

Light Rail in Six Big Cities

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Line and System Characteristics

Recently, the Gulf Coast Institute explored the experiences of six big cities that built their first light rail line or added to their system. We selected the cities of Los Angeles, San Diego, Dallas, Portland, Minneapolis, and Salt Lake City.

Several reports related to this research are available at www.gulfcostinstitute.org, including *The Impact of Light Rail on Local Businesses* and *Mitigation of Business Interruption During Construction*. This document simply describes the basic characteristics of the six light rail systems. In each city, a particular light rail line (its name is shown in red) was selected as the focus of inquiry, although we did not restrict comments and reports to those lines.

SAN DIEGO

Mission Valley East Trolley Line (Green Line)

Status: Extension

Technology: Light rail

Length of existing service: 46.8 miles in four corridors

Length of extension: Closed a critical 5.9 mile gap

Character of corridor: very suburban, not adjacent to many businesses.

Previously, the Metropolitan Transit Development Board planned, designed, and constructed two light rail transit lines for a total of 46.8 miles in four corridors. The light rail system is called the San Diego Trolley. The Orange and Blue Lines were originally railroad branch lines and freight operation still runs at night by railroad. The Blue Line track runs down the middle of San Ysidro Boulevard for a couple of blocks before swinging over to connect to the railroad tracks. The Santee Trolley was completed in 1995, Old Town Trolley in 1996, and Mission Valley West Trolley in 1997. The Mission Valley East extension closed the gap between the Blue and Orange lines when it opened to the public on July 10, 2005. First envisioned by the Metropolitan Transit System (MTS) more than 25 years ago, the \$506 million project provides San Diegans with increased mobility within the busy Interstate 8 corridor. There were two major thoroughfares where mitigation efforts were needed through an older residential and business district at the 70th street exit from I-8, according to Tom Doogan, San Diego Trolley engineer with MTS.

Most of the track along the MVE line is above or below the ground so access to residential or business properties was not a significant issue. However, one segment toward the East end of the project winds through San Diego State University where some small businesses are located.

SALT LAKE CITY

University Line

Status: Extension

Technology: Light rail

Length of existing service: 17.3 miles from Sandy to Downtown

Length of extension: A 2.3 mile route that connected Downtown to the University of Utah and a 1.5 mile extension to the University Medical Center

Character of corridor: commercial corridor along a high-traffic six-lane highway.

The light rail system, called TRAX, includes the Downtown Main Line, a 17.3 mile route from Sandy to Downtown Salt Lake City that opened December 1999. The University Line, a 2.3-mile route from Downtown to the University of Utah, opened December 2001 ahead of schedule for the 2002 Winter Olympics. The Medical Center Extension, a 1.5-mile extension of the University Line to the University Medical Center, opened in September of 2003, which completed the connection between the University of Utah and downtown Salt Lake City. In April 2005, TRAX opened its newest \$1.2 million LRT station, located at 900 South and 200 West. More suburbs are asking for service.

The University Transit Line is located along an old highway strip commercial corridor that runs from Downtown to the

The Gulf Coast Institute is developing resources to help inform the civic discussion about the alignment of the proposed University rail line on the west side of Main Street. The Institute was perhaps the earliest to call for looking at Richmond as an alignment option for this line several years ago. At the present, we are still convinced it is the best option to achieve the strategic regional goal of linking our biggest activity centers with high-quality transit.

Additional resources can be found at www.gulfcostinstitute.org

University and includes the 400 South corridor from South Temple to 900 South Street. Described as a high-traffic six-lane highway where there are limitations on pedestrian crossings, the right of way is controlled by Utah Department of Transportation. The 400 South corridor is defined by low-intensity commercial development, extensive surface parking lots, underutilized land, and single- and two-story low-intensity developments. The 400 South corridor section from downtown to the University of Utah includes small businesses and some residences, and as the line goes into the University area it's mostly institutional, not commercial.

There are over 900 property owners within a 1500-foot radius of the 11 stations from Downtown to the University, and the population of the 400 South Corridor is 27,647, representing 15% of the Salt Lake City population. There are four downtown TRAX stations, three stations along the 400 South Corridor, and four on the University of Utah campus. The three stations in the 400 South Corridor include Library TRAX station (government and institution center), Trolley Square TRAX station (retail center), and 900 East TRAX station (residential center).

PORTLAND

Interstate MAX (Yellow Line)

Status: Extension

Technology: Light rail

Length of existing service: 44-mile, 64-station system

Length of extension: 5.8 miles in N and NE Portland

Character of corridor: Mixed residential and commercial.

Portland's MAX system includes Blue (East and West), Red (Airport) and Yellow (Interstate) lines. The most recent Yellow Line was completed May 1, 2004, and serves North and Northeast Portland.

With 10 stations along Interstate Avenue, Interstate MAX extends 5.8 miles from the Expo Center at the North end and ties into the existing Blue Line at the Rose Quarter Transit Center at the South end.

Construction began on the Green Line (I-205/Portland Mall) December 2005. When finished, the line will be an 8.3 mile extension through the heart of downtown from Union Station to Portland State University and extending down I-205 between the Gateway Transit Center and Clackamas Town Center.

Interstate Avenue was a former highway before the freeway went in during the 1970s, with two lanes going each way. The

corridor has a mix of residential and commercial properties with a strong neighborhood identity among residents and business owners. The area was somewhat run down after going through its growth cycle, spiraling down and then stabilizing.

More than \$3 billion in development has occurred along Max lines since its inception.

DALLAS

Red Line/Blue Line

Status: Start up – 1st 11.2 mile segment opened in Summer 1996. 20-mile starter system was completed in March 1997.

Technology: Light rail

Length of Existing Service: 11.2 mile starter segment.

Length of extension: Dallas Area Rapid Transit (DART) now has 45 miles of light rail transit and is expected to more than double to 93 miles by 2014.

Character of corridor: Downtown, commercial, residential, freeway. The Red and Blue lines run through downtown Dallas, through neighborhoods north and south of downtown, and along/under the Central Expressway.

Dallas Area Rapid Transit (DART) was created by voters on August 13, 1983, and is funded by a one-cent local sales tax. The service area consists of 13 member cities: Addison, Carrollton, Cockrell Hill, Dallas, Farmers Branch, Garland, Glenn Heights, Highland Park, Irving, Plano, Richardson, Rowlett, and University Park.

Revenue from the voter-approved one-cent sales tax, federal funds, investment income, short and long-term financing, and fare box revenue fund the operation and ongoing development of DART's multimodal Transit System Plan. Currently, DART serves the area with approximately 130 bus routes, 45 miles of light rail transit (DART Rail), 31 freeway miles of high occupancy vehicle (HOV) lanes, and paratransit service for the mobility impaired. DART and the Fort Worth Transportation Authority ("the T") jointly operate 35 miles of commuter rail transit (the Trinity Railway Express or TRE), linking downtown Dallas and Fort Worth with stops in the mid-cities area and DFW Airport.

DART is a hub and spoke system with all transit lines converging on downtown. Light rail runs both on the surface and in a tunnel and encompasses 45 miles of a planned 93 miles by 2014. The Fort Worth and Dallas transit systems together convey 100 million passenger trips per year. Extensions now in development include the 17.5-mile

Northwest Corridor, a 13-mile branch that will extend from the Northwest Corridor to DFW International Airport, a 10.2-mile extension to serve the Southeast Corridor, and extension of service south three miles from Ledbetter Station to I-20 and northeast five miles to Rowlett.

Construction of Dallas' \$848.8 million, 20-mile starter light rail system began in 1990. It was funded with only 20% federal money. Late in 1995 and early in 1996, five city councils in DART territory called local elections to reconsider their participation in the transit system. In each case, DART won. On June 14, 1986, the first 11.2-mile light rail segment opened in a blaze of publicity fueled by splashy inaugural events paid for by more than \$1 million in corporate donations. It immediately began carrying around 18,000 fare-paying riders. Another six miles of light rail were completed in January 1997. The last three miles of the 20-mile starter system opened on March 31, 1997. The project was completed on time and on budget.

In 1999, DART entered into a \$333 million Full Funding Grant Agreement with the Federal Transit Administration, the first approved under the Transportation Efficiency Act for the 21st Century. In 2000, voters approved \$2.9 billion in long-term bonds for rail expansion. Trinity Railway Express (TRE) completed a link of downtown Dallas and Fort Worth in 2001. In 2002, DART Rail expanded to North Dallas, Garland, Richardson, and Plano. Construction also began on the Northwest light rail extension between downtown Dallas and Victory Station at American Airlines Center. In 2003, DART finalized Northwest light rail extensions to Farmers Branch, Carrollton, North Irving, and DFW Airport, and the Southeast extension to Deep Ellum, Fair Park, South Dallas, and Pleasant Grove. Victory Station at American Airlines Center opened in 2004.

MINNEAPOLIS

Hiawatha Line

Status: Start up. First segment opened in June 2004. Entire 11.6 mile segment was completed in December 2004.

Technology: Light rail

Length of Existing Service: 11.6 miles.

Length of extension: Which corridor will be the next built is presently under consideration.

Character of corridor: Downtown, commercial, residential, expressway. From downtown Minneapolis, along a 4-lane

expressway that runs through residential and sparsely developed commercial areas, under the airport, through downtown Bloomington, ending at the Mall of America.

Currently, Minneapolis has only one light rail corridor, the 12-mile Hiawatha Line which connects three of the Twin Cities' most popular destinations – downtown Minneapolis, Minneapolis/St. Paul International Airport, and Mall of America in Bloomington. The 17 stations along the line are each fully ADA compliant, with ramps and tactile edges and elevators at stations on bridges. Major park-and-ride lots are located at the Fort Snelling and 28th Avenue stations.

The system utilizes 24 cars electrically powered by overhead wires. The 94-foot-long cars, manufactured by Bombardier, may be coupled together in pairs. Each car has four doorways and can hold 66 seated passengers plus standing room for 120. Inside each car are four luggage racks and four bicycle hangers. There are four wheelchair locations per vehicle and level boarding at each train door. Trains operate at a top speed of 55 mph, with a general service speed of 40 mph and slower speed in downtown.

Ridership, which comes from downtown Minneapolis, the University of Minnesota, 11 neighborhoods, Minnehaha Park, Minneapolis/St. Paul International Airport and Mall of America was 19,300 per weekday in 2005 and is projected to be 24,600 per weekday by year 2020. 46 Metro Transit bus routes connect to 14 rail stations with timed transfers. Twenty percent of rail customers arrive at their station by bus. Fare collection is self-service and barrier free. Light rail fares are the same as bus fares. Transfers are valid between bus and rail if used within 150 minutes.

The 12-mile line is largely on the surface with about 1¼ miles of tunnel beneath the Minneapolis/St. Paul airport. The bulk of the line is in residential areas along Highway 55, as opposed to business areas. The Hiawatha Line right of way was acquired decades ago. Bob Gibbons, Director of Customer Relations/Public Relations with Minneapolis Metro Transit explains that "it goes through a residential area and what was envisioned to be an 8-lane-wide roadway. The citizens rebelled and that project ended." Subsequently, there was a 25-year study of light rail. When the Hiawatha Line was constructed, MetroTransit "didn't have to take anybody's house. We had to take hardly any property at all," says Gibbons. Even though a line connecting Minneapolis and St.Paul has a projected

ridership of 44,000 riders/day, the Hiawatha line was chosen as the first line because of the simplicity of building in this available corridor.

The rail comes into downtown Minneapolis past the Metrodome Stadium, where the Minnesota Twins and Vikings play, then passes on through downtown to the Warehouse District, where there are a number of restaurants. Gibbons reports that about 40% of people who worked in downtown Minneapolis used public transit to get to work even before light rail service began. That figure was 17% for the entire Minneapolis/St. Paul area.

Gibbons anticipates that the next rail route will likely be commuter rail running up north from downtown Minneapolis to Big Lake. This route will follow Highway 10, one of the state's most congested. The Hiawatha Line will extend four blocks to the north to hook up with the North Star Commuter Rail Line. \$60 million in funding for this line is being sought at the state level. The Central Corridor, from Minneapolis to St. Paul, will likely be light rail, although that is not decided yet.

The Hiawatha Line was built by the Minnesota Department of Transportation, is owned by the Metropolitan Council, and is operated by Metro Transit. A \$715.3 million venture, it was the first time in Minnesota that a project wasn't 100% designed before construction began. Instead, as Gibbons explains the approach was design/build: "We designed 75% of the project and had industry tell us how to finish it. This allowed us to get our shovels in the ground earlier." The line broke ground in January of 2001. Its first segment opened in June 26, 2004 – 8 miles and 12 stations. The remaining 4 miles and 5 stations opened December 4, 2004 – 27 days ahead of schedule. Gibbons said Metro wanted to give holiday shoppers the chance to use the line to shop at the Mall of America at its south end.

LOS ANGELES

Gold Line Phase I

Gold Line Eastside Extension;

Gold Line Foothills Extension

Status: Extensions. Additions to Metro Red Line Subway and Metro Blue and Gold Light Rail Lines.

Technology: Light rail

Length of Existing Service: 73.1 miles as of July 2003, including subway and light rail lines.

Length of extension: Gold Line Phase I – 13.7 miles –

completed in July 2003. Gold Line Eastside extension – 6 miles – presently under construction; Foothills Extension – 24 miles – environmental impact study and reports are currently being done.

Character of corridor: Gold Line Phase I - Downtown, commercial, residential, freeway.

The Los Angeles County Metropolitan Transportation Authority (also known as Metro, MTA or LACMTA) is the regional transportation planning and public transportation operating agency for the county of Los Angeles. The agency develops and oversees transportation plans, policies, funding programs, and both short and long-range solutions that address the County's increasing mobility, accessibility, and environmental needs. The Los Angeles County Metropolitan Transportation Authority operates the third largest public transportation system in the United States by ridership with a 1,433-square-mile operating area and 2,000 peak hour buses on the street on any given business day. Metro also designed, built, and now operates 73.1 miles of urban rail service.

Additionally, the authority partially funds sixteen municipal bus operators and a wide array of transportation projects including bikeways and pedestrian facilities, local roads and highway improvements, goods movement, Metrolink, Freeway Service Patrol, and freeway call boxes within the greater metropolitan Los Angeles region. The authority has 9,200 employees, making it one of the region's largest employers.

The light rail system stretches from downtown Long Beach to downtown Los Angeles, to Hollywood, Universal City, and North Hollywood in the San Fernando Valley, from downtown Los Angeles to east Pasadena and from Norwalk to El Segundo and all points in between. From Union Station in downtown Los Angeles, Metro Rail passengers can transfer to Amtrak and the Metrolink commuter rail system. From the Green Line Aviation station passengers can transfer to a free shuttle that will take them to the Los Angeles International Airport terminals.

The Gold Line was envisioned in the early 1990s to run through Pasadena as an extension of the Blue Line. Work began in 1999 with the Pasadena Blue Line Construction Authority. At the time, the line was 11% completed before Metro took over. Once the Red Line was built, the construction for the Gold Line began at Union Station instead of 7th Street. Because the line was disconnected from the Blue Line, Metro decided to change the name. One proposed name was the Rose Line, but because future extensions of the line would go beyond

Pasadena, longtime home of the Rose Bowl and the Rose Parade, the board selected the Gold Line, in tribute to early pioneers in the area who sought gold. The \$740 million, 13.7-mile Gold Line, which opened on July 26, 2003, is Los Angeles' fourth light rail service and expanded Metro Rail to 73.1 miles.

Metro has the authority to construct and operate light rail systems in Los Angeles County and did the initial planning for the Gold Line. However, as one interviewee phrased it, because "nothing was getting done" regarding Metro's construction of the Gold Line, communities in that part of Los Angeles County succeeded in having legislation passed that provided for the formation – in 1999 – of the Los Angeles-to-Pasadena Metro Construction Authority (LPMCA) to design and build a light rail line from Los Angeles to Montclair. Phase I – the initial segment from downtown Los Angeles to Pasadena (the Gold Line) – was fully funded with state and local money at the beginning of construction. It was completed on time and under budget. Once LPMCA completed construction of the Gold Line, it turned over control of the Gold Line's operations to Metro.

Operating on the former right-of-way of the Atchison, Topeka, and Santa Fe Railway (AT&SF), where heavy rail as well as the Southwest Chief and the Desert Wind once operated, the Gold Line links Union Station in downtown Los Angeles and Sierra Madre Villa in East Pasadena via 13 stations, including Chinatown, Highland Park, South Pasadena, and Pasadena. This right-of-way was purchased in the early 1990s by Metro in anticipation of extending the light rail system east through the San Gabriel Valley. The trains start on an elevated rail structure running between Union Station and Chinatown, and subsequently traverse the Los Angeles River and the adjacent Golden Freeway before serving the hillside communities just north of downtown.

The line runs underground for a very short segment, after which it runs in the median of local streets in the neighborhood of Highland Park. After crossing the Pasadena Freeway using the historic Arroyo Seco Bridge, built in 1895, the Gold Line serves the city of South Pasadena, before moving on to downtown Pasadena. This part of the line contains a much longer underground segment of almost half a mile, where the line passes under Pasadena's main thoroughfare, Colorado Boulevard. The Memorial Park station, just beyond Colorado Boulevard, is below grade. The last leg of the Gold Line runs through the median of the Foothill Freeway, terminating at

Sierra Madre Villa station.

Trip time from East Pasadena to downtown Los Angeles is approximately 36 minutes. More than 150,000 riders boarded Metro Gold Line trains during its first weekend of operation. At 15,300 average weekday boardings, Gold Line ridership has been below official projections, which has resulted in cuts in service during the middle of the day and at night. Future extensions will be the Eastside and Foothill Extensions that will be completed in 2009 and 2010, respectively. Once the Foothill Extension is completed, a trip from Montclair to downtown Pasadena will take a little over 40 minutes, making the entire trip from Montclair to Los Angeles approximately 75 minutes.

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