specific routing of an individual's commute, summary level travel demand can be reasonably inferred based on the existing highway and interstate network. This inference has been confirmed by survey findings indicating large percentages of regional commuters using freeways for their commutes.

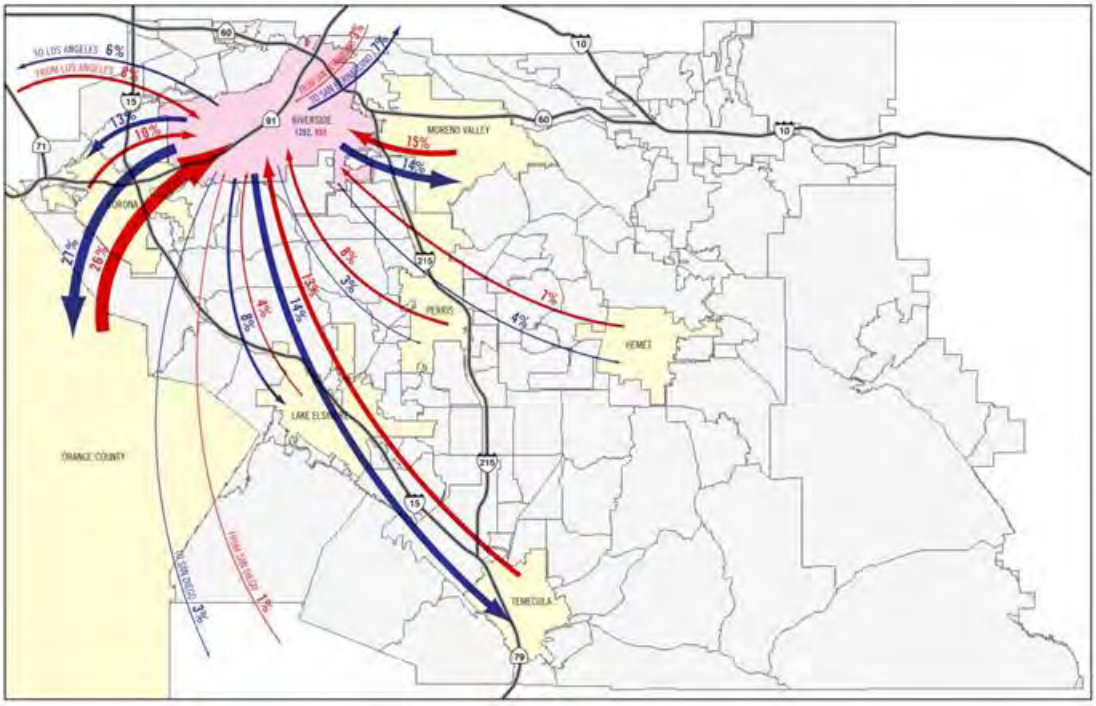
Riverside – Corona – Norco – Mira Loma

Riverside, combined with Corona, Norco, and Mira Loma, is by far the largest service area in western Riverside County accounting for 43 percent of the total population in the western Riverside County. It has a housing-jobs imbalance of 1.5 workers per job. The age distribution in the city of Riverside and the breakdown of household types reflects a family oriented community with high levels of school age children.

As a whole, the service area is one of the higher income locations in Western Riverside. Corona, Norco and Mira Loma in particular have the highest median household incomes in the County, and because of their close proximity, have a very large commuter base heading into Los Angeles and Orange Counties. The city of Riverside has the largest employment base in western Riverside County and as a result supports proportionally a large number of trips within the city.

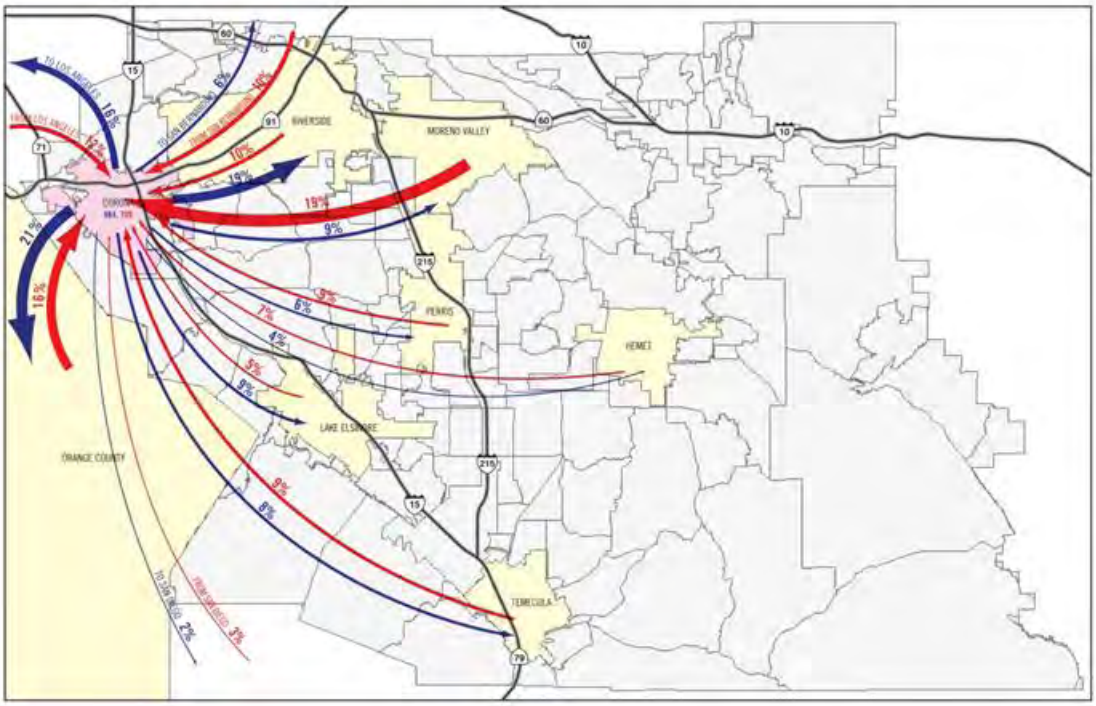
Riverside is also a major destination for trips from other service areas within the County. Vehicle ownership is relatively high in the Riverside – Corona – Norco – Mira Loma service area with 59 percent of households having at least 2 vehicles and only 8 percent of households being without a vehicle.

Figure 3 - All Day Work Trip Travel Flows City of Riverside



Source: SCAG Post-Census Regional Household Travel Survey, 2002

Figure 4 - All Day Work Trip Travel Flows City of Corona



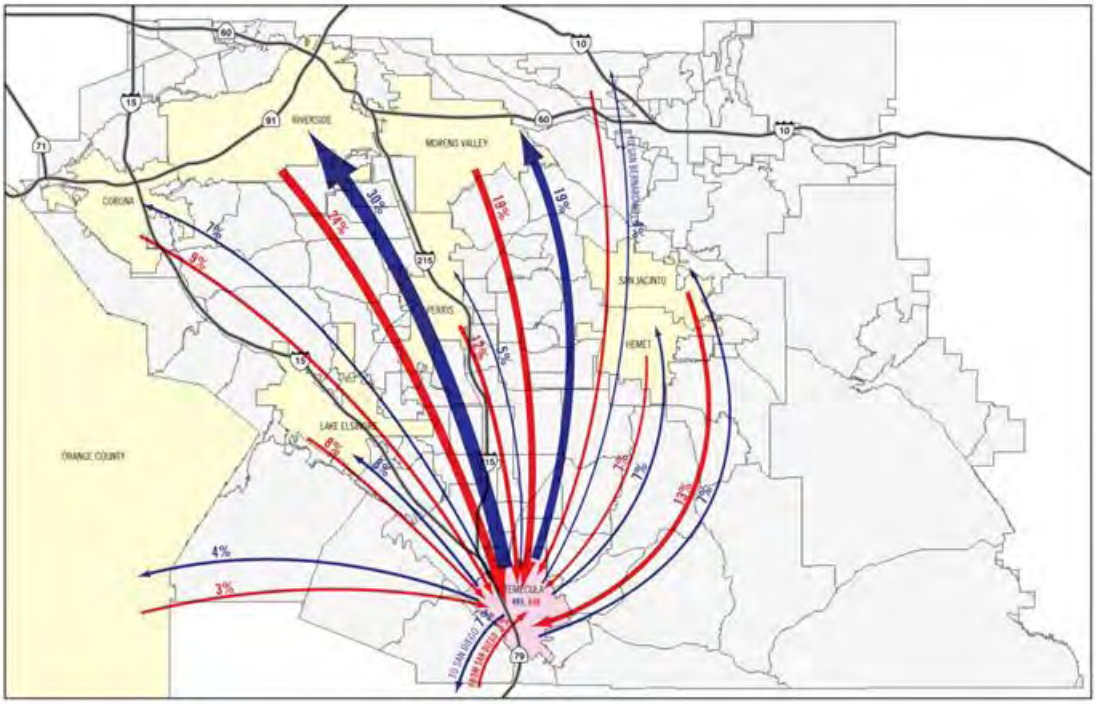
Source: SCAG Post-Census Regional Household Travel Survey, 2002

Murrieta – Temecula

The Murrieta – Temecula service area, located in the southern part of the County, is primarily part of the San Diego commuter shed. Although it has a sizeable employment base, the area is increasingly becoming a "bedroom" community with a resident population consisting of a high number of families with school-aged children.

In addition to being a source of commuter trips to San Diego, a large number of the trips are being made to other Western Riverside service areas with many destined north to Riverside. The Murrieta – Temecula service area has one of the highest income levels in Western Riverside with high vehicle ownership levels and median incomes. The demographics and travel profile in Murrieta – Temecula and growth trends suggest that the need for stronger regional and intracounty connections, and enhanced local services to provide access to community services/schools.

Figure 5 - All Day Work Trip Travel Flows City of Temecula



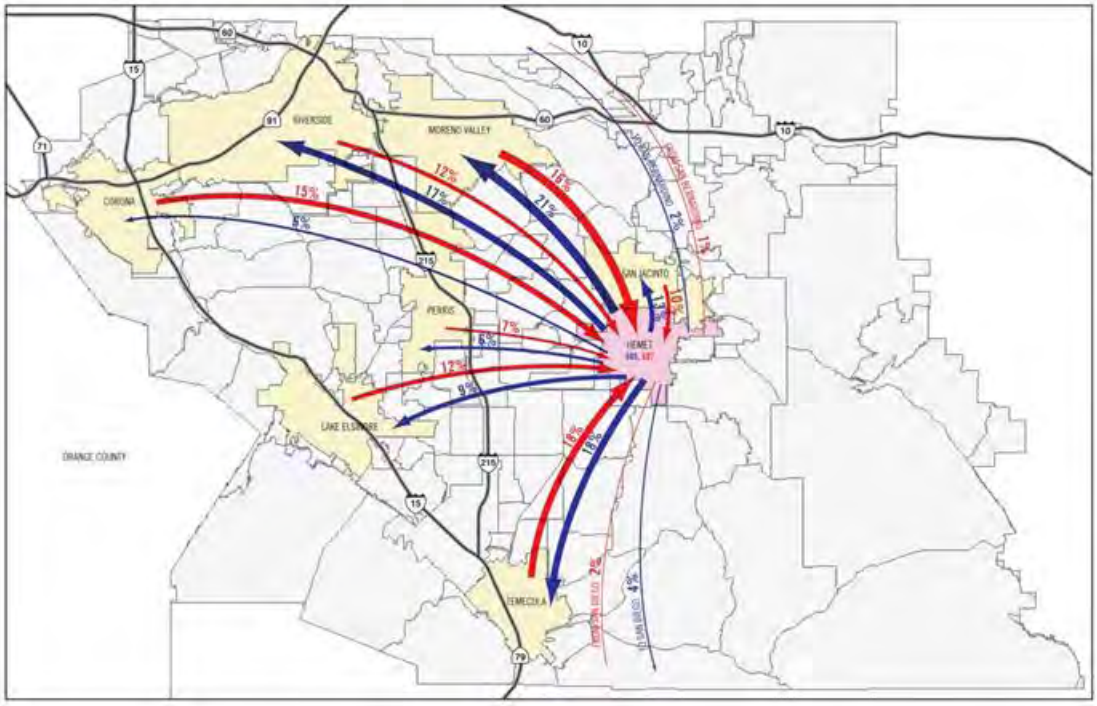
Source: SCAG Post-Census Regional Household Travel Survey, 2002

Hemet – San Jacinto

The Hemet – San Jacinto service area, located in the eastern portion of the RTA service area, is currently comprised of low density residential developments. The availability of affordable housing in this service area is a major factor in its projected high growth rate. The Hemet – San Jacinto service area currently has an older population compared to other service areas, but demographic changes are expected as new developments are constructed and younger families are drawn to the area.

In terms of travel patterns, the Hemet area is one the most self-contained community in Western Riverside with a high percentage of trips made internal to the service area. In addition, Hemet has the highest percentage of people who do not own an automobile, and the age of the population is slightly older than surrounding cities. Existing and future travel patterns suggest the need to enhance local services, reflecting the high proportion of internal travel, but with potential future growth likely to result in an increasing need for intracounty connections.

Figure 6 - All Day Work Trip Travel Flows City of Hemet



Source: SCAG Post-Census Regional Household Travel Survey, 2002

Moreno Valley – Banning – Beaumont

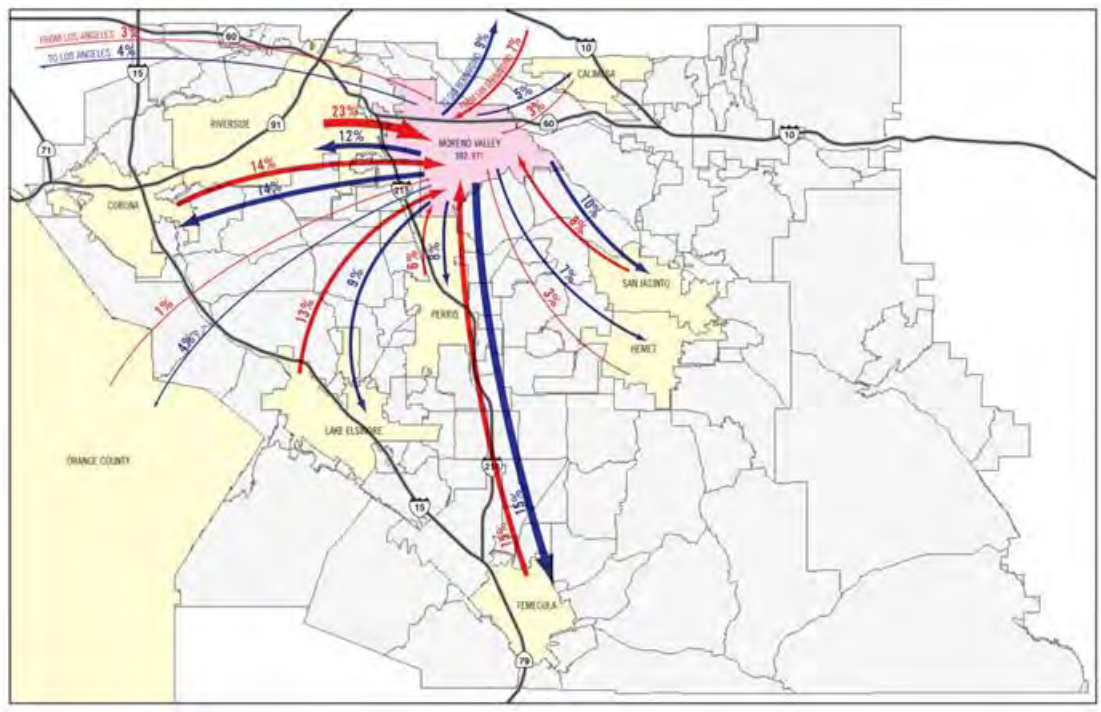
Moreno Valley is largely a bedroom community with 3.9 workers for every job in the service area. The community is largely made up of families with young children. The median income is lower than other surrounding cities, especially when considering the high average household size. Travel out of Moreno Valley is headed largely to the city of Riverside and to a lesser degree into the Los Angeles and Orange counties.

The Banning – Beaumont service area is located in the northeast portion of the RTA service area, encompassing a series of communities located along I-10. This is currently the least populated area in western Riverside County, and this market is projected to experience the highest relative population and employment growth rates.

Similar to Hemet, the population age distribution in Banning-Beaumont is currently older that other communities in western Riverside, with 27 percent of the population being over the age of 65. This average age is expected to drop as the area grows and young families move into the more affordable housing in the area. Trips based in the Banning – Beaumont subarea are currently largely headed east out of western Riverside to communities to the East along I-10 in the Coachella Valley, with some significant travel also to the Riverside city area in the west along SR-60.

Detailed work trip travel flow data for Morena Valley is report in Figure 7.

Figure 7 - **All Day Work Trip Travel Flows City of Moreno Valley**



Source: SCAG Post-Census Regional Household Travel Survey, 2002

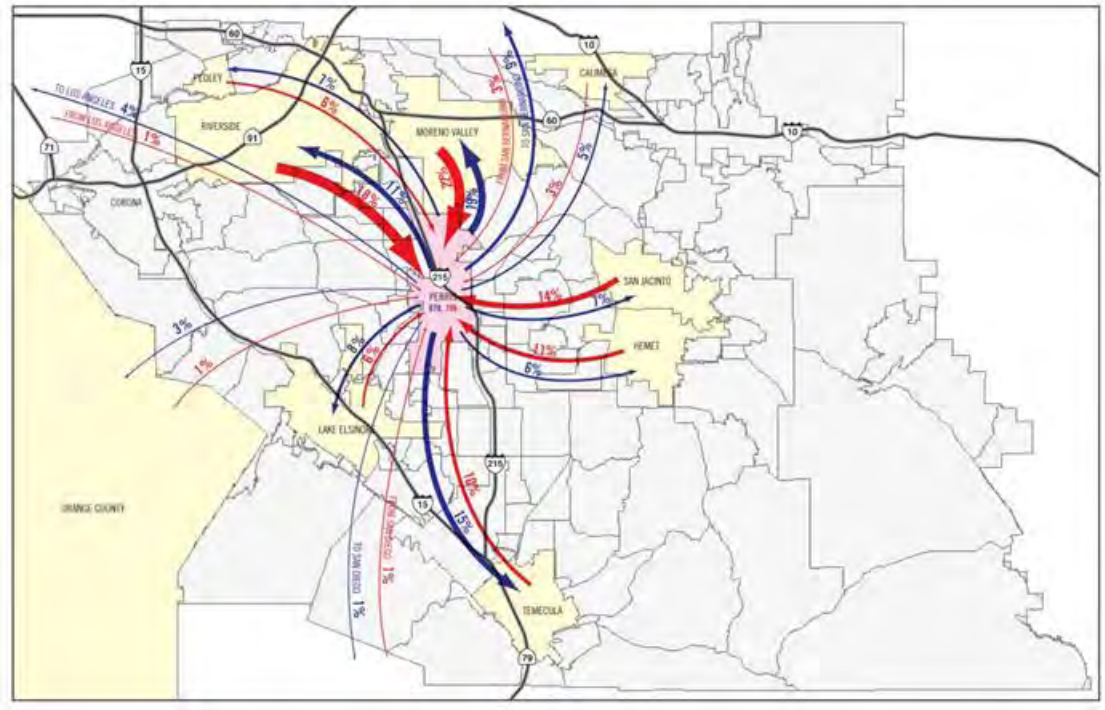
Perris – Lake Elsinore

The Perris area (including neighboring Sun City) is located along the I-215 corridor and has a workers per job ratio of 2.2. According to survey data, residents reported an average motorized trip length of 9 miles, one of the highest in the area. The majority of commute traffic takes place along the I-215 corridor, particularly to and from Riverside and Moreno Valley.

The Lake Elsinore service area, including Canyon Lake and Wildomar, is located in the southwestern part of the County, east of the Santa Ana Mountains. This service area is comprised largely of young families, with high out-commuting from the service area to other areas of the County, notably Riverside and Murrieta–Temecula and to San Diego County. Due to its location, average travel distances are the highest among the service areas.

Detailed work trip travel flow data for the city of Perris is shown in Figure 8. US Census American Community Survey Data from 2000 and 2005 for Lake Elsinore indicate that 22 percent of AM peak period travel is to other WRCOG market areas, while 23 percent of travel is from other WRCOG areas. Eight percent is to areas outside the WRCOG area, with 8 percent from non WRCOG areas.

Figure 8 - All Day Work Trip Travel Flows City of Perris



Source: SCAG Post-Census Regional Household Travel Survey, 2002

2.2 Transit Usage

This section examines the amount of transit travel within the study area, particularly along the proposed BRT alignments. For the sake of this section, transit is considered to be relevant RTA local and regional routes as defined by the SRTP, RTA Commuter Express Routes, and commuter vanpools originating in Riverside County. Relevant routes of each type are examined by corridor below. The figure below is taken from the current RTA System Map, and displays the routes discussed in this section.

Regarding transit usage levels, a 2006 on-board survey provided insights into transit and riders' multiple modes of commute travel. In general, WRCOG residents made limited use of existing transit services for their commute. While driving along accounted for 84 percent of responses, local bus services were used only 1.2 percent of the time, and Metrolink was utilized 0.7 percent. Fifteen percent of respondents reported that they had used transit at least once in the past 12 months.

Local/Regional Routes

When considering dealing with potential BRT markets, research indicates it is reasonable to assume that some existing local transit riders will be users of new BRT services, whether or not that service duplicates any existing local routes. Therefore, the consultant examined existing local and regional transit ridership levels to further develop the overall travel demand within the proposed corridors. As the proposed corridors are relatively long-distance, comparatively few local routes operate for long distances in the proposed corridors. Nevertheless, total ridership numbers for these routes provide insight into long-distance travel patterns and potential BRT market share.

Using data from the 2010-2012 RTA SRTP, the following daily boarding counts per route were calculated by taking annual ridership numbers and dividing them by the appropriate conversion factor based each route's number of operating days.

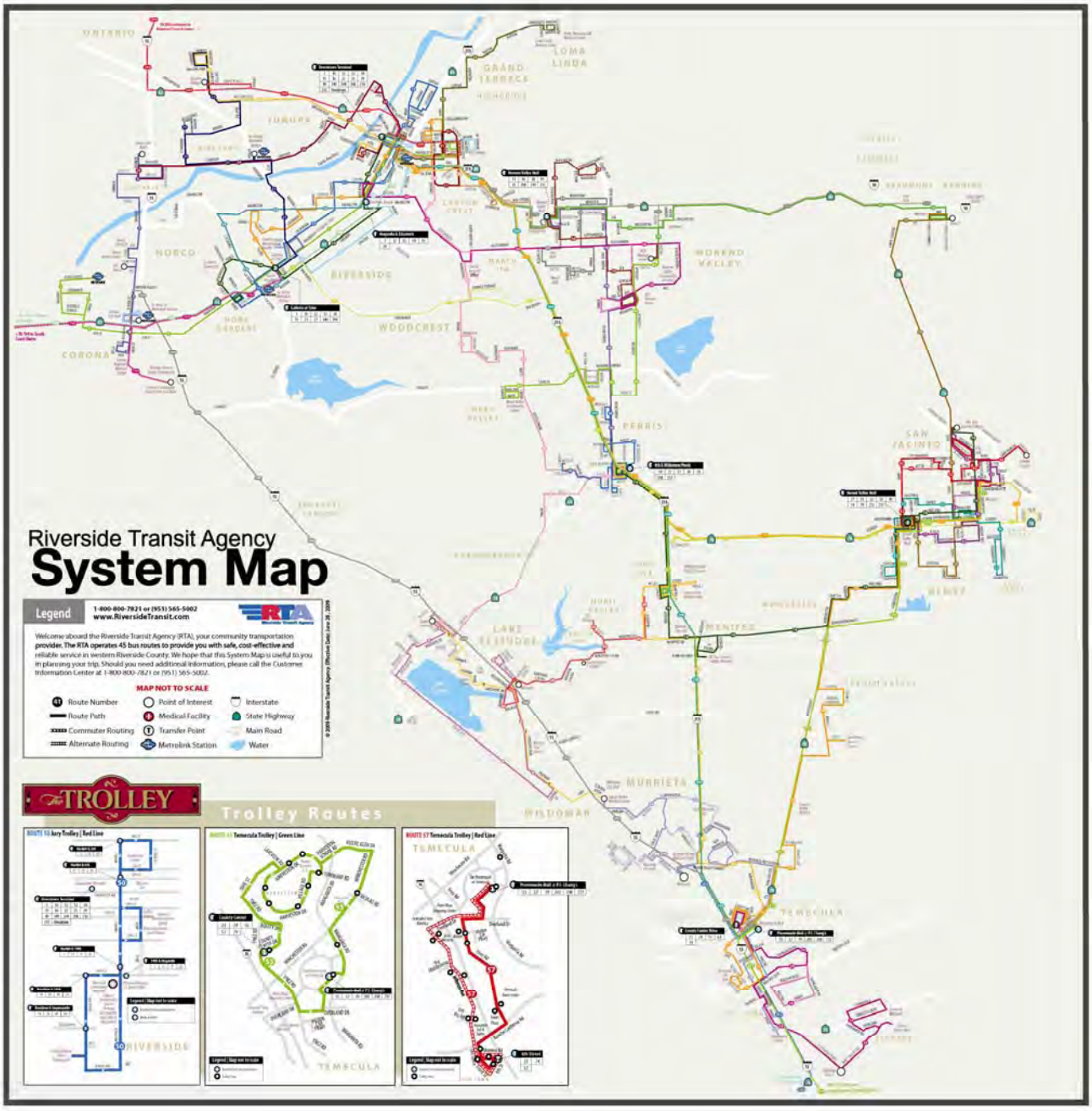
Magnolia Ave. Phases 1 & 2 – The alignment and stations for the Magnolia Avenue BRT project were documented in the *Planning Analysis for Bus Rapid Transit Deployment, Institute of Transportation Studies, University of California, Berkley, 2004*. Route 1 runs along the proposed Magnolia Phase 1 corridor, which is planned to connect the North Main Corona Metrolink Station to Downtown Riverside, Riverside Metrolink, and Phase 2 of the proposed BRT line in Moreno Valley. As it operates in a transit-rich environment, several other local routes operate in and around the corridor, including some that parallel the corridor on adjacent streets. These include Routes 10, 12, 13, 14, and 15.

Phase 2 is planned to run east from Downtown Riverside along University Avenue and Martin Luther King Boulevard to the Moreno Valley Mall and continue to the March Business Park Transit Center, then head east along Alessandro Boulevard towards Perris Boulevard and the RCC College Campus. Currently, local Routes 10, 11, 16, 20, 35 closely match the alignment of Phase 2.

Combined, these routes represent a total of over 12,300 daily passengers, with a route breakdown as follows:

- Route 1 - 5,364
- Route 15 - 1,504
- Route 16 - 1,367
- Route 13 - 991
- Route 20 - 805
- Route 12 - 783
- Route 10 - 660
- Route 11 - 406
- Route 14 - 382
- Route 35 - 114

Figure 9 - RTA System Map



- SR-60 - Route 35 most closely mirrors the proposed corridor. Route 35 connects the Moreno Valley and Banning-Beaumont Areas via a mix of arterial streets and SR-60, with 114 daily passengers.

- SR-91 - Magnolia Ave. Phase 1 closely mirrors this alignment, and for the sake of this overview, the local routes in that comparison should be considered here. These include Routes 1, and 10-15, and average a total of 10,090 daily passengers along their lengths.

- SR-74 - Route 27 runs from Hemet-San Jacinto to Riverside via SR-74 and I-215, and reports 1,420 average daily passengers along its length.

- SR-79 - Route 79 connects Temecula and Hemet, and carries an average of 200 passengers daily.

- I-15 - The cities of Murrieta, Temecula, Lake Elsinore, and Corona each have several routes within the corridors catchment area, particularly in Corona and Temecula. However, only Route 206 runs along the corridor, and it is discussed below.

- I-215 - Routes 27, 61 and 74 each run along I-215 for long stretches, and carry 1,504, 84, and 267 passengers daily, respectively, for a total of 1,771 each day.

- Mid-Valley Parkway - No transit service is currently operated on Ramona Expressway in this corridor.

- Margarita/Ynez - Route 24 comes closest to matching that of the potential BRT corridor, and had 194 total daily passengers. Routes 23, 61, and 79 also operate extensively within the corridor, and reported a total of 358, 84, and 200 daily passengers, respectively.

Long-Distance RTA Commuter Express Routes

The following routes are designated as “Express” routes in the RTA SRTP, and typically travel along highways extensively. As commuter routes, they run 5 days a week, and do not run on weekends. As the majority of these services run along corridors under study for this project, their ridership numbers are particularly important in developing potential BRT corridors due to the base of existing transit riders.

Using annual ridership data obtained from the RTA SRTP, the following daily ridership totals were calculated based on 255 weekdays per year.

- 149/216 CommuterLink - Riverside-Orange County via SR-91: 300 daily passengers
- 202 CommuterLink - Murrieta-Oceanside via I-15: 131 daily passengers
- 204 CommuterLink - Riverside-Montclair via SR-60 & I-15: 169 daily passengers
- 206 -Temecula-Corona via I-15: 314 daily passengers
- 208 - Temecula-Riverside via I-215: 185 daily passengers
- 210 - Banning-Riverside via I-215, SR-60 and I-10: 108 daily passengers
- 212 - Hemet-Marketplace Metrolink via SR-74 and I-215: 147 daily passengers
- 217 - San Jacinto-Escondido via SR-79 and I-15: 167 daily passengers

Vanpool Transit

A 2009 RCTC report on interregional vanpools serving Orange and San Diego Counties reports that there are 242 vanpools originating in Riverside County and ending in San Diego or Orange Counties, totally roughly 1,600 total riders daily. Seventy-five percent of these vanpools originate in the following four communities, and travel extensively to San Diego County destinations along the I-15 corridor.

- Temecula: 539 riders in 80 vanpools
- Murrieta: 450 riders in 68 vanpools
- Menifee: 136 riders in 19 vanpools
- Hemet: 122 riders in 19 vanpools

3. BRT ATTRACTIVENESS FACTORS

A substantial amount of information is available on the performance of BRT systems, including their primary attributes and the factors found to attract riders. Each of the reports listed below were reviewed for information on existing BRT systems, their key attributes, and findings regarding passenger preferences.

- Characteristics of BRT for Decisions Making, FTA, August 2004
- BRT Ridership Analysis, FTA, June 2005
- TCRP 118 BRT Practioners Guide, 2007
- Draft Standards for Service Design, American Public Transportation Association, 2008 (currently available for comment)
- Draft Standards for Branding, Imaging and Marketing, American Public Transportation Association, 2008 (currently available for comment)

The key elements of BRT found to attract riders are described below,

Travel Time Savings

Discussed in all of the references, travel time savings are the single most attractive aspect of BRT service. Surveys have found that BRT services need to be both rapid and easy to use. To help reduce travel times, priority treatments are important. Identifiable running ways that are permanent with minimal traffic delays are desirable, along with other priority treatments such as queue jumps and traffic signal priority.

Travel Time Reliability

Of nearly equal importance to travel time savings is the reliability of travel time. Consistent travel times and on-time performance are important to attract and retain passengers.

Service Frequency

Short waiting times have been found to be attractive to existing and prospective riders. Frequent service, 8-10 minutes in peaks and 12-15 minutes in the off peak, are desirable to enable riders to use the service without a timetable.

Unique Vehicles

Studies have found that modern, comfortable vehicles are an important element of BRT service. Their unique styling helps identify the service as something special, like a train on tires. Multiple doors suitable for both entry and exit, along with level boarding, make the service easy to get on and off. Next stop announcements, coupled with low interior noise levels, are also attractive to riders.

Enhanced Stations

BRT stations need to be designed to provide elements to maximize convenience and usefulness of the service. Enhanced shelters, next bus information, protection from the elements, and safety and security are all important aspects. They should also be located in convenient places to enable easy access to and from surrounding development. They should be designed for convenient, seamless transfers.

Branding

Branding is an important element to identify the service as unique, permanent, and of premium quality. It enables ease of identifying the correct bus and navigating the transit system. It also establishes the BRT's position in relation to the region's transit services and provides a perception as a unique service catering to a niche market. An important element of the branding effort is consistent delivery of brand promise to create loyal customers. Customers need to know the service will always provide the premium elements it claims to. Brand promise should be tailored to address the interests/desires of the target audience.

Service Operation

As a premium service, it is important that BRT be operated in a high quality, consistent manner. A key element are the drivers. Specialized training can be effective in ensuring drivers operate the system to provide maximum performance and customer service. A high level of security at the stations and in the vehicles is also desirable to ensure customers have a positive experience. Keeping vehicles and stations clean at all times is also important.

Service Design

BRT service needs to be well designed to attract and retain riders. Key elements of the service design include:

- Service to at least one activity center, more if possible. Key activity centers include central business districts; colleges and universities; regional shopping centers; hospitals and major medical facilities; entertainment/sports complexes; intercity transportation facilities; and high density residential and commercial developments

- A simple, easy to understand route system.

- Service spans longer than most of the transit system.

- Limited number of stops. Arterial stop spacing on arterials should be 1-2 miles. Closer stop spacing should be limited to CBDs or key activity centers. Freeway BRT can have close stops in the origin and destination areas, with longer distances between stops on or near the freeway.

- Connections to other services. Several sources noted the need to enhance connections to the rest of region's transit system. BRT services are the high capacity element of a system, with local services often proving the first or final leg of a trip. Convenient connections and stops for transfers are important, along with a well designed system of feeder routes.

- Provision of local service in same corridor if warranted. With the longer station spacing of BRT, it is important to provide local services with intermediate stops as needed.

- Fare levels that are generally less than commuter rail service. Fare levels for commuter rail tend to be higher due to the longer trip length and high level of vehicle amenities. BRT fares are generally comparable to LRT. A review of BRT and LRT systems in California and selected western states found BRT fares ranging from $1.25 for Metro Rapid to $3.00 for Las Vegas ACE service. LRT fares range from $1.25 for MTA's Blue Line to $2.50 for the San Diego Trolley and Sacramento.

- Provisions for taking bikes on vehicles. This feature is attractive for some riders, and needs to be considered carefully in light of the space required within the vehicle or the time added for the use of external bike racks.

4. FUTURE RESEARCH

The information in this report is based on research and surveys conducted by others. A set of questions was developed for the RTA area in case the region wishes to undertake a survey of riders and non-riders in the future in relation to BRT development. These questions are included in the Appendix.

APPENDIX – FUTURE SURVEY QUESTIONS

DRAFT FINAL QUESTIONS FOR WRCOG BRT STUDY ON-LINE SURVEY
December 11, 2009

Bus rapid transit (BRT) is a high speed transit service that can operate on freeways and arterial streets, providing upgraded buses and stops, and faster travel times. Using funding provided by SCAG, WRCOG and RTA are conducting a planning study of BRT for the RTA service area. This survey will enable the study team to learn about your existing travel patterns and how you could make use of new BRT service. Thank you for your participation.

1. How many times a week do you use the following modes of travel?
   Bus
   Carpool
   Vanpool
   Drive Alone
   Bicycle
   Walk
   Other

2. Where does your trip begin and end for the first trip in the day?

BEGIN	END
□ Riverside	□ Riverside
□ Corona-Norco-Mira Loma	□ Corona-Norco-Mira Loma
□ Moreno Valley	□ Moreno Valley
□ Perris-Sun City	□ Perris-Sun City
□ Hemet-San Jacinto	□ Hemet-San Jacinto
□ Lake Elsinore	□ Lake Elsinore
□ Murrieta-Temecula	□ Murrieta-Temecula
□ Banning-Beaumont	□ Banning-Beaumont
□ Orange County	□ Orange County
□ Los Angeles County	□ Los Angeles County
□ San Bernardino County	□ San Bernardino County
□ San Diego County	□ San Diego County
□ Other (please specify)	□ Other (please specify)

If you use bus service for some or all of your travel, please complete Questions 3– 18. If you do not use bus service, please complete Questions 19 - 24.

3. How many days a week do you usually ride the bus?
   □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7
   □ Less than once a week

4. What kinds of trips do you make using the bus? Check all that apply.
   □ Work
   □ Looking for Work
   □ Shopping
   □ Church
   □ Visiting Friends Relatives
   □ Entertainment/ Recreation
   □ School
   □ Medical
   □ Other

5. Do you have an automobile available for your use?

□ Yes
□ No

6. What are the three most important aspects of BRT service that would make you more likely to use it?
□ Direct or express service
□ Upgraded buses
□ WIFI/wireless Internet access on the bus
□ More bus stops or bus shelters
□ Faster service
□ Fewer stops
□ Bus stops close to Metrolink platforms
□ Bus stops close to local buses
□ Improved security
□ More frequent service
□ Better passenger waiting facilities
□ Refreshments
□ Other (please specify)
□ I wouldn't use BRT services under any circumstance

7. If BRT service was available, what are the key destinations you would like to see it serve? Please list locations you frequent at least three times a week and be as specific as you can, e.g., Galleria at Tyler.

□	□
□	□
□	□
□	□
□	□

8. What are the three most important amenities at BRT stops and station waiting areas?
□ Shelters
□ Benches
□ Lighting
□ Transit information
□ Security personnel
□ Security cameras
□ Availability of coffee/drinks/snacks
□ Other (please specify)_____

9. On a scale of 1 to 5, with 1 being very unsafe and 5 being very safe, how would you rate your safety when waiting for a bus?

Day

Very Unsafe				Very Safe
□ 1	□ 2	□ 3	□ 4	□ 5

Night

Very Unsafe				Very Safe
□ 1	□ 2	□ 3	□ 4	□ 5

10. On a scale of 1 to 5, with 1 being very unsafe and 5 being very safe, how would you rate your safety when riding on a bus?

Day

Very Unsafe	Very Safe

□ 1 □ 2 □ 3 □ 4 □ 5

Night
Very Unsafe Very Safe
□ 1 □ 2 □ 3 □ 4 □ 5

11. What are the three most important improvements that would make you feel safer while **waiting** for a bus?
    - □ Security personnel
    - □ Security cameras
    - □ Better lighting
    - □ More frequent service
    - □ Improved shelters
    - □ More transit information
    - □ Other (Please specify)

12. What are the three most important improvements that would make you feel safer while **riding** a bus?
    - □ Security personnel
    - □ Security cameras
    - □ Better lighting
    - □ Emergency phones
    - □ More stop announcements
    - □ Faster service
    - □ Fewer stops
    - □ Other (Please specify)

13. What times of day do you ride the bus? (check all that apply)
    - □ 5 am - 9 am
    - □ 9 am - 12 noon
    - □ 12 noon - 3 pm
    - □ 3 pm - 7 pm
    - □ 7 pm – 10:30 pm

14. What type of fare payment do you usually use?
    - □ RTA Pass
    - □ Cash
    - □ Metrolink Pass
    - □ Transfer from another service
    - □ Other

15. What do you like about the existing transit system?

16. What needs to be improved on the existing transit system?

17. “Smart Growth” is a development approach that would group housing and jobs around transit stations to reduce the need for auto trips and encourage making trips by walking and riding bicycles. What three factors would encourage you to consider living in a smart growth development?
    - □ Ability to walk to shops and restaurants
    - □ Proximity to transit service
    - □ Proximity to employment

□ Proximity to child care services
□ Recreational amenities such as parks, trails, fitness centers
□ Other (please specify)

18. Demographic characteristics

Age
□ Under 18 □ 18-30 □ 31-59 □ Over 60

Household Income
□ Under $25,000 □ $25,000 – $50,000 □ $51,000-$75,000 □ Over $75,000

Ethnicity
□ Hispanic □ African-American □ Asian □ American Indian □ White

NON-TRANSIT USERS

19. On a scale of 1 to 5, with 1 being very unlikely and 5 being very likely, how likely are you to use BRT service?
□ 1 □ 2 □ 3 □ 4 □ 5
□ I wouldn't use BRT services under any circumstance

20. If BRT service was available, what are the key destinations you would like to see it serve? Please list locations you frequent at least three times a week and be as specific as you can, e.g., Galleria at Tyler.

□	□
□	□
□	□
□	□
□	□

21. What are the top three aspects of BRT service that would lead you to use it?
□ Travel times comparable to the way I travel now
□ Reasonable fare levels
□ Proximity to stops
□ Proximity to park-and-ride lots
□ More direct or express service
□ Upgraded buses
□ WIFI/wireless Internet access on the bus
□ More bus stops or bus shelters
□ Faster service
□ Improved security
□ More frequent service
□ Better passenger waiting facilities
□ Bus stops close to Metrolink platforms
□ Bus stops close to local buses
□ Refreshments
□ Other (please specify)

22. How many minutes does your current one way commute take?
□ 0
□ 1-15
□ 16-30

□ 31-45
□ 46-60
□ 60-90
□ 90+

23. "Smart Growth" is a development approach that would group housing and jobs around transit stations to reduce the need for auto trips and encourage making trips by walking and riding bicycles. What three factors would encourage you to consider living in a smart growth development?
    □ Ability to walk to shops and restaurants
    □ Proximity to transit service
    □ Proximity to employment
    □ Proximity to child care services
    □ Recreational amenities such as parks, trails, fitness centers
    □ Other (please specify)

24. Demographic characteristics

    Age
    □ Under 18 □ 18-30 □ 31-59 □ Over 60

    Household Income
    □ Under $25,000 □ $25,000 – $50,000 □ $51,000-$75,000 □ Over $75,000

    Ethnicity
    □ Hispanic □ African-American □ Asian □ American Indian □ White

BUS RAPID TRANSIT ROUTE PLANNING PROJECT

BRT Case Studies

Final Technical Memo

January 2010

with The Planning Center

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1. INTRODUCTION

1.1 Overview of Bus Rapid Transit

Bus rapid transit (BRT) is an emerging approach to developing cost-effective high quality, high speed transit service in urban areas. BRT can operate on arterial streets, freeways, and exclusive guideways. Key elements of BRT include increased operating speed, improved stations with shelters and other amenities, and comfortable luxury vehicles. Transit priority measures are frequently provided to enable buses to travel more quickly through congested segments of their routes. BRT can be developed as a new service with all of its distinctive elements included at startup or as an evolution of existing express or arterial services through the increment addition of BRT elements.

The purpose of this report is to review existing BRT systems in North America with comparable operating environments and features that could provide guidance for the design of BRT service in the WRCOG area. The research provides a summary of the system design and operation for selected services and a discussion of the potential applicability to future services in western Riverside County.

The primary focus of BRT planning in the WRCOG area of jurisdiction has been on the Magnolia corridor. Studied in the Magnolia Avenue Specific Plan and summarized in the Caltrans BRT Project Fact Sheet, the Magnolia BRT Project (RapidLink 1A) is designed to be an mixed-flow arterial route connecting UC Riverside to North Main St. Metrolink Station in Corona along Magnolia Avenue. As of early 2010, detailed analyses of alternatives, capital and operation cost estimates have been completed, but no funding sources have been identified for further implementation.

1.2 Selected System Characteristics

Based on discussion with the Project Working Group, five existing BRT systems were selected for study. Designed to realistically reflect the operating characteristics of the Western Riverside County project study area (i.e., no exclusive guideways), the systems were selected using the following criteria:

- Medium- to lower-density development patterns;
- Freeway- and arterial-based systems rather than exclusive transitways; and
- Currently in operation in North America.

As a result, this report focuses on the following systems:

System	Characteristics
LA Metro Rapid – Los Angeles, CA	Arterial-based, relatively low cost, quick implementation timeline
Swift Bus Route 99 – Everett, WA	Medium- to low-density, arterial-based
York Region Transit VIVA, – Toronto, Canada	Arterial-based, priority treatments, phasing into larger system with more priority over time
Valley Metro Rapid – Phoenix, AZ	Freeway-based, commuter-oriented, low density development pattern
Houston Metro Rapid– Houston, TX	Extensive use of freeway HOV lanes by express buses

Figure 1 below highlights the locations of the systems selected for study. Table 1 summarizes selected characteristics and Section 2 provides profiles of each of the systems.

Figure 1 – Selected Peer City BRT System Locations

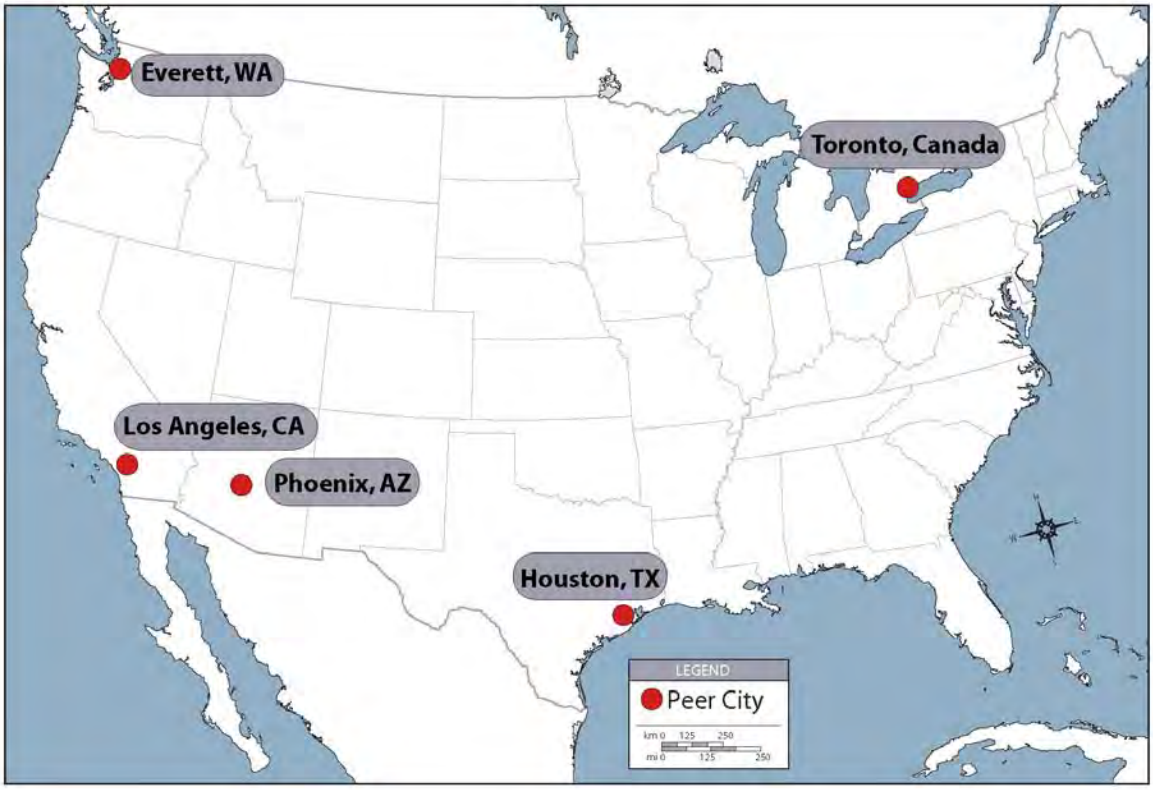


Table 1 – BRT Peer Cities Selected Operating Characteristics

Service	No. of Routes/ Route Length	No. of Stations	Average Station Spacing (Miles)	Service Level (Days, Hrs, Peak/Off Peak Freq)	Approximate Metro Area Population
LA Metro Rapid Los Angeles, CA	24 15.4 miles (average)	NA	NA	•M-F: Generally 5am-9pm; 3-10 min. peak, 10-15 min. off-peak •Sat: : Generally 6am-8pm; 10-15 min. peak, 16-18 min. off-peak •Sun: Generally 6am-8pm; 10-15 min. peak, 16-20 min. off-peak *Note: Some Routes operate weekday service only*	9,862,000 (LA County)
Swift Bus Route 99 Everett, WA	1 17.0 miles	14.0	1.2	•M-F: 5am-7pm; 10 min. frequency 7 p.m. to midnight, 20-minute frequency •Sat: 6am-midnight; 20-min frequency •Sun: 6am-midnight; 20-min frequency	98,000 (City of Everett) 2,641,000 (Seattle Metro Area)
York Region Transit VIVA York, Toronto, Canada	5 48 miles	59	~0.8	•M-F: 5am to midnight; 5-10min. peak, 10-15 min. off-peak •Sat: 6am to midnight; 5-10min. peak, 10-15 min. off-peak •Sun: 8am to midnight ; 5-10 min. peak, 10-15 min. off-peak	1,011,000 (York Region)
Valley Metro Rapid Phoenix, AZ	4 17.0 (average)	10 Park-and-Ride lots ~10 Downtown Stops	Between Park-and-Ride Lots 4.5 miles Downtown 3-4 blocks	• M-F Only: 5am– 9 am, 3pm – 7pm pm; 10-15 min peak only	4,282,900
Houston Park-and-Ride Express Service Houston, TX	32	26 Park-and-Ride lots	NA	M-F: Generally 4am-9am; 3pm-7pm., with service until 9 pm, in some corridors; 10-15 min peak; 20-30 min evening	5,087,000

2. INDIVIDUAL SYSTEM PROFILES

2.1 Metro Rapid – Los Angeles, CA

Description:

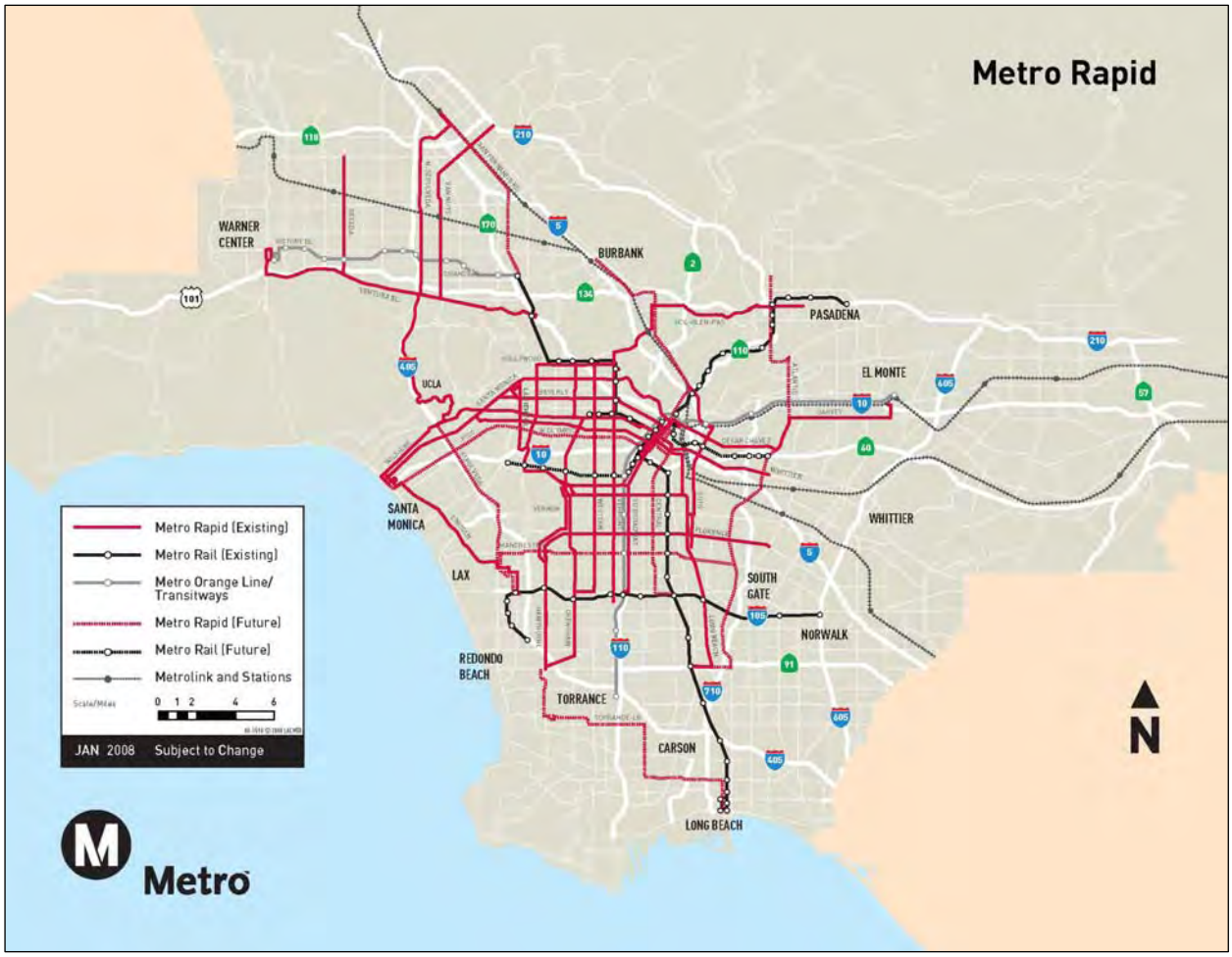
The Metro Rapid Program was implemented in June 2000 to improve bus speeds and on-time performance. Twenty-four LA Metro Rapid routes, Routes 700-799, provide approximately 450 route miles of service to Los Angeles and nearby areas, including Pasadena, Burbank, West Hollywood, and Santa Monica.

Through system integration of bus signal priority, low floor buses, headway rather than timepoint-based schedules, and fewer stops, passenger travel times have been reduced by as much as 29%. As a result, ridership has increased by up to 40%, with one-third of the ridership increase from new riders.

Metro Rapid has several attributes which, when implemented as one program, provide fast, frequent, bus service. One of the key elements of the program is the bus signal priority system, developed by the Los Angeles Department of Transportation in collaboration with Metro for use in the City of Los Angeles.

As with other TSP measures, the system is comprised of loops and radio transponders, is capable of extending the green phase or shortening of the red phase of traffic signals. A second bus signal priority system using wireless technology is used in those areas outside the City of LA. Buses requesting priority are granted priority depending on the scheduled headway of the previous Metro Rapid bus detected at the intersection. The system also provides real-time passenger information at each station.

Average Daily Weekday Ridership:
250,000 on 26 routes
Fleet Characteristics:
40-foot New Flyer buses, 40-foot NABI buses, 45 foot NABI Metro 45Cs, and 60 foot NABI 60-BRT Buses
Fare Structure:
Regular LA Metro fares apply; Adult $1.25; Senior & Disabled $0.55
Website Sources:
http://www.metro.net/projects_studies/rapid/overview.htm
Contact:
Rex Gephardt, Director, 213-922-306, gephart@metro.net


Metro Rapid
WARNER CENTER
BURBANK
PASADENA
EL MONTE
UCLA
SANTA MONICA
LAX
WHITTIER
SOUTH GATE
NORWALK
REDONDO BEACH
TORRANCE
CARSON
LONG BEACH
Metro Rapid (Existing)
Metro Rail (Existing)
Metro Orange Line/ Transitways
Metro Rapid (Future)
Metro Rail (Future)
Metrolink and Stations
0 1 2 4 6
JAN 2008 Subject to Change
N
Metro

2.2 Swift Bus Route 99 – Everett, WA

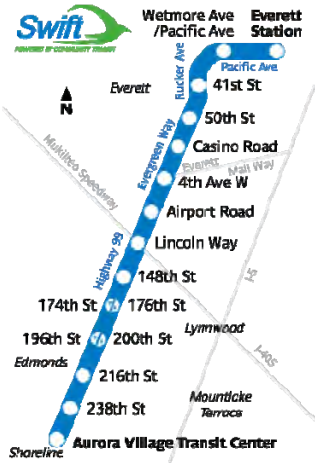
Description:

Opened in November 2009, Swift Bus serves a 17-mile stretch of the Highway 99/Evergreen Way/Rucker Avenue corridor between Shoreline's Aurora Village Transit Center in the south and Everett Station in the north.

The Swift Bus route has 10 miles of transit signal priority (TSP) intersections. Additional TSP will be coming to intersections in Everett. There are seven miles of transit-only lanes in the corridor, and plans include further traffic improvements.

Both Swift Bus terminals are major transit hubs. At the south end, the Aurora Village Transit Center in Shoreline offers connections to Community Transit and King County Metro Transit buses that serve south Snohomish County, north King County and downtown Seattle. At the north end, Everett Station offers connections to Community Transit, Everett Transit, Island Transit, Skagit Transit and Sound Transit buses, as well as Sounder commuter trains, Greyhound and Amtrak.

ORCA smart card readers at each station make paying your fare fast and easy. Local stops near Swift Bus stations offer transfers to additional stops in the corridor as well as east-west service provided by Community Transit and Everett Transit.



Swift Bus vehicles have three boarding doors. Bicycles can be rolled onto bike racks located inside the back door. Most station platforms are just a few inches shorter than the floor of the bus, making it easy to step aboard.

Additional BRT lines similar to the Swift Bus are included in Community Transit's Six-Year Plan.

Average Daily Weekday Ridership:
Not available at this time

Fleet Characteristics:
Fifteen 62-foot articulated diesel-hybrid buses with seating for 43 people

Fare Structure:
Riders pay their fares at the station while waiting for the bus, then board at any door when the bus arrives. Fares are: Adults $1.50, Youth $1.00, Reduced $0.50.

Website Sources:
http://www.everettwa.org/default.aspx?ID=1192

Contact:
George Baxter, Manager, 425-257-7777, etmail@ci.everett.wa.us

2.3 York Region Transit VIVA – Toronto, Canada

Description:

Located in the Toronto metropolitan area, York Region Viva BRT service consists of five routes, with three of them providing all-day service. These routes generally run east-west and connect the York region's urban centers: Markham, Richmond Hill, Vaughan, Aurora and Newmarket. The system also provides intercity links. VIVA links to Toronto's transit system, Go Transit, and the Region of Peel.

The BRT service is being developed in three phases. The Phase I "Quick Start" opened in 2005, with the Full Build System to be completed in increments by 2022. Partners in the project included the Toronto Transportation Commission, the Government of Ontario, and York Region Transit.

Phase I includes dedicated buses, construction of shelters, off-board fare collection, intersection improvements and ITS features. Phase II will feature the fully-featured rapid transit system with the addition of dedicated transitways, enhanced terminals and stations, additional advanced technologies and vehicles, park-and-ride facilities and enhanced fare integration. The Phase III transit expansion may include the possibility of light rail and/or an expansion of the bus rapid transit system.

Under the Region's "Centres and Corridors" land use plan, rapid transit and sustainable land use are seen as interdependent ("Viva will serve as the cornerstone of the Region's growth strategy."). Four mixed-use urban centers, called "transit villages", will be developed to accommodate growth without sprawl. When completed, rapid transit services will be developed within the four planned urban corridors.

Average Daily Weekday Ridership:
20,900 (2009 data for five lines) (ridership on two lines reduced by strike at York University)

Fleet Characteristics:
85 Van Hool 40 foot and 60 foot (articulated) buses

Fare Structure:
$3.50; Passengers using GTA Passes, Monthly Passes, non-Express tickets or transfers must pay a supplement of $0.50 to board YRT Express services.

Website Sources:
http://www.yorkregiontransit.com/

Contact:
Rajeev Roy, Manager – Transit Management Systems, 905-762-1282, Rajeev.roy@york.ca


york region
rapid transit route map
VIVA
key to lines
York University / Richmond Hill / Cornell
Finch / Richmond Hill / Newmarket
Martin Grove / York University / Downsview
Finch / Richmond Hill / Unionville – peak only
Don Mills / McCowan / Cornell – peak only
indicates future service
MultiRide machines located at this terminal
indicates future stop
2 ZONE FARE
required for travel through the zone boundary
Yonge St.
Highway 7
Centre
Newmarket GO Bus Terminal
Eagle
Mulock
Savage
Orchard Heights
Wellington
Golf Links
Henderson
Bloomington
King
Jefferson
19th-Gamble
Bernard
Elgin Mills
Crosby
Major Mackenzie
Weldrick
Mth-Carrville
Bantry-Scott
Richmond Hill Centre Terminal
Bayview
Valleymede
West Beaver Creek
Leslie
East Beaver Creek
Allstate Parkway
Woodbine
Montgomery
Town Centre
Warden
Enterprise
Kennedy
Bullock
McCowan
Main St. Markham
Wootten Way
Markham Stouffville Hospital
Cornell
Martin Grove
Kipling
Islington
Pine Valley
Ansley Grove
Weston
Vaughan Corporate Ctr.
Interchange Way
Keele
Dufferin
Promenade
Atkinson
York University
Keele-Finch
Downsview Station
Royal Orchard
Centre
Clark
Steeles
Finch GO Bus Terminal
Unionville Station
14th
Denison
Esna-Steeles
Mcalcott
Seneca Hill
Don Mills Station

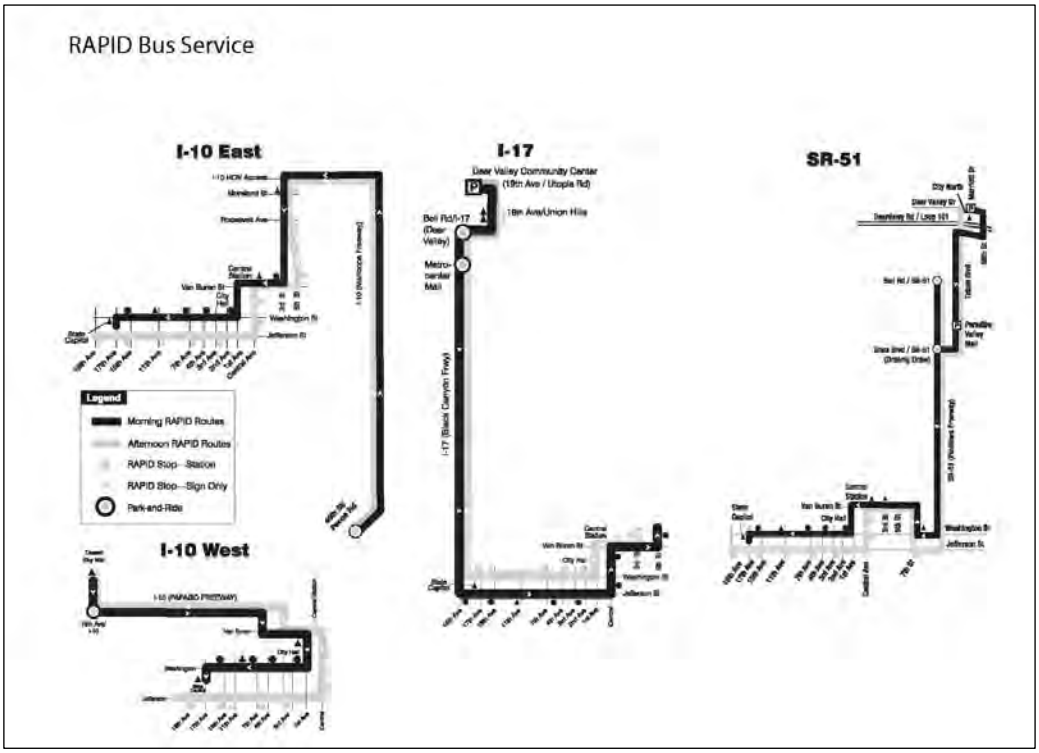
2.4 Valley Metro Rapid – Phoenix, AZ

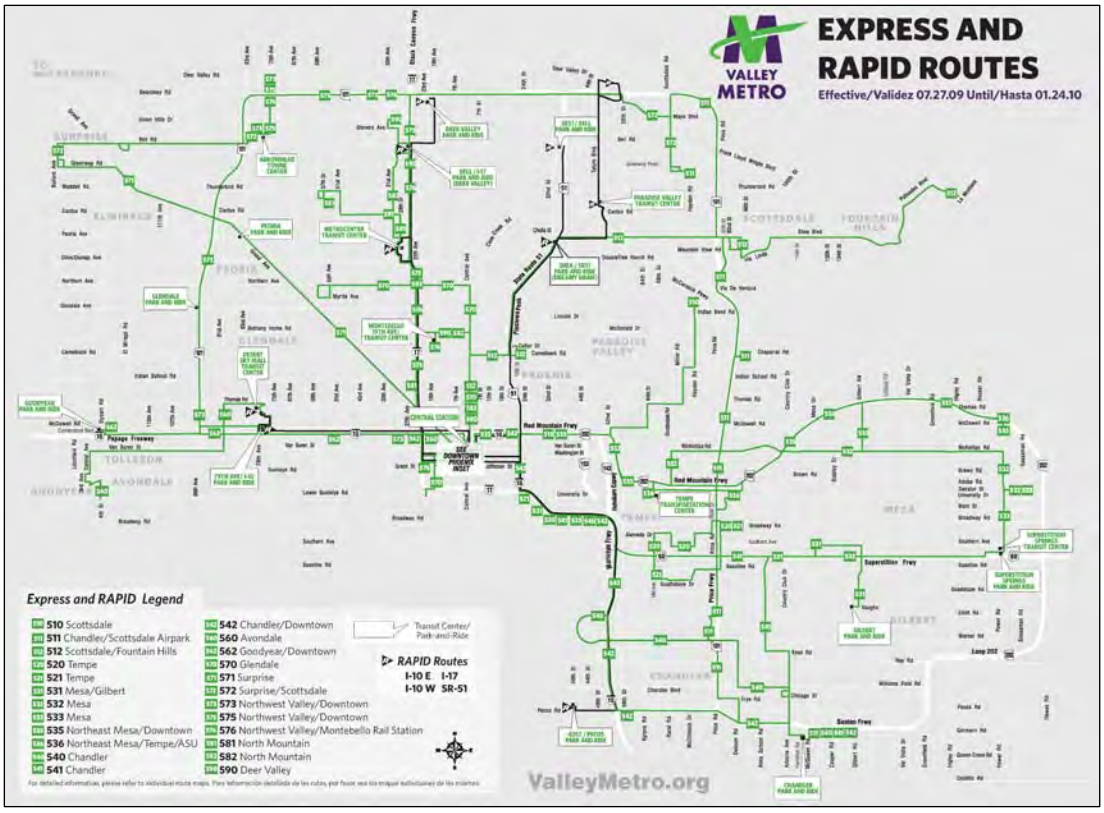
Description:

The SR-51, I-10 East, I-10 West, and I-17 Rapid Buses operate between downtown and other neighborhoods in the northern and western portions of the City. The service is focused on transporting commuters into and out of downtown Phoenix and operates Monday through Friday during the morning and afternoon peak. The routes originate at park-and-ride lots in the corridors and operate in HOV lanes as available. Vehicles have higher end amenities and downtown stops have unique design and amenities to appeal to commuters.

The Valley's first arterial BRT route, Valley Metro LINK, travels between Superstition Springs Center and the METRO light rail terminal at Sycamore Station. The second arterial BRT is scheduled to begin operation in July 2010. It will include 20 BRT stations along Country Club Drive and Arizona Avenue in Mesa and Chandler.

Average Daily Weekday Ridership:
Rapid: 3,185 daily boardings for 4 routes.
Fleet Characteristics:
Rapid – 56 NABI 45' LNG CompoBuses (45C-LFW) with 47 seats
Fare Structure:
$2.75 for all riders
Website Sources:
http://www.valleymetro.org/
Contact:
Stuart Boggs, Valley Metro, sboggs@valleymetro.org


RAPID Bus Service
I-10 East
I-17
SR-51
I-10 West
Legend
Morning RAPID Routes
Afternoon RAPID Routes
RAPID Stop—Station
RAPID Stop—Sign Only
Park-and-Ride


VALLEY METRO
EXPRESS AND RAPID ROUTES
Effective/Validez 07.27.09 Until/Hasta 01.24.10
Express and RAPID Legend
510 Scottsdale
511 Chandler/Scottsdale Airpark
512 Scottsdale/Fountain Hills
520 Tempe
521 Tempe
531 Mesa/Gilbert
532 Mesa
533 Mesa
535 Northeast Mesa/Downtown
536 Northeast Mesa/Tempe/ASU
540 Chandler
541 Chandler
542 Chandler/Downtown
560 Avondale
562 Goodyear/Downtown
570 Glendale
571 Surprise
572 Surprise/Scottsdale
573 Northwest Valley/Downtown
575 Northwest Valley/Downtown
576 Northwest Valley/Montebello Rail Station
581 North Mountain
582 North Mountain
590 Deer Valley
Transit Center/ Park-and-Ride
RAPID Routes
I-10 E I-17
I-10 W SR-51
ValleyMetro.org

2.5 Houston Metro Freeway Express – Houston, TX

Description:

METRO currently operates 26 Park & Ride lots across Harris County, many offering direct access to the HOV network. TxDOT also has numerous Park & Pool locations throughout the region. Parking is provided at no charge at any of the facilities to ride on the bus or in a vanpool or carpool. In addition, the Woodlands Express offers transit services to and from several lots as well as connections to METRO bus routes. Several of the lots have over 2,000 parking spaces.

Peak-hour commuter service runs typically runs between 4:00am and 9am, and again from 3pm to 7:00pm. Some late-evening trips travel as late as 9 p.m. in some corridors. Full Fares run between $2.00 and $4.50 based on the number of zones travelled. Park and ride service is provided in 10 corridors, plus three additional routes.

Houston Metro has recently opened two new arterial BRT routes, the QuickLine and the SwiftLine.

Average Daily Weekday Ridership:
Park and Ride (Commuter) Routes 35,000 boardings
Fleet Characteristics:
Highway coach and express bus vehicles
Fare Structure:
Park and Ride Service between $2.00 and $4.50 per trip.
Website Sources:
http://www.ridemetro.org/
Contact:
Administrative Offices 713-739-4000

The Park and Ride Facilities with Commuter Metro Service in the Houston area are shown below.

3. FINDINGS AND CONCLUSIONS

The review of the five systems revealed several elements that could be part of the BRT system in Western Riverside County.

- Several of the systems have unique treatments for their stops, stations, and vehicles as part of the branding of the system. These aspects identify the service as special and unique, enabling existing and prospective riders to easily identify them as the higher quality services.

- Almost all of the systems use newer vehicles with unique design features and amenities. The use of these vehicles provides a higher level of comfort that supports the image that the BRT services are unique and high quality.

- Stops and stations have extra amenities, such as real time arrival information, to enhance the customer experience.

- Several of the systems have major park-and-ride facilities, in some cases with direct access to freeways. These facilities enable service provision to a large catchment area, especially for long distance commutes. They also provide parking for carpools and vanpools, enabling a leveraging of benefits for alternative transportation efforts.

- HOV lanes shared with traffic enable BRT services to operate at a higher speed and provide faster travel times. Like the park-and-ride lots, the lanes enable several alternative transportation modes to take advantage of the capital investment.

- The arterial BRT systems use transit signal priority extensively to provide faster operating speeds and shorter travel times. While relatively low in cost, the use of TSP provides attractive benefits for commuters and other riders in congested corridors. Their use requires close coordination with local traffic engineers in both design and operation to minimize impacts to cross streets.

All of these elements will be considered as the study progress to identify and screen corridors for potential BRT service.

4. REFERENCES

2009 Valley Metro Transit Book
http://www.valleymetro.org/images/uploads/2009_ValleyMetroTransitBook.pdf

Everett Transit Website
http://www.ci.everett.wa.us/default.aspx?ID=290

Houston Metro Park and Ride Website
http://www.ridemetro.org/SchedulesMaps/ParkRide.aspx

LA Metro Rapid Website
http://www.metro.net/projects_studies/rapid/default.htm

MSA Population Statistics
recenter.tamu.edu/data/popm/

Transport Canada; Intelligent Transportation Systems in 98 B-Line Rapid Bus Service: Advanced Technology at Work
http://www.tc.gc.ca/programs/environment/utsp/intelligenttransportationsystems.htm

TCRP Synthesis 64: Bus Use of Shoulders, A Synthesis of Transit Practice.
Transportation Research Board, Washington, DC 2006
http://www.trb.org/Publications/Blurbs/Bus_Use_of_Shoulders_157542.aspx

York Region Transit Viva Routemap
http://www.yorkregiontransit.com/maps/maps/viva_routemap.pdf

BUS RAPID TRANSIT ROUTE PLANNING PROJECT

Initial Corridor Screening

Final Technical Memo

April 2010

IBI GROUP

with The Planning Center

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1. INTRODUCTION

The BRT Route Planning Project is being conducted under a SCAG Compass Blueprint grant to identify corridors in the WRCOG area that would be suitable for bus rapid transit (BRT) service and determine the priority for BRT projects to be developed following the Magnolia corridor. The purpose of this report is to document the process to screen the universe of corridors using selected criteria to identify four to five corridors for detailed evaluation. Available data, discussions with the project team, and field inspections provided the information needed for the analysis. This report includes a description of the corridors considered, the screening criteria employed, and the results and recommendations for the corridors to be analyzed in more detail.

2. INITIAL CORRIDORS

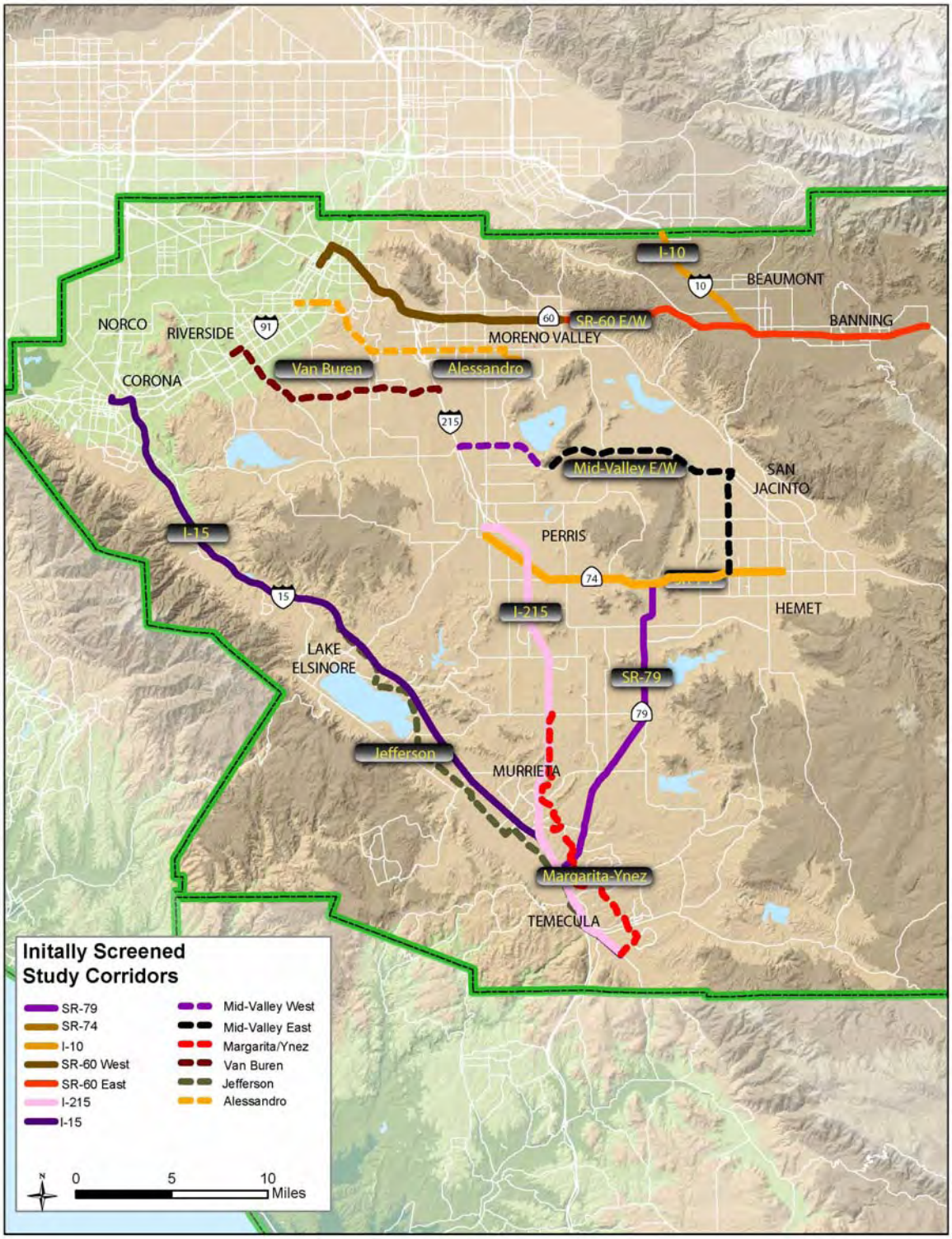
The initial set of corridors to be analyzed was derived from existing data sources and plans, discussions with the technical group, and discussions with Western Riverside County planning directors. Data sources included:

- Current and 2035 population and employment data by TAZ;
- SCAG General Plan;
- RTA RideGuide and GIS route files; and
- Field inspections.

As a result of this input, 13 corridors were identified. They are shown in Figure 1 and listed in Table 1, followed by a description of each one.

The SR-91 corridor between Corona and Riverside was identified for consideration early in the study. It currently has Metrolink service and BRT is programmed for implementation in the Magnolia Corridor. Due to the advanced state of the Magnolia Corridor project, and the purpose of the study to identify BRT projects to be implemented after the Magnolia project, this corridor was not screened as part of this effort.

Figure 1 Initial Screening Corridors



Source: IBI Group

Table 1 Initial Screening Corridors

Corridor	Limits	Length (mi.)
Freeway/Highway Corridors		
I-15	Corona - Pechanga	41.7
I-215	Perris Metrolink Station - Pechanga	25.6
I-10	Calimesa - Beaumont	7.5
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9
SR-60/I-10 East	Moreno Valley (Redlands Blvd) to Morongo/ Cabazon	19.9
SR-74	Perris Metrolink Station - Hemet	17.0
SR-79	Hemet - Pechanga	17.2
Arterial Corridors		
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5
Van Buren Blvd.	Magnolia/Galleria - I-215/March AFB	12.7
Mid-Valley Parkway West	I-215 - Lake Perris	4.9
Mid-Valley Parkway East	Lake Perris - Hemet	15.8
Margarita/Ynez	Pechanga - Loma Linda University Medical Center Murrieta	17.2
Jefferson Avenue	Pechanga - Lake Elsinore Outlet Stores	24.7

2.1 Freeway/Highway Corridors

I-15 – The I-15 corridor runs between the Corona Metrolink Station and the Pechanga Resort near Temecula. HOV lanes are planned in the median north of I-15, providing the potential for BRT travel time savings. Areas that could be served include the Dos Lagos development, the Lake Elsinore Outlet Center, and the future Temecula Transit Center. Selected park and ride lots in the corridor would also be served.

I-215 – This corridor runs between the future Perris Metrolink Station and the Pechanga Resort. Service would be provided to the new Loma Linda Medical Center at Murrieta, and the future Temecula Transit Center. Selected park and ride lots in the corridor would also be served.

I-10 – The I-10 Corridor is located between Calimesa and Beaumont.

SR-60 West Segment – This corridor is located between the Downtown Riverside Transit Center/Metrolink Station and the eastern end of Moreno Valley at Redlands Boulevard. Service would be provided to UCR and the Moreno Valley Mall.

SR-60 East Segment/I-10 – This segment would extend from the Redlands Boulevard interchange east to Morongo/Cabazon. It would serve Beaumont and Banning.

SR-74 – Extending between the future Perris Metrolink Station and downtown Hemet, this corridor would serve Romoland and Homeland.

SR-79 – This corridor extends from Hemet to Pechanga with service to Winchester and the Temecula Transit Center. Part of the route would run on I-15 in Temecula.

2.2 Arterial Corridors

Alessandro Boulevard – This corridor extends from Magnolia Avenue in Riverside to the Riverside County Medical Center in Moreno Valley. It would serve established areas near the Magnolia Corridor, along with developing areas west of I-215 and in Moreno Valley.

Van Buren Boulevard – This corridor extends from the Galleria at Tyler on Magnolia in Riverside to the future development at March Air Reserve Base. It would connect to the Magnolia Corridor BRT and would serve developing areas west of I-215 including Woodcrest.

Mid-Valley Parkway West Segment – This corridor extends from I-215 to Lake Perris, serving the developing areas south of the March Air Reserve Base. The existing facility in the corridor is the Ramona Expressway.

Mid-Valley Parkway East Segment – This corridor extends from Lake Perris to Hemet. The existing facility in the corridor is the Ramona Expressway. While primarily rural in nature today, substantial growth is planned for the area. It would serve Lakeview and San Jacinto.

Margarita/Ynez – The corridor extends from the Pechanga Resort through Temecula and Murrieta to the new Loma Linda Medical Center in Murrieta. It would operate primarily on existing arterial streets, with a small portion on I-215.

Jefferson Avenue – This corridor runs between the Pechanga Resort near Temecula to the Lake Elsinore Outlet Center. It would serve Temecula, Murrieta, Wildomar, and Lake Elsinore.

3. SCREENING CRITERIA

Developed in collaboration with the project team, the following set of seven criteria were selected for the initial screening to enable evaluation of the corridors for key considerations in an efficient manner.

- Population Density
- Employment Density
- Activity Centers
- Smart Growth Opportunities
- Local and Regional Transit Connectivity
- Existing Local and Express Bus Service
- Potential for Transit Priority Treatments

Each criterion was scored using a scale of -2 to +2. The general scoring concept is described below.

+2	substantially positive
+1	somewhat positive
0	average
-1	somewhat negative
-2	substantially negative

A description of each criterion and the metric for its scoring is provided below.

3.1 Population Density

The 2035 forecast population for each TAZ in a corridor was compiled using GIS. TAZs within 0.5 miles of each side of the corridor were used. If any portion of a TAZ was within the corridor, the entire population of that TAZ was included in the summation. The population total was divided by the area of the TAZs to determine the population per square mile. The scoring of population density was applied as follows:

+2	4,000 or greater
+1	3,000 – 3,999
0	2,000 – 2,999
-1	1,000 – 1,999
-2	999 or less

3.2 Employment Density

The 2035 forecast employment for each TAZ in a corridor was compiled using GIS. TAZs within 0.5 miles of each side of the corridor were used. If any portion of a TAZ was within the corridor, the entire employment of that TAZ was included in the summation. The employment total was divided by the area of the corridor to determine the population per square mile. The scoring of employment density was applied as follows:

+2	2,500 or greater
+1	2,000 – 2,499
0	1,500 – 1,999
-1	1,000 – 1,499
-2	999 or less

3.3 Activity Centers

Potential activity centers in each corridor could include shopping centers, employment centers, medical centers, colleges and universities, etc. The number of activity centers in each corridor were identified and scored in the following manner:

+2	4 or more
+1	3
0	2
-1	1
-2	0

3.4 Smart Growth Opportunities

The potential for Smart Growth developments was evaluated based on completed and ongoing studies, and community desires. The level of interest and plans for Smart Growth were qualitatively considered and scored according to this metric:

+2	multiple opportunities/high interest
+1	some opportunity/interest
0	no identified opportunities but possible
-1	opportunities not likely
-2	opportunities very unlikely

3.5 Local and Regional Transit Connectivity

Connections to other services in the transit system were based on existing service, RTA's current SRTP, and the RTA Comprehensive Operations analysis. Most of the corridors have some opportunities for connections, but connections to key transit centers and/or Metrolink stations were rated highly. The following scoring system was used:

+2	two or more connections to high capacity services and/or major transit centers
+1	one connection to high capacity services and/or major transit centers
0	connections to some regional and local services
-1	connections to local services only
-2	no connections to regional or local services

3.6 Existing Local/Express Bus Service

The presence of local, especially high frequency, and/or express bus service is an indicator of existing demand in a corridor. The existing service in each corridor was reviewed to determine the number of routes and the type of services. The scoring approach is shown below.

+2	two or more routes running along a majority of the corridor
+1	one route running along a majority of the corridor
0	one or more routes running along any portion of the corridor
-1	no routes running along the corridor, but one or more routes crossing the corridor
-2	no routes running along or crossing the corridor

3.7 Potential for Priority Treatments

Effective BRT service provides noticeable travel time savings. Priority treatments could include exclusive lanes, shared use of HOV lanes, queue jumps, or traffic signal priority. The evaluation of the corridors is based on existing conditions and expected improvements.

+2	opportunities for priority treatments along most of the length of the corridor and access routes
+1	opportunities for priority treatments along substantial portions of the corridor and/or access routes
0	opportunities for some treatments along the corridor and/or cross streets
-1	few opportunities along length of the corridor, some spot treatments possible along access routes

-2 no opportunities along length of the corridor with limited opportunities along access routes

Tables and figures used in the scoring can be found in the Appendix.

4. RESULTS

Using the method described in Section 3, the corridors were scored for each of the criteria and totalled for an overall score. The results are reported in Table 2, and the findings and recommendations are summarized below.

4.1 Corridors Proposed for Detailed Analysis

The five highest scoring corridors are recommended for detailed analysis. They are shown on Figure 2, with the key reasons for their selection provided below.

I-15 – With a score of 7, this freeway corridor scores well for connectivity due to its connections to the Metrolink Station in Corona, and local and regional services in Temecula. It also scored well for the potential for priority treatments due to the planned HOV lanes in the median, where space is available the length of I-15. It scored well for activity centers and smart growth.

I-215 – With a score of 8, this freeway corridor has several activity centers and existing transit service. The corridor scored well for transit connectivity and existing service. Its potential for priority treatments is limited.

SR-60 West Segment – With a score of 10, this freeway corridor scores well for activity centers and existing service. It also scores well for priority treatments due to the HOV lanes along the full length of SR-60. Population density, existing service, and priority treatments scored well. In line stations will be considered for this service to minimize surface street travel to reach stations and to provide the best possible travel times.

Alessandro Boulevard – With a score of 10, this arterial corridor scores well for employment, population, existing service and the potential for priority treatments at intersections. The corridor scored well for smart growth and existing service.

Margarita/Ynez – With a score of 9, this arterial corridor scores high for activity centers, local and regional connectivity, existing service, and population density. Consideration will be given during the detailed analysis to including a portion of Jefferson Avenue in the BRT alignment in this corridor to facilitate Temecula's redevelopment plans.

4.2 Corridors Not Recommended for Further Analysis

These corridors did not score as high as the recommended corridors. While they will no longer be considered for BRT service in this study, there are opportunities to enhance existing routes with express service or other upgrades. Those improvements will be considered by RTA as part of the annual short range transit planning process.

I-10 – With a score of -9, this freeway corridor received low marks for employment density, activity centers, transit connectivity, and existing service.

SR-60/I-10 East – With a total of -4, this freeway corridor had low scores for population and employment density, activity centers, smart growth, and priority treatments.

SR-74 – Scoring 5, this highway corridor had low scores for population and employment density.

SR-79 – With a total of 4, this highway corridor had low scores for employment and population density, and priority treatments.

Van Buren Boulevard – With a total 2, this arterial corridor had low scores for population and employment density, activity centers, and smart growth.

Mid-Valley Parkway West – Scoring -4, this arterial corridor had low marks for population and employment density, smart growth.

Mid-Valley Parkway East – With a total of 0, this arterial corridor had low marks for population and employment density.

Jefferson Avenue – With a score of 3, this arterial corridor had low marks for population and employment, as well as activity centers. High capacity service in this area can be more effectively provided on I-15, which runs parallel to this corridor.

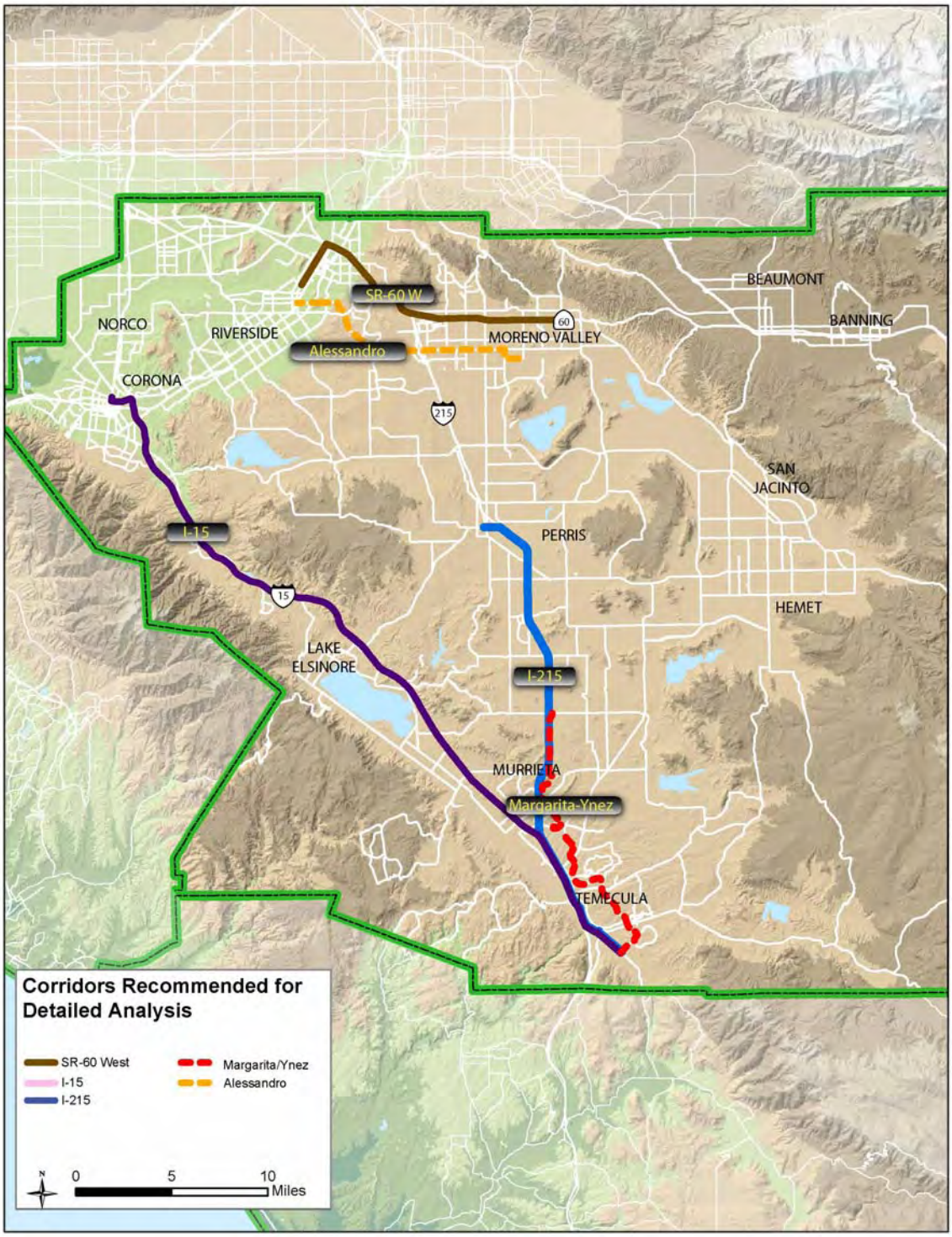
5. NEXT STEPS

The selected corridors will be evaluated using more detailed criteria. In addition, station planning will get underway to identify conceptual locations for stations and conduct the more detailed analysis for selected station types. The results of the detailed analysis will be a priority list of corridors and guidelines for station development.

Table 2 Corridor Screening Results

Corridor	Limits	Length (mi.)	Criteria							Totals
			Population Density	Employment Density	Activity Centers	Smart Growth Opportunities	Local & Regional Transit Connectivity	Existing Local/ Express Bus Service	Potential for Priority Treatments	
Freeway/Highway Corridors										
I-15	Corona - Pechanga	41.7	-1	-1	2	2	2	1	2	7
I-215	Perris Metrolink Station - Pechanga	25.6	0	0	2	2	2	2	0	8
I-10	Calimesa - Beaumont	7.5	0	-2	-2	-1	-2	-2	0	-9
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9	2	1	1	1	1	2	2	10
SR-60 East/I-10	Moreno Valley (Redlands Blvd) to Morongo/Cabazon	19.9	-1	-2	-1	-1	1	1	-1	-4
SR-74	Perris Metrolink Station - Hemet	17.0	1	-1	0	1	2	2	0	5
SR-79	Hemet - Pechanga	17.2	-1	-2	2	1	2	2	0	4
Arterial Corridors										
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5	2	2	0	2	1	2	1	10
Van Buren Blvd.	Magnolia/Galleria - I-215/March AFB	12.7	0	-1	0	0	1	1	1	2
Mid-Valley Parkway West	I-215 - Lake Perris	4.9	-2	-2	-2	0	1	0	1	-4
Mid-Valley Parkway East	Lake Perris - Hemet	15.8	-1	-2	0	1	1	0	1	0
Margarita/Ynez	Pechanga - Loma Linda University Medical Center Murrieta	17.2	2	0	1	1	2	2	1	9
Jefferson Avenue	Pechanga - Lake Elsinore Outlet Stores	24.7	-1	0	0	1	2	0	1	3

Figure 2 Corridors Recommended for Detailed Analysis



Source: IBI Group

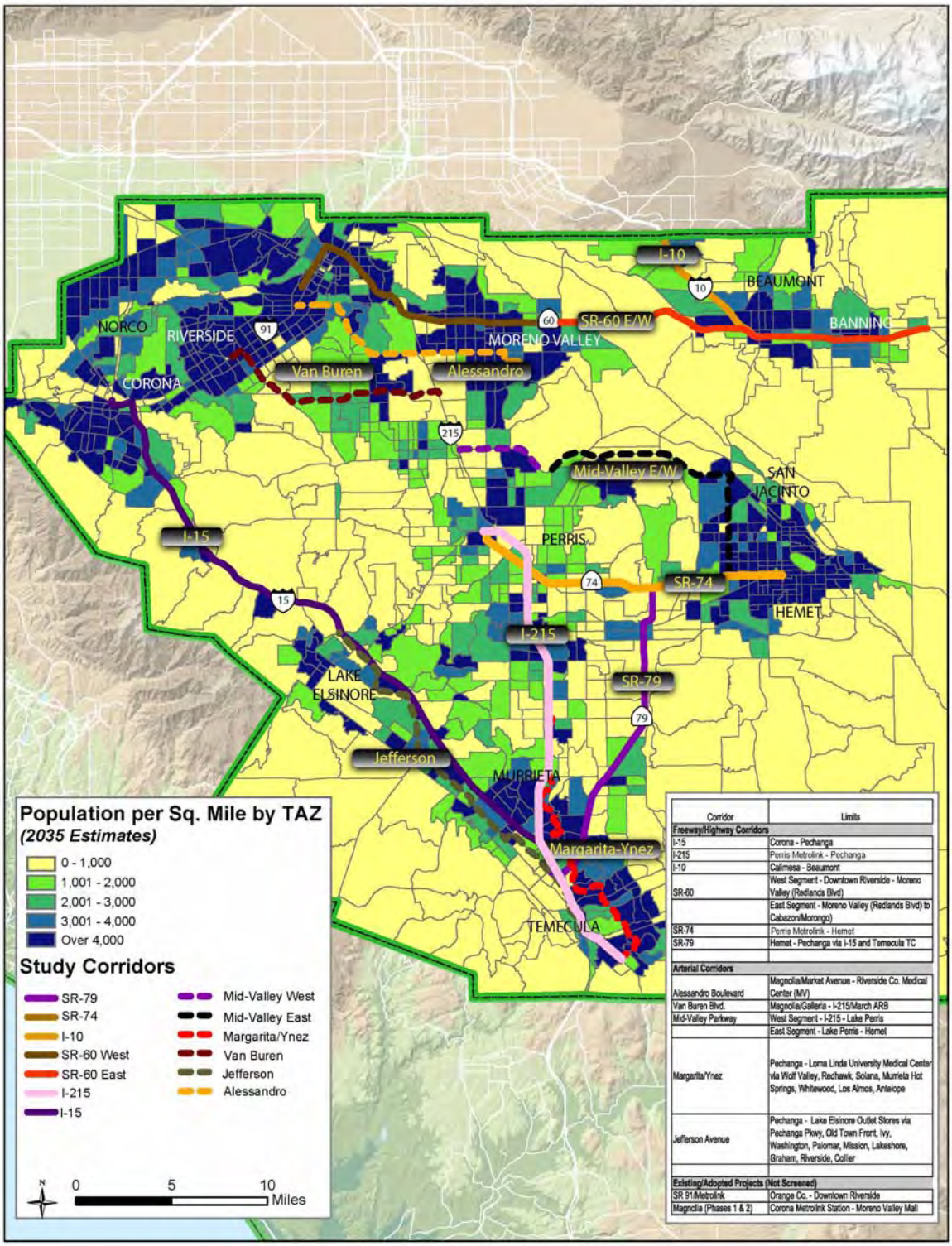
APPENDIX – BACKGROUND DATA AND INFORMATION

Population and Employment Information

Corridor	Length (Miles)	2007 Population	2007 Employment	2035 Population	2035 Employment	2035 Population Per Square Mile	2035 Employment Per Square Mile	Square Miles
I-15	41.7	176,245	98,701	247,899	176,662	**1,403**	**1,000**	**176.7**
I-215	25.6	126,913	61,184	174,381	107,919	**2,884**	**1,785**	**60.5**
I-10	7.5	25,067	6,002	72,756	19,025	**2,788**	**729**	**26.1**
SR-60 West	14.7	124,436	74,084	195,548	135,694	**2,901**	**2,013**	**67.4**
SR-60 East	19.9	44,474	14,103	122,010	54,035	**2,848**	**1,261**	**42.8**
SR-74	17.0	61,838	26,100	127,199	59,210	**3,037**	**1,414**	**41.9**
SR-79	17.2	61,139	30,561	87,941	50,509	**1,107**	**636**	**79.4**
Alessandro	13.5	113,804	38,797	157,472	89,433	**4,664**	**2,649**	**33.8**
Van Buren	12.7	62,575	27,009	84,136	52,885	**2,214**	**1,391**	**38.0**
Mid-Valley West	4.9	10,097	6,664	25,686	12,862	**529**	**265**	**48.6**
Mid-Valley East	15.8	25,830	5,603	100,298	27,755	**1,790**	**495**	**56.0**
Margarita / Ynez	17.2	137,547	41,151	171,186	72,955	**4,142**	**1,765**	**41.3**
Jefferson	24.7	96,885	62,549	148,530	114,861	**1,948**	**1,506**	**76.3**

Source: WRCOG Forecasts, IBI Group

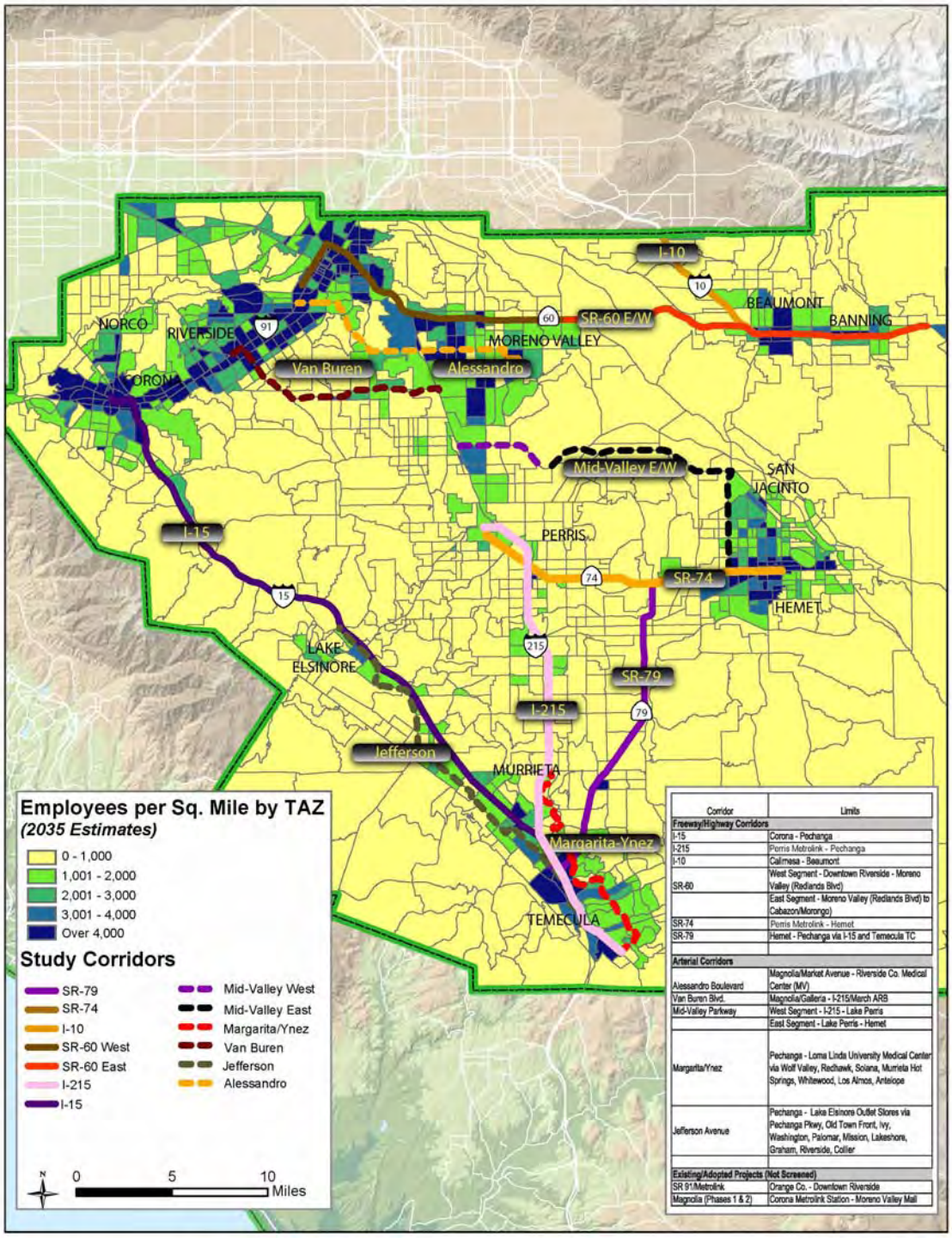
2035 Population Density



Corridor	Limits
Freeway/Highway Corridors	
I-15	Corona - Pechanga
I-215	Perris Metrolink - Pechanga
I-10	Calimesa - Beaumont
SR-60	West Segment - Downtown Riverside - Moreno Valley (Redlands Blvd)
	East Segment - Moreno Valley (Redlands Blvd) to Cabazon/Morongo)
SR-74	Perris Metrolink - Hemet
SR-79	Hemet - Pechanga via I-15 and Temecula TC
Arterial Corridors	
Alessandro Boulevard	Magnolia/Market Avenue - Riverside Co. Medical Center (MV)
Van Buren Blvd.	Magnolia/Galleria - I-215/March ARB
Mid-Valley Parkway	West Segment - I-215 - Lake Perris
	East Segment - Lake Perris - Hemet
Margarita/Ynez	Pechanga - Loma Linda University Medical Center via Wolf Valley, Redhawk, Solana, Murrieta Hot Springs, Whitewood, Los Almos, Antelope
Jefferson Avenue	Pechanga - Lake Elsinore Outlet Stores via Pechanga Pkwy, Old Town Front, Ivy, Washington, Palomar, Mission, Lakeshore, Graham, Riverside, Collier
Existing/Adopted Projects (Not Screened)	
SR 91/Metrolink	Orange Co. - Downtown Riverside
Magnolia (Phases 1 & 2)	Corona Metrolink Station - Moreno Valley Mall

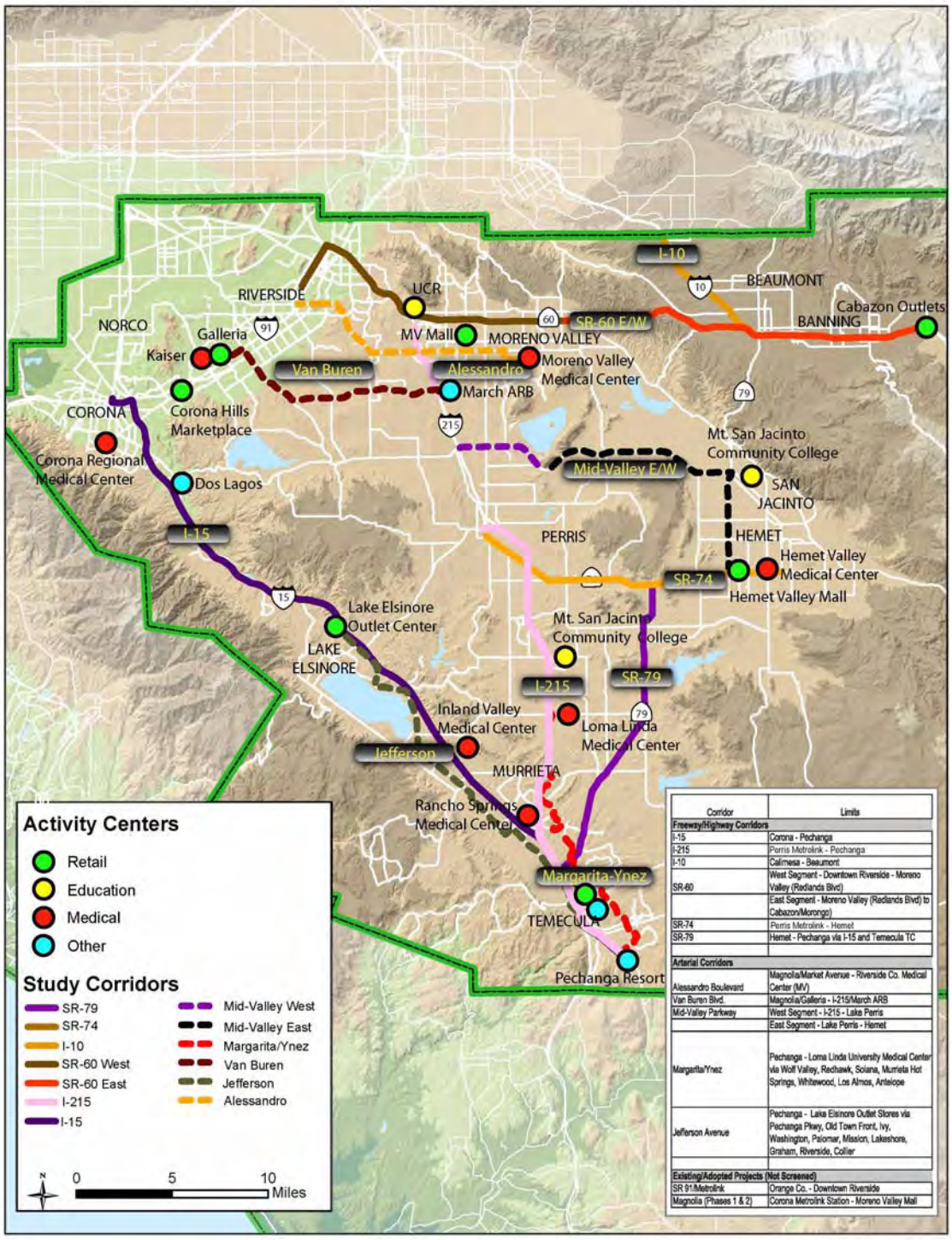
Source: WRCOG Forecasts, IBI Group

2035 Employment Density

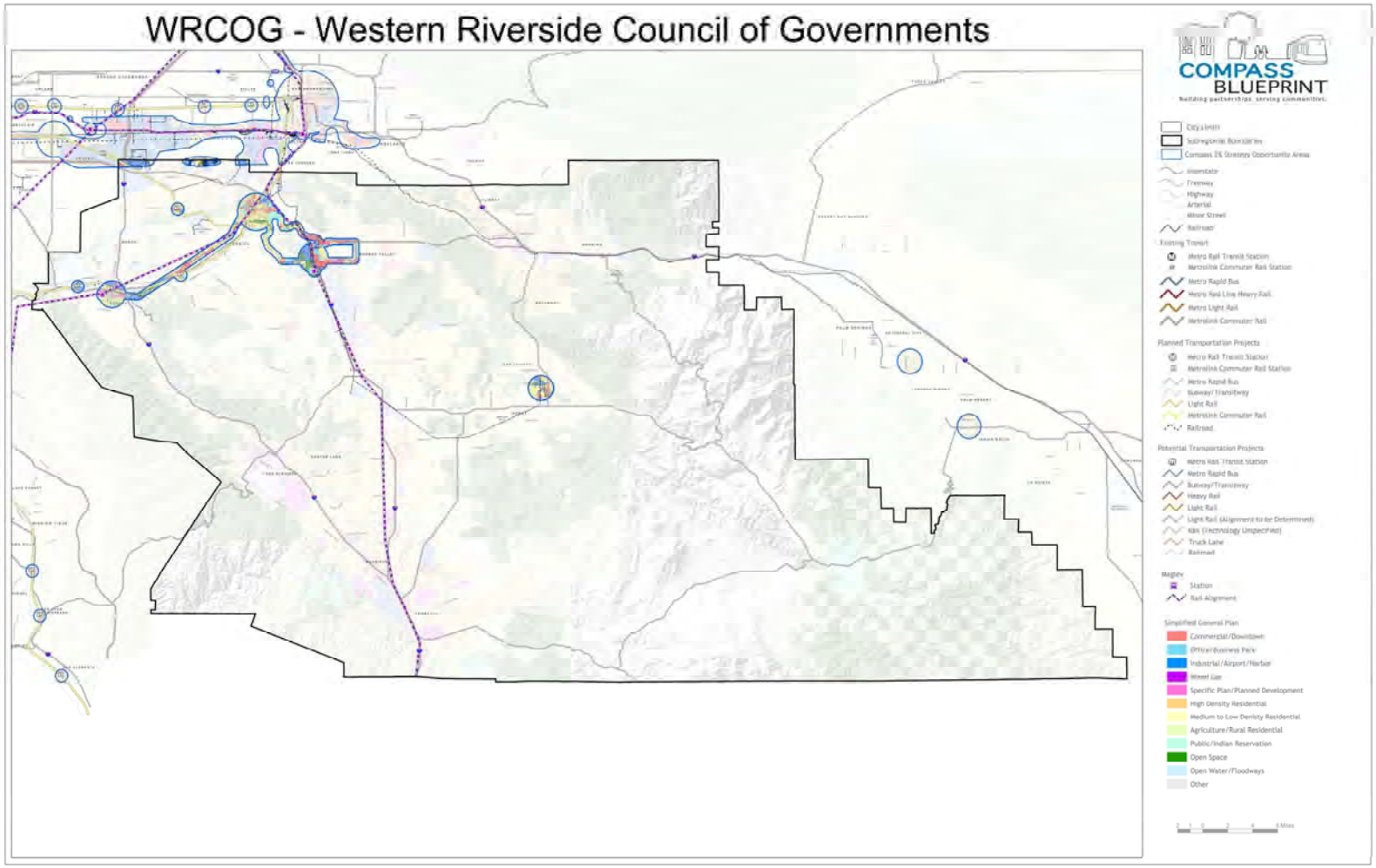


Source: WRCOG Forecasts, IBI Group

Activity Centers

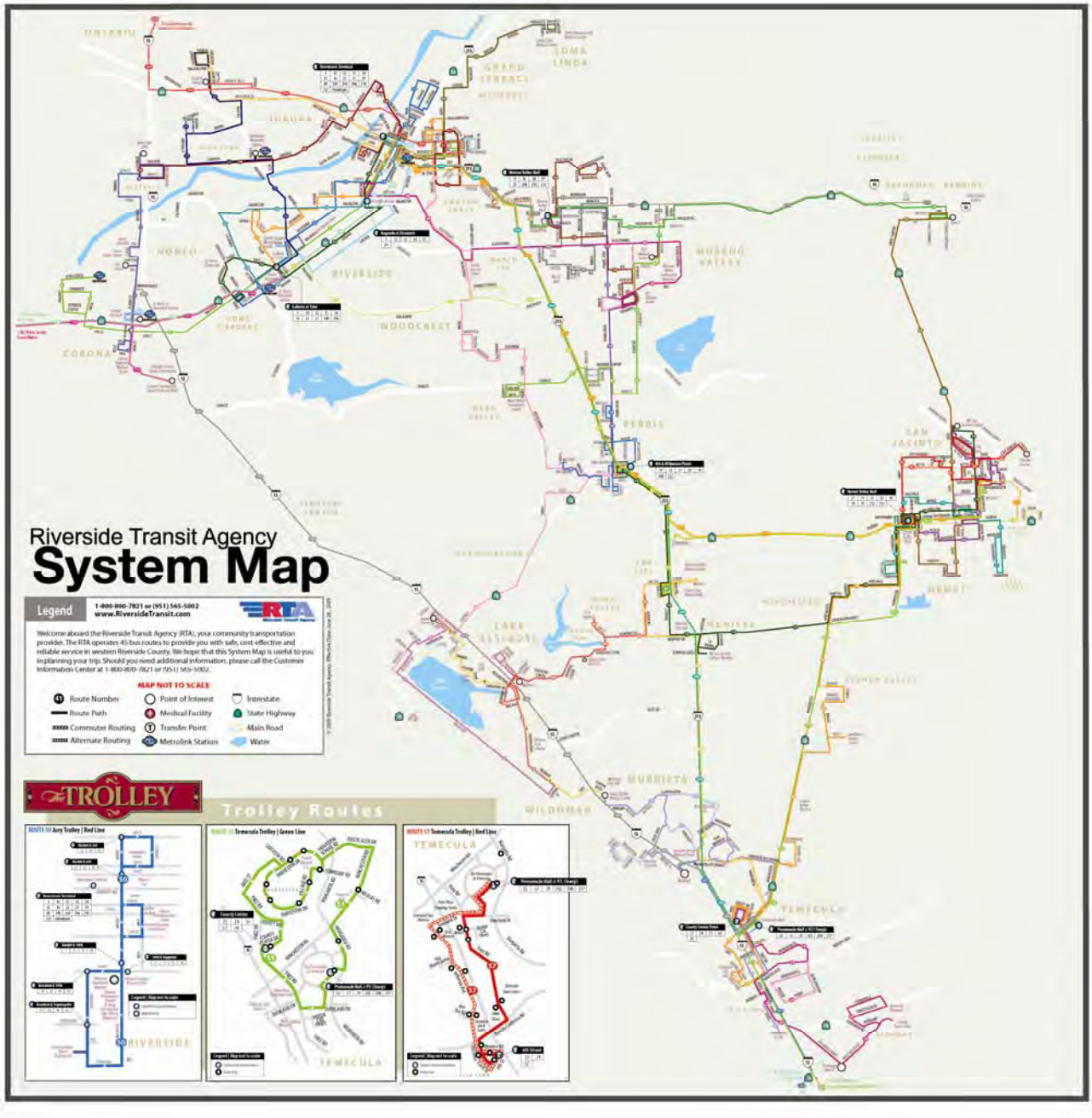


Source: IBI Group


WRCOG - Western Riverside Council of Governments
COMPASS
BLUEPRINT

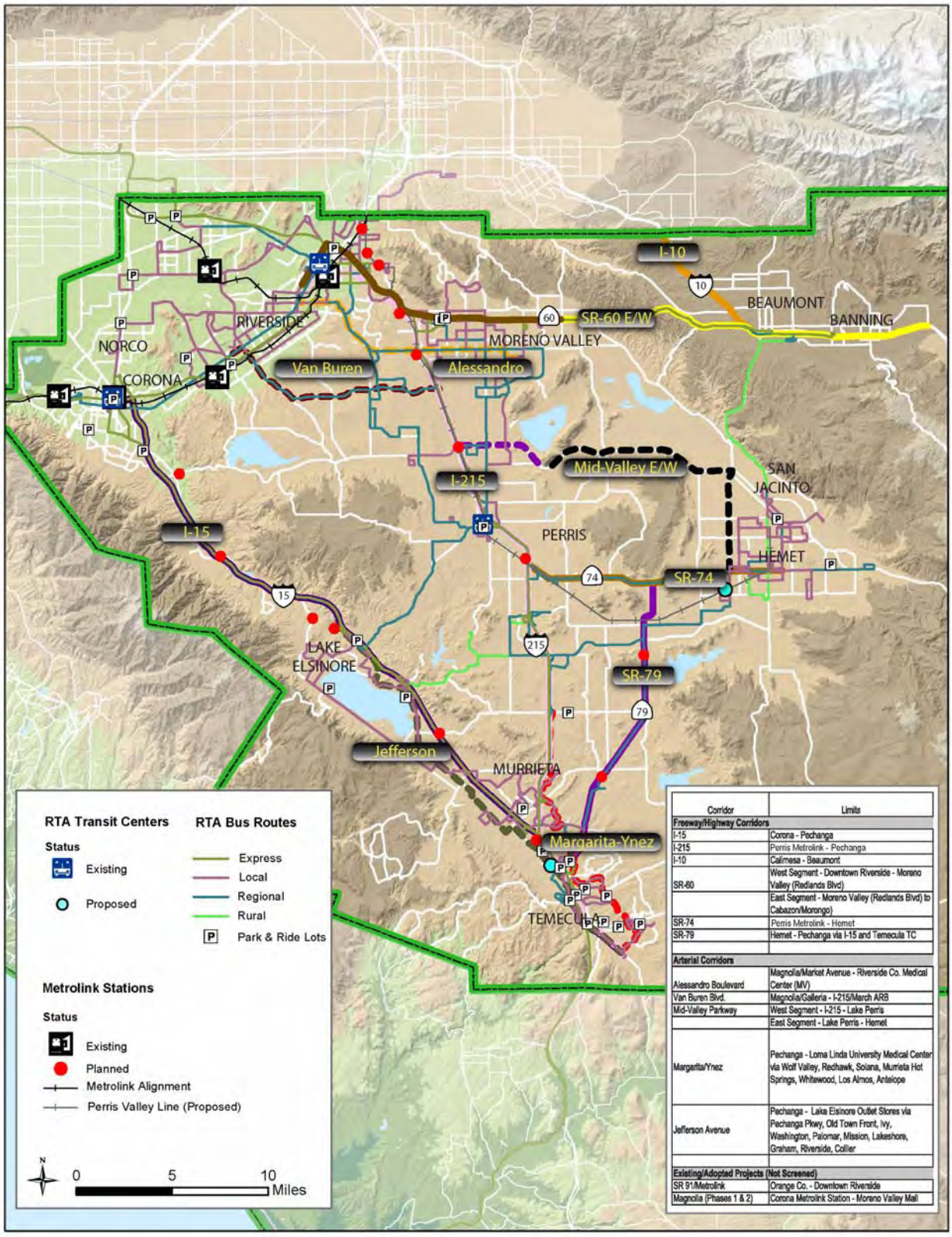
Source: SCAG

RTA System Map



Source: RTA

Corridors and Existing Service



Corridor	Limits
Freeway/Highway Corridors	
I-15	Corona - Pechanga
I-215	Perris Metrolink - Pechanga
I-10	Calimesa - Beaumont
SR-60	West Segment - Downtown Riverside - Moreno Valley (Redlands Blvd)
	East Segment - Moreno Valley (Redlands Blvd) to Cabazon/Morongo)
SR-74	Perris Metrolink - Hemet
SR-79	Hemet - Pechanga via I-15 and Temecula TC
Arterial Corridors	
Alessandro Boulevard	Magnolia/Market Avenue - Riverside Co. Medical Center (MV)
Van Buren Blvd.	Magnolia/Galleria - I-215/March ARB
Mid-Valley Parkway	West Segment - I-215 - Lake Perris
	East Segment - Lake Perris - Hemet
Margarita/Ynez	Pechanga - Loma Linda University Medical Center via Wolf Valley, Redhawk, Solana, Murrieta Hot Springs, Whitewood, Los Almos, Antelope
Jefferson Avenue	Pechanga - Lake Elsinore Outlet Stores via Pechanga Pkwy, Old Town Front, Ivy, Washington, Palomar, Mission, Lakeshore, Graham, Riverside, Collier
Existing/Adopted Projects (Not Screened)	
SR 91/Metrolink	Orange Co. - Downtown Riverside
Magnolia (Phases 1 & 2)	Corona Metrolink Station - Moreno Valley Mall

Source: RTA System Map, IBI Group

BUS RAPID TRANSIT ROUTE PLANNING PROJECT

Shortlist Corridors Evaluation

Final Technical Memo

June 24, 2010

with The Planning Center

DISCLAIMER

This is a project for the Western Riverside Council of Governments (WRCOG), Bus Rapid Transit Route Planning Project, with funding provided by the Southern California Association of Governments' (SCAG) Compass Blueprint Program. Compass Blueprint assists Southern California cities and other organizations in evaluating planning options and stimulating development consistent with the region's goals. Compass Blueprint tools support visioning efforts, infill analyses, economic and policy analyses, and marketing and communication programs.

The preparation of this report has been financed in part through grant(s) from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) through the U.S. Department of Transportation (DOT) in accordance with the provision under the Metropolitan Planning Program as set forth in Section 104(f) of Title 23 of the U.S. Code.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of SCAG, DOT or the State of California. This report does not constitute a standard, specification or regulation. SCAG shall not be responsible for WRCOG's future use or adaptation of the report.

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1. INTRODUCTION

The BRT Route Planning Project is being conducted under a SCAG Compass Blueprint grant to identify corridors in the WRCOG area that would be suitable for bus rapid transit (BRT) service and determine the priority for BRT projects to be developed following implementation of the previously studied Magnolia Corridor BRT project. This is a long range study, based on 2035 growth projections.

This study is non-binding. Jurisdictions, and local transportation commissions and agencies, are not required to adopt this plan. In addition, no funding is available at this time to pursue BRT or any other element discussed in this report. However as SB 375 and AB 32 move forward for implementation, local governments will have to develop plans that reduce VMT and greenhouse gas emissions. BRT is one avenue that can be pursued towards the goal of GHG reductions and this study lies out possible routes and opportunities to pursue BRT in western Riverside County in the future. In the event that there is in the future a desire among the region's policy makers to explore BRT, this study could be used and/or referenced as a potential starting point. Nothing in this report suggests or recommends that any future study be funded, or that any policy be changed to move in that direction.

The study is being conducted under the direction of an interagency project team with representatives of WRCOG, SCAG, the Riverside Transit Agency (RTA), and the Riverside County Transportation Commission (RCTC). Discussions with individual cities and Riverside County staff contributed to the information used in the study. The purpose of this report is to document the additional evaluation of corridors selected in the initial screening process for more evaluation. The results of this additional evaluation include recommendations for the corridors to be improved and the priority for implementation.

The analysis documented in this report was conceptual in nature and future in-depth studies would be required to determine if BRT service can be cost-effectively provided in the potential corridors. The evaluation considered the conceptual operational characteristics of the potential BRT services, but did not attempt to provide a detailed financial analysis. To advance the recommended corridors to implementation, each will require a feasibility study and financial plan.

Service implementation will be subject to funding availability and the economic constraints at the time. The timing of their implementation will be determined through the planning and programming processes of WRCOG, RTA, and RCTC.

2. CORRIDORS SELECTED FOR DETAILED EVALUATION

Based on discussions with the Project Team, review of previous reports, input from the region's planning directors, and field inspections, 13 corridors were identified for the initial screening (see Table 1). Each one was evaluated using the following seven criteria:

- Population Density
- Employment Density
- Activity Centers
- Smart Growth Opportunities
- Local and Regional Transit Connectivity
- Existing Local and Express Bus Service
- Potential for Transit Priority Treatments

Based on the results of the initial screening, five corridors were selected for detailed evaluation. While the other corridors were not selected for further consideration of BRT service at this time, they remain candidates for other types of transit service improvements, including enhanced express services, increased frequency, and upgraded vehicles. Specific improvements will be determined as part of the annual short range transportation plan update conducted by RTA.

The Perris Boulevard corridor was added to the detailed evaluation after initial screening as a result of a review of ridership on existing routes in the RTA system. While Route 1 in the Magnolia Corridor has the highest ridership, Route 19, which operates in the Perris Boulevard corridor, is among RTA's most patronized routes. Its linear nature and service to key activity centers make it a suitable corridor for consideration of BRT service. Also, during the course of the detailed evaluation, opportunities in Temecula led to combining the Margarita-Ynez corridor with the I-215 corridor.

Table 1 Initial Screening Corridors

Corridor	Limits	Length (mi.)
Freeway/Highway Corridors		
I-15	Corona Metrolink Station - Pechanga Resort	41.7
I-215	Perris Metrolink Station - Pechanga Resort	25.6
I-10	Calimesa - Beaumont	7.5
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9
SR-60/I-10 East	Moreno Valley (Redlands Blvd) to Morongo/Cabazon	19.9
SR-74	Perris Metrolink Station - Hemet	17.0
SR-79	Hemet - Pechanga Resort	17.2
Arterial Corridors		
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5
Van Buren Boulevard	Magnolia/Galleria - I-215/March AFB	12.7
Mid-Valley Parkway West	I-215 - Lake Perris	4.9
Mid-Valley Parkway East	Lake Perris - Hemet	15.8
Margarita-Ynez	Pechanga Resort - Loma Linda University Medical Center Murrieta	17.2
Jefferson Avenue	Pechanga Resort - Lake Elsinore Outlet Stores	24.7

Questions were raised regarding whether certain large developments in the SR-79 corridor were included in the 2035 population and employment forecasts used for initial screening. A review of projects in the approval process found that while a few such developments may not have been included in the forecasts prepared in 2006, their inclusion would not have increased the overall

population and employment density enough to add the corridor to the ones receiving additional analysis. The corridors considered in the detailed evaluation are listed in Table 2 and shown in Figure 1.

Table 2 Detailed Evaluation Corridors

Corridor	Limits	Length (mi.)
Freeway/Highway Corridors		
I-15	Corona Metrolink Station - Pechanga Resort	41.7
I-215	Perris Metrolink Station - Pechanga Resort	28.0
SR-60 West	Downtown Riverside - Moreno Valley (Redlands Blvd)	24.9
Arterial Corridors		
Alessandro Boulevard	Magnolia - Riverside Co. Medical Center	13.5
Perris Boulevard	Moreno Valley Mall - Perris Transit Center	16.7

2.1 Freeway/Highway Corridors

I-15 – The I-15 corridor extends from the Corona Metrolink Station to the Pechanga Resort near Temecula. HOV lanes are planned in the median north of I-215, providing an excellent opportunity for BRT travel time savings. Key stations in the corridor include Pechanga Resort, Temecula Transit Center, Railroad Canyon Road/Lake Elsinore, Dos Lagos, and the Corona Metrolink Station. Selected park and ride lots in the corridor would also be served.

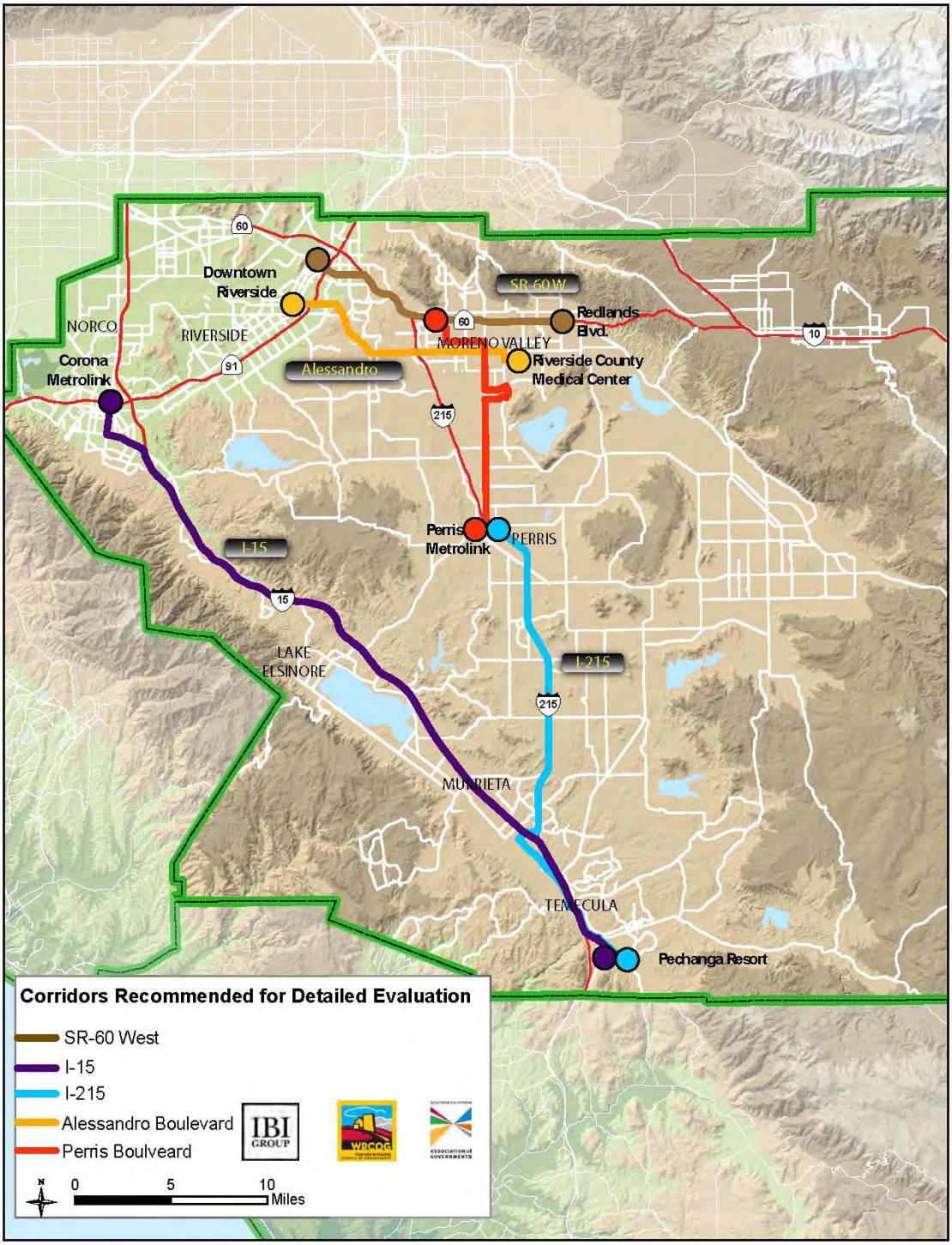
I-215 – This corridor stretches from the Perris Transit Center and future Metrolink station to the Pechanga Resort. Service would be provided to the Metrolink Station at SR-74, the park-and-ride lot at Newport Road, the new Loma Linda Medical Center at Murrieta, the future Temecula Transit Center, and Jefferson Avenue. Selected park and ride lots in the corridor would also be served.

SR-60 West Segment – This corridor extends from the Downtown Riverside Transit Center/Metrolink Station to the eastern end of Moreno Valley at Redlands Boulevard. Key stations include the Moreno Valley Mall and UCR.

2.2 Arterial Corridors

Alessandro Boulevard – This corridor extends from Magnolia Avenue to the Riverside County Medical Center in Moreno Valley. It would serve established areas near the Magnolia Corridor, along with developing areas west of I-215 and in Moreno Valley. Key stations include Magnolia Avenue, Mission Grove, the future Moreno Valley March Field Metrolink Station, and the Riverside County Medical Center.

Figure 1 Detailed Evaluation Corridors



Source: IBI Group

Perris Boulevard – This corridor extends from the Perris Transit Center and future Metrolink station in downtown Perris to the Moreno Valley Mall. It would serve the Riverside Community College and future development at March Air Force Base, and would intersect with the Alessandro BRT corridor. The existing service in the corridor, Route 19, is one of the highest ridership routes in the RTA system.

3. SCREENING CRITERIA

Developed in collaboration with the Project Team, the following 15 criteria were used to evaluate the shortlisted corridors.

- Population Density
- Employment Density
- Transit Dependency
- Service to Employment Centers & Redevelopment Areas
- Activity Centers
- High Speed Operation/Travel Time Savings
- Local and Regional Transit Connectivity
- Support of Regional and Local Transportation Plans
- Support of Regional and Local Land Use Plans
- Support of Smart Growth
- Effect on Traffic Operations
- Right of Way Availability
- Capital Improvements
- Operating Cost
- Phasing of Corridor into Ultimate System

Each criterion was scored using a scale of -2 to +2 using the following general scoring concept.

+2	Substantially Positive
+1	Somewhat Positive
0	Average
-1	Somewhat Negative
-2	Substantially Negative

A description of each criterion and the metric for its scoring is provided below.

3.1 Population Density

The 2035 forecast population for TAZs in each corridor was compiled using GIS. TAZs within 0.5 miles of each side of the corridor were used. If any portion of a TAZ was within the corridor, the entire population of that TAZ was included in the summation. The population total was divided by the area of the TAZs to determine the population per square mile.

+2	4,000 or greater
+1	3,000 – 3,999
0	2,000 – 2,999
-1	1,000 – 1,999
-2	999 or less

3.2 Employment Density

The 2035 forecast employment for TAZs in each corridor was compiled using GIS. TAZs within 0.5 miles of each side of the corridor were used. If any portion of a TAZ was within the corridor, the entire employment of that TAZ was included in the summation. The employment total was divided by the area of the corridor to determine the employment per square mile.

+2	2,500 or greater
+1	2,000 – 2,499
0	1,500 – 1,999
-1	1,000 – 1,499
-2	999 or less

3.3 Transit Dependency

Transit dependency comparisons were based on available information regarding the concentrations of persons under 18 and over 65, low income household, and zero vehicle households in each corridor. The average propensity for the four factors was calculated for each corridor and the rankings were based on the following breakdown.

+2	High level of transit dependency (average over 20 percent)
+1	Moderate level (average between 15 and 20 percent)
0	Low level (average less than 15 percent)
-1	Very low (average less than 10 percent)
-2	Extremely low (average less than 5 percent)

3.4 Service to Employment Centers & Redevelopment Areas

Employment centers and redevelopment areas were identified through GIS and discussions among the consultant team. Each corridor was examined to determine the number of each in its service area. The scoring method is shown below.

+2	4 or more employment centers or redevelopment areas
+1	3
0	2
-1	1
-2	0

3.5 Activity Centers

Regional destinations such as shopping centers, colleges and universities, sporting venues, etc. were identified and plotted on a figure of the study area. Each corridor was then checked to determine the number of activity centers in its service area. The scoring method is listed below.

+2	6 or more activity centers
+1	5
0	4
-1	3
-2	2 or less

3.6 High Speed Operation/Travel Time Savings

The ability to provide transit priority treatments to facilitate high speed operation and travel time savings was examined for each corridor. The review focused on the presence of HOV lanes for the freeway corridors and the potential for queue jumps, bus lanes, and signal priority in the arterial corridors. The scoring approach is shown below.

+2	Potential for high speed travel along most of the corridor due to opportunities for priority measures such as HOV/HOT lanes, queue jumps, and traffic signal priority
+1	Opportunities for high speed travel along portions of the corridor due to opportunities for priority measures such as HOV/HOT lanes, queue jumps, and signal priority
0	Opportunities for some priority treatments along both the corridor and access points
-1	Some opportunities along length of the corridor or at access points/ intersections
-2	Little or no opportunities along length of the corridor and at access points

3.7 Local and Regional Transit Connectivity

Connections to other services in the transit system were based on existing service, RTA's current SRTP, and the RTA Comprehensive Operations analysis. Most of the corridors have some opportunities for connections, but connections to key transit centers and/or Metrolink stations were rated highly.

+2	Two or more connections to high capacity services and/or major transit centers
+1	One connection to high capacity services and/or major transit centers
0	Connections to some regional and local services
-1	Connections to local services only
-2	No connections to regional or local services

3.8 Support of Regional and Local Transportation Plans

This criterion considers the presence of corridor transit projects in regional and local transportation plans. This may include BRT specifically or other high capacity treatments.

+2	BRT project is identified in the corridor
+1	Infrastructure useable by the BRT is identified in the corridor or corridor is identified for other high capacity transit service such as Metrolink
0	Corridor is not identified for BRT or other high capacity service
-1	Corridor is not in adopted plans and potentially duplicates BRT service identified in the general area
-2	Corridor is not in adopted plans and potentially conflicts with adopted plans

3.9 Support of Regional and Local Land Use Plans

This criterion considers the relationship of regional and local land use plans to the BRT corridors. It considers the potential to support or conflict with adopted plans and emerging planning initiatives.

+2 Included in land use plans for the corridor
+1 Supportive of adopted and developing plans
0 Not mentioned in land use plans but does not conflict
-1 Some conflict with land use plans
-2 Significant conflict with land use plans

3.10 Supportive of Smart Growth

The potential for Smart Growth developments was evaluated based on completed and ongoing studies, and discussions with local and regional planning staff. The level of interest and plans for Smart Growth were qualitatively considered and scored.

+2 Multiple opportunities/high interest
+1 Some opportunity/interest
0 No identified opportunities but possible
-1 Opportunities not likely
-2 Opportunities very unlikely

3.11 Effect on Traffic Operations

This criterion considers the impact of the BRT operation on general traffic. In a conceptual manner, it considers mainline freeway traffic, freeway access points, and arterial parallel and cross traffic movements.

+2 No effect on traffic due to the use of HOV lanes on freeways or bus lanes on arterials
+1 Little effect on mainline, access points, or cross streets
0 Some effect along short segments of main line, access points, or cross streets
-1 Effect along large portions of the mainline, or numerous access points
-2 Substantial effect on most of the mainline, access points, and/or cross streets

3.12 Right of Way Availability

This criterion considers the right of way that would be required for BRT in the corridor, both for running ways and station facilities.

+2 Right of way available and/or facilities useable by the BRT are in place or programmed for construction. ROW available at most intersections for queue jumps along arterial corridors.
+1 Right of way generally available, with minor right of way or facility constraints
0 Some constraints that would limit the ability to provide priority measures or facilities.
-1 Numerous constraints in the corridor that could limit the ability to provide priority measures or facilities
-2 Right of way constrained throughout the corridor with limited opportunity for priority treatments or stations

3.13 Capital Improvements

The relative capital expense for running ways and station facilities is considered in this criterion. A conceptual assessment of the stations, queue jumps, and traffic signal priority locations in each corridor was made to enable order of magnitude comparisons for the corridors.

+2	Corridor takes advantage of existing or planned infrastructure and requires relatively small expenditures, primarily for stations. No new major facilities/ structures required.
+1	Corridor requires some expenditures for running facilities along with modest stations
0	Corridor requires large capital outlays primarily for stations
-1	Large capital outlays required primarily for major improvements to the guideway
-2	Corridor requires substantial capital outlay for both running ways and station facilities.

3.14 Operating Cost

Annual operating costs were estimated based on the length of the corridor, service hours and frequency, and planning level cost per hour estimates. All services were assumed to run seven days a week, with 15-minute service all day on the freeway corridors, and 15-minute service all day in the arterial corridors. All corridors were also assumed to have 30-minute weekend service. Estimated hourly rates for directly operated services were used in the calculations.

+2	Less than $2 million per year
+1	Between $2 and 3 million
0	Between $3 and 4 million
-1	Between $4 and 5 million
-2	Over $5 million

3.15 Phasing of Corridor into Ultimate System

The phasing analysis considered how the BRT service could be developed in increments to match ridership demand and available budget as the service grows. All of the services can start at a lower level of frequency. Certain corridors require a higher level of capital investment to get the service started, e.g., on line stations in freeway medians or shoulders. Arterial corridors lend themselves to incremental upgrades in priority treatments and station amenities. Consideration was also given to the ultimate plans for corridor, where the BRT could be a precursor to higher capacity services in future, e.g., Metrolink extensions.

+2	Strong potential to build on existing services with incremental increases in frequency, station amenities, and vehicles
+1	Some potential to build on existing services with incremental increases in frequency, station amenities, and vehicles
0	Modest investment required to begin service operation
-1	Moderate amount of infrastructure investments required to begin service operation
-2	Large infrastructure investments required to begin service operation

Tables and figures used in the scoring can be found in the Appendix.

4. RESULTS

Using the criteria and measurement methods described in Section 3, the corridors were scored for each of the criteria and totaled for an overall score, as summarized in Table 3.

Table 3 Corridor Scoring Summary

Corridor	Score
Alessandro Boulevard	15
Perris Boulevard	11
I-15	11
I-215	9
SR 60 West	9

The scores for each criterion are reported in Table 4, and the key findings for each corridor are discussed in this section below.

Alessandro Boulevard

With the highest score of 15, the Alessandro Corridor has high scores for numerous criteria. It has high marks for population and employment density, reflective of the developed nature for much of its length. It ties into the Magnolia Corridor, as well as the future development at March Air Force Base, with a terminal at the Riverside County Medical Center. As an arterial corridor, it has the potential to serve travel throughout the day for a wide range of trip types. Its construction costs are relatively low, it is supportive of transportation and land use plans, and it lends itself well to phased implementation. Its primary negative is the potential for impact to the operations of traffic on its alignment and cross streets. The city of Moreno Valley is currently developing a vision for this corridor through the Alessandro Boulevard Corridor Compass Blueprint study, considering land use and transportation needs with an eye to enhancing the corridor for improved transit service.

Perris Boulevard

This arterial corridor is tied for the second highest score with 11. It has high scores for population density, local and regional transit connectivity (with its connections to the Perris Metrolink Station, and the Moreno Valley Mall), construction cost, and phasing. It also scores well for employment density, transit dependency, and support of land use plans and Smart Growth. The terminal at the Perris Metrolink Station enables connections with numerous bus routes and Metrolink, and its service to Riverside Community College and future development at March Air Force Base strengthen its score. By having strong existing service (Route 19), it lends itself well to phased implementation. It would have relatively low construction costs, primarily for shelters, queue jumps, and traffic signal priority. Like the Alessandro Boulevard corridor, its primary negative is the potential for impact to the operations of traffic on its alignment and cross streets.

I-15

The I-15 Corridor is also tied for the second highest score of 11. By operating on the future HOV lanes in the median, it has strong potential to provide travel time savings. It also has high marks for service to employment and activity centers. By serving the Dos Lagos development, it supports Smart Growth, and its service to the Temecula Transit Center supports redevelopment along Jefferson Avenue. Its low population and employment density, and its connection to the Corona Metrolink Station indicate it is well suited to serve commuters traveling in the corridor. The long length of its alignment, 41.7 miles, leads to relatively high operating cost.

I-215

Along with the SR-60 West Corridor, the I-215 Corridor scored 9, based in large part on the transit dependency in the corridor, connections to regional transit services (including the future Metrolink

Station in Perris and the Temecula Transit Center), and its support of Smart Growth such as that planned at Mt. San Jacinto Community College in Menifee. Its primary drawback is the lack of right of way for exclusive bus lanes or shared HOV lanes.

SR-60 West

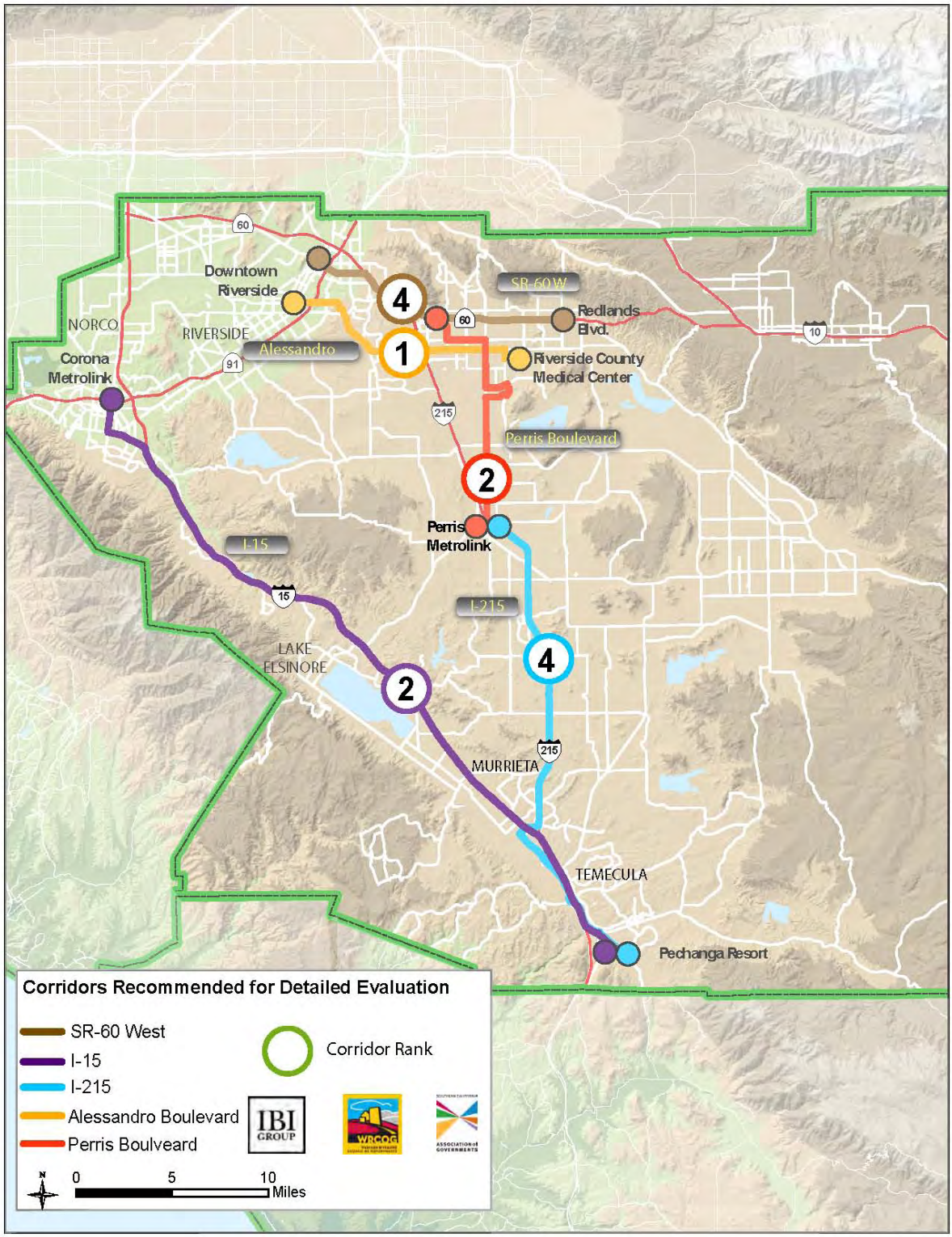
This corridor, tied with I-215 with a score of 9, is strong for population density and transit dependency. It serves fewer activity centers than some of the other corridors, and it is located close to the Alessandro Boulevard Corridor. BRT service in this corridor would be able to use HOV lanes for much of its travel on SR-60. It also would affect traffic operations on the University Avenue portion of the alignment.

Table 4 Detailed Evaluation Scoring Results

Criteria	Corridor				
	I-15	**I-215**	**SR-60 West**	**Alessandro Blvd**	**Perris Blvd**
Population Density	-1	0	2	2	2
Employment Density	-1	0	1	2	1
Transit Dependency	0	1	1	0	1
Service to Employment Centers & Redevelopment Areas	2	1	1	0	1
Activity Centers	2	0	-1	-1	0
High Speed Operation/ Travel Time Savings	2	-1	1	1	0
Local and Regional Transit Connectivity	2	2	1	2	2
Supportive of Regional and Local Transportation Plans	2	1	-1	2	0
Supportive of Regional and Local Land Use Plans	1	1	1	2	1
Supportive of Smart Growth	2	1	1	2	1
Effect on Traffic Operations	1	0	0	-1	-1
Right of Way Availability	1	0	1	0	0
Construction Cost	0	1	0	2	2
Operating Cost	-2	0	0	0	-1
Phasing of Corridor into Ultimate System	1	1	1	2	2
Totals	11	9	9	15	11

The ranking of each corridor is depicted in Figure 2.

Figure 2 Corridor Ranking



Source: IBI Group

5. RECOMMENDATIONS

To maximize its effectiveness and the use of capital investment, BRT service needs to provide frequent service and carry large numbers of passengers. Arterial routes usually serve a wide range of trips throughout the day, many of them short in length, that facilitates high ridership. Freeway routes often serve primarily commuters, leading to the need for frequent service on weekdays during peak periods, but less service during off peak times and weekends. As a result, true BRT service lends itself well to deployment in arterial corridors, while finely tuned, high quality express service can often serve transit demand in freeway corridors.

Implementation of BRT or enhanced express services will most likely be phased in nature. Improved commuter service can be the precursor to BRT particularly along the highway corridors. A similar approach of phased improvement can also used for the arterial corridors. An excellent example is the Route 1 service in the Magnolia corridor. With relatively high frequency service today, Route 1 is a strong candidate for upgrading to BRT service. The demonstrated high levels of demand in the corridor today indicate that BRT will be beneficial as the next step for service between Corona to Moreno Valley in the Magnolia corridor.

Freeway express service can likewise be upgraded in phases with increased frequency during peak hours, enhanced vehicles, and improved amenities at stops. The I-15 corridor, which already has strong commuter demand, could be the beneficiary of these improvements, especially with the future HOV lanes available to increase operating speeds and decrease travel time. Should demand throughout the day build to sufficient levels, service in this corridor could be upgraded to all day BRT type service with higher frequency.

It is also important to note that the level of development density in these corridors will need to increase dramatically to justify and sustain BRT service levels and infrastructure improvements. Research has found that an urban area should have a density of at least 5,000 persons per square mile to support bus rapid transit (TCRP Report 90, Bus Rapid Transit Volume 2: Implementation Guidelines, Table 2-1, page 2-5, 2003). By 2035, the Alessandro and Perris corridors are expected to have population densities near the 5,000 level. The other corridors are projected to have substantially less. In addition, any type of federal grant will require a demonstrated need for service at levels that can support 10 to 15 minute headways for a BRT project to be eligible for funding.

CORRIDOR IMPROVEMENTS

With the key attributes of BRT and express bus service in mind, the following recommendations are provided regarding the study corridors.

BRT Corridors

Alessandro Corridor – As an arterial corridor with strong existing and future travel demand, this highest ranked corridor lends itself well to phased implementation. It can be upgraded gradually, with priority treatments and branded shelters being added early, followed by traffic signal priority, queue jumps, higher frequency, and BRT vehicles. The first step involves incorporating this corridor into the region's programming documents, to secure funding and ensure it is the next BRT corridor to be developed after both phases of the Magnolia project are completed.

Perris Boulevard –Tied with I-15 as the second highest corridor, BRT service in this arterial corridor can be implemented in a way that matches improvements with increases in demand over time. The start up of Metrolink service in late 2012 in addition to the routes currently serving the Perris Transit Center, will provide an important opportunity to begin the phased upgrade to BRT in this corridor. As

March Air Force Base is developed, ridership in this corridor can be expected to grow and BRT service will help serve that demand.

Express Bus Corridors

I-15 – As one of the second highest ranked corridors, I-15 has outstanding potential for upgraded transit service. Due to the long distances and commute nature of much of the corridor's travel, it is recommended that upgraded express service be provided. This upgraded service could be implemented in phases, by first operating on the planned HOV lanes when they are completed to increase operating speed and reduce travel time. Stations in the early phases could be provided on the shoulders, or on interchange on ramps. A stop at the Dos Lagos development could be implemented early, providing service to this high density, mixed use development. Over time, online stations with pedestrian overpasses could be provided to serve park and ride lots and minimize off line travel. Vehicles can be upgraded to highway coaches, similar to the services operated on I-15 in San Diego. Finely tuned scheduling to match work start and stop times would enable the service to be effective and help ensure it is provided at a reasonable cost.

I-215 – Like I-15, this corridor would be more suitable for upgraded express bus service rather than high frequency, all day BRT service. Since HOV lanes are not planned for in this corridor, there will be limited opportunities to improve mainline travel time. Queue jumps and TSP could be provide on the arterial portion of the route. Lower cost stations could be provided on the shoulders, with pedestrian bridges to link both sides of the freeway to the stops. Tying into the Perris Transit Center and the future Metrolink service, will provide a strong terminal connection, while service to the Temecula Transit Center will enhance travel opportunities in the southern part of the study area and assist in the redevelopment along Jefferson Avenue.

SR-60 West – This corridor also lends itself to upgraded express bus service to take advantage of the existing and future HOV lanes. The improved service would provide travel time savings through the congested SR-6-/I-215 interchange, and service to UCR and Downtown Riverside would be enhanced. While it is located near the Alessandro Corridor, its service can be tailed to avoid duplication by focusing on commuter travel, with lower frequency in the off peak periods.

FUNDING ISSUES

Reduced tax revenues resulting from the economic slowdown and the changing nature of communities due to difficulties in the housing market, have resulted in a reduced amount of funding for the region's transportation infrastructure projects. Currently federal, state and local revenue streams that are available to fund transit operations have been significantly reduced. While this trend is expected to continue in the near-term, longer term funding solutions and sources may become apparent in the future as alternative transportation methods - such as BRT - may be more fully examined for the potential to reduce vehicle miles traveled and greenhouse gas emissions.

At this time it is not possible to define a timeline for the implementation of these services, as implementation of transit improvements in any of these corridors will depend on the availability of new or increased funding. Identifying specific existing and new funding sources would be an important part of the next phase of service development. The region's transportation partners, WRCOG, RCTC, and RTA, may incorporate these corridors into the region's transportation programs and seek to secure funding for their construction and operation in the future. Gradual upgrades in the highest ranking corridors will be required.

The Federal Transit Administration (FTA) offers a New Starts Program that funds "Small Starts" and "Very Small Starts" projects. These projects provide smaller agencies such as RTA to take advantage of grant money under a much simplified evaluation and project rating procedure. In order

to qualify as a Small Starts project, the total project cost must be less than $250 million, with no greater than $75 million in requested grant funding. (It should be noted that RCTC is currently using a Small Starts grant to fund the MetroLink expansion to Perris.) In addition, a project must meet one of the following two guideway criteria:

1. Be a fixed guideway for a least 50% of the project length in the peak period; and/or

2. Be a corridor-based bus project with the following minimum elements:
   a. Substantial Transit Stations
   b. Signal Priority/Pre-emption
   c. Low Floor/Level Boarding Vehicles
   d. Special Branding of Service
   e. Frequent Service – 10 min. peak/15 min. off peak
   f. Service offered at least 14 hours per day

In order to qualify as a Very Small Starts project, the total project cost must be less than $50 million and less than $3 million per mile (excluding vehicles). Additionally, the project must contain the following features:

1. Transit Stations
2. Signal Priority/Pre-emption
3. Low Floor/Level Boarding Vehicles
4. Special Branding of Service
5. Frequent Service - 10 min peak/15 min off peak
6. Service offered at least 14 hours per day
7. Existing corridor ridership exceeding 3,000/day

This study is a future planning effort geared towards transcending current economic issues and providing a basis for moving forward with projects when the timing is right. As the transit network in western Riverside County develops, WRCOG, RCTC, and RTA will continue to work together to incorporate these corridors into the region's transportation planning and programs process. The timeline for funding future BRT services will be developed once key BRT characteristics such as ridership demand and service frequency exceed the requirements for grant funds such as FTA's Small Starts and Very Small Starts.

APPENDIX – BACKGROUND DATA AND ALIGNMENT INFORMATION

Population and Employment Information

Corridor	Length (Miles)	2007 Population	2007 Employment	2035 Population	2035 Employment	2035 Population Per Square Mile	2035 Employment Per Square Mile	Square Miles
I-15	41.7	176,245	98,701	247,899	176,662	1,403	1,000	176.7
I-215	28.0	130,076	64,995	180,265	113,285	2,916	1,833	61.8
SR-60 West	14.7	124,436	74,084	195,548	135,694	2,901	2,013	67.4
Alessandro Blvd.	13.5	113,804	38,797	157,472	89,433	4,664	2,649	33.8
Perris Blvd	16.7	131,010	27,992	170,465	74,760	4,861	2,132	35.1

Source: WRCOG Forecasts, IBI Group

Transit Dependency

Corridor	Age (5-17)		Low Income (<$40,000 Household Income)		Disabled Population (Age 16-64)		Zero-Vehicle Availability		Age (65+)		Avg % of Propensity Factors
	% of Pop.	Pop. #	% of Households	No. of Households	% of Population	Population #	% of Households	No. of Households	% of Pop.	Pop. #	
I-15	24.3%	48,129	18.4%	17,564	3.9%	7,645	1.6%	744	10.3%	15,276	11.7%
I-215	23.8%	32,528	34.7%	16,073	2.9%	4,098	2.4%	1,131	14.4%	19,698	15.6%
SR-60 West	23.1%	31,211	44.2%	25,079	8.8%	11,938	1.4%	485	6.1%	6,530	16.7%
Alessandro Blvd	25.3%	37,747	23.7%	12,374	6.6%	9,845	2.1%	825	8.6%	10,982	13.2%
Perris Blvd	28.1%	36,824	46.0%	16,537	7.6%	9,968	2.2%	791	5.7%	7,540	17.9%

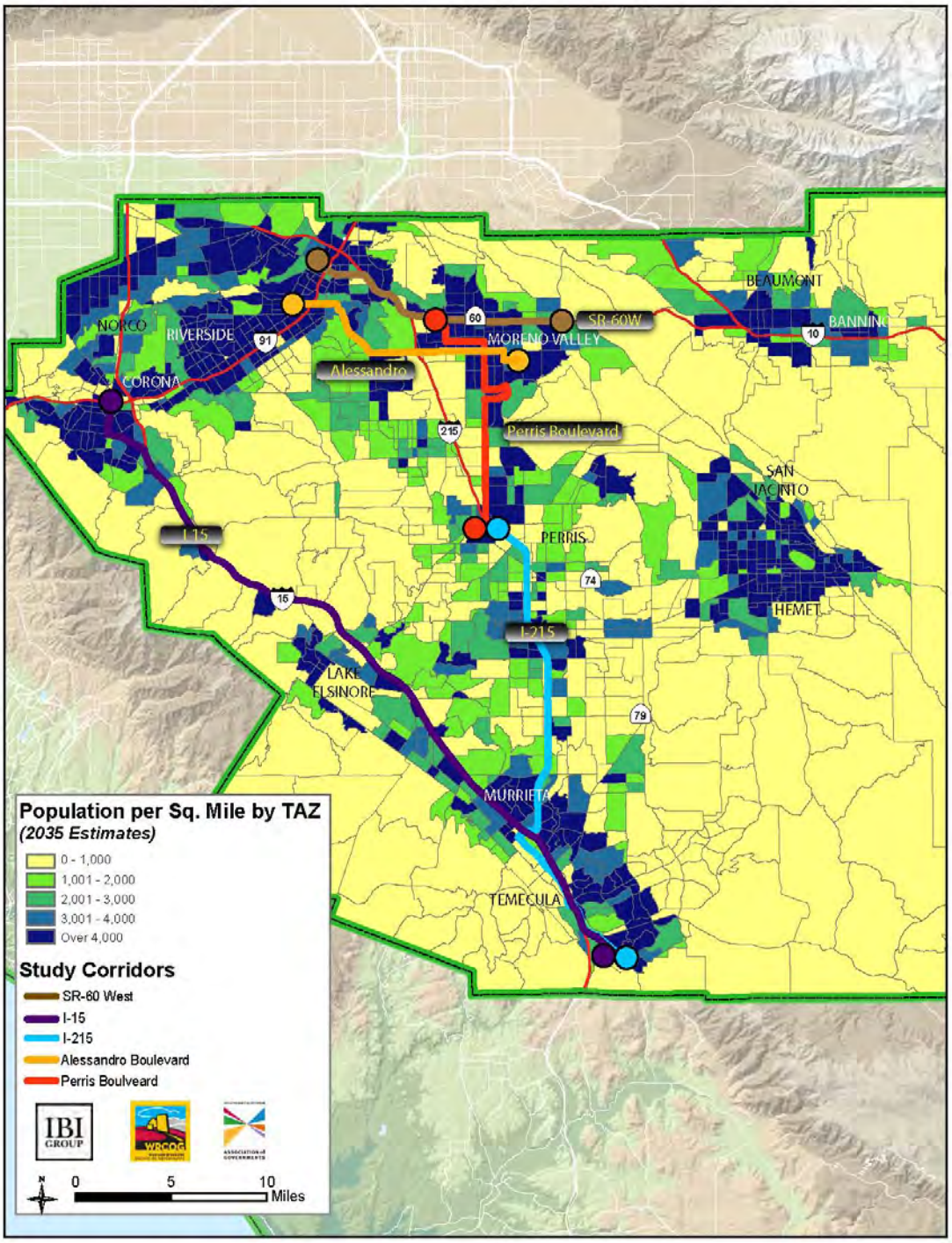
Source: 2000 Census Data, IBI Group

Operating Cost Estimates

	Service Levels				Miles		Hours		Oper Cost Hours	
(Input)	(Input)	(Input)	(Input)	(Input)	(Input)	(Calc)	(Input)	(Calc)	(Input)	(Calc)
					Length of	Annual	Average	Annual		Annual
	Hours of	Frequency	No. of	No. of	Corridor	Revenue	Miles	Revenue	Cost/	Operating
Service Option	Operation	(Minutes)	Trips/Day	Days	(Miles)	Miles	per Hour	Hours	Hour	Cost Hours
Corridors										
I-15 (Peak)	6-9 am & 3-6 pm	15	48	255	41.7	510,408	30	17,014	$110.00	$1,871,496
I-15 (Day)	9 am -3 pm & 6-8 pm	15	64	255	41.7	680,544	30	22,685	$110.00	$2,495,328
I-15 (Weekend)	6 am - 8 pm	15	112	110	41.7	513,744	30	17,125	$110.00	$1,883,728
Total						1,704,696		56,823		$6,250,552
I-215 (Peak)	6-9 am & 3-6 pm	15	48	255	28.0	342,720	30	11,424	$110.00	$1,256,640
I-215 (Day)	9 am -3 pm & 6-8 pm	15	48	255	28.0	342,720	30	11,424	$110.00	$1,256,640
I-215 (Weekend)	6 am - 8 pm	15	112	110	28.0	344,960	30	11,499	$110.00	$1,264,853
Total						1,030,400		34,347		$3,778,133
60W (Peak)	6-9 am & 3-6 pm	15	48	255	24.9	304,776	30	10,159	$110.00	$1,117,512
60W (Day)	9 am -3 pm & 6-8 pm	15	64	255	24.9	406,368	30	13,546	$110.00	$1,490,016
60W (Weekend)	6 am - 8 pm	15	112	110	24.9	306,768	30	10,226	$110.00	$1,124,816
Subtotal						1,017,912		33,930		$3,732,344
Alessandro (Peak)	6-9 am & 3-6 pm	15	48	255	13.5	165,240	18	9,180	$110.00	$1,009,800
Alessandro (Day/Night)	9 am -3 pm & 6-8 pm	15	64	255	13.5	220,320	18	12,240	$110.00	$1,346,400
Alessandro (Weekend)	6 am - 8 pm	15	112	110	13.5	166,320	18	9,240	$110.00	$1,016,400
Subtotal						551,880		30,660		$3,372,600
Perris Blvd (Peak)	6-9 am & 3-6 pm	15	48	255	16.7	204,408	18	11,356	$110.00	$1,249,160
Perris Blvd (Day)	9 am -3 pm & 6-8 pm	15	64	255	16.7	272,544	18	15,141	$110.00	$1,665,547
Perris Blvd (Weekend)	6 am - 8 pm	15	112	110	16.7	205,744	18	11,430	$110.00	$1,257,324
Subtotal						682,696		37,928		$4,172,031

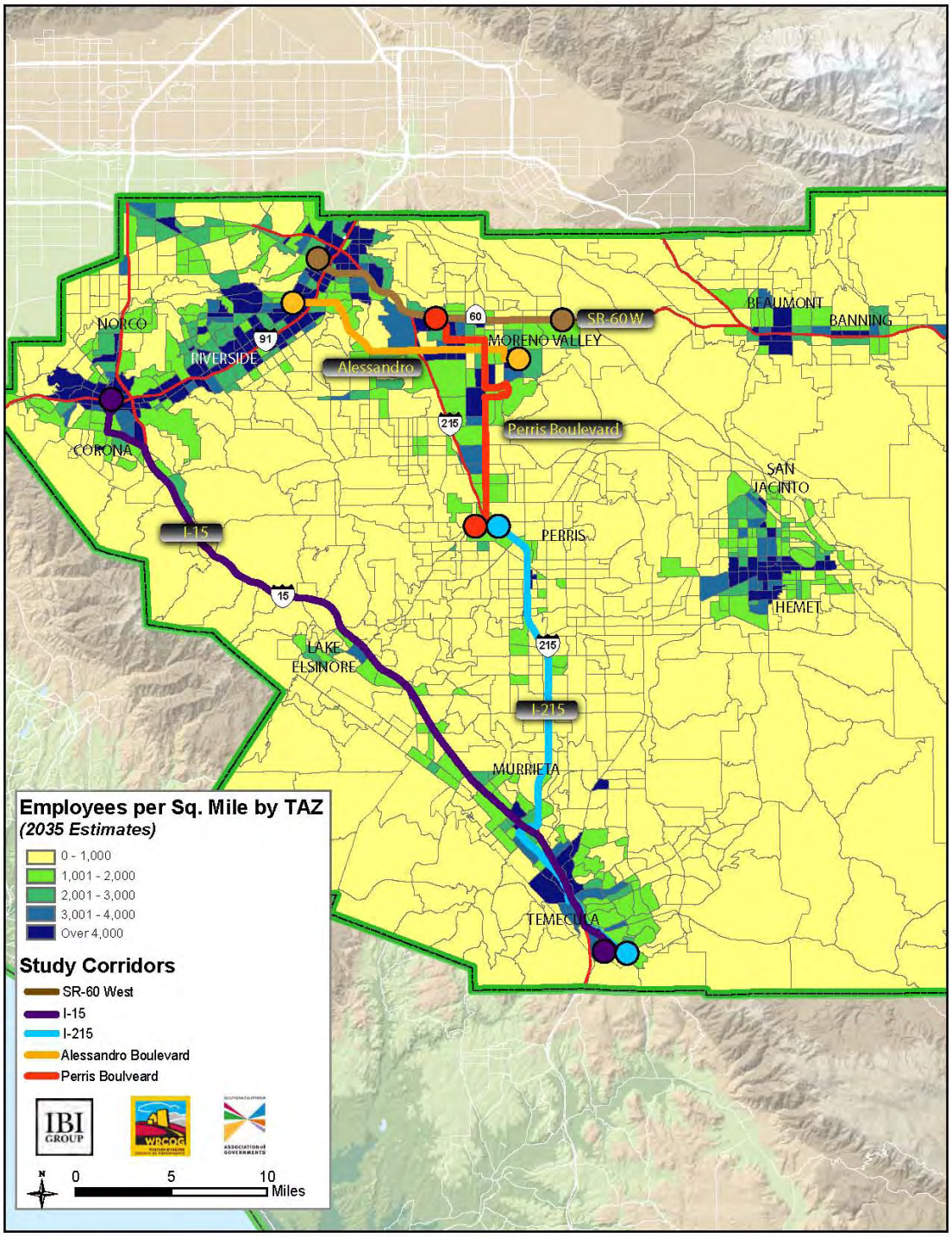
Source: IBI Group

2035 Population Density



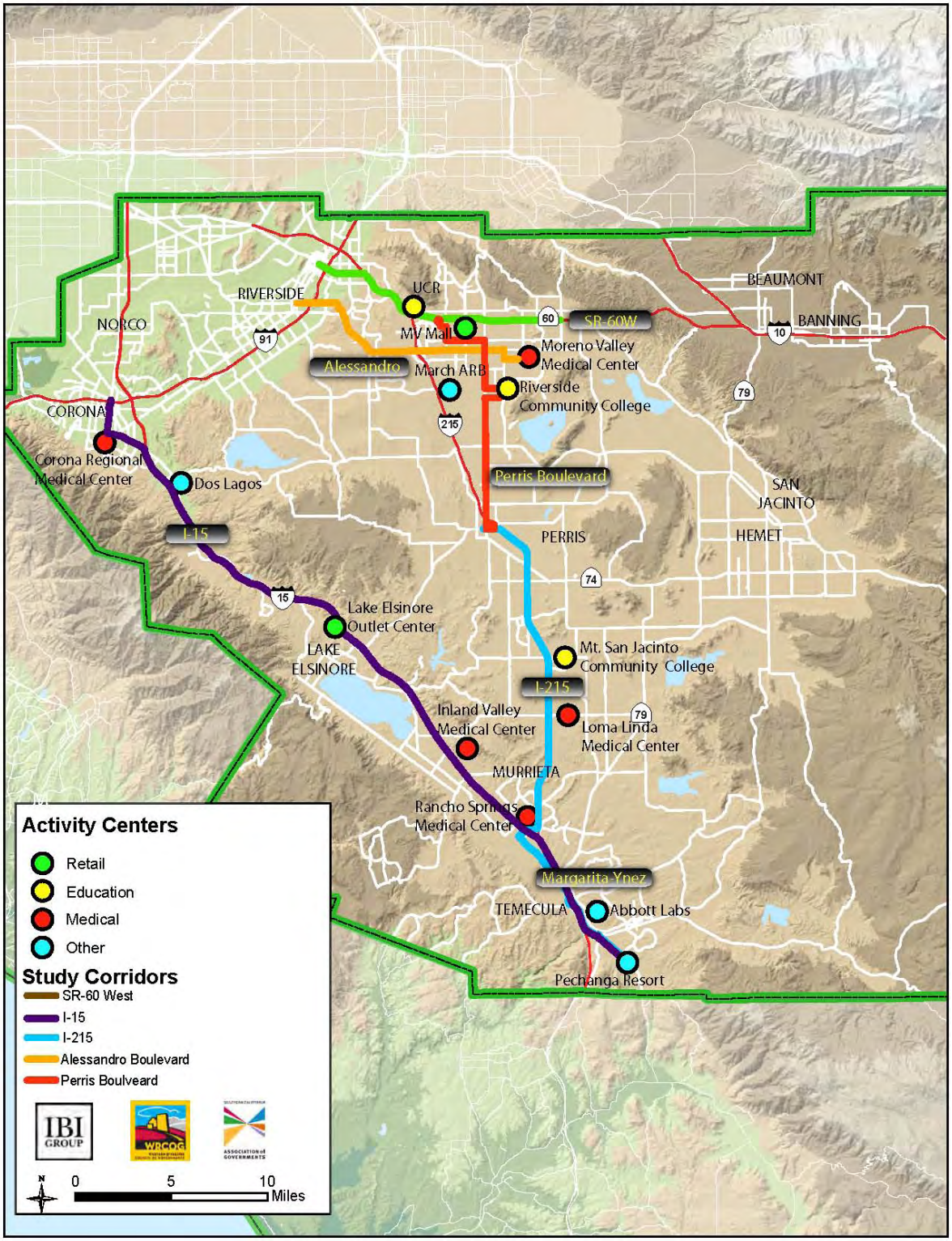
Source: WRCOG Forecasts, IBI Group

2035 Employment Density

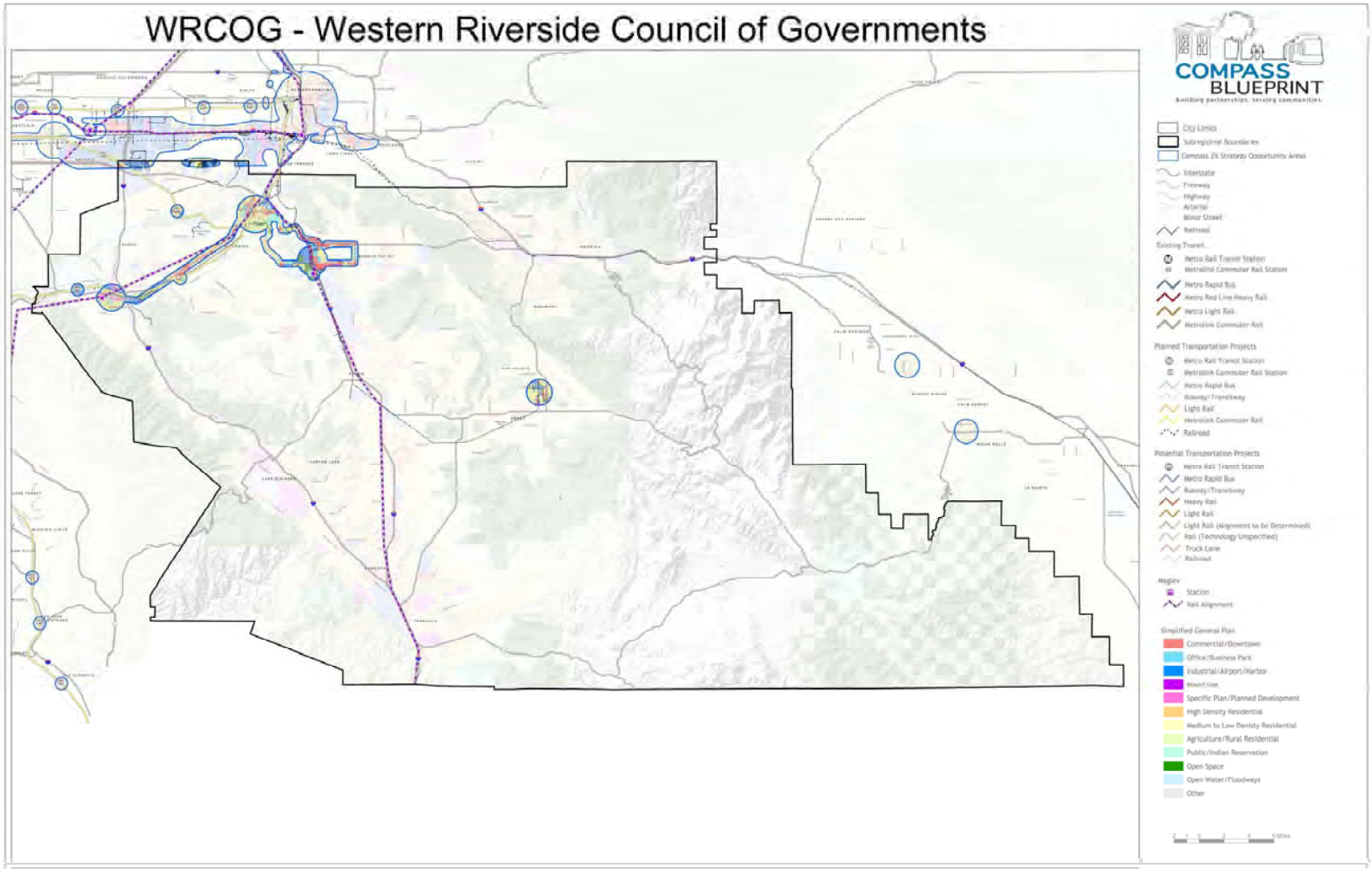


Source: WRCOG Forecasts, IBI Group

Activity Centers

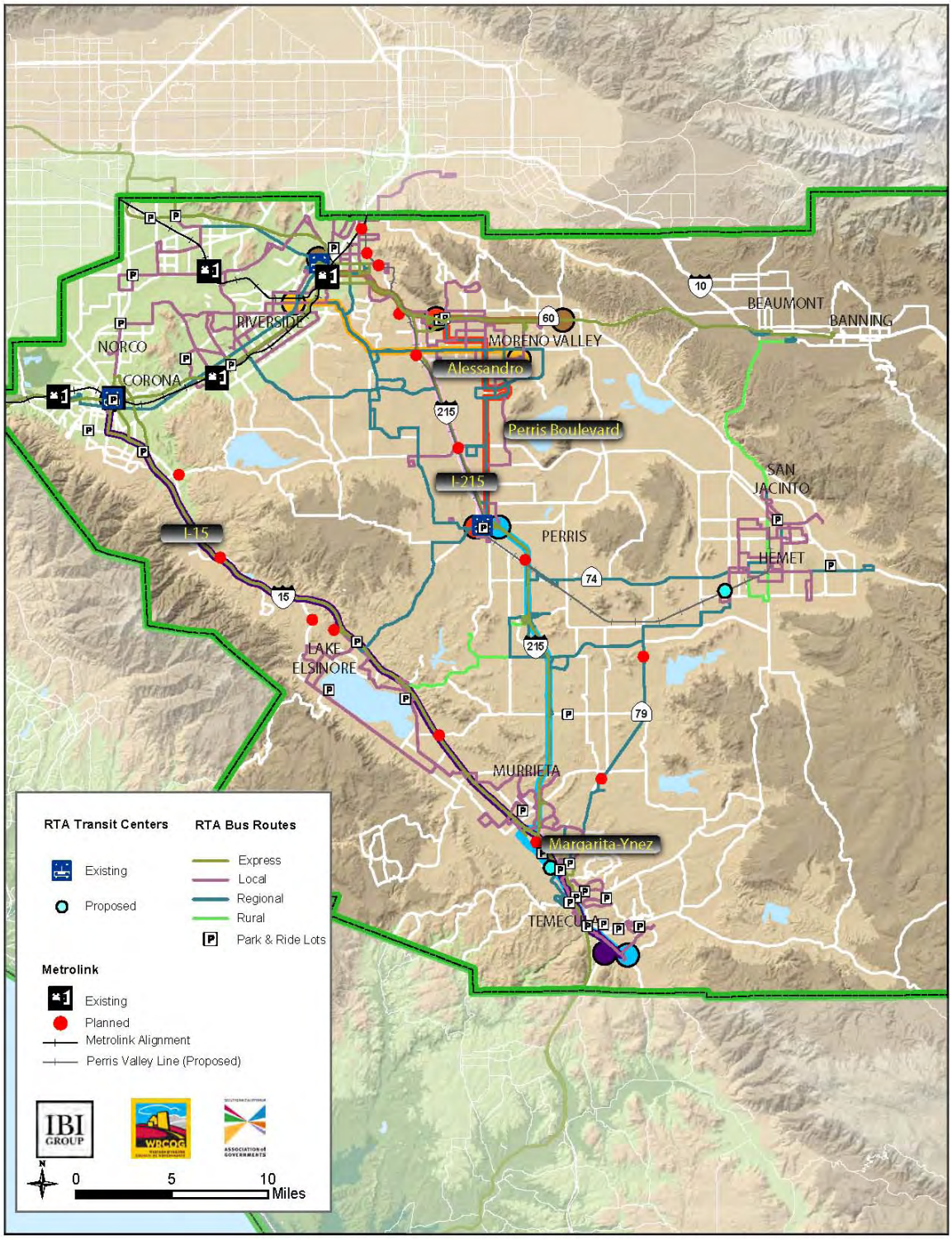


Source: IBI Group

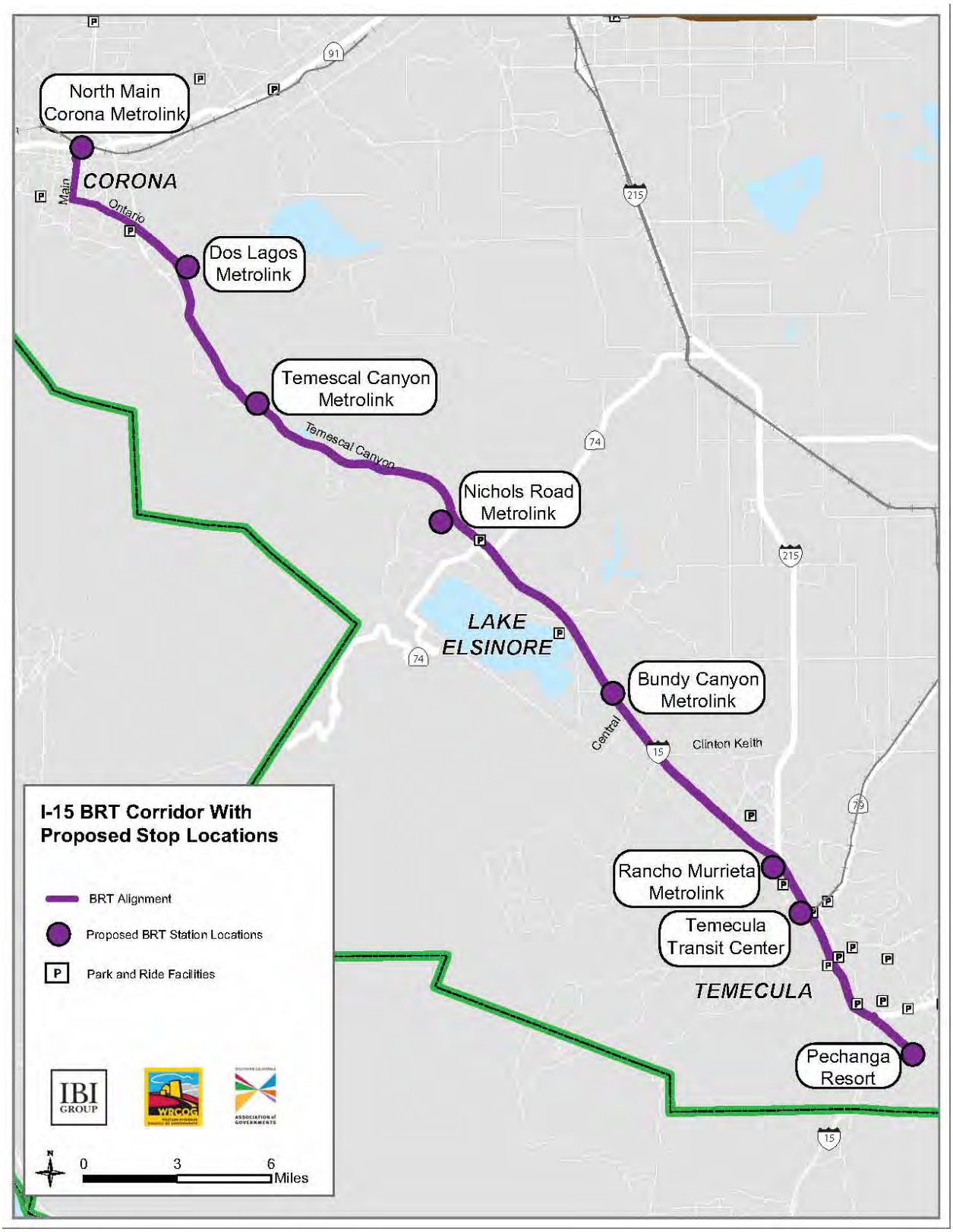

WRCOG - Western Riverside Council of Governments
COMPASS
BLUEPRINT
City Limits
Subregional Boundaries
Compass 2% Strategy Opportunity Areas
Interstate
Freeway
Highway
Arterial
Minor Street
Railroad
Existing Transit
Metro Rail Transit Station
Metrolink Commuter Rail Station
Metro Rapid Bus
Metro Red Line Heavy Rail
Metro Light Rail
Metrolink Commuter Rail
Planned Transportation Projects
Metro Rail Transit Station
Metrolink Commuter Rail Station
Metro Rapid Bus
Busway/Transitway
Light Rail
Metrolink Commuter Rail
Railroad
Potential Transportation Projects
Metro Rail Transit Station
Metro Rapid Bus
Busway/Transitway
Heavy Rail
Light Rail
Light Rail (Alignment to be Determined)
Rail (Technology Unspecified)
Truck Lane
Railroad
Magev
Station
Rail Alignment
Simplified General Plan
Commercial/Downtown
Office/Business Park
Industrial/Airport/Harbor
Mixed Use
Specific Plan/Planned Development
High Density Residential
Medium to Low Density Residential
Agriculture/Rural Residential
Public/Indian Reservation
Open Space
Open Water/Floodways
Other

Source: SCAG

Existing Transit Service in Corridors



Source: RTA


North Main
Corona Metrolink
CORONA
Main
Ontario
Dos Lagos
Metrolink
Temescal Canyon
Metrolink
Temescal Canyon
Nichols Road
Metrolink
LAKE
ELSINORE
Bundy Canyon
Metrolink
Central
Clinton Keith
Rancho Murrieta
Metrolink
Temecula
Transit Center
TEMECULA
Pechanga
Resort
I-15 BRT Corridor With
Proposed Stop Locations
BRT Alignment
Proposed BRT Station Locations
Park and Ride Facilities
IBI
GROUP
WRCOG
ASSOCIATION of GOVERNMENTS
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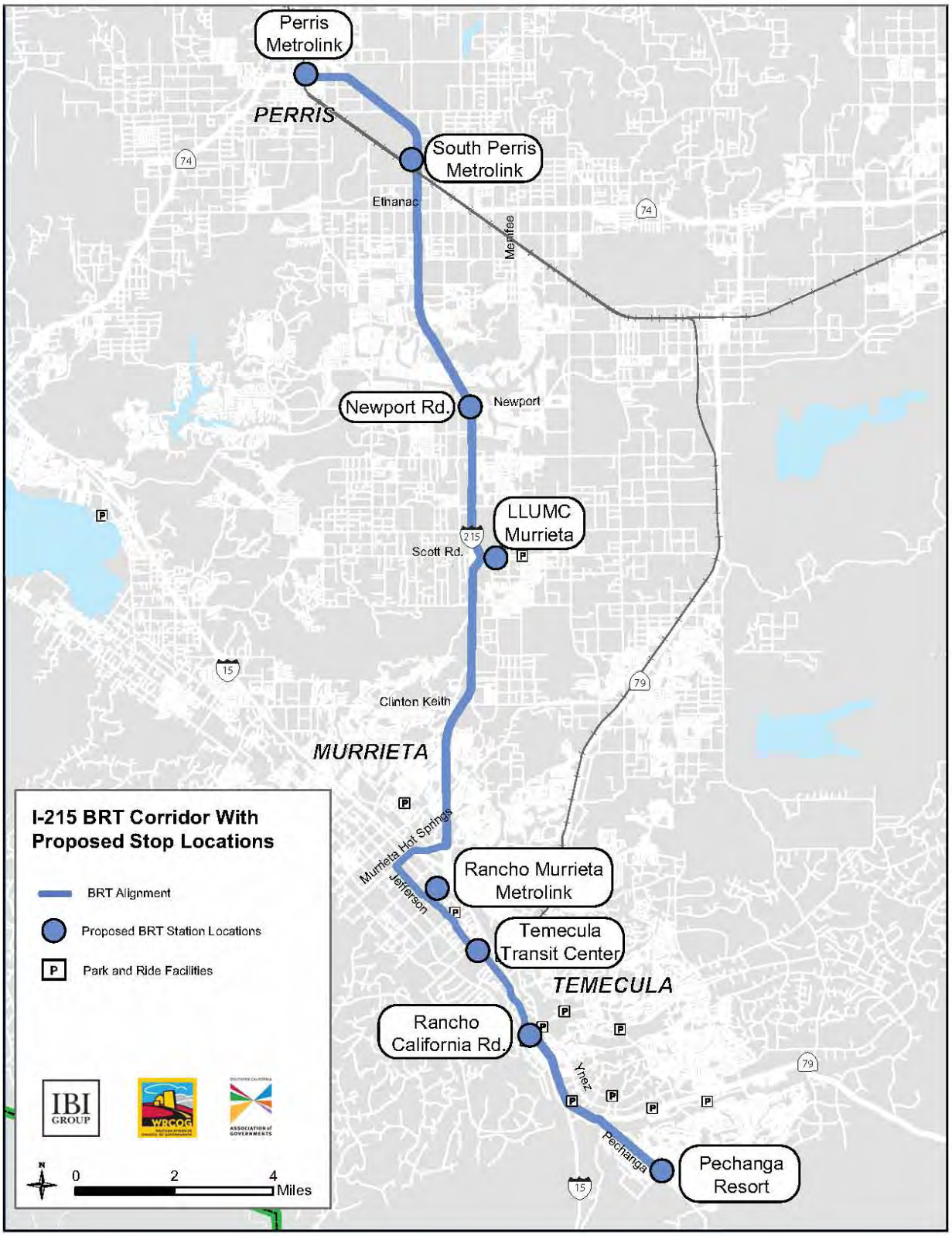
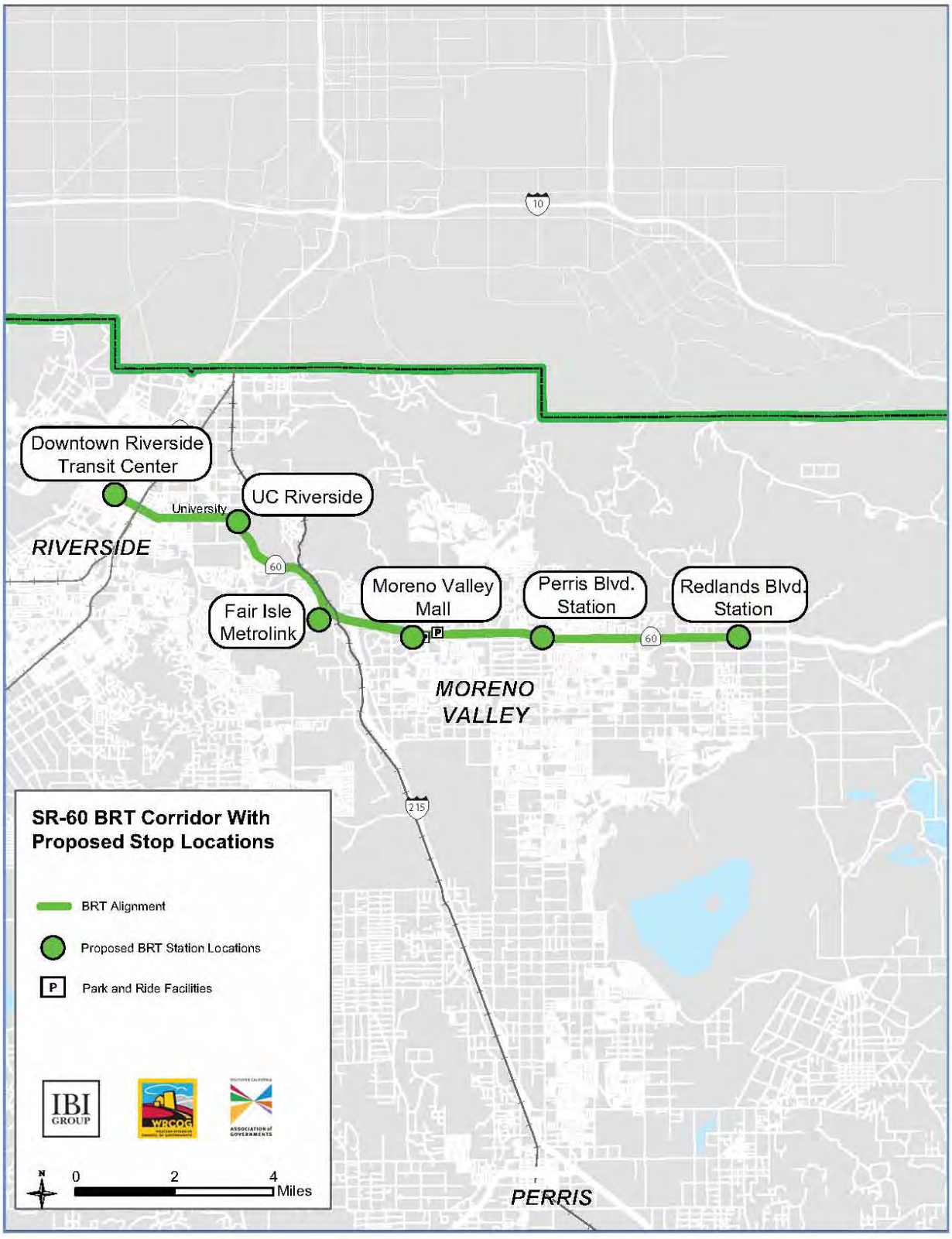
3
6
Miles
91
215
74
15
79


Perris Metrolink
PERRIS
South Perris Metrolink
Ethanac
Menifee
Newport Rd.
Newport
LLUMC Murrieta
Scott Rd.
Clinton Keith
MURRIETA
Murrieta Hot Springs
Jefferson
Rancho Murrieta Metrolink
Temecula Transit Center
TEMECULA
Rancho California Rd.
Ynez
Pechanga
Pechanga Resort
I-215 BRT Corridor With Proposed Stop Locations
BRT Alignment
Proposed BRT Station Locations
Park and Ride Facilities
IBI GROUP
0 2 4 Miles


Downtown Riverside Transit Center
UC Riverside
University
RIVERSIDE
Fair Isle Metrolink
Moreno Valley Mall
Perris Blvd. Station
Redlands Blvd. Station
MORENO VALLEY
PERRIS
10
60
215
SR-60 BRT Corridor With Proposed Stop Locations
BRT Alignment
Proposed BRT Station Locations
Park and Ride Facilities
IBI GROUP
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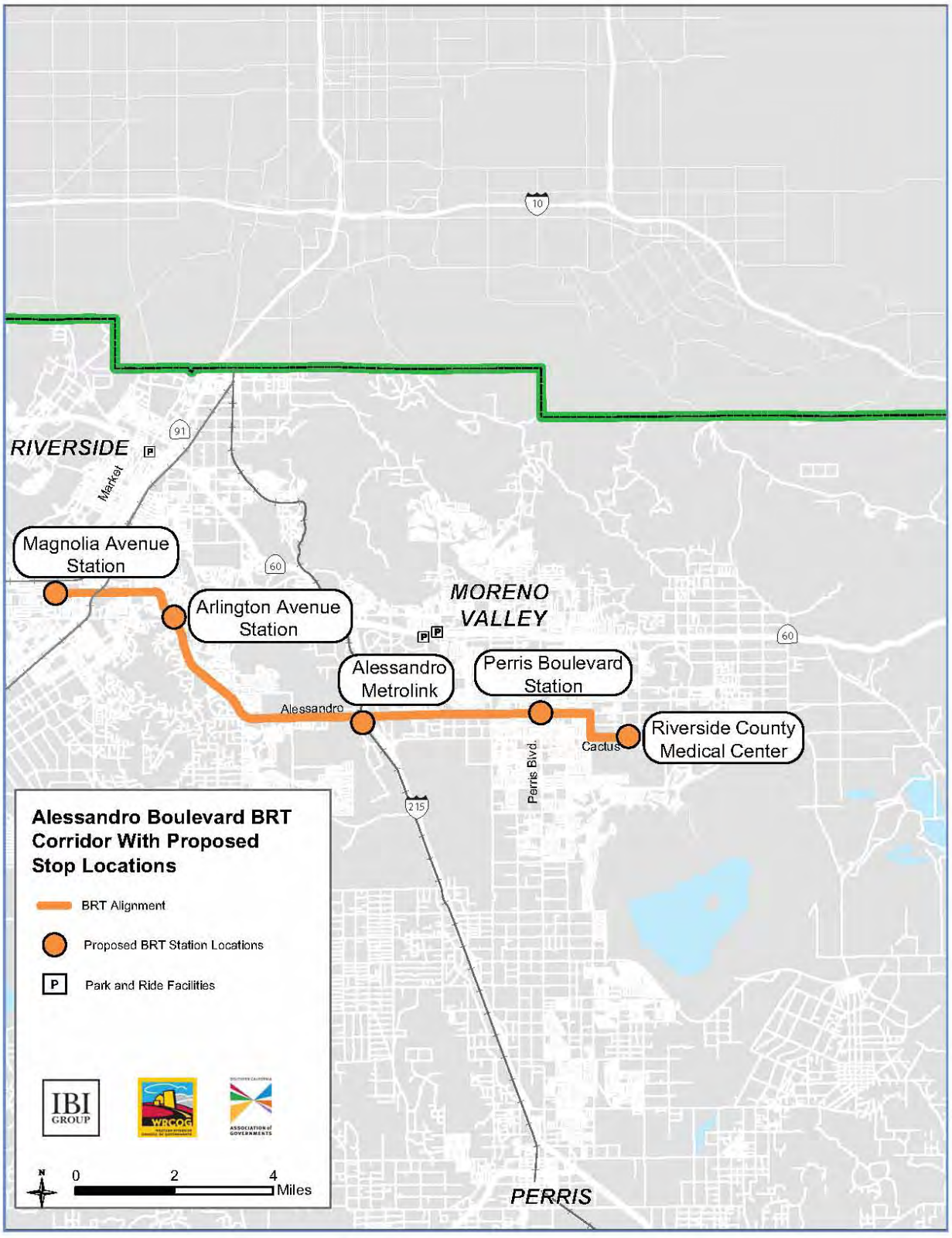
RIVERSIDE
Market
Magnolia Avenue Station
Arlington Avenue Station
MORENO VALLEY
Alessandro Metrolink
Alessandro
Perris Boulevard Station
Cactus
Riverside County Medical Center
Perris Blvd.
PERRIS
10
91
60
215
Alessandro Boulevard BRT Corridor With Proposed Stop Locations
BRT Alignment
Proposed BRT Station Locations
Park and Ride Facilities
IBI GROUP
0
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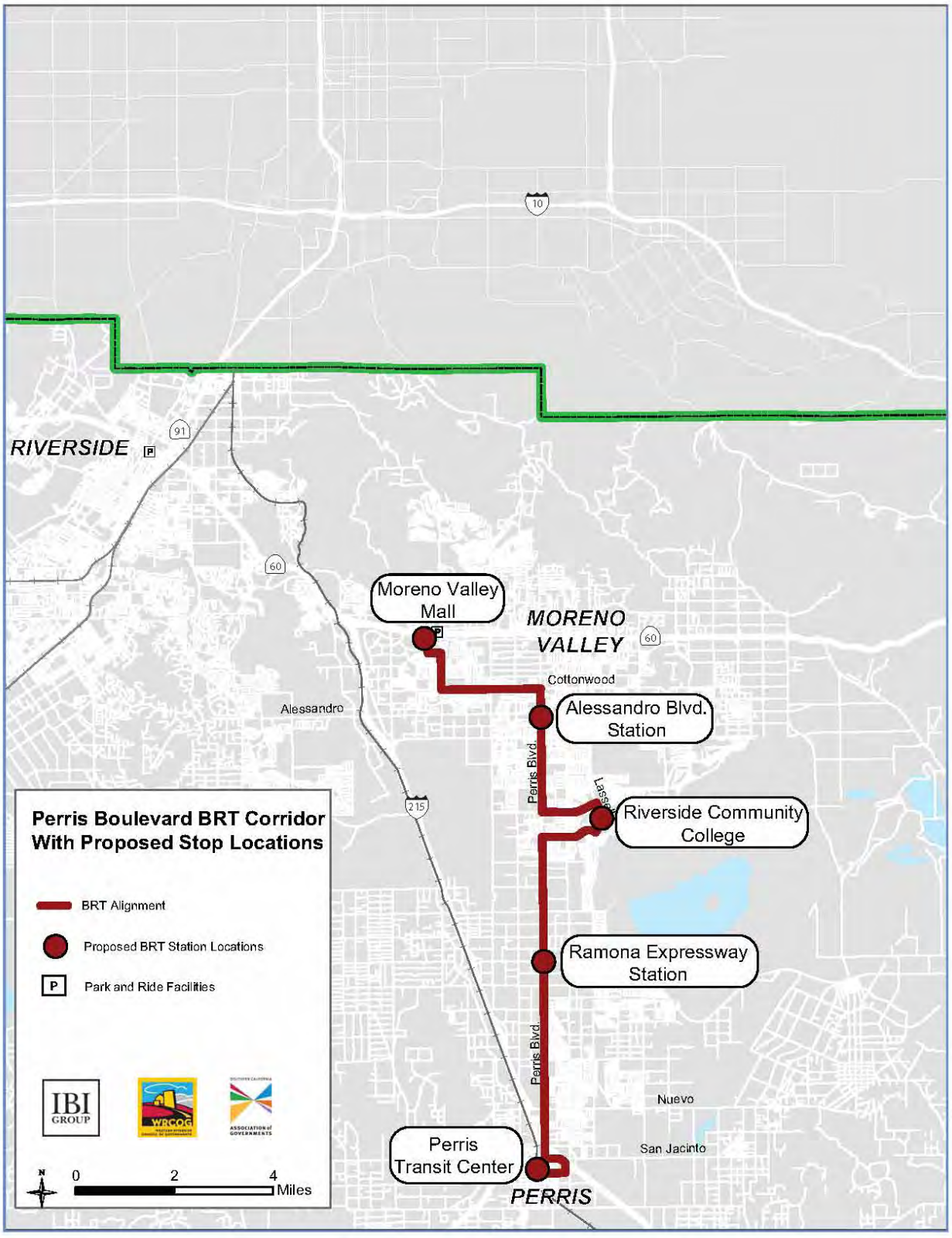
Miles


Perris Boulevard BRT Corridor
With Proposed Stop Locations
BRT Alignment
Proposed BRT Station Locations
Park and Ride Facilities
IBI GROUP
WRCOG
ASSOCIATION of GOVERNMENTS
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0
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Miles
RIVERSIDE
P
91
60
10
215
Moreno Valley Mall
MORENO VALLEY
Cottonwood
Alessandro
Alessandro Blvd. Station
Perris Blvd.
Riverside Community College
Ramona Expressway Station
Perris Blvd.
Nuevo
San Jacinto
Perris Transit Center
PERRIS

Route Alignments

I-15
- Pechanga Resort Start
- Northwest on Pechanga Parkway
- West on Temecula Parkway (SR-79)
- North on I-15
- Exit Weirick
- East on Weirick
- North on Temescal Canyon
- Northwest on Ontario Ave.
- North on Main St.
- End at Corona Metrolink Station

I-215
- Pechanga Resort Start
- Northwest on Pechanga Parkway
- West on Temecula Parkway (SR-79)
- North on I-15
- Exit Rancho California Rd.
- West on Rancho California Rd.
- North on Jefferson Ave.
- Northeast on Murrieta Hot Springs Rd.
- North on I-215
- Exit 4th St/SR-74
- West on 4th
- North on C St.
- End at Perris Metrolink Station

60 West
- Redlands Blvd at SR-60 Start
- 60 West to University Ave. Exit
- West on University Ave.
- End at Downtown Riverside Transit Center ---OR--- West on University to Victoria, South on Victoria, West on 14th to Downtown Riverside Metrolink Station

Alessandro Boulevard
- Magnolia Ave at Central Ave Start
- East Central Ave. becomes Alessandro Blvd.
- South on Lasselle St.
- East on Cactus Ave.
- End at Riverside County Regional Medical Center

Perris Boulevard
- Perris Transit Center Start
- North C St.
- East San Jacinto Ave.
- North on Perris Blvd.
- East on Krameria Ave.
- North on Lasselle St.
- West on Iris Ave.

- North on Perris Blvd.
- West on Cottonwood Ave.
- North on Frederick St.
- West on Towngate Blvd.
- End at Moreno Valley Mall

BUS RAPID TRANSIT ROUTE PLANNING PROJECT

Station Area Planning

Technical Memo

June 2010

1.0 INTRODUCTION

The Bus Rapid Transit (BRT) Route Planning Project is being conducted under a SCAG Compass Blueprint grant to identify corridors in the WRCOG area that would be suitable for BRT service and determine the priority for BRT projects to be developed following implementation of the previously studied Magnolia Corridor BRT project. This is a long range study, based on 2035 growth projections, and is being conducted under the direction of an interagency project team with representatives of the Western Riverside Council of Governments (WRCOG), the Southern California Association of Governments (SCAG), the Riverside Transit Agency (RTA), and the Riverside County Transportation Commission (RCTC). Discussions with individual cities and Riverside County staff contributed to the information used in the study.

The project included the following reports under separate cover: 1) a case studies report that evaluated comparable BRT systems in North America that could provide guidance for the design of BRT service in the WRCOG area; 2) an initial corridor screening report that evaluated and ranked 13 potential BRT routes; and 3) a detailed evaluation of short-list BRT corridors that includes recommendations on priority and implementation timing. The analysis documented in this report was conceptual in nature and future in-depth studies would be required to determine if BRT service can be cost-effectively provided in the potential corridors. The evaluation considered the conceptual operational characteristics of the potential BRT services, but did not attempt to provide a detailed financial analysis. To advance the recommended corridors to implementation, each will require a feasibility study and financial plan. This station area planning report focuses on conceptual station area planning for six different station prototypes, as described in greater detail below.

BRT is an emerging approach, particularly in Southern California, to developing cost-effective high quality, high speed transit service in urban areas. BRT can operate on arterial streets, freeways, and exclusive guideways. Key elements include increased operating speed, improved stations with shelters and other amenities, and luxury vehicles. Transit priority measures are frequently provided to enable buses to travel more quickly through congested segments of their routes.

Five corridors have been selected as potential priority routes, based on a series of screening criteria. They are shown on Figure 1, with the key reasons for their selection provided below. The stations included in this report are also identified on Figure 1. Additional screening will be conducted for each of the lines identified below.

- I-15 – The I-15 corridor extends from the Corona Metrolink Station to the Pechanga Resort near Temecula. HOV lanes are planned in the median north of I-215, providing an excellent opportunity for BRT travel time savings. Key stations in the corridor include Pechanga Resort, Temecula Transit Center, Railroad Canyon Road/Lake Elsinore, Dos Lagos, and the Corona Metrolink Station. Selected park and ride lots in the corridor would also be served. This freeway corridor scores well for connectivity due to its connections to the Metrolink Station in Corona and local and regional services in Temecula. It also scored well for the potential for priority treatments due to the planned HOV lanes in the median, where space is available the length of I-15. It scored well for activity centers and smart growth.

- I-215 – This corridor stretches from the Perris Transit Center and future Metrolink station to the Pechanga Resort. Service would be provided to the Metrolink Station at SR-74, the park-and-ride lot at Newport Road, the new Loma Linda Medical Center at Murrieta, the future Temecula Transit Center, and Jefferson Avenue. Selected park and ride lots in the corridor would also be served. This freeway corridor has several activity centers and existing transit service. The corridor scored well for transit connectivity and existing service. Its potential for priority treatments is limited.

- SR-60 West Segment – This corridor extends from the Downtown Riverside Transit Center/Metrolink Station to the eastern end of Moreno Valley at Redlands Boulevard. Key stations include the Moreno Valley Mall and UCR. This freeway corridor scores well for activity centers and existing service. It also scores well for priority treatments due to the HOV lanes along the full length of SR-60. Population density, existing service, and priority treatments scored well. In-line stations could be considered for this service to minimize surface-street travel and to provide the best possible travel times.

- Alessandro Boulevard – This corridor extends from Magnolia Avenue to the Riverside County Medical Center in Moreno Valley. It would serve established areas near the Magnolia Corridor, along with developing areas west of I-215 and in Moreno Valley. Key stations include Magnolia Avenue, Mission Grove, the future Moreno Valley March Field Metrolink Station, and the Riverside County Medical Center. This arterial corridor scores well for employment, population, existing service, and the potential for priority treatments at intersections. The corridor scored well for smart growth and existing service.

- Perris Boulevard – This corridor extends from the Perris Transit Center and future Metrolink station in downtown Perris to the Moreno Valley Mall. It would serve the Riverside Community College and future development at March Air Force Base, and would intersect with the Alessandro BRT corridor. The existing service in the corridor, Route 19, is one of the highest ridership routes in the RTA system. It has high scores for population density, local and regional transit connectivity (with its connections to the Perris Metrolink Station, and the Moreno Valley Mall), construction cost, and phasing. It also scores well for employment density, transit dependency, and support of land use plans and Smart Growth.

Implementation of transit improvements in any of these corridors will depend on the availability of new or increased funding. As a result, it is not possible at this time to define a timeline for the implementation of these services. Identifying specific existing and new funding sources would be an important part of the next phase of service development. It is expected that the region's transportation partners—WRCOG, RCTC, and RTA—will work together to incorporate these corridors into the region's transportation programs and secure funding for their construction and operation. Each corridor will require additional analysis prior to implementation. Gradual upgrades will also be required.

FIGURE 1. POTENTIAL PRIORITY BRT ROUTES, EXISTING RAIL LINES, AND STATION LOCATIONS

2.0 APPROACH

Focusing urban development around transit facilities is recognized as a significant way to improve the effectiveness of public transportation systems. Furthermore, the placement and design of transit stations can achieve other community planning and development objectives. The future transit stations associated with the BRT corridors in Western Riverside County have multiple roles to play. First, there is the transportation role, including providing safe and efficient interface between riders and buses. Next, and equally important, are the placemaking and land development roles that maximize the placement, size, and design of the station to add character, create place, and help foster surrounding development over time. With this perspective in mind, several BRT station concepts, including their relationship to existing or future potential development, were examined.

Six prototypical BRT station types have been identified for the Western Riverside BRT corridors: the Multimodal Station; the Major Bus Transfer Station; the In-Line Station; the End-of-Line Station; Village Center Park-n-Ride Station; and the Walk-up Station. Each of these station types has been explored in this report, along with principles and design ideas for associated development. The purpose of this exercise is to illustrate the typical station requirements, layout, and integration with surrounding development. These are intended to be used as a guide for future station planning along each of the western Riverside BRT routes. Opportunities for future TOD will of course vary from station area to station area, but the basic principles and best practices for ensuring development that is "transit oriented" versus "transit adjacent" remain the same.

3.0 BRT ISSUES AND OPPORTUNITIES FOR TRANSIT ORIENTED DEVELOPMENT

While the practice and analysis of transit-oriented development has focused predominantly on rail-based modes, there is a growing body of literature on the benefits, limitations, and best practices associated with bus TOD (BTOD). BRT has different strengths and weaknesses compared to rail that need to be taken into consideration in station area planning, but in general, the better the service (higher frequency of service, more amenities at the station, higher quality of vehicles), the greater the opportunity for successful BTOD. Please see Appendix A for a list of the academic references drawn upon for this report.

Similar to light rail systems, BRT hinges on the ability to have supportive land uses that concentrate activity along system corridors. In most cases, BRT systems have been built in corridors with proven demand. BRT can attract denser TOD development that will in turn enhance the BRT system in the future. This reciprocal connection between BRT investments and land development has been the cornerstone of success along the systems found in Brazil and Canada, as well as the BRT lines in Cleveland and Boston. In the survey conducted by in 2008 by Breakthrough Technologies Institute, developers indicated that proximity to BRT increased property values by 3 to 5 percent compared to similar properties without BRT service.

Current literature suggests that lower density thresholds are acceptable for BTOD vs. rail TOD (based on studies in San Diego, Washington and Portland). For a suburban center with 10-minute peak service and a mix of office, multifamily residential, retail, and entertainment uses, density needs to be a minimum of 20 units per acre. Along a suburban corridor with 20-minute peak service, density needs to be a minimum of five to eight units per acre. Studies on land use benefits associated with large-scale BRT systems show that the introduction of high frequency service achieved substantial increases in transit patronage and associated densification of development around stations.

Based on literature review of existing BRT systems, the following key factors appear to influence the success of the service and potential to attract development:

- **Density and intensity is the primary determinant of transit ridership.** Similar to rail TOD, density and intensity of development is also a significant factor in reducing auto use. People that live near transit are five times more likely to use it—and to walk and bike to work.
- **Frequency of service and speed are next to density in determining ridership.** The impact of transit on surrounding development requires an effective service offering. High frequencies, exclusive running ways (or signal prioritization), quality stations with real-time tracking, and easy access to a station matters in attracting riders and new development.

density and intensity near transit increases ridership

investment in station design shows permanence of system

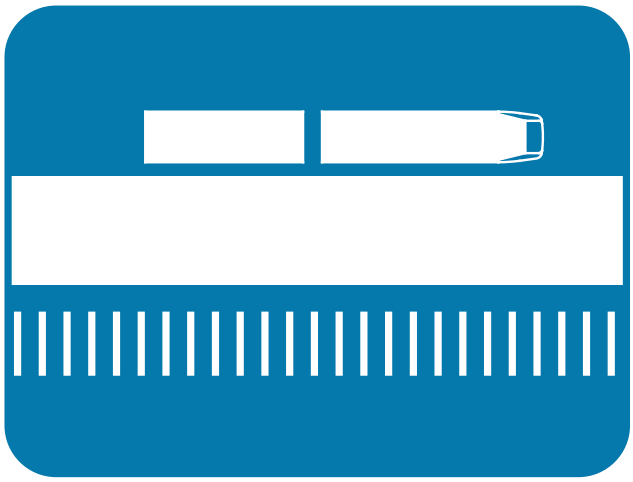
- **Permanence of the system is important to developers.** Developers view the permanence of the system and the associated station improvements as important factors in making investment decisions. Even in cities with a relatively low level of infrastructure, BRT was viewed as permanent due to the clear long-term commitment of the transit agency.
- **Need to overcome bus stigmatization.** In many communities, buses are seen as a second class form of transportation. BRT service needs to be differentiated from local service and marketed to appeal to a different group of users. New BRT service requires high-profile branding and upgraded buses and bus stations to attract commuters. Evidence suggests that suburban based bus systems operating at low frequency with minimal fixed infrastructure lack the magnitude and permanence for successful large-scale BTOD.
- **Park-and-ride-based service can affect the success of BTOD.** Similar to park-and-ride facilities at Metrolink stations, parking lot locations/design can negatively affect the success of TOD. A large parking lot or structure located immediately adjacent to a station can create a barrier between the station and nearby development. TOD is forced further from the station, reducing placemaking opportunities where transit-supportive services are integrated with new development. Local agency involvement in the planning of parking lots in conjunction with an overall plan for TOD is an important consideration. On-street BRT service with a low volume of park-and-ride access can be an asset to BTOD.

unique bus design helps overcome bus stigmatization

provide safe pedestrian access

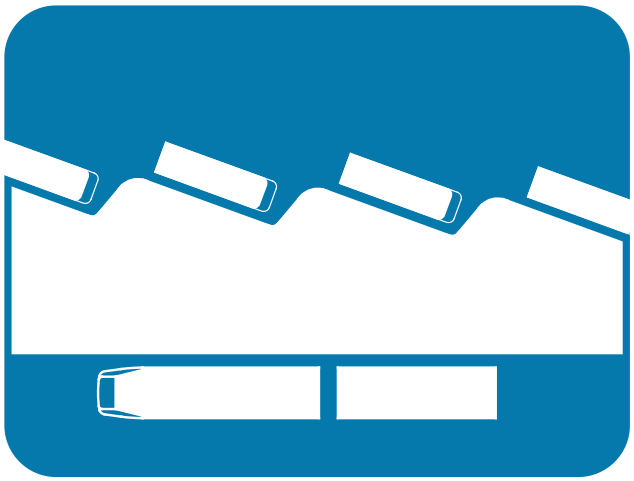
- **Agency role affects success of BTOD.** Based on surveys, the success of many development projects was directly related to a high level of cooperation among the affected local and transit agencies and the developer. Developer respondents also noted that financial incentives for TOD were not as important in attracting development as having an expedited permitting process and the right zoning already in place. Time kills deals.
- **Need to provide safe and quality pedestrian access.** If pedestrians feel unsafe or if there are too many obstacles or delays in walking to a station, transit use will be reduced. Many solutions are available and tested (See Safe Routes to Transit, Bus Rapid Transit Planning Guide). Streetscape improvements also play an important role in creating a more inviting environment.

4.0 STATION PROTOTYPES FOR WESTERN RIVERSIDE COUNTY



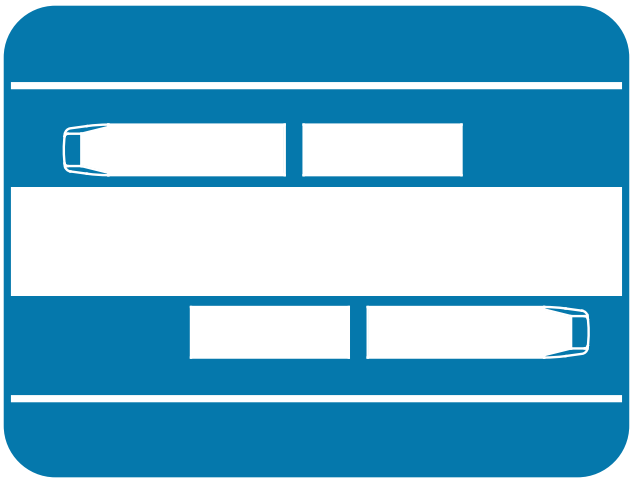
Multimodal Station

- Serves multiple communities, similar to service area of Metrolink stations
- Provides transfers between BRT, Metrolink service, and local/regional bus services
- Located at or adjacent to Metrolink stations
- Station area to contain sufficient bus bays for multiple bus services and parking for bus customers
- Station amenities include identifiable bus shelter with seating, ticketing, real-time bus-tracking schedule, and potential vendors (coffee and newspaper stands)
- BTOD opportunities are consistent with rail-based TOD opportunities, based on local context and local plans
- Stations have strong public and private joint-development opportunities because of the high volume of transit customers
- Multimodal stations should have a strong civic component and a high quality public realm that is safe and inviting for users



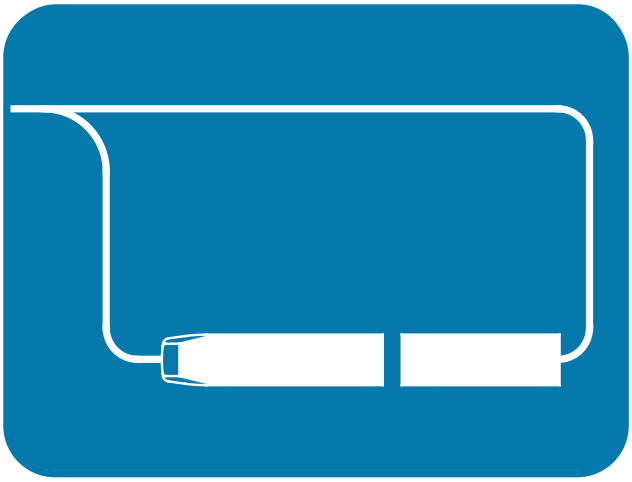
Major Bus Transfer Station

- Serves multiple communities, including long-haul services such as intracounty BRT services
- Provides transfers between BRT trunk lines, intracounty BRT trunk lines, local and regional bus lines, as well as other types of shuttle or jitney services
- Located conveniently off a freeway interchange—important that access not be constrained by peak-hour traffic
- Station area to contain sufficient bus bays for multiple bus services and parking for bus customers
- Station may also include freeway park and ride spaces per Caltrans needs
- Station has a limited walk-up function in the near term, but that will increase as development occurs around the station
- Station amenities include identifiable bus shelter with seating, ticketing, real-time bus-tracking schedule, and potential vendors (coffee and newspaper stands)
- Station location may drive significant TOD opportunities over time, including long-range joint development opportunities at the station



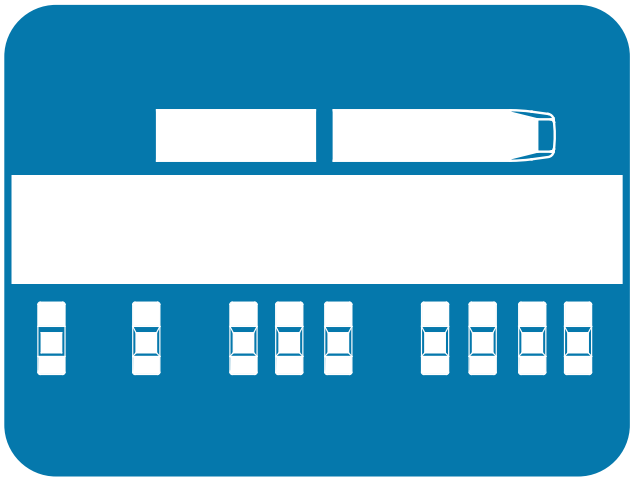
In-Line Station

- Serves part or entire community, up to a 2-mile radius
- Provides transfers between BRT and regional bus services—strong commuter orientation
- Located within median of freeway or major arterial
- If located within freeway right-of-way, may be located along shoulder as a pull-in/pull-out stop
- If located within median of freeway, HOV lanes are preferred to enable easy access into station
- Stations accessed by pedestrian bridge over freeway or arterial—pedestrian bridge also provides access to uses on both sides of right-of-way
- Station amenities include identifiable bus shelter with seating, ticketing, and real-time bus tracking schedule
- Park and ride is provided on both sides of freeway or arterial—ranging from 100–200 spaces on both sides
- Located at a high-activity center that can take advantage of uses on both sides of right-of-way
- Significant TOD opportunities over time, including long-range joint development opportunities at the park-and-ride lots



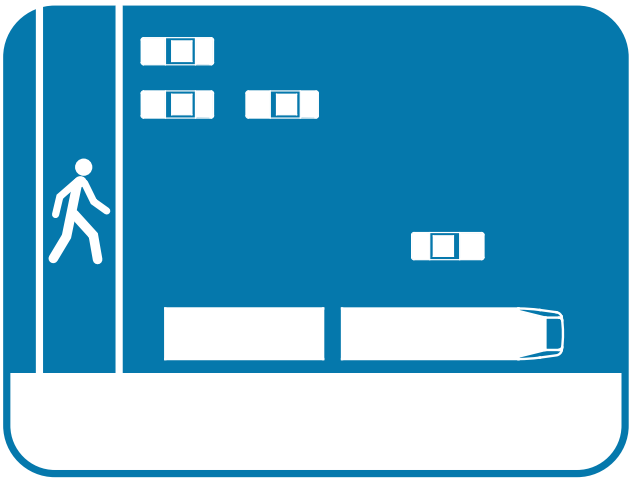
End-of-Line Station

- Serves surrounding neighborhoods and businesses, up to a 5-mile radius
- Station is at the end of the BRT line—buses start and end service at this location throughout the day
- Buses will have a layover time requiring multiple bus bays
- Provides transfer between BRT and feeder services, possible BRT trunk lines, and employee shuttle or local jitney services
- Station amenities include identifiable bus shelter with seating, ticketing, and real-time bus-tracking schedule
- Ideally located at a high-activity center —either a major employment center or mixed-use town center
- Designed as a pull-up station along the arterial corridor (space for 4–6 BRT buses on each side of the street) or can be located immediately adjacent to the arterial in a small station configuration
- Includes parking area for commuters—ranging from 100–200 spaces
- Safe and direct pedestrian access from surrounding uses is key design element
- Multiple service options provide enhanced opportunities for TOD over time, including joint development opportunities at the station



Village Center Park & Ride Station

- Serves a multiuse activity center and nearby residential, up to a 2-mile radius
- Provides transfers between BRT and feeder services (local and regional bus)
- Accommodates some layovers of BRT buses
- Designed as a pull-up station along the arterial corridor (space for 2 BRT buses on each side of the street) or can be located immediately adjacent to the arterial in a small station configuration
- Includes parking area for commuters — ranging from 100–200 spaces
- Station amenities include identifiable bus shelter with seating, ticketing, and real-time bus-tracking schedule
- Safe and direct pedestrian access from surrounding uses is key design element
- Typically located within an existing developed corridor with sufficient demand—design responds to existing neighborhood fabric but expect additional TOD opportunities over time



Walk-Up Station

- Serves surrounding neighborhoods and businesses, up to a half-mile radius
- Provides transfers between BRT and feeder services (local and regional bus)
- Designed as a pull-up station along the arterial corridor—bus turnout is not preferred
- Station amenities include identifiable bus shelter with seating, ticketing, and real-time bus-tracking schedule
- No park-and-ride lot
- Safe and direct pedestrian and bicycle accessibility from nearby residential and business uses is paramount in TOD design
- Typically located within an existing developed corridor with sufficient demand—design responds to existing neighborhood fabric but expect additional TOD opportunities over time

4.1 Multimodal Station Prototype

Along the five BRT corridors identified in this study, there are five existing or planned multimodal stations that will accommodate future BRT service. These stations will ultimately provide access to Metrolink (commuter rail service), local and regional bus service, and future BRT service. The following is a status report on the facilities at each of the five stations, and the future potential for TOD.

North Main Corona Station

The North Main Corona Station is the second busiest station in Riverside County. A 2,000-car parking structure was recently completed on the north side of the tracks, adjacent to the Metrolink platforms. There are plans for a second, 1000 car parking structure in the future. On the south side of the tracks, the bus station is under construction. The bus station includes eight bus bays, including a bay large enough to accommodate an articulated BRT bus. A bridge connecting the bus station to the Metrolink platforms is currently under construction. The bus station is scheduled to be completed by September 2010.

There are opportunities for transit-oriented development surrounding the station. In 2007, SCAG's Compass Blueprint Program funded a conceptual planning project for the City of Corona that explored TOD opportunities and constraints within the quarter-mile radius around the station. Since that time, several large commercial parcels have been assembled by a private developer for redevelopment as a mixed-use, residential transit-oriented project. The project is currently on hold, but is anticipated to start up again when the market has improved.

FIGURE 2. N. MAIN CORONA METROLINK AND BRT STATION

proposed BRT route

FIGURE 3. NORTH MAIN CORONA MIXED-USE PROJECT

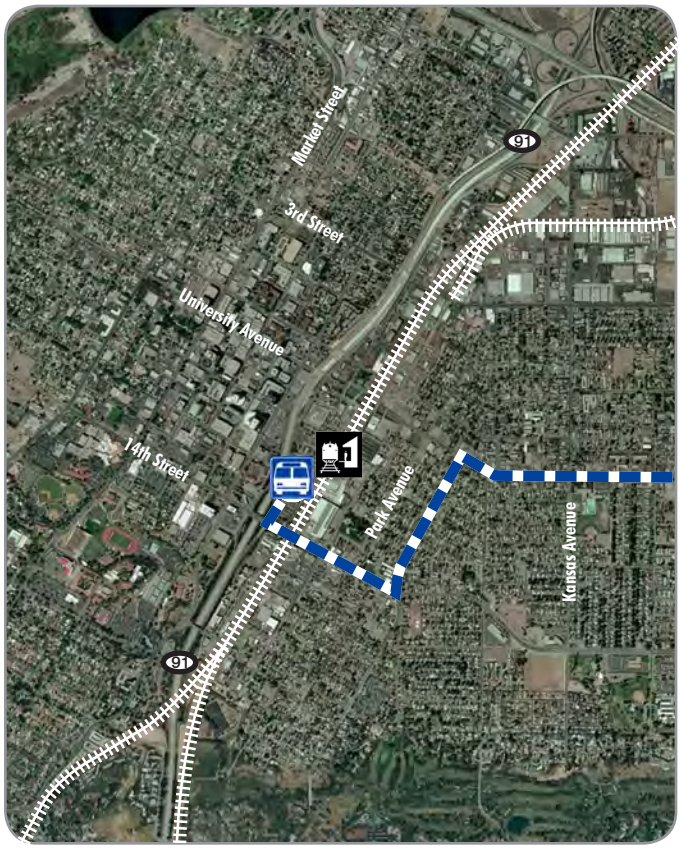
Source: Architects Orange, 2009
Developer: Watermarke Properties

Downtown Riverside Station

Metrolink has been serving this station since 1993 and it is the busiest rail station in Riverside County. The station is currently surface parked. Although buses regularly stop at the Metrolink platforms, there is not a separate bus station at this location that serves as a transfer point for intercounty and intercity buses. There is a feasibility study underway to determine the best site for this bus station near the Downtown Riverside Station. This station is planned for 12 bus bays and will be built to accommodate the future articulated BRT buses. RTA's schedule calls for opening of the new bus station in mid-2013.

Similar to the North Main Corona Station, there are significant opportunities for transit-oriented development surrounding the station. In 2007, SCAG's Compass Blueprint Program funded a conceptual planning project for the City of Riverside that explored TOD opportunities on the east side of the tracks. The City supports increasing density on the west side of the tracks as well. One joint public-private development project was proposed for the surface parking area adjacent to the platforms, but it was not found to be viable by RCTC. When the market turns around, developers are expected to return with a range of TOD proposals on multiple sites in the area.

FIGURE 4. DOWNTOWN RIVERSIDE METROLINK AND BRT STATION



Note: The exact BRT station location is still to be determined.

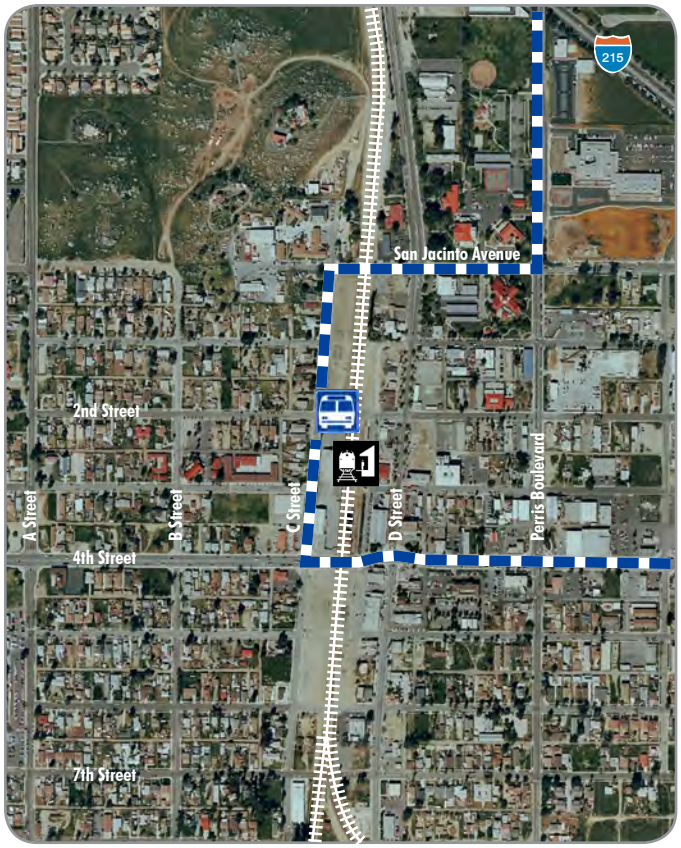
proposed BRT route

Downtown Perris Station

The Downtown Perris Station opened in early 2010. It currently provides intercity and intercounty bus service, but a future Metrolink station is also planned to open at this location in December 2012. The facilities include 6 bus bays and limited parking. It has also been built to accommodate future articulated BRT buses.

This station is ideally located in the heart of Perris's historic downtown. The City recently completed a Specific Plan for the downtown area that establishes a new land use plan, development standards, and design guidelines for intensifying and mixing of land uses in the area. There are opportunities for transit-oriented development surrounding the station, which will be guided by the vision and standards of the Specific Plan.

FIGURE 5. DOWNTOWN PERRIS METROLINK AND BRT STATION



proposed BRT route

Perris Station Transit Center

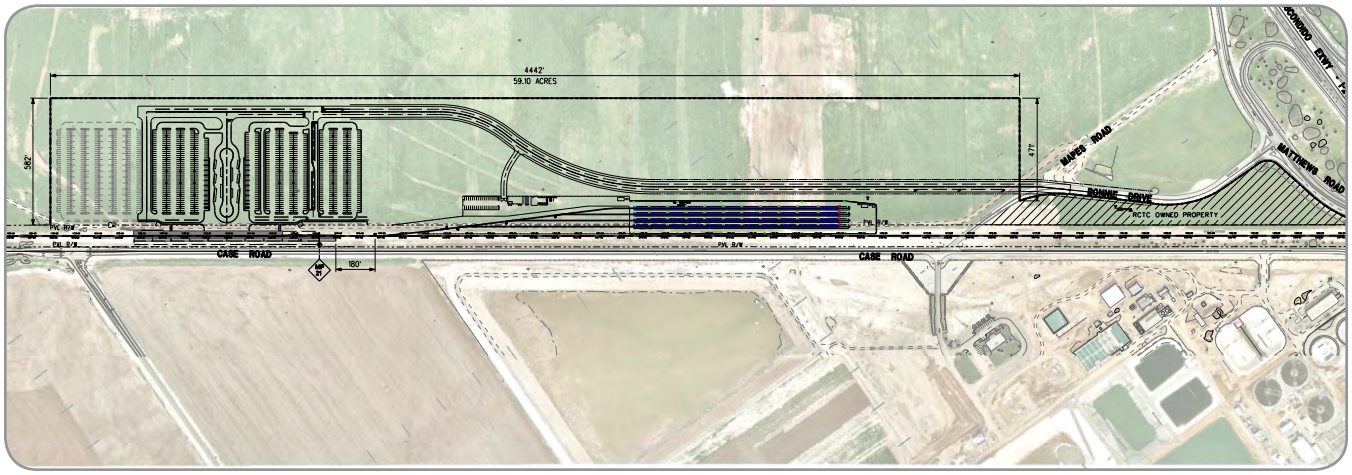
South Perris Station

The South Perris Station is a future bus facility at the I-215 and Maples Road. The station will have 6 bus bays and is adequately sized to accommodate future BRT service. This station is also planned as a future Metrolink station, with a layover facility, to also open in December 2012. A large surface parking area is ultimately planned to accommodate both the bus and BRT service.

There are two large-scale communities planned for the area surrounding the station. However, both the Riverglen and Green Valley Specific Plans are considered outdated by the City and will ultimately be redesigned to respond to changes in the market, as well as future transit services. Together, the projects currently total 5,467 dwelling units and 243 acres of nonresidential uses. The Riverglen project in particular has a significant opportunity to create a transit-oriented development plan adjacent to the station.

FIGURE 6. SOUTH PERRIS METROLINK AND BRT STATION

FIGURE 7. SOUTH PERRIS METROLINK STATION AND LAYOVER SCHEMATIC



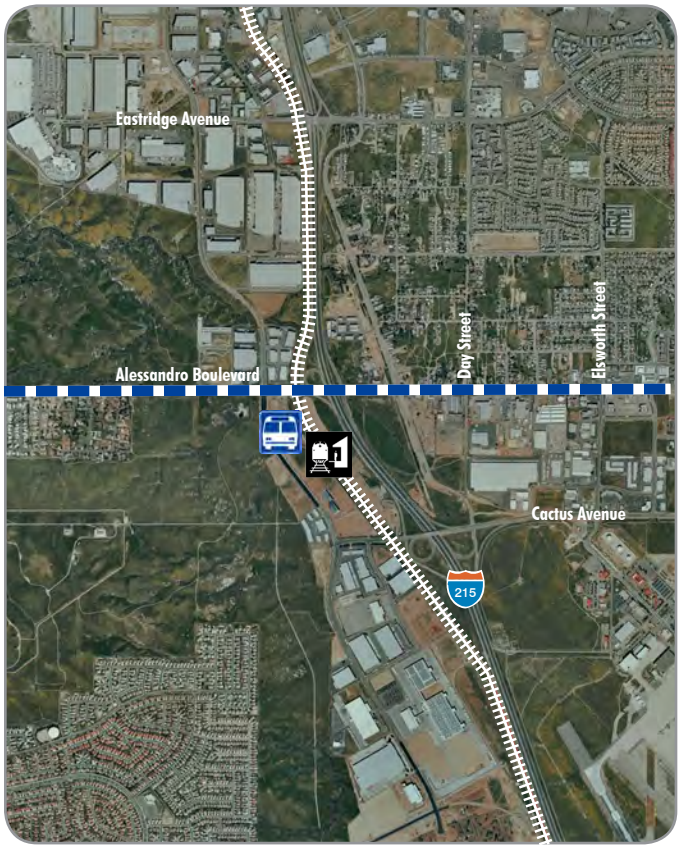
Source: STV Incorporated, 2009

Moreno Valley March Field Station

The Moreno Valley March Field Station is a future planned station within the Meridian Business Park. It is planned to accommodate both a Metrolink and bus station off Meridian Parkway and Alessandro Boulevard. A total of 10 bus bays are programmed. Final design will also include appropriately sized facilities for BRT buses. Construction of the bus station is expected to be concurrent with construction of the Metrolink station. Metrolink service is planned for the stop in December 2012.

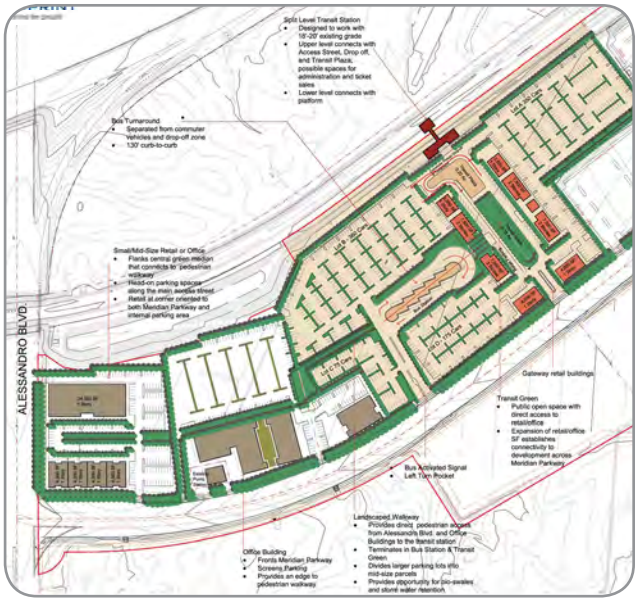
A concept plan for the station design and nearby development parcels was prepared in 2007 for WRCOG and the March JPA as part of a SCAG Compass Blueprint Program grant. The station area concept provides a pedestrian-friendly design, including food-service and other convenience retail that is intended to be inviting for both station commuters and other employees of the business park. Opportunities for TOD exist in the remaining undeveloped parcels surrounding the future station. Design recommendations for building layout, pedestrian connectivity, and design of parking lots were included in the 2007 Compass report to the March JPA.

FIGURE 8. MORENO VALLEY MARCH FIELD METROLINK AND BRT STATION



proposed BRT route

FIGURE 9. MORENO VALLEY MARCH FIELD METROLINK AND BRT STATION CONCEPT PLAN



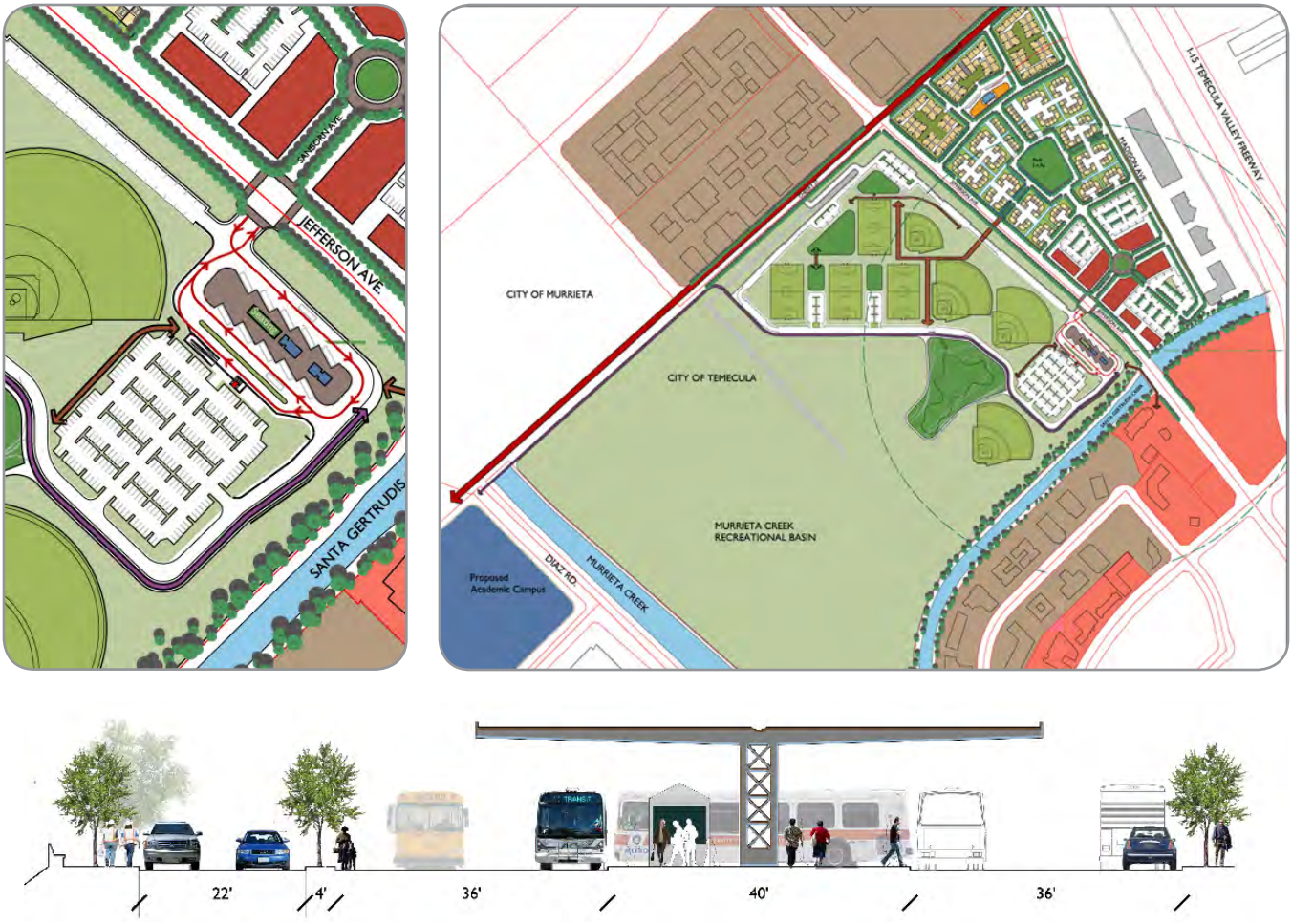
4.2 Major Bus Transfer Station Prototype

RTA is currently planning the Temecula Transit Center, which will be located at the south corner of Jefferson Avenue and Cherry Street in the City of Temecula. This 2.5-acre site is part of a larger, 100+ acre site owned by the Riverside County Flood Control District. The southern portion of the site will be maintained for flood control purposes, while the northern portion is planned for a large sports complex. The station will be served by the new I-15 interchange at French Valley.

This major transit center was the focus of a conceptual planning study for WRCOG and the City of Temecula as part of a SCAG Compass Blueprint Program grant. The station program includes 10 bus bays with shelters, waiting area, restroom facility, and vendors. The parking program includes a 160-space parking lot for bus users, vanpools, and carpools. The concept plan provides additional parking for the recreation area along an inner loop road and four separate lots dispersed throughout the recreation facilities. Bike lanes and pedestrian facilities are also included in the concept plan.

A total of 323 buses per day are expected to use the Temecula Transit Center by 2012. Bus service includes local and regional bus service from RTA (16 lines), BRT service from San Diego MTS, and military shuttles for personnel stationed in San Diego. The station is also being designed to accommodate future planned BRT service from the potential I-15 and I-215 Corridors. This station is scheduled to be open in late summer 2013.

FIGURE 10. MAJOR BUS TRANSFER STATION CONCEPTUAL LAND USE PLAN, SITE PLAN, AND SECTION



view of potential TOD west of the in-line station in Menifee

4.3 In-Line Station Prototype

The location selected to study as an In-Line Station prototype is in the City of Menifee along the I-215. This station has two alternate design configurations, depending on the ultimate right-of-way plans for the I-215. The station is conceptually located across from Mt. San Jacinto College on the east, and across from Menifee's future town center on the west. The town center area includes the existing Countryside Marketplace, which is the city's most successful shopping district, and the proposed Town Center Specific plan, which allows for a mix of 1,052 residential units and 558,000 square feet of commercial, office, and hotel uses. The bridge over the freeway will provide a convenient connection between the college and uses associated with the town center area.

The station area planning concept involves locating a park-and-ride lot on either side of the freeway, with TOD development concepts for nearby vacant parcels. Opportunities for development of college-related uses on the west side of the freeway have been explored and should continue to be explored as BRT implementation schedules are established. The college district is currently preparing a long-range master plan for the campus and will be considering the new opportunities associated with a future BRT station.

FIGURE 11. IN-LINE STATION CONCEPTUAL LAND USE PLAN

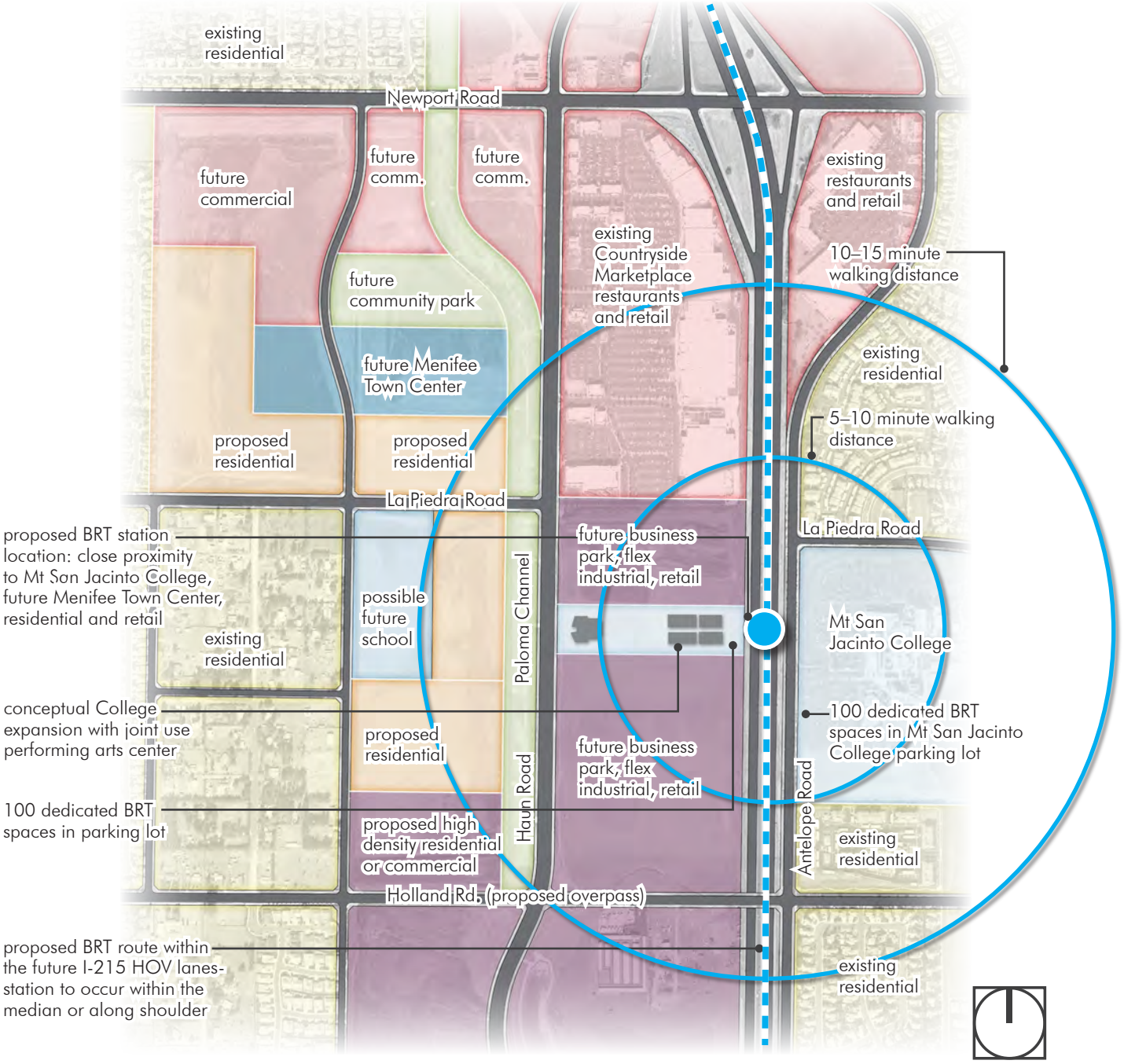


FIGURE 12. IN-LINE STATION CONCEPTUAL SITE PLANS

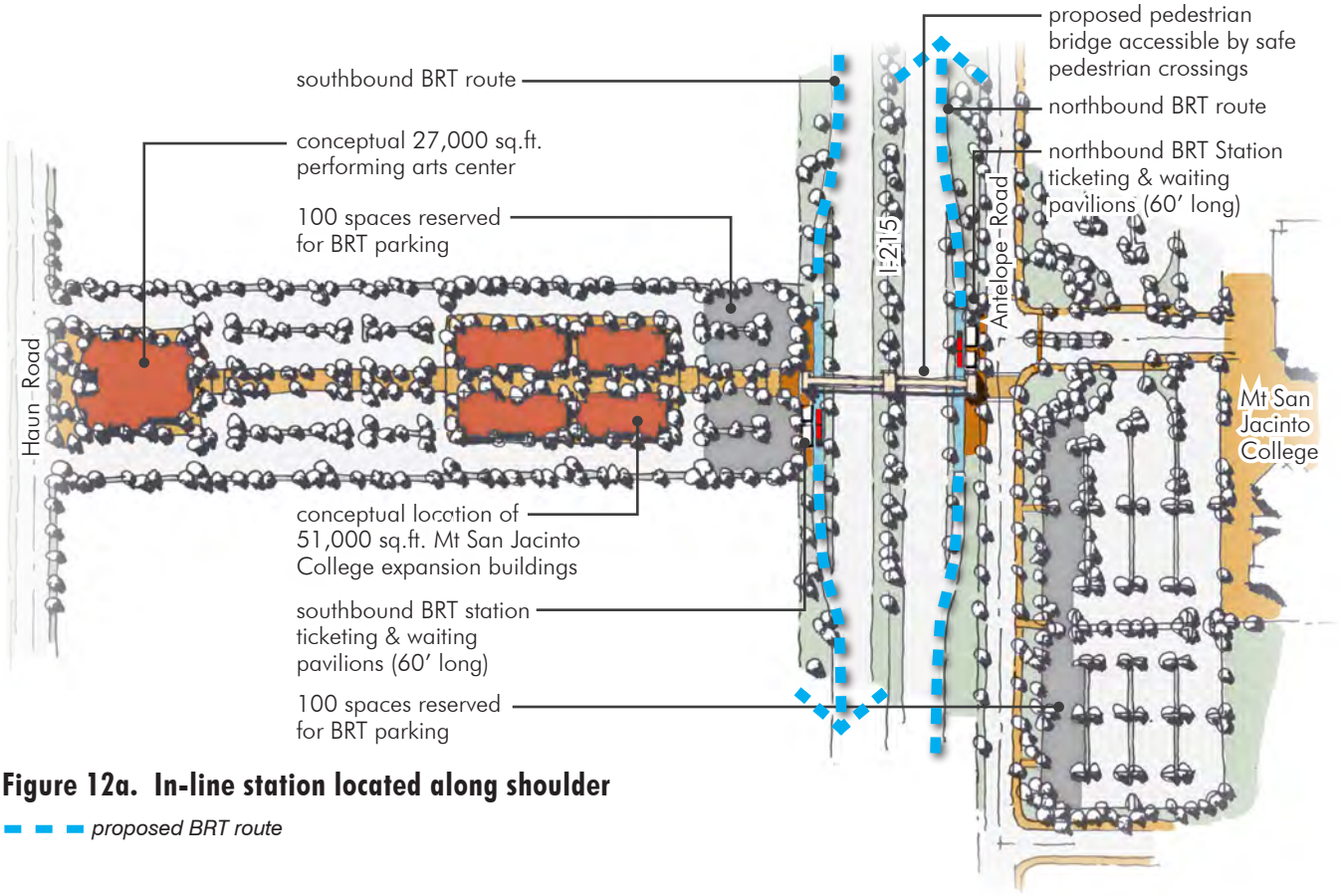


Figure 12a. In-line station located along shoulder

proposed BRT route

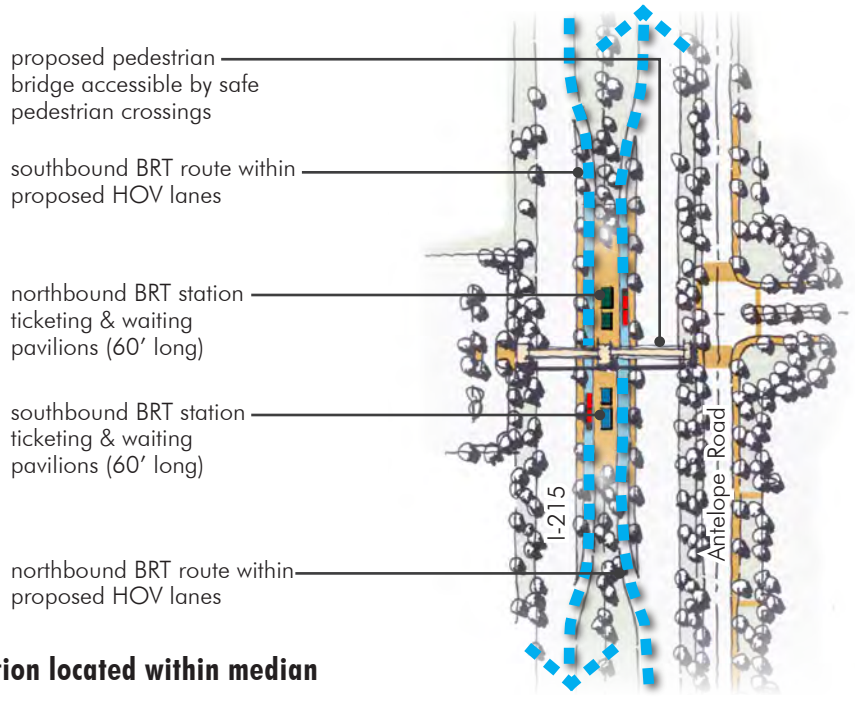


Figure 12b. In-line station located within median

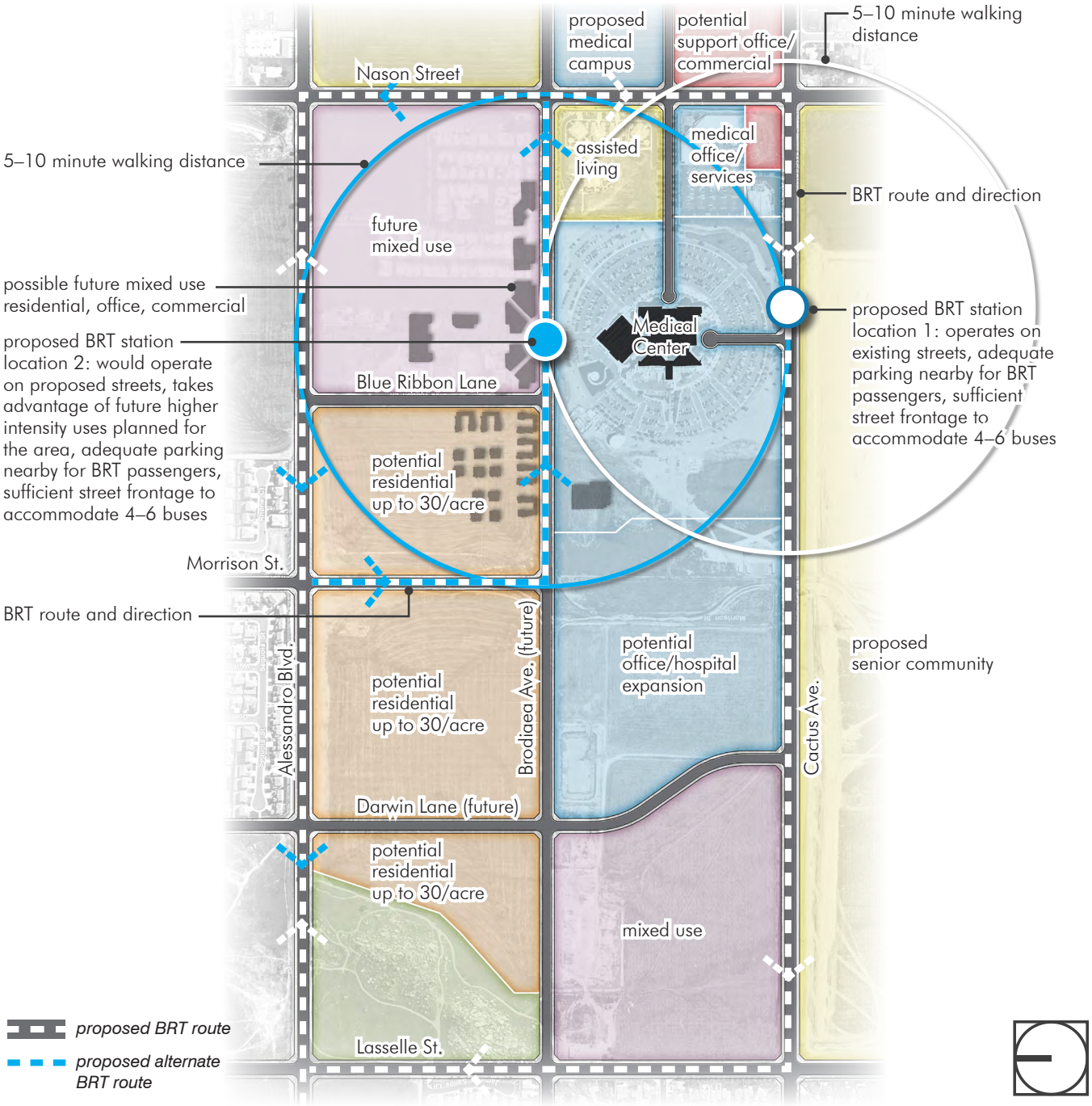
view of potential BRT station and TOD at Riverside County Medical Center

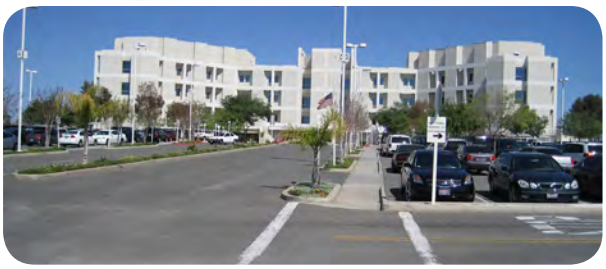
4.4 End-of-Line Station Prototype

The location selected to study as an End-of-Line Station prototype is at the Riverside County Medical Center in the City of Moreno Valley. This station is at the end of a 13.5-mile route along Alessandro Boulevard that extends from Magnolia Avenue in Riverside to the Riverside County Medical Center via Nason Street or Morrison Street. It would serve the established areas near the Magnolia Corridor, along with the developing areas west of the I-215 and in Moreno Valley. The Riverside County Medical Center is currently undergoing expansion plans for new facilities and parking areas, which were evaluated as part of this analysis. In addition, the City of Moreno Valley is targeting the undeveloped area around the Medical Center for a higher-density concentration residential and mixed-use development. The area immediately south of the medical center is planned for senior housing.

The station area concepts include two alternative station locations. One is located along Cactus Avenue directly across from the main entrance to the medical center. The stop would include a small park-and-ride lot dedicated for BRT users. A second potential location is along Brodiaea Avenue, near a secondary entrance to the medical center. Future planned development around this location has the potential to be transit oriented in design, intensity, and mixing of uses.

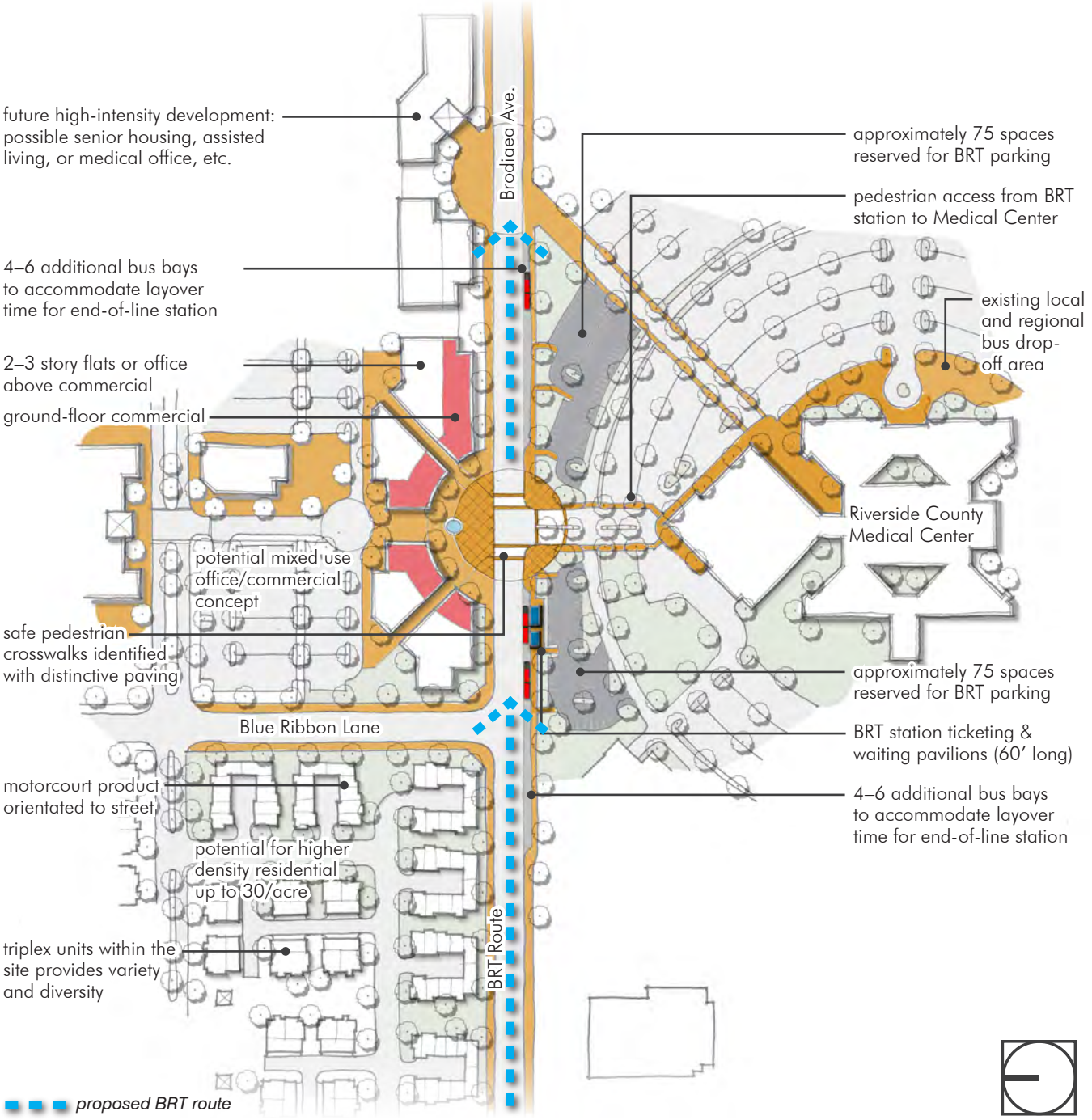
FIGURE 13. END-OF-LINE STATION CONCEPTUAL LAND USE PLAN





existing sidewalk from proposed BRT station location to Medical Center

FIGURE 14. END-OF-LINE STATION CONCEPTUAL SITE PLAN



ground floor retail with office above

plaza adjacent to BRT station

higher density residential fronting Brodiaea Ave.

view of potential BRT station at Dos Lagos, integrated with future TOD

4.5 Village Center Park & Ride Station Prototype

The location selected to study as a Village Center Park & Ride prototype is in the Dos Lagos Specific Plan Area in the City of Corona. BRT service will extend along the I-15 corridor, which is anchored on the north by the North Main Corona Metrolink/Multimodal Station and on the south by the Temecula Transit Station. The potential station at Dos Lagos is one of several types of stations that may be located along this route. The Dos Lagos project was selected because of its existing and planned concentration of residential, commercial, entertainment, recreation, and office uses. At buildout Dos Lagos will contain over 1,000 dwelling units, 575,000 sf of commercial and entertainment uses, and 640,000 sf of office uses. Dos Lagos is already a local and regional destination.

From the north, BRT buses will travel south on Temescal Canyon Road. The BRT station is located on the street near the intersection of Temescal Canyon Road and Pronio Circle. From the south, BRT buses will exit the I-15 freeway at Weirick Road and travel east to Temescal Canyon Road. The station is located close to the designated parking for bus uses. The parking area selected is also designated as public parking for access to the adjacent lake and surrounding grounds. Joint use of the parking area is reasonable given that the lot will be used mainly by visitors to the lake on weekends and by commuters during the week.

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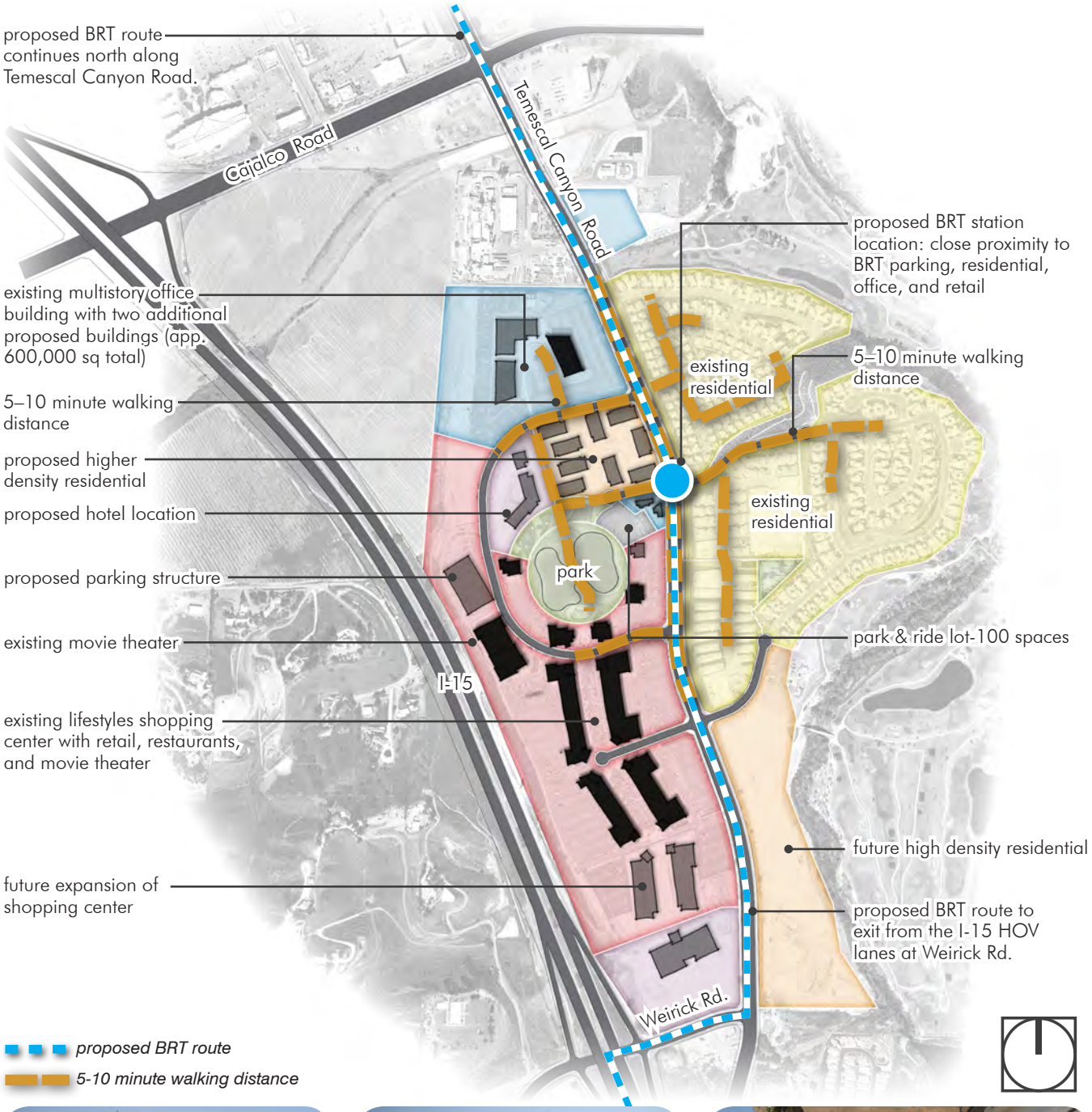
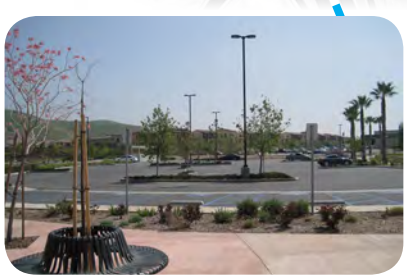
FIGURE 15. VILLAGE CENTER PARK & RIDE STATION CONCEPTUAL LAND USE PLAN



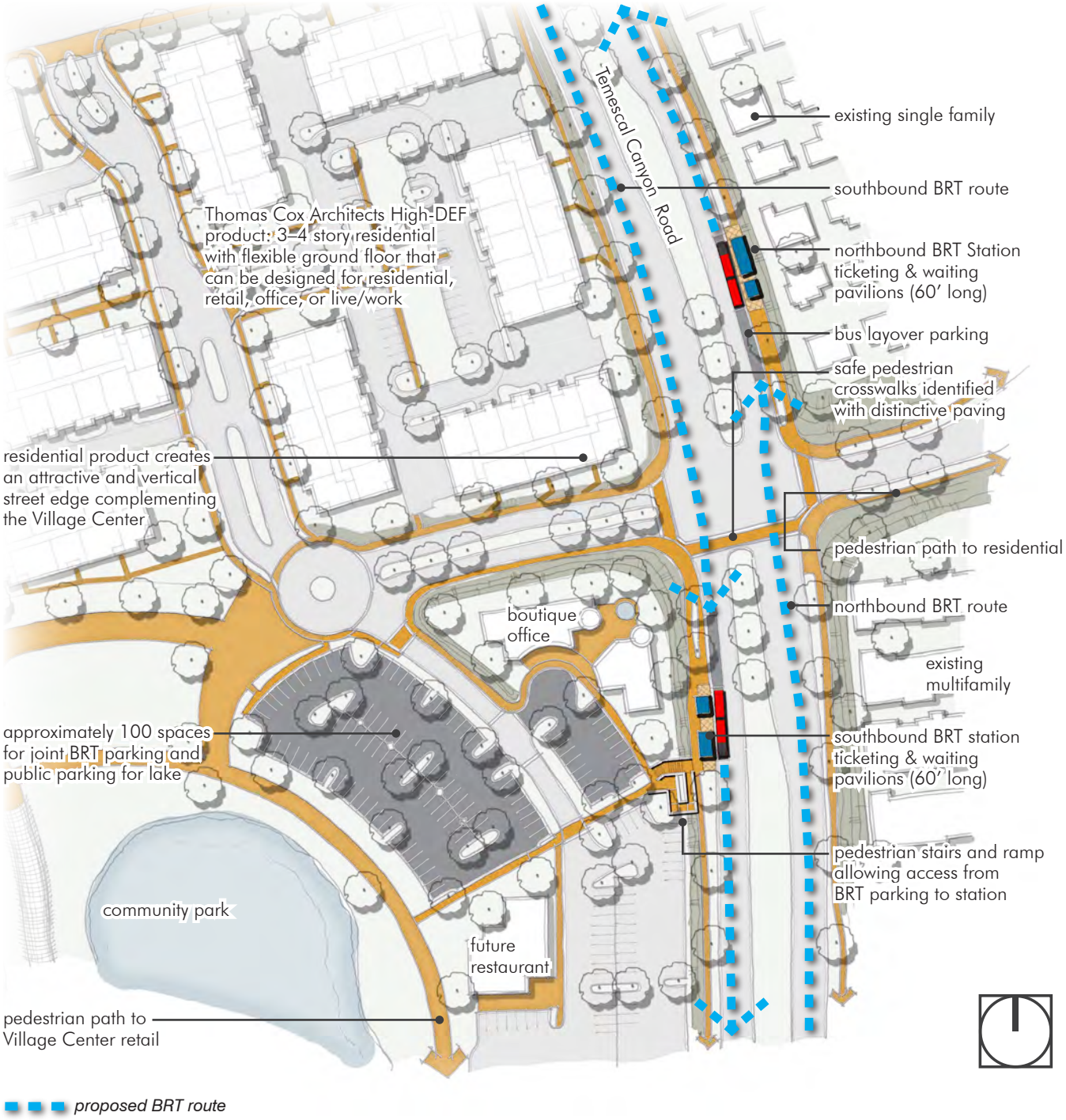
pedestrian crossing at BRT station



shared BRT/park parking lot

retail within a 5-10 minute walk of BRT station

FIGURE 16. VILLAGE CENTER PARK & RIDE STATION CONCEPTUAL SITE PLAN



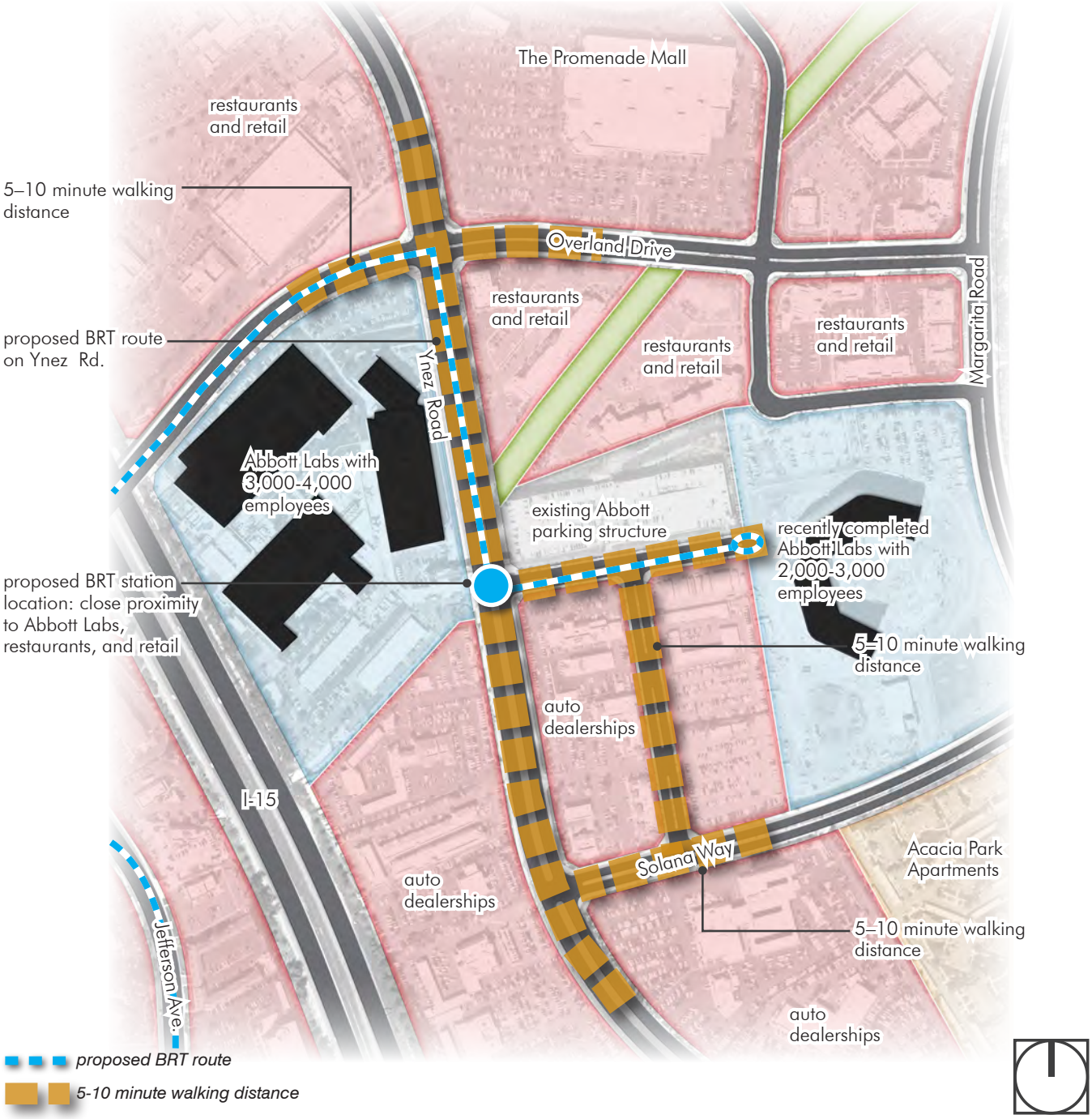
view of prototype station design concept in the City of Temecula

4.6 Walk-Up Station Prototype

The location selected to study as a Walk-Up Station prototype is along Ynez Road, in the City of Temecula. This route extends from the Pechanga Resort on the south and continues along Jefferson Avenue. At Overland Drive there will be a peak hour extension across I-15 to southbound Ynez Road facilitating a stop adjacent to Abbott Labs. From Jefferson Avenue, the route extends into Murrieta and connects to the I-215 BRT route. The Walk-Up Station prototype is located immediately adjacent to Abbott Labs, which has offices/facilities on both sides of Ynez Road. The existing plant at Abbott Labs has over 4,000 employees, with an additional 2,000 employees to be added with the recent completion of a new 300,000-square-foot office building. In addition, there are numerous commercial, retail, and office uses within a half-mile walking distance.

The Walk-Up Station for BRT service will also accommodate transfers to existing local and express bus service. Convenient and safe pedestrian sidewalks and crossings are the key design considerations. Improvements to landscaping along the street, combined with upgraded bus shelters and other BRT service amenities, will be more inviting to potential users.

FIGURE 17. WALK-UP STATION CONCEPTUAL LAND USE PLAN

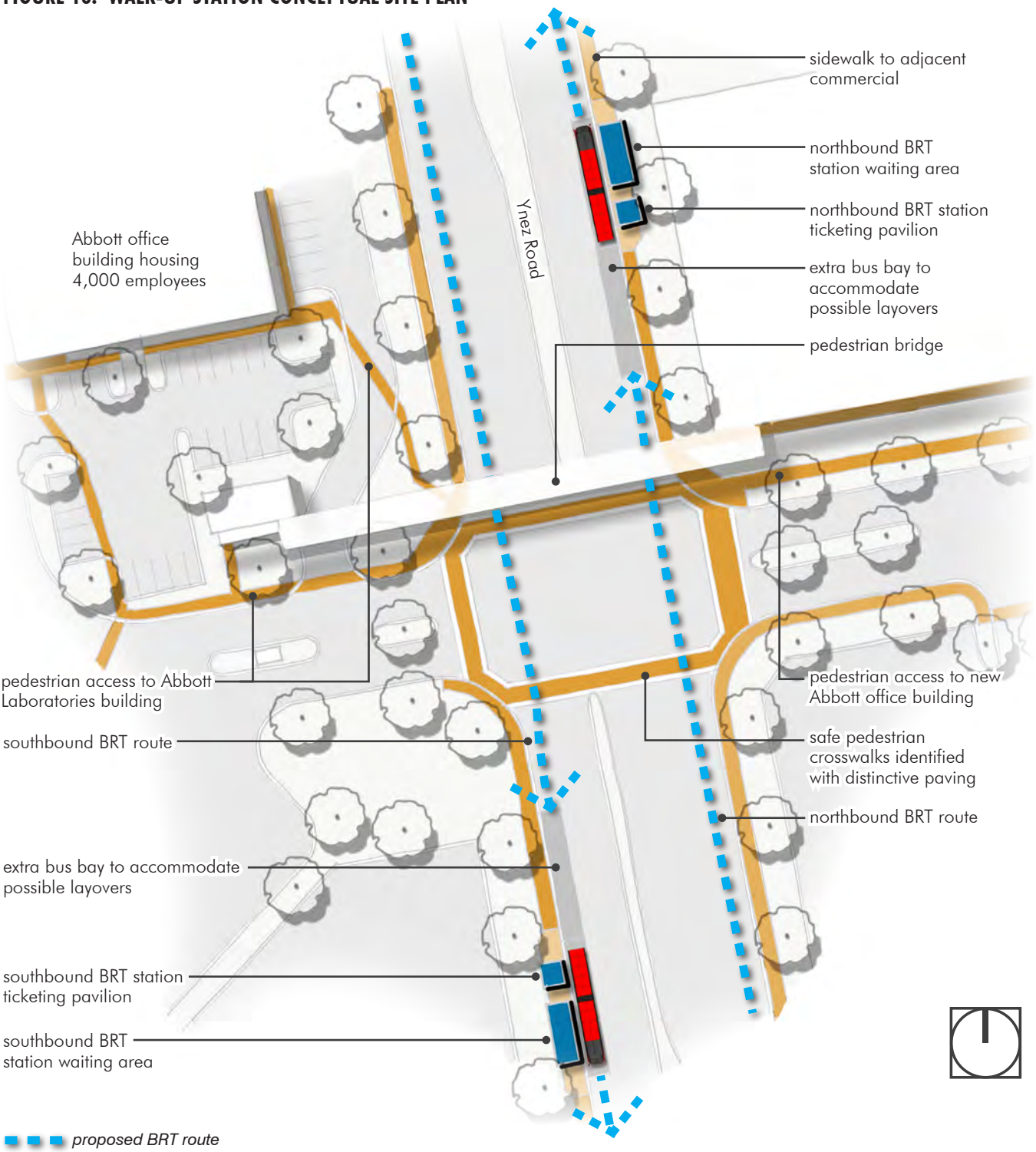


Ynez Road pedestrian crossing

sidewalk to new Abbott building

recently completed Abbott building

FIGURE 18. WALK-UP STATION CONCEPTUAL SITE PLAN



APPENDIX A

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WRCOG BRT Route Planning Project

2009 – 2010

As part of the SCAG Compass Blueprint Program, WRCOG is conducting a study to analyze long term options for BRT services in Western Riverside County to provide high quality transit options for the region into the future. The key elements of the study are described below.

Study Purpose

- Evaluation & Ranking of Corridors to Identify The Best BRT Project for Development after The Magnolia Project
- Alignment and Stop Design Elements
- Station Area TOD Planning

Participating Agencies

- RCOG
- SCAG
- RTA
- RCTC

Key Elements of BRT

- Transit Priority Measures:
  - Queue Jumpers
  - Dedicated Lanes
  - Traffic Signal Priority
- Vehicle Tracking Systems
- Station Spacing
- Fare Collection/Management
- Active Operations/Driver Training

Study Tasks

1. Kickoff
2. Rider Profile
3. BRT Case Studies
4. Identify Potential BRT Corridors
5. Evaluation of Shortlist Corridors
6. Station Area Planning
7. Recommended Corridors

Potential BRT Corridors

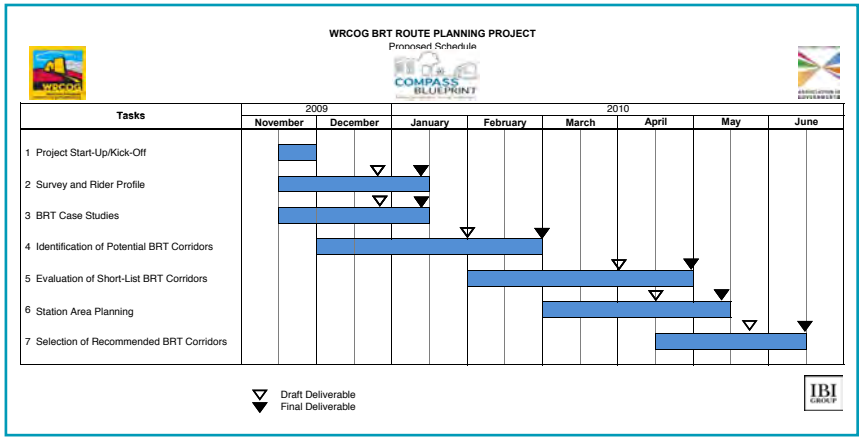
- SR-91
- SR-60
- I-15
- I-215
- SR-74
- SR-79
- Magnolia Avenue
- Mid-Valley Parkway (future)
- Margarita/Ynez Arterial

(Refer to the map on the back)

Key Issues

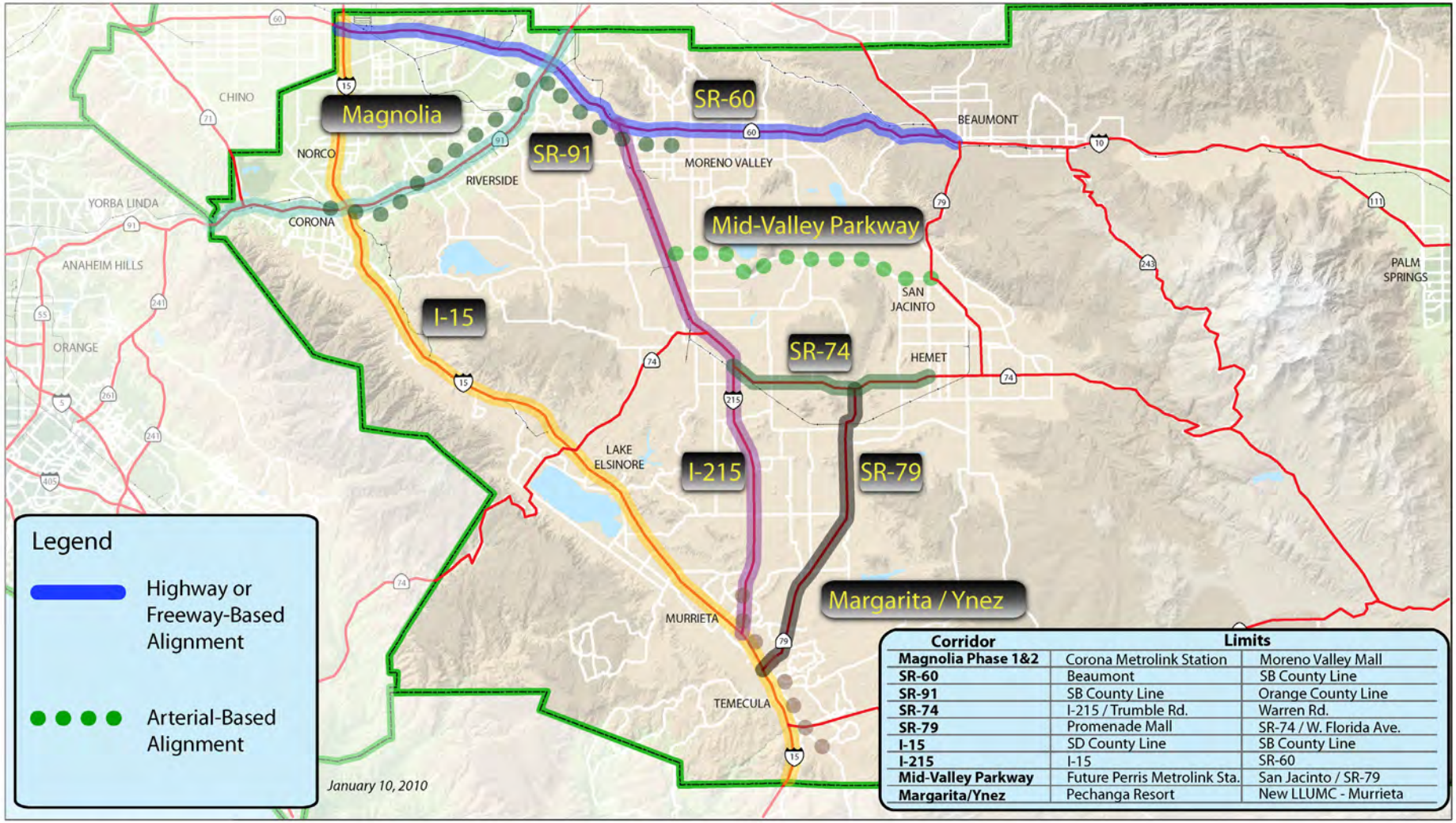
- Matching Service to Development Densities
- Type of Priority Treatments
- Integration of Stations into Communities & Smart Growth Plans
- Implementation Funding
- Long Range Planning vs. Short Range Implementation

Schedule



Additional Information

For additional information or to be added to the project email list, contact Danielle Coats, WRCOG Project Manager, at coats@wrcog.cog.ca.us or visit our website www.wrcog.cog.ca.us/



Corridor	Limits	
Magnolia Phase 1&2	Corona Metrolink Station	Moreno Valley Mall
SR-60	Beaumont	SB County Line
SR-91	SB County Line	Orange County Line
SR-74	I-215 / Trumble Rd.	Warren Rd.
SR-79	Promenade Mall	SR-74 / W. Florida Ave.
I-15	SD County Line	SB County Line
I-215	I-15	SR-60
Mid-Valley Parkway	Future Perris Metrolink Sta.	San Jacinto / SR-79
Margarita/Ynez	Pechanga Resort	New LLUMC - Murrieta

Initial BRT Corridors

0 10 20 Miles