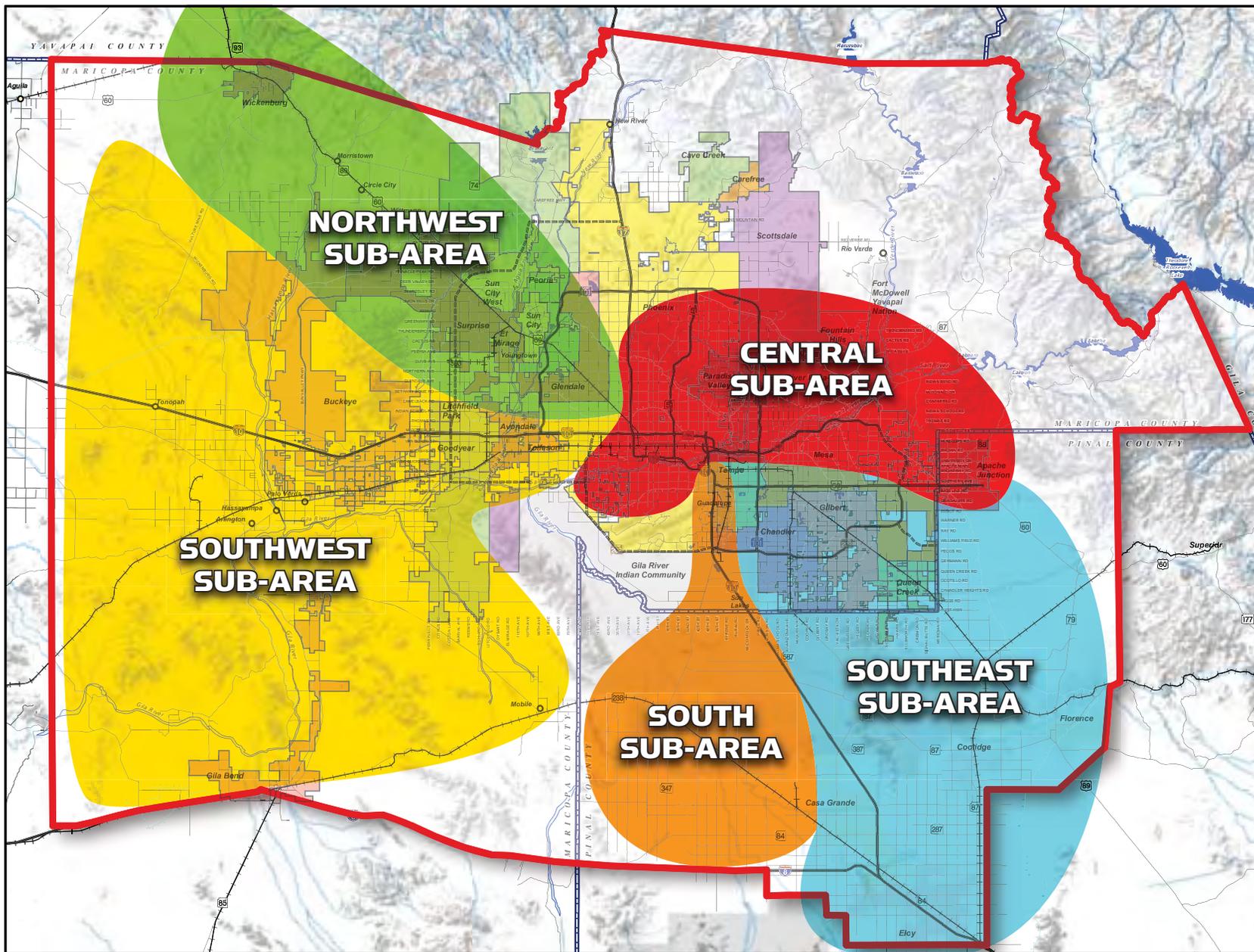


STUDY SUB-AREAS



MAG COMMUTER RAIL STRATEGIC PLAN

SUB-AREA DEFINITION

Legend

- Commuter Rail Study Area
- County Boundary
- Indian Community
- Incorporated Area
- Canal
- Stream/Wash
- Lake
- Intermittent Water
- Existing Freeway
- Planned Freeway
- Major Road
- Railroad
- Interstate Highway
- US Highway
- State Highways and Freeways
-

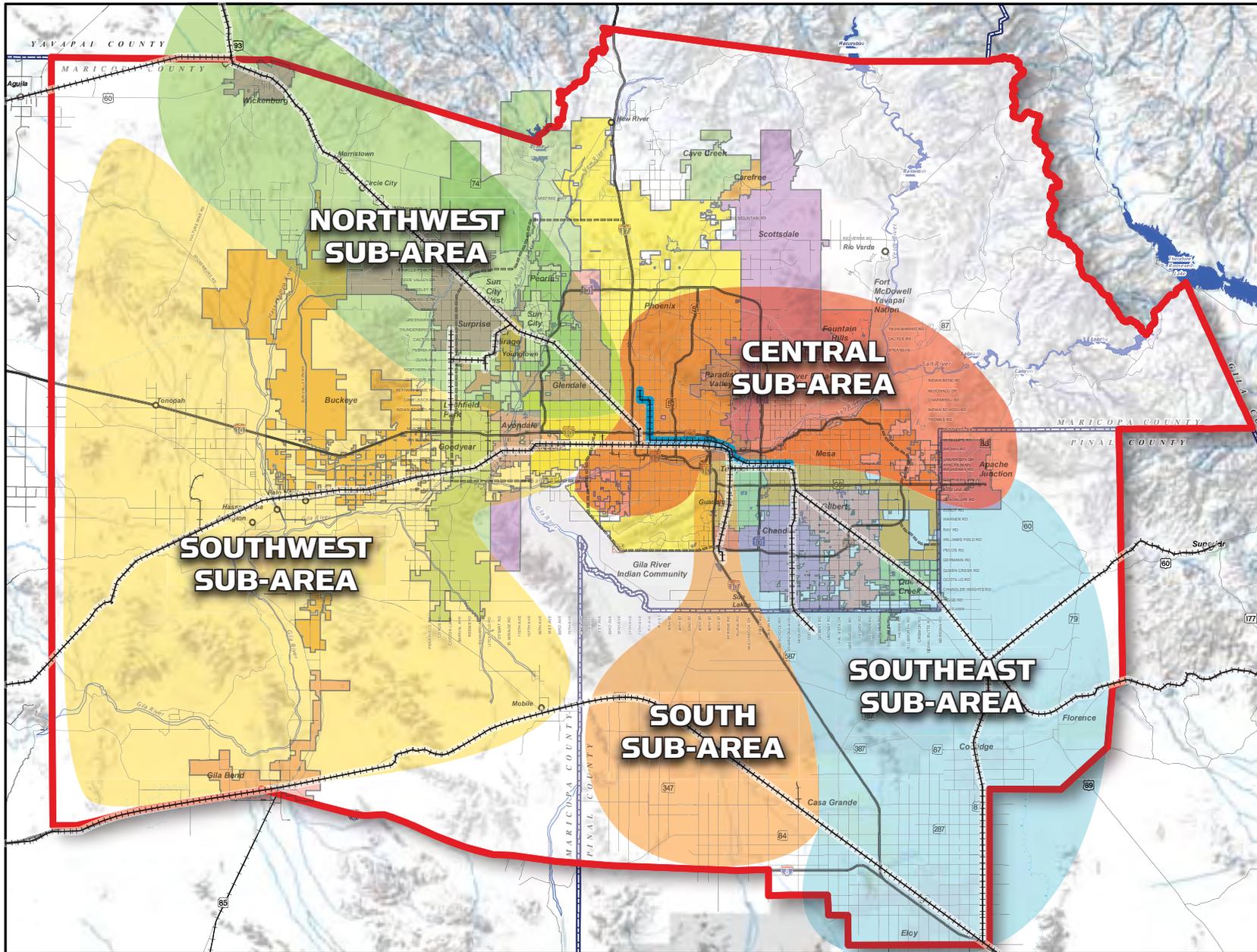
Arizona Counties



While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

Source: URS Date: May 2007

CONCEPT SYSTEM PLAN - EXISTING RAIL CORRIDORS



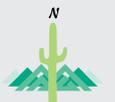
MAG COMMUTER RAIL STRATEGIC PLAN

EXISTING RAIL CORRIDORS

Legend

- Light Rail Line
- Freight Rail Lines
- Commuter Rail Study Area
- County Boundary
- Indian Community
- Incorporated Area
- Canal
- Stream/Wash
- Lake
- Intermittent Water
- Existing Freeway
- Planned Freeway
- Major Road
- Railroad
- Interstate Highway
- US Highway
- State Highways and Freeways

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Source: URS

Date: May 2007

CONCEPTUAL CORRIDOR DESCRIPTION

Corridor/Line	Limits	One-Way Miles ⁽¹⁾	Buildout Extension ⁽¹⁾	Ease of Implementation
BNSF – Grand Avenue	Downtown Phoenix to Loop 303	26	To Wickenburg (add 28 miles; total 54 miles)	Requires joint operation with BNSF mainline Complex at-grade crossings (6 approach legs) each mile Multiple industrial users along length Major BNSF yard on 19th Ave/South of I-10
UP Main/ Chandler Branch	Downtown Phoenix to Queen Creek Road	28	NA	Requires 15 miles joint operations with UPRR mainline At-grade crossings each mile
UP Main/ Southeast	Downtown Phoenix to Ellsworth Road	32	To Eloy/Picacho (add 42 miles; total 74 miles)	Requires joint operation with UPRR for entire length; most likely will need double track At-grade crossings each mile
UP Yuma/West	Downtown Phoenix to Buckeye	31	NA	Light railroad service At-grade crossings each mile
UP Main/Tempe Branch	Downtown Phoenix to Chandler Boulevard	17	NA	Requires 8 miles joint operations with UPRR mainline Corridor under study by METRO for transit improvement At-grade crossings each mile
Potential Extensions/New Alignments	Tempe branch to Maricopa	10 - 12	NA	Alignment through Gila River Indian Community adjacent to SR 347
	Chandler branch to Coolidge	8 - 10	NA	Alignment through Gila River Indian Community on old alignment
	Hasayampa Valley/ Rainbow Valley	20 - 40	NA	New alignment to be reserved as part of Master Plan developments

(1) As described in the MAG High Capacity Transit Study; 2005 URS; October 22, 2007

CONCEPTUAL CORRIDOR TRAVEL CONDITIONS

Corridor/Line	Limits	Parallel Highway Congestion (Peak Hour/ Peak Direction in 2006)				Commuter Rail Operation (Peak Hour/ Peak Direction)		
		Route	AutoVolume (1)	Level of Service	Auto Travel Time (2)	Commuter Rail Travel Time (2)	Peak HourPotential Riders (3)	Highway Lanes Replaced
BNSF – Grand Avenue	Downtown Phoenix to Loop 303	US 60/ Grand Ave	2,700	LOS F - Failure	65 mins	45 mins	3,600	3.5
UP Main/ Chandler Branch	Downtown Phoenix to Queen Creek Road	US 60/ I-10 East	7,100	LOS F - Failure	55 mins	45 mins	3,600	1.8
UP Main/ Southeast	Downtown Phoenix to Ellsworth Road	US 60/ Loop 202 I-10 East	8,400	LOS E/F - Capacity Failure	55 mins	50 mins	3,600	1.8
UP Yuma/West	Downtown Phoenix to Buckeye	I-10 West	11,000	LOS F - Failure	60 mins	45 mins	3,600	1.8
UP Main/ Tempe Branch	Downtown Phoenix to Chandler Boulevard	I-10 East	7,100	LOS F - Failure	52 mins	40 mins	3,600	1.8

(1) Traffic volumes from ADOT TMS - 2006 (2) Travel time for typical 25 mile commute trip; train trip times from MAG HCT; 2003

(3) Four trains per hour; trains of five bi-level cars each

URS: October 22, 2007

POSSIBLE IMPLEMENTATION SCENARIOS

SCENARIOS	DEFINITION	EXAMPLES
1) GET STARTED	<ul style="list-style-type: none"> › Single Corridor- This scenario would focus on a single congested corridor. › Railroad Coordination- A single corridor project may be more feasible to a railroad when compared to regional systems because of lower freight usage; the railroad would benefit from improved facilities and/or new revenues › Low cost of entry- A single corridor could have a low initial cost because of shared track and shared right of way with freight railroad › Simple approach to Governance/Administration/Funding could be focused on single corridor 	<ul style="list-style-type: none"> › NorthStar Commuter Rail, Minneapolis- 40 mile transportation corridor that runs in the BNSF right-of-way along Hwy 10 from Big Lake to downtown Minneapolis. › Trinity Railway Express- 43 mile corridor extending from Dallas to Fort Worth <p>SUMMARY</p> <ul style="list-style-type: none"> › Northstar is experiencing implementation costs of \$307million or about \$8 million per mile
2) STARTER SYSTEM	<ul style="list-style-type: none"> › Multiple Corridors- Scenario 2 could focus on more than one congested corridor and possibly serve outlying Maricopa County and Pinal County › Single trackway- Low cost of entry. This could focus on shared or single track lines initially › Upgrade System Over Time- As ridership increases the system can be upgraded to address increasing demand by adding trains and additional track › More complex approach to Governance/Administration/ Funding if multiple jurisdictions participating 	<ul style="list-style-type: none"> › Salt Lake City- Commuter rail from Salt Lake City to Ogden/ Pleasant View (45 miles) and to Provo (80 miles) with service to start April 2008 to Ogden › The Virginia Railway Express (VRE)- 64 mile line to Fredericksburg, VA, and 33 mile line to Manassas <p>SUMMARY</p> <ul style="list-style-type: none"> › Implementation costs for Salt Lake City to Ogden line of \$410 million or \$10 million per mile › Implementation costs for VRE \$10-\$20 per mile for double track right of way
3) REGIONAL SYSTEM	<ul style="list-style-type: none"> › Multiple corridors- This scenario would focus on implementing multiple corridors simultaneously and serve the entire region › System operation- with multiple corridors, systems would require separate facilities from freight rail and would be more costly › Complex- A regional rail system would be the most complex of the three scenarios in regards to Governance/Administration/ Funding. 	<ul style="list-style-type: none"> › Metrolink- Southern California Commuter Rail- Initial Phase (1992)- 3 lines of service, 12 stations, 5,000 passengers Current System (2007)- 7 lines, 54 station, 40,000 passengers › Denver FasTracks transit expansion program includes five new rail corridors of which four will be commuter rail. <p>SUMMARY</p> <ul style="list-style-type: none"> › Implementation costs for Metrolink \$10-\$20 per mile for leased or purchased right of way › Implementation costs for Denver FasTracks will be about \$20 million per mile

URS; October 22, 2007

IMPLEMENTATION SCENARIOS CONCEPTUAL OPERATING & COST CHARACTERISTICS

SCENARIOS	OPERATIONS	DAILY RIDERSHIP CAPACITY (1)	POTENTIAL ANNUAL VMT SAVED	CONCEPTUAL CAPITAL COSTS	OPERATING COST SUBSIDY
1) GET STARTED	<p>Single Corridor with Minimum Service:</p> <ul style="list-style-type: none"> › 5 trains per peak period in peak direction › 1 reverse commute trip each peak period › 1 mid-day trip › 1 evening trip › 4-car trains 	10,100 riders per day in one Corridor	Savings of 60 to 65 million vehicle-miles of travel saved per year.	<p>Minimum facilities:</p> <ul style="list-style-type: none"> › \$50 M to \$400 M › Typical uses operating lease for railroad right-of-way 	Typically 50 to 65% of operating cost
2) STARTER SYSTEM	<p>Two Corridors with Minimum Service:</p> <ul style="list-style-type: none"> › 5 trains per peak period in peak direction › 1 reverse commute trip each peak period › 1 mid-day trip › 1 evening trip › 4-car trains 	10,100 riders per day per Corridor; 20,200 total daily riders	Savings of 125 to 130 million vehicle-miles of travel per year.	<p>Moderate Facilities:</p> <ul style="list-style-type: none"> › \$400 M to \$800 M › Limited purchase of some railroad right-of-way 	Typically 50 to 65% of operating cost; will decline with more trains/ ridership
3) REGIONAL SYSTEM	<p>Three Corridors with Moderate Service:</p> <ul style="list-style-type: none"> › 20-minute service in each peak period in peak direction; › 40-minute reverse commute each peak period; › Hourly service mid-day and weekends › 5-car trains 	47,000 riders per Corridor; 141,000 total daily riders	Savings of 800 to 900 million vehicle-miles of travel per year.	<ul style="list-style-type: none"> › Moderate to substantial facilities with double track › \$1 billion- \$2 billion › Could include purchase of railroad right-of-way 	Typically less than 50% of operating costs; additional capacity at low incremental cost

Notes- (1) Ridership capacity is number of seats per typical bi-level rail car, several cars can be connected to make a train.
URS; October 22, 2007

EXAMPLE OF SCENARIOS EVALUATED AGAINST MAG COMMUTER RAIL GOALS

SCENARIO	GOALS				
	EMPLOY COMMUTER RAIL TO SHAPE REGIONAL GROWTH	IMPROVE TRANSPORTATION MOBILITY OPPORTUNITIES BY IMPLEMENTING COMMUTER RAIL	PROVIDE A SEAMLESS AND COST EFFECTIVE COMMUTER RAIL OPTION	PROMOTE SUSTAINABILITY THROUGH THE IMPLEMENTATION OF COMMUTER RAIL	INCREASE PUBLIC/PRIVATE COOPERATION TO IMPLEMENT COMMUTER RAIL
1) Get Started	Limited; would help to shape growth locally in one corridor.	Would improve mobility options during peak periods in single corridor.	Requires least investment for single corridor, however a seamless commuter rail option would not be achieved; connections to other modes would be offered.	Provides some reduction in Vehicle Miles Traveled (VMT) indicating savings of energy and air pollutant emissions.	Would increase public/private cooperation with one railroad and would offer limited opportunities for joint development in corridor.
2) System Starter	Moderate; would help to shape growth locally within two corridors and would help provide increased access to central areas.	Would improve mobility options during peak periods in two corridors with some improvement on parallel regional highways.	Requires significant investment but offers through-routing of trains; connections to other modes would be offered.	Provides significant reduction in VMT and associated savings of energy and air pollutant emissions to promote sustainability in corridors.	Would require agreements with two railroads to increase public/private cooperation and would offer some opportunities for joint development in corridors.
3) Regional System	Significant; would help to shape growth at a regional level within multiple corridors and would help provide increased access to more development in central areas.	Would improve mobility options during peak periods and throughout the day and evening in multiple corridors for significant congestion relief on parallel regional highways.	Would provide the most seamless system offering connections to other modes in many locations; requires substantial investment.	Provides substantial reductions in VMT and associated savings of energy and air pollutant emissions to promote sustainability at regional level	Would require agreements with railroads, may require public participation in railroad operations to increase public/private cooperation and would offer many opportunities for joint development of projects.

IMPLEMENTATION ISSUE: FUNDING

Sample Comparison of Commuter Rail Facilities and Dedicated Local Transit Funding

State / County	Operating Authority	Commuter Rail Facility	Dedicated Local Transit Funding (inclusive of all transit services provided by operating authority)
Utah: Weber, Davis, and Salt Lake	Utah Transit Authority	FrontRunner	Dedicated Local Sales Tax
Texas: Tarrant and Dallas	The Fort Worth Transportation Authority and Dallas Area Rapid Transit	Trinity Railway Express	Dedicated Local Sales Tax
California: San Diego	San Diego Metropolitan Transit System	The San Diego Coast Express Rail (COASTER)	Dedicated Local Sales Tax
New Mexico: Valencia, Bernalillo, and Sandoval	Rail Runner Express	Rail Runner	None (funded by the State of New Mexico) from General Fund and GRIP II Bond Program
Minnesota: Anoka, Benton, Hennepin, and Sherburne	Minnesota Department of Transportation and the Northstar Corridor Development Authority	Northstar	Various dedicated funding for counties in Minnesota.
Arizona: Maricopa and Pinal	To Be Determined	None	Dedicated Local Sales Tax