Among the most iconic urban images held around the world is San Francisco’s iconic cable cars being pulled up and down the city’s landmark hills. As important as those historic vehicles are to the city’s identity, San Francisco boasts an even broader collection of streetcar and light-rail routes that add to the region’s myriad mobility options.

The San Francisco Municipal Transportation Authority (SFMTA) — previously known as the San Francisco Municipal Railway (MUNI), has served the citizens and visitors of San Francisco for more than 100 years. MUNI consists of multiple modes of transportation such as traffic, transit and parking. Its rail network is also comprised of a diverse fleet of vehicles that includes the famous cable cars, historic streetcars and light-rail vehicles.

What Started It All?

San Francisco’s Market Street Railroad Co. began operating in 1860 as San Francisco’s horse car and steam train lines. Local inventor and British immigrant Andrew Smith Hallidie introduced the now-legendary cable cars
on Clay Street in 1873. The cable cars ran on steel rails and connected to an underground cable that pulled the cars at nine miles per hour.

As electric streetcars outpaced cable cars in the late 1880s, the Market Street Cable Railway Co., became the Market Street Railway Co., and converted all cable cars – except for those on Market Street – to run on electric power, which could reach more areas quicker, and was cheaper to build and maintain.

San Francisco’s transportation future changed when the great San Francisco earthquake hit in 1906, causing severe damage and uncontrollable fires. In the aftermath, the city rebuilt four streetcar lines on Market Street and created one of the nation’s first municipal public transportation agencies in 1912, the agency that became today’s MUNI. Acknowledging the long-term shift to streetcars over cable cars, MUNI constructed two tunnels to speed streetcars through hilly terrain as the city’s footprint expanded west across the peninsula: the 2.27-mile Twin Peaks Tunnel opened in 1918, followed by the shorter Sunset Tunnel in 1928.

A Sense of History

Of the four rebuilt streetcar lines on Market Street, the E-Union streetcar line ran north from the Ferry Building on The Embarcadero and west to reach the Presidio, establishing a highly visible presence for streetcars among the city’s most notable attractions. Market Street’s F-Stockton line – now known as MUNI’s F-Market and Wharves streetcar line – ran from Market Street to the Marina District. However, due to high labor costs and aging equipment MUNI was forced to shutdown both the E-Union and F-Stockton streetcar lines in 1944.

Although most cities with streetcar lines in abandoned their routes in the 1950s, MUNI kept its lines that travelled through the Twin Peaks and Sunset tunnels (the K, L, M and N lines), as well as the J-Church line, which maintained extensive private right-of-way along its route. In 1958, MUNI retired the original streetcar fleet and replaced it with 105 streamlined PCC (Presidents’ Conference Committee) streetcars. The PCCs ran on Market Street’s two tracks.

In 1962, San Francisco voters approved a $792 million bond that would help build the Bay Area Rapid Transit (BART) heavy rail metro rail system that would operate under Market Street. The bond also allowed for Muni’s streetcar lines to build a second sub-
way level above BART’s tracks.

A Modern Vision for Historic Vehicles

In the early 1980s, the city’s cable cars were going to be removed from the streets and rebuilt for 18 months. Rick Laubscher, who was the chair of the transportation committee of the San Francisco Chamber of Commerce saw an opportunity to run historic streetcars during the cable car shutdown.

The San Francisco Historic Trolley Festival opened in 1983 with streetcars running on the two surface tracks that were removed from Market Street during the construction of the BART/MUNI subway. The popular festival continued for the next five years and paved the way for today’s F-Market and Wharves line, which opened in 1995. The Market Street Railway, which is MUNI’s nonprofit preservation partner, funded and built the F-Line with the hopes of also eventually rebuilding the E-Line. In addition to rare examples of historic streetcars from cities around the world, MUNI and the Market Street Railway have acquired the nation’s largest fleet of PCC cars, each painted in the historically-accurate livery of streetcar systems from across the country. Each PCC car – retrofitted by MUNI to provide full accessibility and air conditioning – offers a unique travel experience for each rider.

“MUNI’s historic streetcars are a vital component of our overall transportation network,” said SFMTA Director of Transportation, Ed Reiskin, “Every Saturday and Sunday, there are approximately 15,000 and 18,000 boardings respectively on the F Line, and that number jumps up to about 24,000 each weekday. This goes to show that while people come from all over the world to ride these vehicles, there are thousands of San Franciscans who rely on this line for their daily commute.”
Light Rail: A Practical Hybrid

The 1962 bond that allowed for the construction of the BART/MUNI subway tunnel introduced a new era for San Francisco’s venerable streetcar network. When the new subway was completed in 1980, the measure provided for new streetcars called light-rail vehicles (LRVs). The new vehicles – manufactured by Boeing-Vertol from 1979-80 – offered a mix of high- and low-floor boarding to accommodate both the high-platform subway stations as well as streetcar-style boarding where MUNI LRVs operated on city streets in mixed traffic. The only other light-rail system with a mix of both high- and low-platform boarding is Buffalo’s Metro Rail system, which opened in 1985.

Today, MUNI’s light-rail network consists of seven lines with a fleet of 151 new LRVs from Breda that operate above ground and in through San Francisco’s three tunnels. The vehicles can carry more than 13,000 passengers per hour during rush hour and more than 173,000 passengers per weekday.

BART, Caltrain & the California High-Speed Rail Network

In addition to its substantial network within the city of San Francisco, MUNI also connects with other commuter rail services and other cities near the San Francisco area.

BART has provided reliable transportation from the San Francisco area to cities in the East Bay, and MUNI serves as one of...
BART’s largest ridership feeders. Caltrain also provides commuter rail service in the San Francisco area through the South Bay to San Jose. Caltrain’s San Francisco, 22nd Street and Bayshore stations connect with MUNI’s light-rail routes.

Additionally, the state of California is supporting the development of the nation’s **first true high-rail rail system**, with high-speed, electric-powered trains that will travel up to 220 miles per hour across hundreds of miles of track that connecting Sacramento, the San Bay Area, Southern California and San Diego. In San Francisco, MUNI will connect with high-speed trains at the Transbay Transit Center, which is currently under construction (for more information on the Transbay Transit Center, see RAIL #21 – ed).

### Vehicle Fleet Renovation, Replacement and Expansion

In 2013, the SFMTA went through with its plans to obtain more than 175 LRVs that would replace the existing Breda fleet. The additional LRVs would also expand the fleet by 24 vehicles to keep up with the city’s demands. It is expected that the new LRVs will arrive by 2016.

“San Francisco is a transit-first city and we are always looking for ways to improve service for MUNI riders,” Reiskin said. “Most recently, this includes replacing and expanding our light-rail fleet, providing additional train shuttles to address overcrowding, working to keep our infrastructure in a state of good repair, and implementing all-door-boarding system-wide.”

SFMTA took five years to complete a $24.8-million effort, which included $3.3 million provided by Prop K – approved by voters on November 3, 2013 – to expand the historic streetcar fleet that serves Market Street’s F-Market and Wharves line by 16 cars. In June of that same year, the SFMTA completed work on a $2.6 million project also funded by Prop K to renovate eight damaged LRVs.

### Looking to the Future

Although the basis for MUNI’s light-rail network is based on the legacy of its streetcar system, new lines are expanding the operation’s reach. MUNI’s first entirely new light-rail line brought rail transit service to San Francisco’s east side for the first time in 2007. The new route – known as the **T Line** – connects with the existing N Line near Caltrain’s 4th & King Streets terminal, serving 18 stations over a 5.1-mile route, terminating at Sunnydale Avenue. LRVs operate in a dedicated...
right-of-way for most of the route.
By 2019, T Line trains will continue underground through the city’s Central Subway tunnel, which is currently under construction. It will serve as San Francisco’s first cross-town subway and access three new stations. Upon completion of the Central Subway, the T Line is projected to carry the most riders in the MUNI system. Meanwhile, the subway may ultimately continue past their terminus in Chinatown to reach Fisherman’s Wharf and connect with the F-Market & Wharves line.

San Francisco Achieves Desirability

Mention livable American cities where people would like to live and work, and San Francisco and the Bay Area often finds itself at the top of the list. Multi-modal public transportation options that include some of North America’s most diverse and efficient rail systems are just one of the reasons for San Francisco’s enduring popularity. In San Francisco, historic and modern streetcars connect riders with an excellent – and growing – transit network. While other cities sought to replace streetcars, San Francisco embraced them. That commitment is still paying dividends today.

CDTLS can provide funding in support of transportation facility construction or renovation. Across the country local transit services are building facilities and promoting economic development through transportation. Sustainable economic development can be dependent on an intermodal transportation system that includes rail or bus. Financing is meant to facilitate or enhance community transportation activities and to promote intermodal activities and mobility.

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EQUAL OPPORTUNITY LENDER
When Is Light Rail Not a Streetcar? When It’s a Subway

By Rich Sampson

Every so often, a media outlet will pick-up a story on long-lost, abandoned downtown subways in places like Cincinnati and Rochester. We’re no different – we covered them for ourselves back in RAIL #19. The tales of forgotten infrastructure lying just feet beneath the streets and buildings where many go about their daily lives casts a strong allure, portending a glorious future that never quite arrived. Of course, these systems were never subways like those in New York, Washington or Chicago, but hybrid operations where what we today call light-rail or streetcar vehicles ducked into a tunnel portal to avoid the bustle of downtown.

So, what if a city never abandoned their light-rail / streetcar subway, but instead maintained it and then ultimately expanded it? Actually, it’s a story that’s played out many times, in Boston and Philadelphia, Pittsburgh and San Francisco. Yet it’s the Newark Light Rail system that really captures the real benefits of a rail transit operation that does not neatly fit into rigid labels of light-rail, streetcar or subway service.

Going Under…In A Good Way

As American cities like Newark rushed headlong into modernity in the late 19th and early 20th centuries, the same urban dynamism that directed vast numbers of riders to streetcar lines also produced those cities’ first measurable congestion. Some of the earliest motion picture films record the manic bustle of the era, with pedestrians, streetcars, traffic cops and delivery vehicles all scurrying about and doing their best not to collide with each other. The same was true in Newark, where a handful of streetcar lines converged downtown – particularly in the vicinity of the Pennsylvania Railroad’s terminal – which offered the easiest trip into Manhattan.
As the Pennsylvania was constructing a new Newark station in the mid-1930s – today’s Penn Station – a new streetcar line was developed by the Public Service Railway, a private company that operated most of New Jersey’s streetcar and interurban lines. The new route – Public Service Railways #7 line – utilized the abandoned route of the former Morris Canal, which stretched 107 miles from Phillipsburg on the Delaware River to Jersey City on the Hudson. This established an entirely new, dedicated streetcar right-of-way along the western boundary of Branch Brook Park, then winding under and around major streets to reach downtown Newark through a subway tunnel running from the intersection of Lock and New streets to Penn Station. The route was envisioned as a speedier trip to downtown from Newark’s then-suburban neighborhoods, as well as a quicker means for existing streetcar lines to access downtown. Indeed, more than seven additional routes other than the #7 line traveled through the subway, which also included a short connection to the neighboring Public Service Terminal, home to the Railway’s interurban lines that spanned the state.

Still, it was the #7 service that was most identified with the subway. The line’s official designation was #7 – City Subway, and the name stuck. Gradually, as streetcars in Newark followed trends elsewhere and were replaced by buses in the 1950s and ‘60s, the City Subway remained intact, primarily due to its largely grade-separated route away from city streets and its direct path to the subway that allowed for high-frequency service, as often as every 90 seconds in peak periods. Its fleet of 30 distinctive black-and-white painted Presidents’ Conference Committee (PCC) cars arrived in 1954, as Twin Cities Rapid Transit transitioned its streetcar routes to bus lines. Those PCC cars served the #7 City Subway for 47 years, until New Jersey Transit – which assumed control of the line in 1980 – delivered new light-rail vehicles manufactured by Kinki Sharyo in 2001.

According to Neil Fitzsimmons, New Jersey Transit’s Director of Light Rail Service Planning, the system was able to survive through the bus era not only because of its dedicated infrastructure, but more importantly the high-frequency service it was able to offer riders.

“While the subway and dedicated right-of-way were important assets for the line, the high level of reliable, frequent service attracted large numbers of people, allowing it to operate essentially unchanged for more than 65 years,” says Fitzsimmons, noting the system’s better than 90 percent reliability rate.

**Putting the New in Newark**

In as much as the #7 City Subway was lovingly appreciated by its daily riders as a testament to the city’s longevity and resiliency, more than six decades of service takes a toll...
on any piece of equipment. The Kinki Sharyo light-rail vehicles offered better service to passengers than the aging PCC fleet through improved reliability and more amenities – such as full accessibility, air conditioning and more comfortable seats – while producing an enhanced operating environment for New Jersey Transit via doubled passenger capacity and lower maintenance costs. The new vehicles also offered the agency economies of scale, as they were purchased under an option for additional units for the system’s Hudson-Bergen Light Rail network in nearby Hoboken and Jersey City. That allowed maintenance expertise to be shared between the two operations, which proved particularly important in the early years of the vehicles’ service.

The new railcars served as a prelude to a larger expansion of Newark’s light-rail network. The original line was extended to Grove Street in 2002 along the former Orange Branch of the Erie Railroad, now owned by Norfolk Southern. In addition to the new Grove Street terminus – which also included a new maintenance and repair facility – another station at Silver Lake was added, producing a 5.2-mile, 12-station route. The extension allowed the line to more effectively serve the suburban communities of Belleville and Bloomfield.

By revitalizing the longstanding #7 City Subway line, new momentum emerged to further utilize light rail to help fuel Newark’s downtown renaissance. A strong mix of downtown attractions – ranging from the New Jersey Performing Arts Center and Riverfront Stadium, host to Newark’s minor league and college baseball teams – and economic development projects begged for a natural connection that also linked them to the city’s twin rail stations, Penn Station and Broad Street Station, served by New Jersey Transit’s commuter rail lines from the north and west. Utilizing an existing tunnel off the main subway line that once reached the Public Service Terminal, a new branch was constructed through downtown Newark between Penn and Broad Street stations, adding five new stations along a new mile of light-rail tracks. The $202.7 million project opened for service on July 16, 2006. The twin lines were rebranded as a cohesive network now known as Newark Light Rail.

“Over the last 10 or 15 years, there’s been lots of investment in Newark Light Rail,” says Fitzsimmons. “The combined system serves a number of different, but complimentary ends: connecting commuters to their jobs, supporting strong, existing neighborhoods and encouraging new development. It’s designed to all work together.”
Three Systems, One Jersey

Light-rail and streetcar networks around North America take on many forms and each has their own uniqueness and nuance. Still, there are no agencies that oversee three, operationally distinct rail lines that do not connect with each other, yet still strive to achieve the same objective: connecting communities. The Newark Light Rail system is joined with the Hudson-Bergen Light Rail operation along with the River Line between Trenton and Camden in South Jersey to form New Jersey Transit’s Light Rail Division (for more on the River Line, see RAIL #23 – ed).

Newark’s hybrid mix of old streetcar subway and modern light rail complements the Hudson-Bergen line’s high-volume, high-density rail transit operation and the River Line’s reincarnation of the historic interurban concept. All told, New Jersey Transit’s light rail systems carry a combined 79,000 daily riders, while each line is positioned to drive rail-oriented development in numerous locations along their routes. The economic impact of the trio of operations easily exceeds $10 billion.

“It’s an interesting portfolio of services,” says Fitzsimmons. “Each service is very different in how it operates, but the goals are common for all three: move passengers safely, effectively and efficiently while supporting the varying economies of all the communities they serve.

In the years ahead, several new projects are under consideration to widen the reach of New Jersey’s light-rail network. A number of enhancements of the Hudson-Bergen Light Rail have been proposed, including new stations at 18th Street and Canal Crossing in Jersey City, 17th & Clinton in Hoboken, along with a short, .7-mile extension to serve the Bayfront redevelopment district and a longer expansion along the former Erie Railroad Northern Branch right-of-way to finally serve
its namesake Hudson County, as the system currently only operates in Bergen County. An environmental study for the Northern Branch expansion is currently underway. The system could even be extended across the Bayonne Bridge to reach Staten Island and connect with the Staten Island Railway.

Further south, the River Line could extend from its current southern terminus in Camden along a 18-mile corridor utilizing the existing Vineland Secondary line, which sees occasional freight service operated by the joint CSX/Norfolk Southern shared assets area known as Conrail, which hasn’t seen passenger trains since 1871. The new route would serve 13 new stations in communities such as Gloucester, Woodbury, Wenonah, Sewell, Pitman and Glassboro. The $1.8 billion line could open for service as early as 2019.

A Chord of Connectivity

The term chord has many different meanings, but most point to numerous elements coming together to forge something stronger and more profound than the sum of its parts. This is certainly true when considering the trilogy of light-rail operations in New Jersey. Newark’s venerable light-rail system is the oldest, built on the sturdy spine of a once-sweeping streetcar network. The more recent additions of the Hudson-Bergen Light Rail and River Line have only strengthened the collection of mobility options available to dozens of communities across the state. That’s the type of three-note chord that produces a certain harmony to longtime observers like Neil Fitzsimmons.

“Its very satisfying to see a system like Newark’s endure for so long and be the foundation of a light-rail network across New Jersey,” says Fitzsimmons.