

## TRANSIT STRATEGIES

# COMMUTER RAIL

Commuter rail is passenger rail service that is designed to transport large volumes of passengers over long distances in a fast and comfortable manner. The primary market for commuter rail service is usually commuters to and from city centers. However, many commuter rail lines also provide regional and all day service. The major benefits of commuter rail service are:

- ➔ **Comfortable and fast service, often faster than driving**
- ➔ **Easy to understand and use**
- ➔ **Efficient way to transport large volumes of people**

MINNEAPOLIS NORTHSTAR



NASHVILLE MUSIC CITY STAR



Common elements of commuter rail service include:

- **Vehicles:** Most American commuter rail trains consist of a locomotive and multiple passenger cars, but some consist of multiple self-propelled cars. Most American commuter rail systems are diesel-powered, but a few are electric-powered.
- **Length:** Most commuter rail lines are designed to serve long distance travel, and lines that range from 20 to 50 miles are most common.
- **Station Spacing:** To provide competitive travel times, stations are spaced widely apart, typically every three to five miles, and often longer.
- **Access and Station Facilities:** Most commuter rail stations rely heavily on park and ride access, and thus most include parking, and many facilities can be very large. Other station facilities include platforms, and depending upon boarding volumes, either simple shelters or enclosed waiting areas. They also commonly include other elements such as real-time passenger information, ticket vending, and bicycle parking.
- **Capacity:** Commuter rail coaches can be either single or double level. Single level coaches can seat up to 125 passengers and bi-levels coaches can seat up to 185 passengers. Train lengths of up to 10 cars are common in major commuter rail systems, and can seat over 1,500 passengers. Smaller systems often run two-car trains, which seat approximately 350 passengers.<sup>1</sup>
- **Schedules:** In most cities, commuter rail lines provide service from at least Monday to Saturday, and provide all day and evening service. However, a few provide more limited service (including the Music City Star).

<sup>1</sup> With a two car train, one car must be a “cab car” from which the train operator controls the train when it is being pushed by the locomotive, which reduces the number of seats in that car.

## DEVELOPMENT OF COMMUTER RAIL SERVICE

Commuter rail was originally established in the United States in the 1800s and early 1900s by private railroads as for-profit ventures. This model continued until after World War II, when automobile travel became more popular and commuter rail ridership began to decline. By the 1960s, most commuter rail services were no longer profitable; consequently, many shut down, and the rest were in decline. In many urban areas – New York, Chicago, Philadelphia, Boston, and others – to prevent the loss of commuter rail, public agencies took over loss-making commuter rail systems and began to improve them. By 1989, all commuter rail systems were in public hands.

While cities that still had commuter rail were preserving, improving, and expanding it, there was also renewed interest in restoring commuter rail in areas that had lost it as well as in newly emerging cities and urban areas. The first “new” commuter rail line was Tri-Rail in Miami in 1987, and today, approximately 25 U.S. cities have commuter rail service.

Of the new commuter rail areas, most, like Nashville, have developed a single line (although some of operate through the city center to provide the service of two lines). To date, only Los Angeles has developed a new system that now consists of seven lines,<sup>2</sup> and South Florida’s Tri-Rail is in the process of developing its second and third lines.

### New Commuter Rail Services since 1990

- Tri-Rail in Miami in 1987
- Shore Line East in New Haven, CT in 1990
- MetroLink in Los Angeles in 1992
- Virginia Railway Express (VRE) in Washington D.C. in 1992
- Coaster service in San Diego in 1995
- Trinity Railway Express (TRE) between Fort Worth and Dallas in 1996
- Altamont Commuter Express in San Jose in 1998
- Sounder in Seattle in 2008.
- Music City Star in Nashville in 2006
- Rail Runner Express in Albuquerque in 2006
- FrontRunner in Salt Lake City in 2008
- NorthStar in Minneapolis in 2009
- A-Train in Denton County, TX in 2011
- Capital MetroRail in Austin in 2011
- Sunrail in Orlando in 2014

## RIGHT-OF-WAY/TRACK SHARING

One of the most important elements in the development of new commuter rail services is the availability of the right-of-way and track required to operate the services. Most of the older and larger commuter rail systems – in the New York City area, Chicago, Philadelphia, and Boston – assumed ownership of rail lines and/or trackage rights when they acquired the services from the private railroads that no longer wanted to operate them.

Conversely, most new commuter rail services have been developed along lines owned by freight railroads. In these cases, the agency developing commuter rail service must either negotiate a “trackage rights” agreement for use of the line or purchase the line. Along lines where freight use is light, for example, along the Nashville and Eastern Line used by the Music City Star, freight railroads are often willing to share track rights as an additional source of revenue, or sell them entirely. However, in other cases, and especially along lines where freight use is heavy, freight railroads are either reluctant or unwilling to share their tracks due the limitations it would place on freight operations. Obtaining the rights to use freight rail lines for commuter rail service is often the most challenging aspect of service development, and in many cases, the reason it isn’t done.

Even in cases where it can be done, track sharing in heavily used freight corridors can be problematic. For example, in the Boston area, the MBTA’s Worcester Line ran along a CSX freight line until 2012, and it was the MBTA’s least reliable line. This was the case for a number of reasons:

- Conflicts between commuter and freight trains. Although the agreement between CSX and the MBTA provided slots for commuter trains, delays to freight trains meant that those slots were not always clear.
- Dispatching. CSX, as the owner of the line, performed dispatching functions, and the MBTA was required to communicate with its trains through CSX dispatchers. Communications delays exacerbated other delays.
- Heat-related speed restrictions. In hot temperatures, due to the way the line had been constructed, CSX imposed speed restrictions to prevent the track from warping.

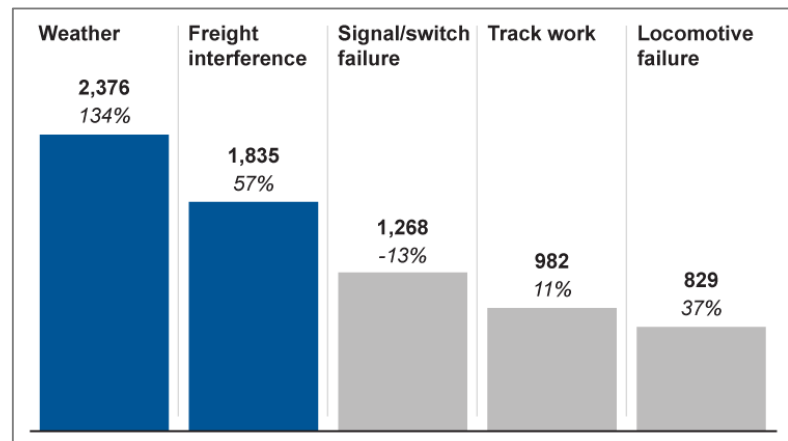
<sup>2</sup> In Canada, Toronto has also constructed a new system.

At its low point in 2007, on-time performance had declined to less than 50%, although the MBTA and CSX worked together to improve it to the low 80% range. In 2012, in conjunction with CSX moving its Beacon Park freight yard in Boston west to East Worcester in a location that does not interface with commuter operations, the MBTA purchased the 45-mile long line for \$100 million. At that time, it took over dispatching and added service, and has been upgrading track to eliminate heat related speed restrictions.

Minneapolis' NorthStar commuter rail line, which operates from 40 miles north of Minneapolis to downtown via Burlington Northern Santa Fe (BNSF) tracks, also experiences freight-related delays. A February 25, 2014 Star Tribune article stated "In what has become a chronic problem for the Northstar line from Big Lake to Minneapolis, heavy freight traffic pushed the commuter train off schedule and is expected to do so several days this week." Those problems have been caused a 50% increase in freight traffic since the line opened in 2009, compounded by equipment problems during severe winter weather.

In Chicago, Metra's BNSF Line, as the name implies, operates on BNSF tracks. In 2014, that line had the worst performance of Metra's 11 lines, with many of the delays blamed on freight interference. For all of its lines, freight interference is the second highest causes of delays.

**CHICAGO METRA CAUSES OF COMMUTER RAIL DELAYS**



Source: Metra, On-Time Performance Report December 2014; Graphic: Chicago Tribune

In Middle Tennessee, beyond the existing Music City Star line, potential new commuter rail lines would either need to use, at least in part, CSX freight lines or new rights-of-ways would need to be developed. For CSX, there are several reasons that using CSX freight lines for commuter rail purposes is problematic.

- CSX's Nashville lines are some of the most heavily used in CSX's entire system. Nashville lies in the middle of CSX's north-south mainline from Chicago to Florida. Its east-west line through Nashville connects with Memphis is also one of its most heavily travelled, as Memphis is one of only five gateways that connects eastern and western railroads. It is also the closest re-route hub for the New Orleans gateway.
- Nashville is the hub for five different lines coming from other directions, and the Radnor Yard complex is the third largest switching center in CSX's network.
- CSX tracks in Nashville are near capacity today, and the increasing demand for freight transport means they could be above capacity in the near future.

For these reasons, CSX is currently not willing to share its Nashville area tracks with commuter rail services. The alternative of developing new rail rights-of-way, while to-date not examined, would clearly also be difficult.

## NEW COMMUTER RAIL SERVICES IN NASHVILLE AND OTHER AREAS

Commuter rail services in the United States can generally be categorized into three groups:

1. Large systems in major urban areas. There are four of these, which are in the New York area (MTA Long Island and Metro-North and New Jersey Transit), Chicago (Metra), Philadelphia (SEPTA), and Boston

(MBTA). All of these are “legacy” systems that have been in continuous operation since the 1800s or early 1900s.<sup>3</sup>

2. Small systems, that often consist of a single line. Most of these have been developed since the late 1980s, but a few, such as Caltrain between San Jose and San Francisco are legacy lines. In many cases, the newly developed lines are viewed as the start of the development of a system.
3. Newly emerging systems, such as Los Angeles’ Metrolink, which now consists of seven lines, and South Florida’s Tri-Rail, which is now in the process of expanded to three lines.

The following sections describe new commuter rails in five medium-sized cities: Nashville, Fort Worth, Austin, Salt Lake City, and Albuquerque.

## MUSIC CITY STAR (NASHVILLE)

The RTA’s Music City Star operates between Lebanon and Nashville, and began service in 2006. The line is 32 miles long and has six stations.

Service is much more limited than on most commuter rail lines, and more commuter-oriented. Service operates only on weekdays, and with the exception of one Friday evening round trip, only operates during peak periods. Monday through Thursday, there are three inbound and outbound trips during the AM and PM peaks, and no midday or evening service. On Fridays, the same service is provided as on Mondays through Thursdays, plus an inbound trip that arrives in Nashville at 7:30 PM and an outbound trip that departs at 10:30 PM. Ridership averages 1,000 passengers per day, which is lower than on other American commuter rail systems. This reflects the limited service and the size of the market.

### Nashville Music City Star Quick Facts

Length: 32 miles  
Stations: 6  
Average Station Spacing: 6.4 miles  
Weekday Trains: 12 (14 on Fridays)

### NASHVILLE MUSIC CITY STAR



Service operates entirely along tracks owned by the Nashville & Eastern Railroad (NERR), and is also operated by NERR under contract to the RTA. NERR also operates freight service along the line.

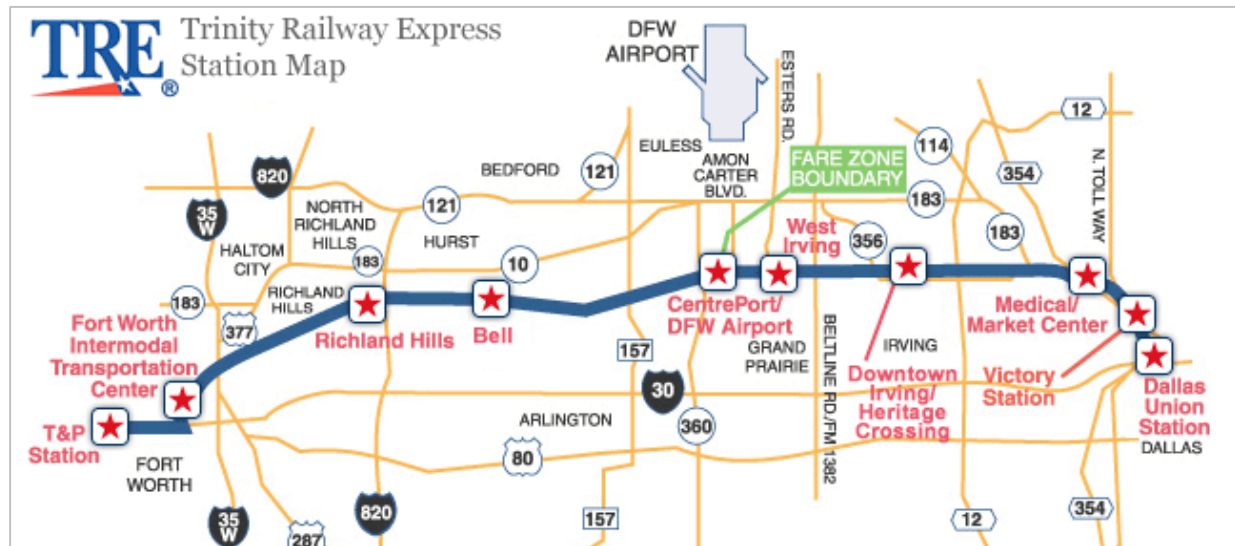
The development of the Music City Star was also unique in a number of respects. First, freight service volumes were low, and the freight operator was willing to operate commuter service. Second, the capital improvements that were needed to provide passenger service – stations, crossing upgrades, and limited bridge replacement – were modest. Third, second-hand equipment was procured from Amtrak and Chicago’s Metra to operate the service.

<sup>3</sup> The only new large system that has been developed in North America has been in Toronto. Montreal also has a large legacy system.





FIGURE 1 | TRINITY RAILWAY EXPRESS (TRE) MAP



## CAPITAL METRORAIL (AUSTIN)

Austin's Capital Metro provides Capital MetroRail commuter rail service between Leander in Austin's northern suburbs and downtown Austin. The line, which began service in 2010, is 32 miles long, serves nine stations, and carries approximately 2,500 passengers per weekday. There are park and lots at only three of the stations.

Service operates Monday through Saturday. On Monday through Thursday, service operates from 5:00 AM to 6:30 PM (last departure from Austin), approximately every 30 minutes during peak periods and every 60 minutes during the midday. On Fridays, there is also evening service, which operates hourly until 12:30 AM. On Saturdays, there is only evening. This service serves all stations except Leander (the outermost station) and operates approximately every 34 minutes from 4:00 PM to midnight.

Whereas most U.S. commuter rail systems provide diesel-hauled locomotive service (a diesel locomotive that pulls or pushed unpowered rail cars), Capital MetroRail service is provided with "Diesel Multiple Units," or DMUs, which are self-propelled diesel powered rail cars. The Capital MetroRail cars are, in many respects, a hybrid of commuter rail and light rail vehicles, especially in terms of exterior appearance and interior configuration. (Similar vehicles are also used by Denton County, Texas' A-Train service and have been ordered for TEXRail service that will begin service in 2018 between Fort Worth and Dallas/Fort Worth International Airport.) They also operate in exclusive lanes on arterial streets in downtown Austin, which is common for light rail, but unusual for commuter rail.

Outside of downtown, Capital MetroRail operates along a former freight line that Capital Metro purchased in 1995 in anticipation of its future use for passenger service. Freight service still operates along the line, but only outside of the hours that passengers service operates. The reason for this is that the Capital MetroRail DMUs are not "FRA-compliant," in that they do not meet Federal Railroad Administration (FRA) crash-worthiness standards for crashes with freight trains. As a result, the two types of service cannot operate during the same periods and are instead separated by time of day.

### Austin Capital MetroRail Quick Facts

Length: 32 miles  
Stations: 9  
Average Station Spacing: 3.6 miles  
Weekday Trains: 36 (48 on Fridays)  
Weekly Ridership: 2,500

## CAPITAL METRORAIL



## CAPITAL METRORAIL ROUTE



## FRONTRUNNER (SALT LAKE CITY)

FrontRunner service, which is provided by the Utah Transit Authority (UTA), operates between Pleasant View, which is north of Ogden, to Provo, via Salt Lake City. The line was developed in two parts, starting with the northern half in 2006 and the addition of the southern half in 2012. In many respects, Frontrunner service consists of two lines that operate as one. The total length of the line is 88 miles and there are 15 stations.

FrontRunner service operates Monday through Saturday. On weekdays, service begins at 5:00 AM and the last train departs at 11:09 PM. Service operates approximately every 30 minutes during peak periods and every 60 minutes during the rest of the day. On Saturdays, service operates approximately hourly from 7:45 AM to 1:05 AM. Ridership is approximately 16,000 passengers per weekday.

FrontRunner service operates for most of its length within a Union Pacific Railroad right-of-way, but on separate tracks that were constructed on parallel to the existing freight tracks. The only portion where service operates on shared tracks is along the northernmost six miles.

### Salt Lake City FrontRunner Quick Facts

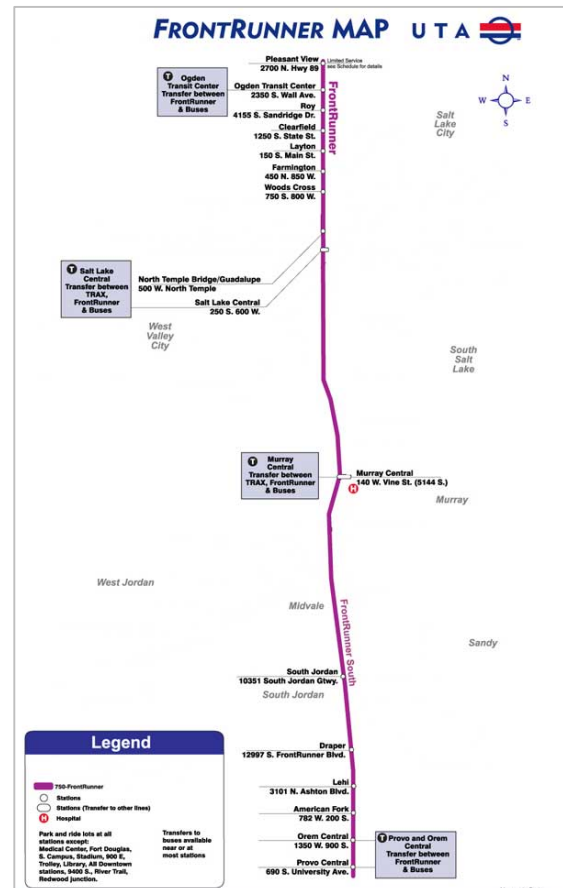
Length: 88 miles  
Stations: 15  
Average Station Spacing: 6.3 miles  
Weekday Trains: 63  
Weekend Bikes: 16,000



## SALT LAKE CITY FRONTRUNNER



## FRONTRUNNER ROUTE



## RAIL RUNNER EXPRESS (ALBUQUERQUE)

The New Mexico Rail Runner Express, which is operated by the New Mexico Department of Transportation and the Rio Metro Regional Transit District, provides commuter rail service between Santa Fe and Belen, NM via Albuquerque. Phase 1 service, which operated between Belen, which is 35 miles south of Albuquerque, and Bernalillo, which is 18 miles north, began in 2006. Service was extended further north to Santa Fe in 2008. The line is 97 miles long and has 15 stations. Similar to Salt Lake City's FrontRunner, in many respects, the Rail Runner also consists of two lines that operate as one.

Service operates seven days a week. On weekdays, there are 11 trips in each direction that operate between 4:32 AM and 9:00 PM (last departure). These consist of a combination of local and express trips, including two that only operate between Albuquerque and Santa Fe and two that only operate between Belen and Santa Fe. Weekday ridership averages approximately 4,000 passengers. Saturday trains are scattered throughout the day, with six trains in each direction between 7:28 AM and 10:33 PM. As on weekdays, not all trains operate the full length of the route. On Sundays, there are only three northbound trains and four southbound trains.

Service between Belen and Albuquerque operates along a former Burlington Northern Santa Fe (BNSF)-owned freight line. The state initially intended to negotiate trackage rights for the line, but ultimately, to ensure the provision of reliable passenger service, agreed to purchase the entire line from Belen to the Colorado border. This line is used for service between Belen and Bernalillo, and some freight traffic continues to operate along the line.

### Albuquerque Rail Runner Quick Facts

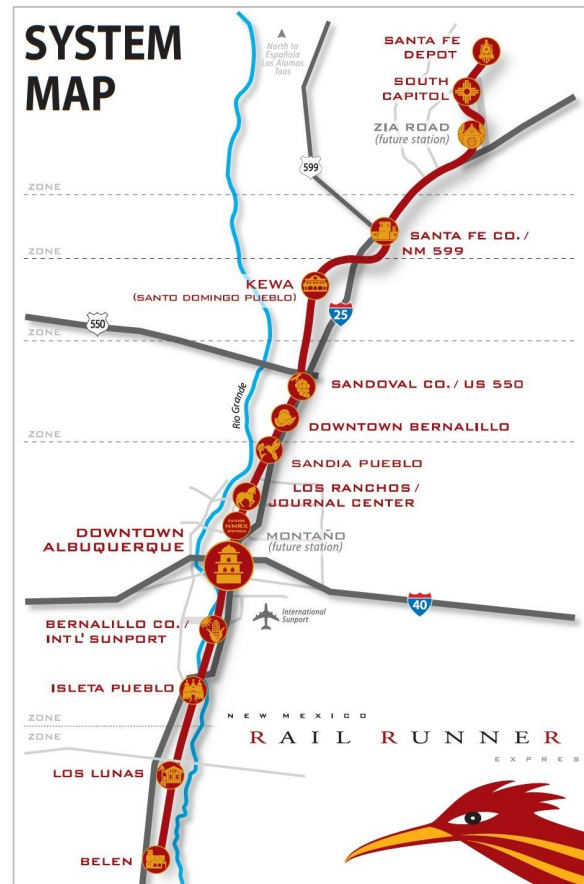
Length: 97 miles  
Stations: 15  
Average Station Spacing: 6.9 miles  
Weekday Trains: 22  
Weekend/Daytime: 4,000



#### SALT LAKE CITY FRONTRUNNER



#### RAIL RUNNER EXPRESS ROUTE



The extension from Belen and Bernalillo operates along a combination of former Santa Fe Southern and newly constructed right-of-way, with the newly constructed right-of-way designed to straighten curves to provide for faster operating speeds. This right-of-way is also owned by the state. BSNF has trackage rights along the southern half of the extension, and Santa Fe Southern has trackage rights along a short portion of the right-of-way leading into Santa Fe.

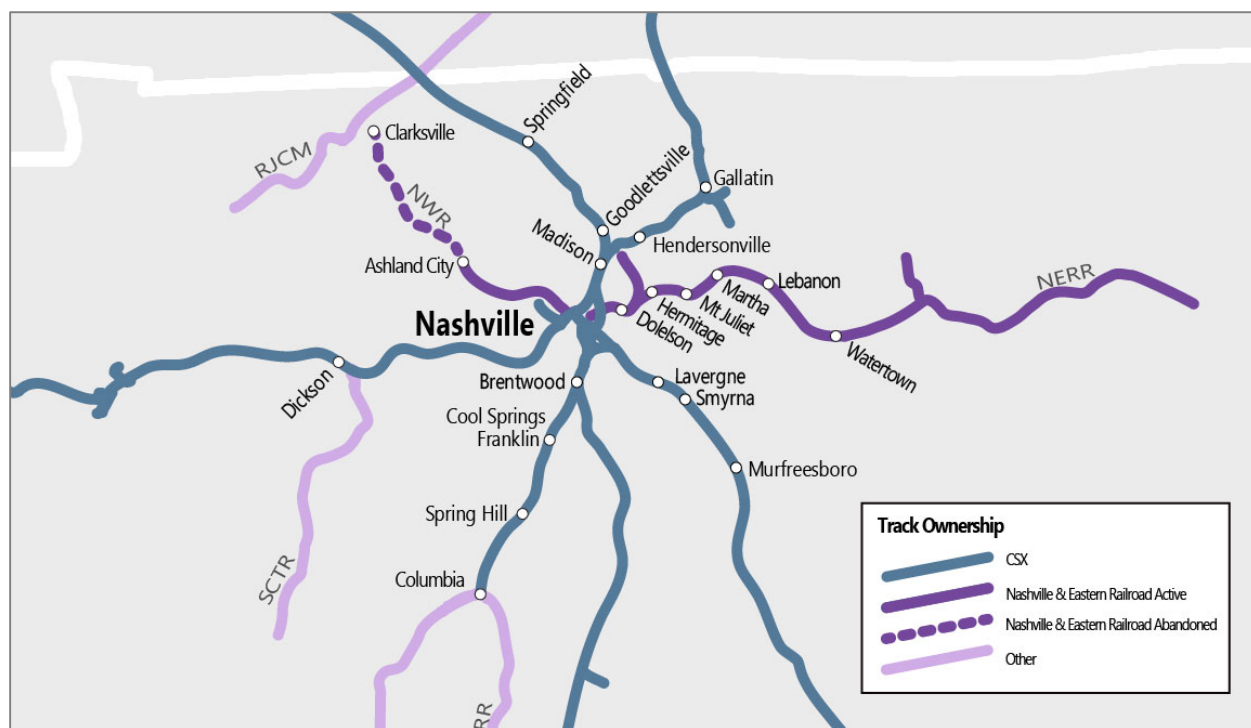
## POTENTIAL NEW MIDDLE TENNESSEE COMMUTER RAIL LINES AND IMPROVEMENTS

A significant amount of desire has been expressed for the development of new commuter rail lines in Middle Tennessee, with the greatest focus on the Northwest Corridor between Clarksville and Nashville and improvements to existing Music City Star service. Other potential lines that have generated interest include Murfreesboro and Franklin/Spring Hill.

One of the challenges to the development of new commuter rail lines in Middle Tennessee is that the most desirable rail corridors are CSX lines that have very heavy freight traffic. As illustrated in the examples above, the new commuter rail lines that have been implemented since the 1990s, including the Music City Star, have been developed in rail corridors with low levels of freight traffic or the ability to develop parallel tracks within existing freight rights-of-way. In those cases, the freight railroads either had sufficient excess capacity to accommodate commuter rail and/or the receipts from the sale of the rail corridors more than offset negative impacts to freight service.

However, this is not the case in Middle Tennessee. Except for the Nashville and Eastern line that is used for Music City Star service, and with the possible exception of a Clarksville line, other potential commuter rail lines would be CSX lines that are heavily used for freight traffic. Beyond the freight traffic alone, Nashville is also a major center for related freight activities, and the company has a major rail yard in Nashville (Radnor), an intermodal terminal, an automobile distribution center, and a bulk transfer terminal. CSX's Nashville area freight traffic is near capacity, and for this and the other reasons described above, CSX not willing to share its tracks with passenger traffic.

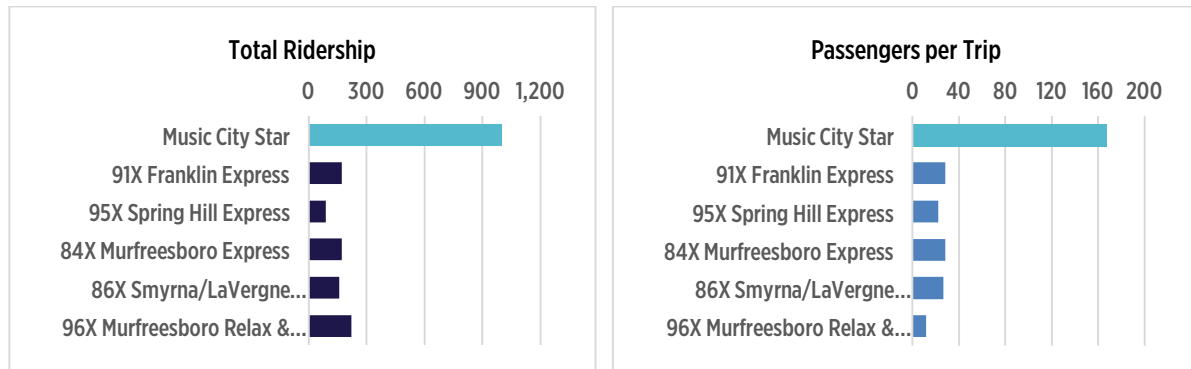
#### MIDDLE TENNESSEE TRACK MAP (CSX IN BLUE)



As a result, it will be extremely difficult to significantly expand commuter rail in Middle Tennessee in the foreseeable future. Longer term, this situation may change. At the present time, much of CSX's Nashville area traffic consists of coal shipments. The use of coal is declining and is expected to continue to do so. In this event, then coal shipments through Nashville would likely decline, and unless there are offsetting increases in shipments of other types of goods, this could free up some capacity. Alternatively, continuing increases in freight traffic may exceed the capacity of CSX's Nashville area network, which could require a large-scale solution such as the development of a rail bypass around Nashville for some freight traffic. This type of change would be well beyond the scope of what the MTA or RTA could do, but could also free up the capacity needed to develop new commuter rail lines.

However, this situation does not mean that commuter rail efforts should not continue. Experience in Middle Tennessee and elsewhere shows that commuter rail can shift far more people out of cars than express bus services. For example, compared to express bus services in Williamson and Rutherford Counties, the Music City Star carries over six times more passengers and over seven times more passengers per trip. This is the case for a number of reasons, the most important of which include faster service and greater comfort. This is the case even though the Music City Star serves a smaller market than the express bus routes.

## MUSIC CITY STAR RIDERSHIP COMPARED TO EXPRESS BUS RIDERSHIP



Looking forward, the Northwest Corridor Transit Study will examine, among other things, commuter rail service between Clarksville and Nashville. Most of that line would use a Nashville and Western Railroad right-of-way that runs inbound to the vicinity of I-40 near Herman Street but not all of the way into downtown Nashville. Work on this study will likely further clarify CSX-related issues and could produce potential solutions. Even without the use of CSX right-of-way, an Austin-type solution could be possible in which street running DMUs are used from the end of the Nashville and Western rail line into downtown.

## AUSTIN STREET RUNNING DMUS



There is also the potential to improve Music City Star service:

- **More Service:** As described above, existing service is very limited, and more limited than on other commuter rail lines. Service improvements including weekday midday service, weekday evening service, Friday and Saturday evening/night service, and weekend service would make service more attractive and help spur transit-oriented development (TOD).
- **Double Tracking:** The current line is single track with one passing siding. Double tracking or additional passing sidings would provide for the provision of more frequent service.
- **New Stations:** A new station will be constructed at Hamilton Spring in Lebanon; others could also be possible.
- **Wilson County Extension:** There is beginning to be interest in Wilson County to extend service further eastward, potentially to Watertown.
- **Transit Oriented Development:** The new Hamilton Springs Station in Lebanon is planned in conjunction with TOD that will consist of 400 apartments, retail, and office space. There is also a desire to create a

“downtown Donelson” at Donelson Station. The RTA is also about to issue a Request for Proposals for TOD at Mount Juliet Station.