

TRAINS OF THOUGHT

SIX CITIES, SIX LIGHT-RAIL SYSTEMS, SIX VISIONS

BY CHRISTOF SPIELER, P.E.

THIS NOVEMBER, before METRO opens its first light-rail line, Houston voters will decide whether to lay 22.1 more miles of track. Is it prudent, a voter might wonder, to build more light rail before the Main Street line has proven itself?

But in fact, light rail is no experiment. The United States' first light-rail line has now operated for 22 years. Since it was built, 12 cities across the country have opened light-rail systems. All the systems are still in operation, and all but one system has expanded since its opening.

Urban rail transit is nothing new. At the turn of the 20th century, every large U.S. city had rail — subways, els, and streetcars — but in most places those systems were eventually abandoned in favor of automobiles. By the 1960s, though, the downfalls of car dependency became clear: congestion, pollution, sprawl, and oil dependency. A handful of cities built modern "heavy-rail" systems. These massive undertakings — five- or ten-car trains running on tracks completely separated from all other traffic — lured commuters from their cars, but were also very expensive.

Light rail presented an economical alternative. A light-rail vehicle is essentially an advanced streetcar, quieter and more comfortable, but more crucially, used in a different way. Streetcars ran like buses do today: in the same lanes as cars, stopping frequently, with the driver collecting fares. These "street-running" habits made service bus-like — slow and unpredictable. Light rail was born when European cities separated streetcars from automobiles.

That separation can take different forms. The important point is that a light-rail line does not require a consistent right of way. In laying out a light-rail line, planners string together different segments — a street, an abandoned railroad line, a highway median, maybe a bit of tunnel — to form a single line. The resulting system grows out of history and happenstance.

Some cities were fortunate enough to have abandoned rail lines in the right places; St. Louis even had an unused subway under downtown. But sometimes neighborhood opposition or bad planning eliminates these possibilities, and sometimes they never existed in the first place. How a line is cobbled together determines how well a line works.

The perfect rail transit system goes where people want to go and gets them there quickly but does not interfere with traffic or disturb neighborhoods. Above all, it's inexpensive. Dozens of cities — those that have rail and want to expand, as well as those that want to build their first lines — compete for the \$1.2 billion or so the Federal Transit Administration annually allocates to supplement local funds for "New Starts." The FTA grades proposals on cost-effectiveness: How many riders for how much money? The straightforward question requires a complex answer, one full of tradeoffs. Saving money by using an available corridor is good — but not if that corridor misses ridership sources. Serving a high-density employment area is good — but not if it requires too much expensive tunneling. Serving a neighborhood by running trains on the street, like buses, may add riders — but it could discourage other riders by increasing trip times.

Such tradeoffs can be decided only by addressing a much bigger question: Who is rail for, anyway? But that's not a technical question, it's a political one.

Debates about rail often accentuate divisions between suburbs and inner cities. With the coming of freeways, cities tended to segregate along economic lines, as the middle class moved outwards and left the inner cities to the poor. This migration left most cities with a relatively prosperous car-oriented suburban fringe, a belt of declining poor areas inside the fringe, and a vestigial downtown at the center

— still a major employment center, but no longer a retail or entertainment destination. The rail systems of the 1970s were intended primarily to sustain those central business districts; business interests worried that congestion would drive white collar jobs out of the city and promoted rail as a way to make life easier for suburbanites coming to work. These goals are clear in the maps of these systems: San Francisco's BART has only a single line through the city, serving the financial district, but spreads out far into the suburbs. Washington D.C.'s MetroRail has more lines in the core, but they also concentrate on office areas. It's no accident that MetroRail's Green Line — which runs through minority inner-city neighborhoods — was completed long after its Red Line had been built miles into the suburbs.

Light rail came of age in a different era. Since the 1980s, cities have strived to revitalize their downtowns, sprucing them up with convention centers and boutique hotels, museums and ballparks, nightclubs and restaurants, lofts and condos. Meanwhile, inner-city neighborhoods around downtowns are gentrifying as the children of suburbia look for shorter commutes and homes with character. The donut city is growing a new inner ring.

In this new era, light rail's disadvantages turn into advantages. Tracks in the street, more visible than subway entrances, serve as beacons of renewal. Frequent stops encourage pedestrian activity. Even the novelty of rail — something that earlier planners worried might discourage riders — counts as a plus for people looking for something different.

The inner-city revival should not be overstated; the numbers of people involved are still small, and the suburbs have not stopped growing. But the inner city has become a major political focus. Richard Florida, author of *The Rise of the Creative Class*, and others argue that to succeed

cities must retain the young, the educated, and the innovative, and that such people want a livable, vibrant city. Light rail fits that lifestyle and that image.

But the poor have not gone away; they have simply been driven further out, into older suburbs. The city is as segregated as ever. We have the suburbanites, car-dependent but frustrated by traffic jams; the new urbanites, who'd rather ride than drive to work or a coffeehouse; and the poor, who ride transit because they have no other choice. Rarely is one of these groups enough to justify a light-rail system, but their interests do not naturally converge. Who to serve — and how — is the central question in planning a rail line.

Outside New York City, rail will never again be transportation that serves everyone for every reason. But that does not mean rail does not have a place. A good transportation system offers options. Some people want to live in the suburbs and drive to work; others prefer an inner-city neighborhood where they can take the train to work and to a restaurant on Friday night. All of these people are part of what makes a city work, and we need to make a place for all of them. That doesn't mean putting rail everywhere or putting freeways everywhere; people will move, as they always have, to places that meet their needs. To say that rail is bad because it cannot move to adjust to the population is silly; the population moves to adjust to the transportation infrastructure.

Light rail has succeeded in a variety of different cities because it is flexible enough to fit in varied places and meet varied needs. No two light-rail systems are alike; each reflects local geography, demographics, and political priorities. In the next seven pages are descriptions of six systems: one old, four modern, and one proposed. They might be a preview of Houston's future — or a glimpse of what might have been.

San Francisco: Street-running light-rail lines mix with automobiles and trucks in traffic lanes, and obey the same traffic laws. When traffic backs up, so does the transit service. This is the slowest and least reliable way to run rail, and prone to accidents.

Houston: Light rail in reserved lanes fits into a street but interacts with other traffic only at intersections, where it obeys traffic signals. Since Houston's signals are designed to give trains automatic green lights, rail schedules are predictable and light rail will be faster than buses.

San Diego: In private right-of-way, the rail line occupies its own strip of land, outside of streets. Where a street crosses the tracks at grade, railroad-style crossing gates protect the trains. The trains can travel at top speed with high reliability and modest impact on traffic.

Denver: The overpasses and underpasses of a freeway provide an easy way to separate rail from traffic. But development alongside a freeway is not usually transit-oriented and station surroundings are often unfriendly to pedestrians.

Dallas: An elevated rail line avoids traffic altogether, but costs several times as much as a line at grade. Unlike the "els" of Chicago, new elevated lines are rarely built along streets (communities don't find that aesthetically acceptable); instead, they use a strip of private right-of-way.

Portland: Subways allow rail to avoid traffic completely, but are expensive to build. Tunnel stations also raise crime concerns, are more expensive to maintain, and don't have the visible presence of above-ground stations.



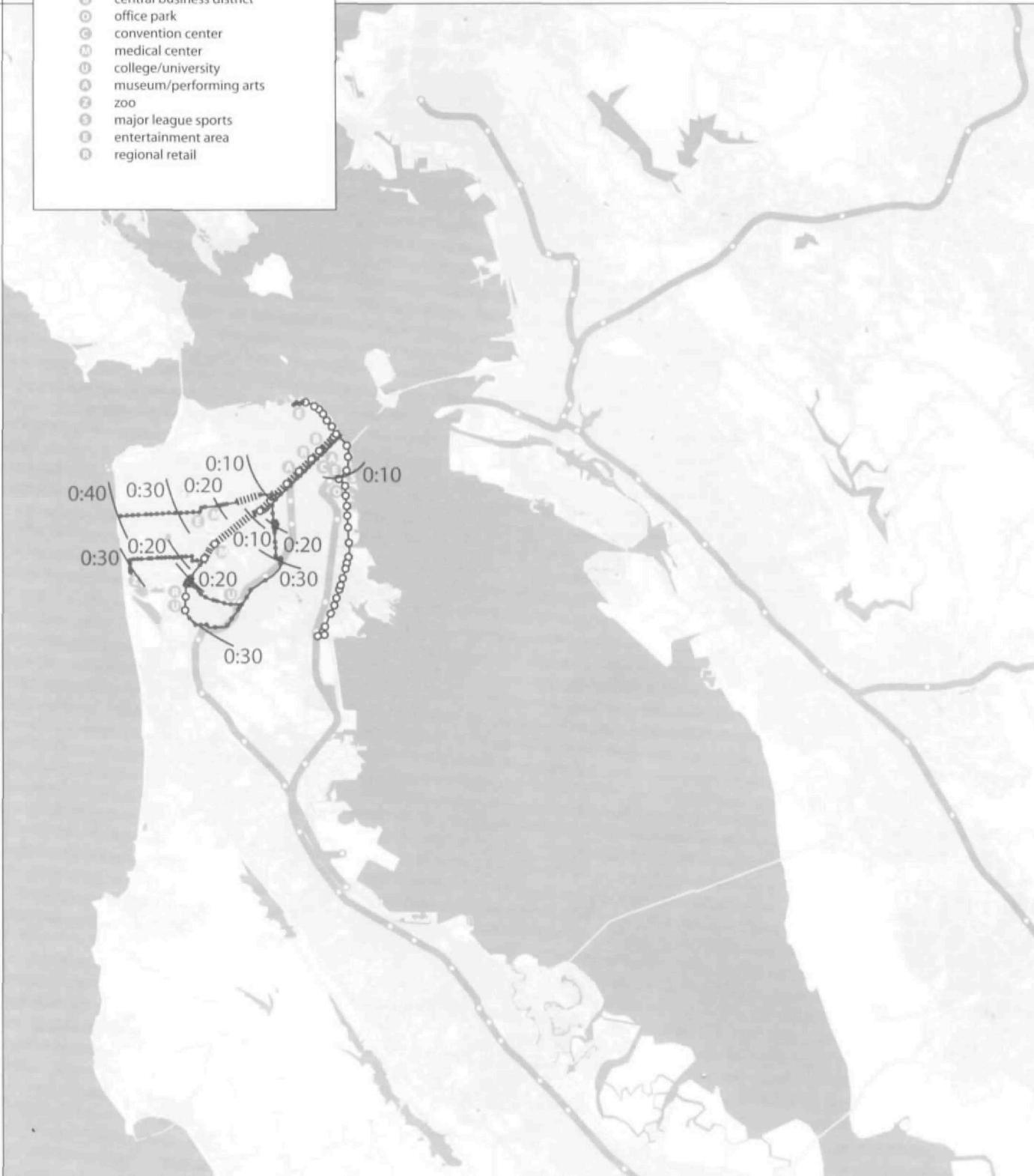
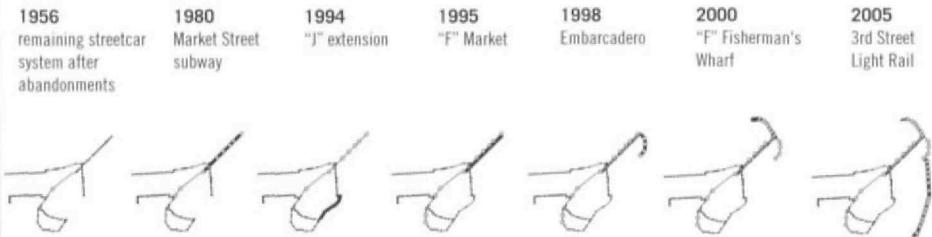
Christof Spierer, P.E.

San Francisco, California

MUNI
 in street
 private right of way or elevated
 tunnel
 station (none have park-and-ride)
 10:00 travel time to downtown

BART (heavy rail) / Caltrain (commuter rail) station

Light rail destinations
 central business district
 office park
 convention center
 medical center
 college/university
 museum/performing arts
 zoo
 major league sports
 entertainment area
 regional retail



SAN FRANCISCO was one of the few U.S. cities that did not entirely eliminate its streetcar system. A combination of political pressure (from residents who preferred streetcars to buses) and expediency (three lines used tunnels that could not easily be converted to bus) saved four of the lines. Into the 1970s, 1940s-era streetcars still rolled down the streets of San Francisco.

Meanwhile, work was underway on the transit system of the future: sleek, comfortable, computer-controlled, completely separate from street traffic. The result was the Bay Area Rapid Transit system — intended not to replace the streetcars, but to bring suburban commuters into the city. It would run through downtown San Francisco in a subway under the streetcar tracks on Market Street. Plans for the subway included a second level that was above the BART tracks and below the station mezzanine. San Francisco decided to use that level for the streetcars, taking them out of street traffic in the city center. At the same time, the system was re-equipped with modern light-rail vehicles and renamed MUNI Metro.

The light-rail vehicles now run up to five and a half miles in a tunnel, averaging a speed of 20 miles per hour. Once they emerge on the surface, though, they revert to the ways of a traditional streetcar. They run in lanes shared with cars, down the center of residential streets and shopping areas. Most light-rail stops are nothing more than an orange band painted around a streetlight, and the stops are spaced closely. Nobody would design a light-rail system like this nowadays, but it works. This is the second busiest light-rail system in the country, and the N-Judah line alone carries 41,600 weekday passengers — more riders than half the light-rail systems in the country can claim. In the dense residential and commercial neighborhoods that grew up around the streetcar, light rail is indispensable. San Francisco has only half a car per capita.

In the past decade, MUNI has expanded the system with surface lines built to modern light-rail standards. First came a short extension from the formerly dead-end downtown subway to the surface and along the southern waterfront, a formerly industrial area redeveloped with apartments, offices, and a new baseball stadium. Construction is now underway on extending that southwards, through the Mission Bay redevelopment area (offices and a University of California medical research campus) and into Bayshore, San Francisco's poorest neighborhood. Some transit activists have questioned the need for these lines, pointing to more congested corridors elsewhere in the city (including the Geary Avenue bus, with 50,000 weekday riders). MUNI's supporters point out that the new line serves the areas where San Francisco can accommodate growth. Light rail will encourage that development to be the dense, transit-driven style, like the old streetcar neighborhoods — not the suburban sprawl created by freeways.

Meanwhile, MUNI has also revived the traditional streetcar. The tracks that carried streetcars down Market before the subway was built have been rebuilt, and restored streetcars from Philadelphia and Milan provide local service, stopping more frequently than the subway. Thus, Market street has three levels of rail transit: BART on the bottom, connecting the city to the suburbs, MUNI Metro above, connecting downtown to the outer neighborhoods, and the historic streetcars, serving the inner core. The historic streetcar line has also been extended along the northern waterfront to Fisherman's Wharf. The antique vehicles, an integral part of the transit system, carry more than 20,000 locals and tourists on an average day.

San Francisco, California, MUNI Metro **Operator:** San Francisco Municipal Railway **Funding source:** city general fund, 0.5% sales tax for transportation (capital costs), city general fund, federal and state funds (capital costs) **Service area population:** 0.8 million **Bus weekday trips:** 564,000 on 907 vehicles **Light rail weekday trips:** 164,000 on 163 vehicles

san francisco municipal railway

MUNI Metro

SAN DIEGO was the first U.S. city to build a new light-rail system. In 1979, local governments had the opportunity to purchase the San Diego and Arizona Eastern railroad, which ran south from downtown San Diego to the Mexican border at Tijuana, then east through the desert, with a branch line from the downtown area to the northeast. These lines provided the core of a new, low-cost light-rail system built without federal funding and with few frills. The trains were off-the-shelf light-rail vehicles already in use in Germany; the stations were simple; and the planners avoided expensive structures such as overpasses or tunnels. The South Line and East Line both followed the railroad tracks to the southern edge of downtown, then ran in the center of city streets through downtown to the railroad station, where Amtrak trains connect to Los Angeles.

The system succeeded immediately. The South Line ends only yards from the Mexican border; locals soon discovered they could take the trolley to Tijuana. Mexicans commuting to jobs in San Diego found it even more useful. Navy sailors from the Pacific Fleet can take light rail downtown. Park-and-ride lots serve suburban commuters. The line has attracted steady ridership throughout the day, with the first train running at 4:17 a.m. and the last at 1:52 a.m. Within three years of its opening, the South Line was carrying more than twice as many passengers as express buses had previously served in the same corridor. The East Line is more commuter-oriented, and thus has more pronounced rush hours. After three years, it carried almost four times as many passengers as the buses had.

The next extensions followed active railroad tracks along the revitalized waterfront, extending light rail south to loop around downtown and north to a major transit center. These lines serve the new convention center, hotels, and entertainment areas.

The plans then grew more ambitious. In Mission Valley, a series of shopping centers, a medical complex, Qualcomm Stadium, and San Diego State University line a narrow greenbelt floodplain — in other words, no obvious path for rail, but lots of potential ridership. Fitting in the tracks required building lengthy elevated structures, rerouting a creek, and even building a short tunnel to reach the center of the SDSU campus. The western half of the Mission Valley extension opened in time to carry crowds to the 1998 Super Bowl; the eastern half is now under construction. In addition to bus and park-and-ride commuters (the stadium parking lot, just off of Interstates 8 and 15, becomes a 17,000-space park-and-ride lot when no event is in progress), the Mission Valley line serves stadium spectators and shoppers. The Trolley is marketed as a way to park at one shopping center and shop at all of them.

Reaching the many areas still not served, particularly to the north, will be expensive. But the Trolley's track record has generated the political support needed to extend the system into more difficult corridors.

1981	1986	1989	1990	1992	1995	1996	1997	2004
South Line 15.9 miles	East Line to Euclid 4.5 miles	East Line to El Cajon 11.3 miles	Orange Line Bayside 1.5 miles	Blue Line Bayside 0.5 miles	Orange Line to Santee 3.6 miles	Blue Line to Old Town 3.2 miles	Mission Valley West 6.1 miles	Mission Valley East 5.8 miles = 52.4 miles total



San Diego, California

San Diego Trolley
current and under construction

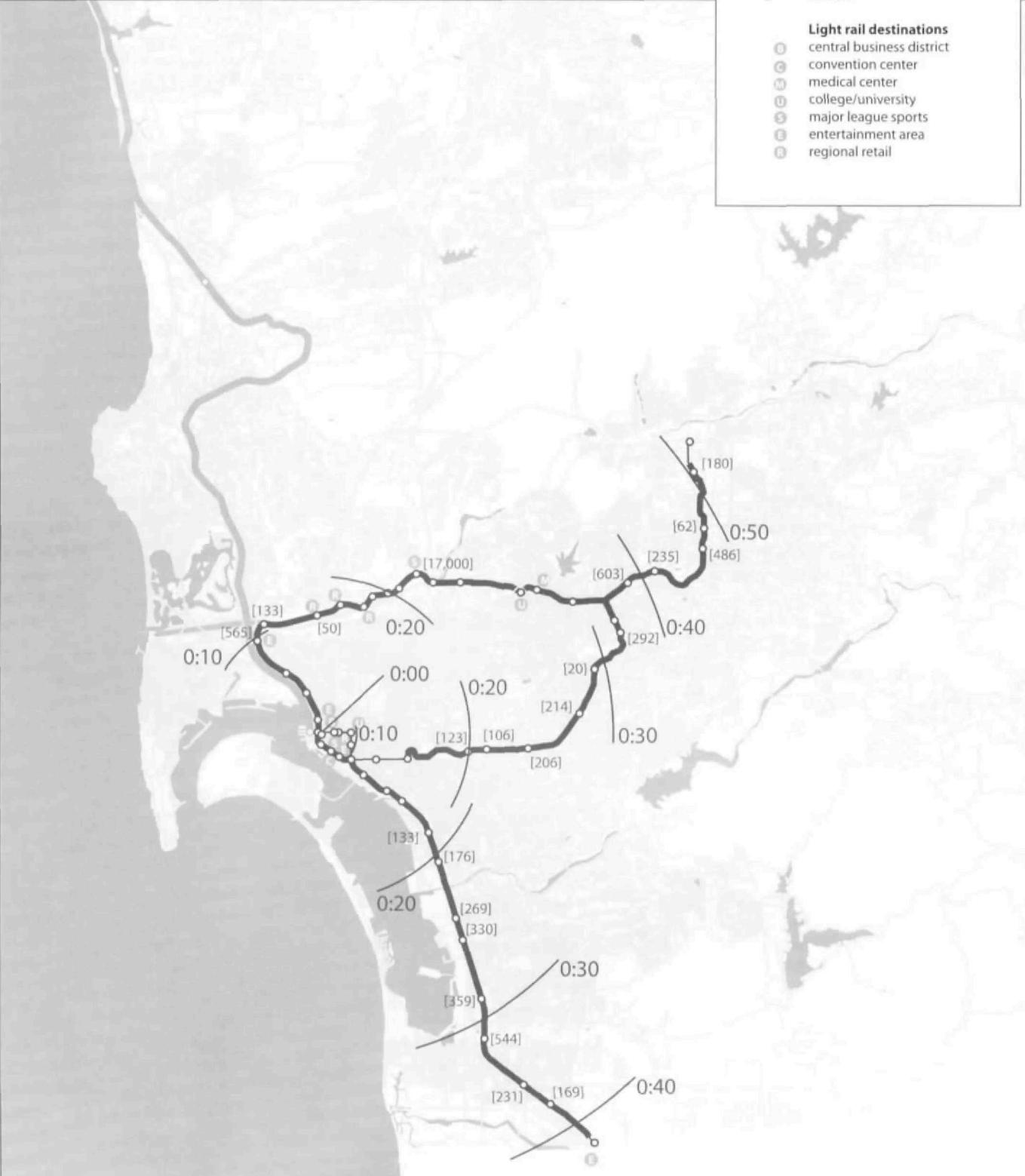
- in street
- private right of way or elevated
- tunnel
- station
- [99] number of park-and-ride spots
- 10:00 travel time to downtown

Coaster (commuter rail)
current

- station

Light rail destinations

- central business district
- medical center
- college/university
- major league sports
- entertainment area
- regional retail



San Diego, California, San Diego Trolley **Operator:** San Diego Metropolitan Transit Development Board **Funding source:** 0.5% local sales tax; state and federal funds (capital costs only) **Service area population:** 2.1 million **Bus weekday trips:** 167,000 on 408 vehicles **Light rail weekday trips:** 84,000 on 86 vehicles

san diego metropolitan transit development board

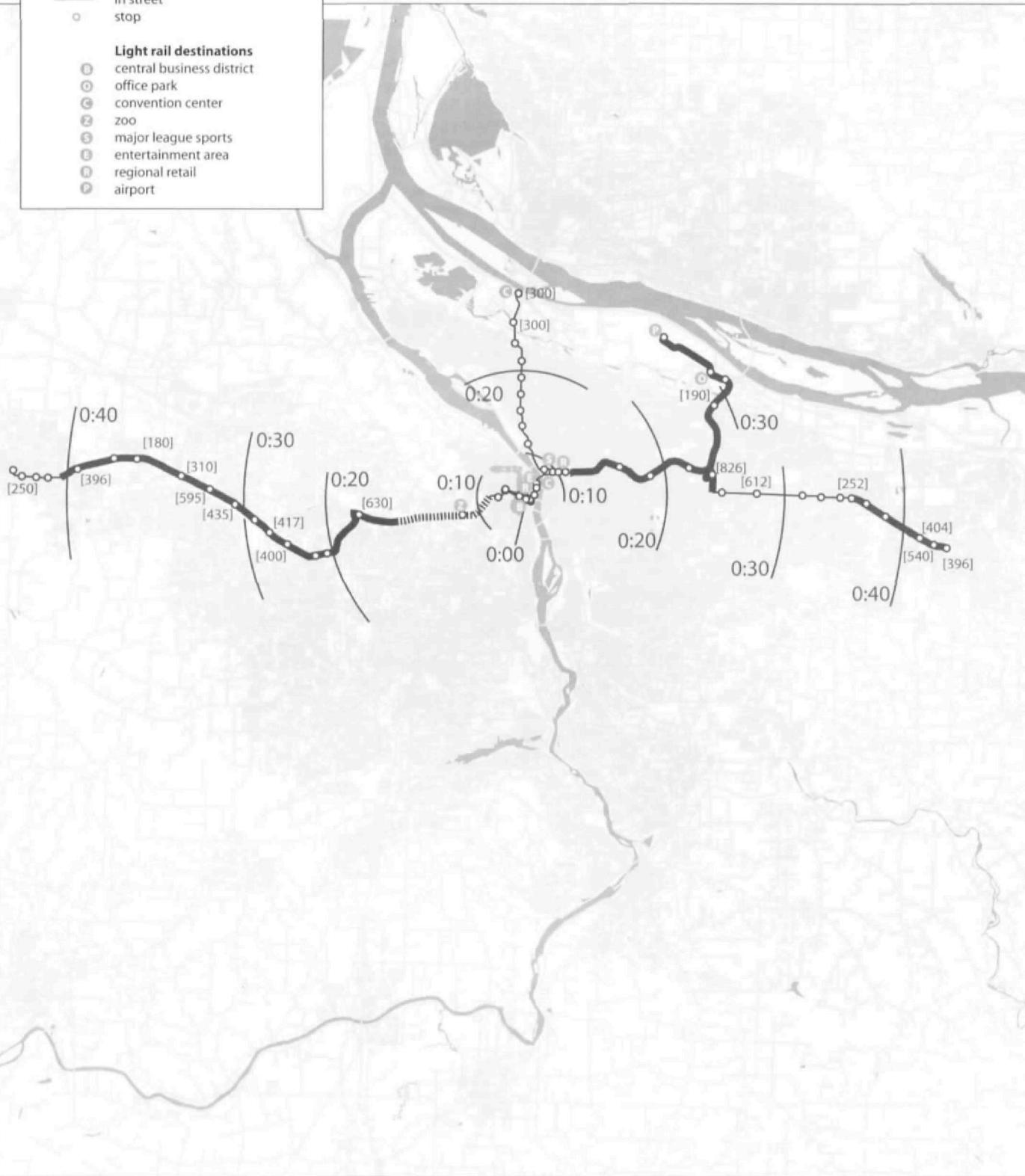
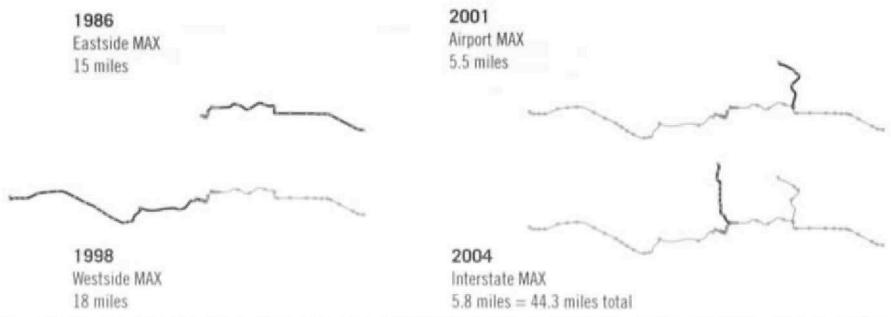
TROLLEY

Portland, Oregon

MAX light rail
current and under construction
 in street
 private right of way or elevated
 tunnel
 station
 10:00
 [99] travel time to downtown
 # of park-and-ride spaces

Portland Streetcar
current
 in street
 stop

Light rail destinations
 central business district
 office park
 convention center
 zoo
 major league sports
 entertainment area
 regional retail
 airport



PORTLAND'S light-rail system was born in a freeway revolt. The Mount Hood freeway, proposed in the 1940s, would have headed west from downtown Portland, cutting through inner-city neighborhoods on its way to suburban Gresham. In 1969, the beginning of demolition for the new freeway prompted the election of anti-freeway activist Neil Goldschmidt to city council. As mayor, he presided over a city council vote to cancel the freeway. He also persuaded the federal government to allow Portland to reallocate \$500 million in freeway funds to other projects, including a \$214 million, 15-mile light-rail line from downtown to Gresham. Construction began in 1981, and service started in 1986.

The Gresham line, named MAX (Metropolitan Area Express), runs through the center of downtown on a pair of one-way streets. It crosses the downtown transit mall, which provides bus service to other parts of downtown. A streetcar line, opened in 2001, also connects with MAX in downtown, with service to Portland State University, northwest Portland, and the Pearl District. The light-rail line uses a street bridge across the Willamette River to leave downtown. After a few more blocks of running in the street past the Oregon Convention Center and the state's largest mall, the tracks squeeze between a freeway and a freight railroad line to pass through residential neighborhoods.

In the first decade, light rail's daily ridership grew from just under 20,000 to 30,000, and Tri-County Metropolitan Transportation (Tri-Met) cites \$3 billion in development along the line. A 1997 Portland State University study found that houses adjacent to light rail stations were worth 10 percent more than those farther away.

Geography created difficulties for the second phase, a western line. Hills lie between downtown and the suburbs of Beaverton and Hillsboro, and the only way through was a tunnel, three miles long, dug through solid rock. Beyond the tunnel, the line follows a highway, old rail lines, and runs briefly on suburban streets. The Westside line also proved a success. Before it opened, about 14,300 people a day rode Tri-Met buses into downtown from the Westside; by 2002 there were 13,600 bus riders and 29,000 rail riders — more than had been projected for 2005. Overall MAX ridership more than doubled, to more than 75,000 passengers a day in 2002. A Tri-Met survey found that 77 percent of bus and light-rail riders have cars and ride by choice.

In taking the next step, a north-south line, Tri-Met suffered setbacks. In 1994 and 1998, voters in Portland and across the Columbia River in Clark County, Washington, rejected north-south line proposals. In Washington, most saw no benefit in a line that would serve only a small part of the county. In Oregon, several neighborhoods had concerns about the line's alignment. Without voter approval, Tri-Met couldn't issue bonds, but the agency found other ways to finance. A land swap enabled construction of a line to the Portland Airport, on the shore of the Columbia River. The city traded a large plot next to the airport to the Bechtel Corporation in exchange for Bechtel's constructing the Airport MAX line, which also serves Bechtel's property. Tri-Met used that private funding — which enabled the Airport MAX line to be built without federal money — as a financial match to obtain federal funding for a line along Interstate Avenue north from downtown and to the Columbia. When it opens in 2004, there will be two light-rail lines directly across the river from Washington — in case Clark County changes its mind.

In Portland, light rail is part of a broader vision that aims to combat traffic with planning, not freeway lanes. Zoning codes encourage higher-density development; a growth boundary around the city limits sprawl; and local governments provide tax breaks and financial assistance to developers building transit-oriented projects. Anti-rail and anti-planning think tanks point out that most Portlanders still drive their cars to work and that highway congestion is still increasing. But locals, particularly in Portland itself, support both the planning and light rail. For MAX, Tri-Met cites an astonishing 90 percent approval rating.

Portland, Oregon, MAX **Operator:** Tri-County Metropolitan Transportation District **Service area population:** 1.2 million **Funding source:** 0.6218% payroll tax in service area, federal funds (capital costs) **Bus weekday trips:** 214,000 on 695 vehicles **Light rail weekday trips:** 77,000 on 72 vehicles

portland tri-county metropolitan transportation district

MAX

When DENVER'S first light-rail line opened, it ran from nowhere (a run-down residential neighborhood a mile and a half north of downtown) to nowhere (a transit center next to a freeway three miles southwest of downtown). This was the best the Regional Transportation District could do; previous attempts to raise taxes for regional rail proposals had failed. The Central Line did all right, though, mainly because buses from the south were rerouted to feed into rail. A 1,000-space park-and-ride lot at the south end of the line also brought some riders. In 1995, there were 13,100 riders on an average weekday. By 1999, that number was 16,100, 30 percent of whom were new to transit.

Colorado has strong anti-tax politics; state government must refund any increase in revenue that is above that attributed to inflation and the increase in population. Thus, RTD had to ask voters to increase spending even when its tax base grew. In 1995, RTD requested that its tax ceiling be increased for a light-rail extension south to Littleton. This time, the measure passed.

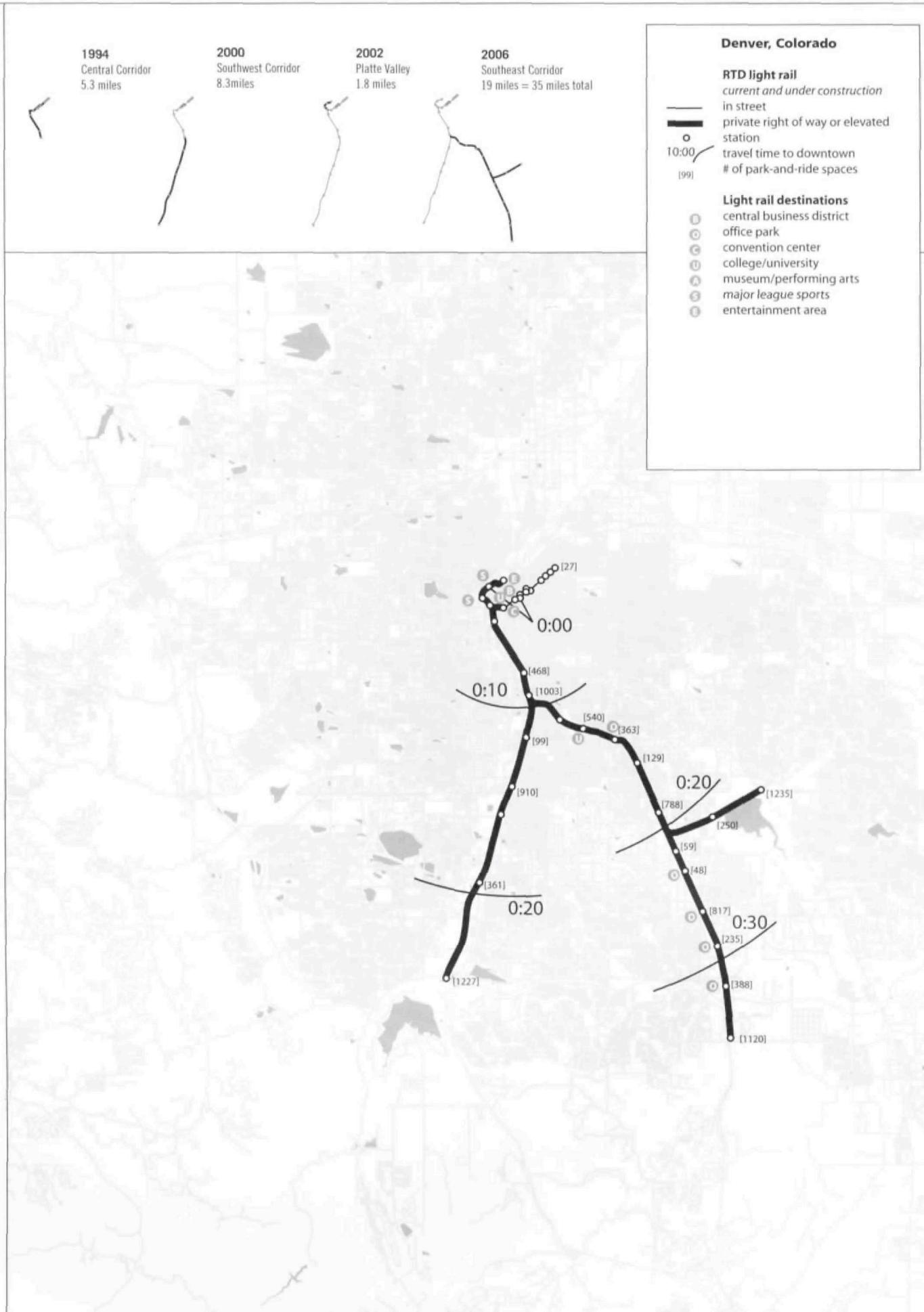
The Southwest Corridor extension followed active railroad lines through suburbs along Santa Fe Boulevard in a corridor with lots of commuters and no freeway. Once again, bus lines were rerouted, but the extension relied heavily on park-and-ride lots, with 2,600 spaces at four stations. As soon as the line opened in 2000, the lots filled, and RTD scrambled to provide more spaces. Riders complained about crowded trains. On an average weekday 13,300 people rode the new line (compared to 8,400 projected); 34 percent were new to transit. Light rail was no longer a train to nowhere.

With the Southwest Line a success, RTD considered further extensions. Planners concluded, though, that the original line, which followed streets through downtown, lacked the required capacity. So work began on a second downtown line, which follows the Platte Valley past Mile High Stadium to Union Station at the edge of the trendy LoDo area. Like the original line, it connects to the downtown transit mall, where free, frequent buses provide service to offices, shops, and the civic center.

Voters did not immediately embrace the system's expansion. A proposal to raise taxes for a regional system failed in 1997, but two years later a measure to fund the Southeast Corridor extensions passed.

The Southeast Corridor far exceeds the Southwest line in scope and potential. Denver stretches almost 20 miles across the plains to the southeast, and so far a commuter's only choice has been Interstate 25, the most congested highway in Denver. In the 1990s, the Colorado Department of Transportation studied expanding I-25 and found that any growth would be a tight squeeze. With little additional right-of-way available, any lanes added now might be the last ever. The highway department proposed to include light rail.

Pairing rail transit and freeways is nothing new; Chicago replaced an "el" with a rapid transit line in the center of the Eisenhower Expressway in 1953; San Francisco and Washington followed suit in the 1970s. But for those cities, the goal was simply to combine two modes of transportation in one corridor. The Colorado Department of Transportation saw light rail as a way to expand the freeway's capacity. When the freeway was expanded, the department reasoned, congestion would decrease at first, but then rise again as the population rose and no additional lanes could be built. But a rail line the width of a freeway lane has tremendous spare capacity. If three-car trains running every ten minutes fill up, you can run them every five minutes, or even run four-car trains every three minutes. In other words, a six-fold increase in capacity requires only the purchase of more rail vehicles. In the Southeast Corridor, rail's primary purpose is not to serve today's needs; it's to provide relief for future demand.



Denver, Colorado, The Ride **Operator:** Regional Transportation District **Funding source:** 0.6% sales tax, federal funds (capital costs) **Service area population:** 2.4 million **Bus weekday trips:** 238,000 on 1,163 vehicles **Light rail weekday trips:** 31,000 on 31 vehicles

denver regional transportation district

The Ride

Dallas, Texas

DART light rail
 current
 in street
 private right of way or elevated
 tunnel
 station
 10:00
 [99] travel time to downtown
 # of park-and-ride spaces

Trinity Railway Express (commuter rail)
 current
 station

Light rail destinations
 central business district
 office park
 convention center
 medical center
 college/university
 museum/performing arts
 zoo
 entertainment area

1996-1997
 (in 3 stages)
 Starter System
 20 miles

2001-2002
 (in 5 stages)
 Red Line to Plano and
 Blue Line to Garland
 24 miles = 44 miles total



DALLAS Area Rapid Transit opened a 20-mile light-rail "starter system" in 1996 and 1997. The modest name *concealed great ambitions.*

In 1988, 58 percent of voters had rejected DART's plan to issue bonds for a 93-mile light-rail system. Despite that huge margin, the plan never went away. The "starter" line, built without bonds, was designed to be the core of that system, and it was built accordingly. On both ends of the downtown section are massive structures: a 3.5-mile tunnel under the North Central Expressway on the north and a 0.9-mile bridge over the Trinity River on the south. These were expensive projects, but they provide critical links, connecting downtown to ready-made rail corridors in the form of abandoned railroad lines, of which DART owns 125 miles. Two such corridors provided the path for extensions north to Plano and Garland, which opened last year.

These extensions have resulted in an oddly lopsided system. But the shape is telling: DART is two systems, one north and one south, with different purposes and characters.

The south end serves mostly lower-income, more transit-dependent neighborhoods. Trains run past back yards and down the center of a commercial street. The stations are designed for pedestrians and as bus hubs; park-and-ride lots are small. Besides the Trinity bridge, there are few major structures. The trains generally cross streets at grade. It's a typical light-rail system: efficient and not overly elaborate.

There's nothing modest about the north end. After a fast passage through the tunnel, trains emerge near SMU at Mockingbird Station, which is built in a huge trench with escalators up to street level. The two northern lines split even before leaving the trench. Neither stays on the ground for long: the lines cross major streets with overpasses. As a result, several stations are elevated. The goal here is to get suburbanites out of their cars and onto trains. Fast service — the trains speeding above cars stopped at red lights, past suburban shopping strips and the mid-rise office buildings of the Telecom Corridor — encourages them. So do vast parking lots at stations.

DART's light-rail system is different things to different people: a more comfortable alternative to the bus for some, a less stressful ride than the freeway for others. Socioeconomic segregation has allowed DART to serve two very different populations in very different ways: commuters get parking lots and fast trips; the transit-dependent get neighborhood stations. The bifurcated plan works: the first segment of the system to be opened started with 18,000 daily riders as opposed to the projected 15,000; the entire starter system carried 7 percent more riders than projected.

DART also pulled off another balancing act: It pleased the voters. The 1988 rail referendum was no fluke, and DART's unpopularity lasted through the early 1990s. Member cities regularly contemplated leaving the authority; Flower Mound and Coppell did. Now, light rail remains a hot political issue, but in a very different way: The question is not whether, but where and when. (The current debate is whether to spend more to serve the Love Field terminal directly with an underground station. Dallas likes the idea, but suburban mayors don't want the project to take priority over extensions to their cities.) In 2000, when DART asked voters to approve \$2.9 million in bonds to speed up expansion, 77 percent voted in favor.

Dallas is now touted as a light-rail success story. The obvious conclusion is that once voters see trains running, they think differently about rail. But Dallas' approach was not really incremental. It was ambitious from the start. The difference between the rail system that the voters rejected and the one they now support is not substance but perception. What Dallas is now building is essentially the same as what it would have built had DART gotten its way the first time around.

Dallas, Texas, DART Light Rail **Operator:** Dallas Area Rapid Transit Authority **Funding source:** 1% sales tax in service area, federal funds (capital costs) **Service area population:** 2.1 million **Bus weekday trips:** 214,000 on 858 vehicles **Light rail weekday trips:** 39,000 on 95 vehicles (includes spare vehicles for unopened extensions)

dallas area rapid transit authority

DART light rail

HOUSTON is infamous in transit circles for its repeated rejection of rail. The track record is striking: Twice, METRO got as far as selecting contractors for rail systems before political winds shifted. When rail construction finally began, it was despite lawsuits and a citizen initiative that proposed literally to rip completed tracks out of the streets. Rail is controversial everywhere, but Houston is extreme. With the 2001 passage of Proposition 1, Houston is the only major city in the United States where voters must approve any new rail transit line regardless of funding.

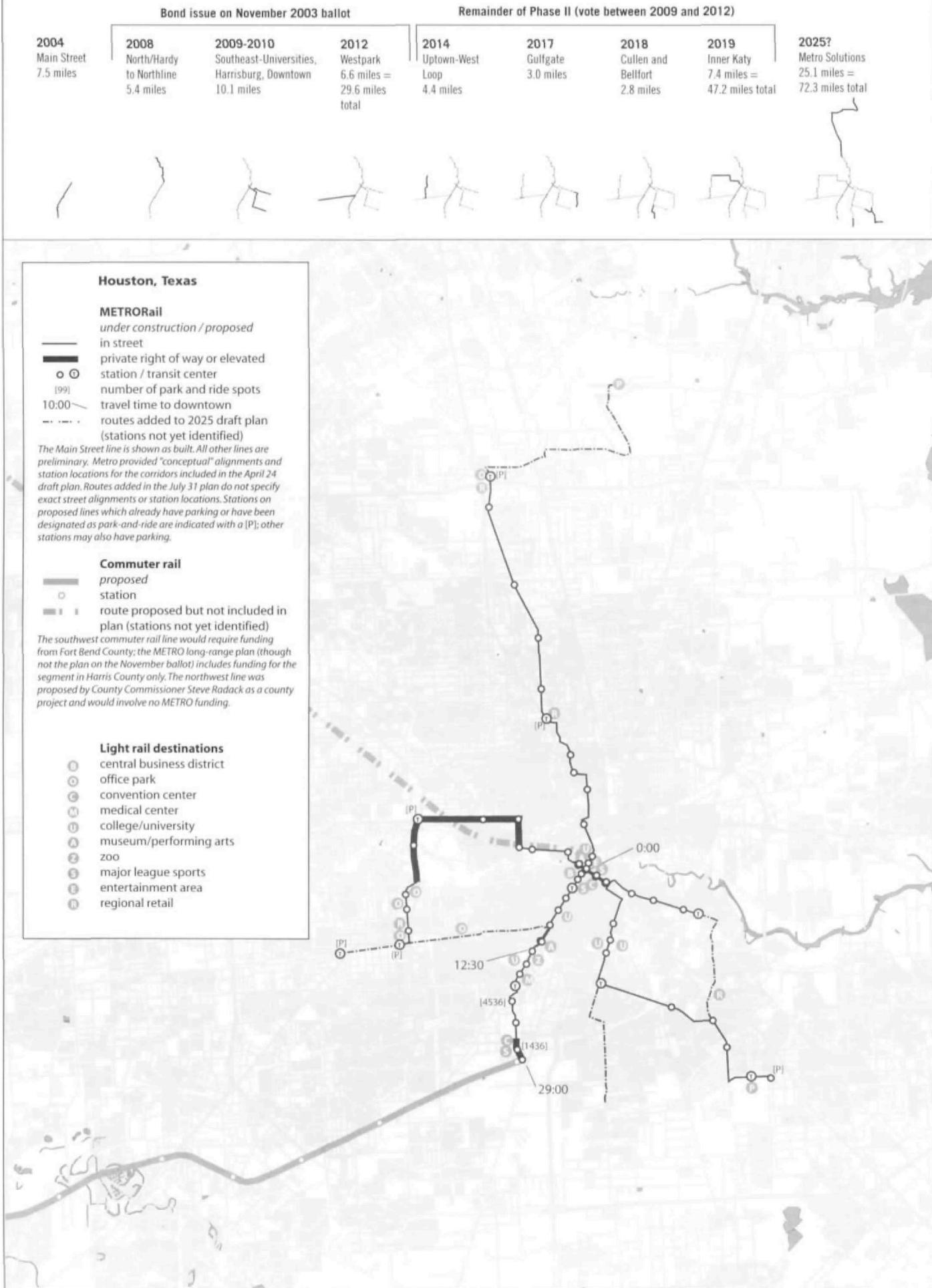
Less obvious than the contentious history is the legacy of the rail battles: Money that would have gone into a subway or monorail went instead to a network of High Occupancy Vehicle lanes. HOV lanes are the unloved stepchild of transit; they have never gotten much political support or public awareness. Conservatives sing their praises to defeat rail plans, then talk of converting them to tollways when the rail threat is gone. Transit supporters dislike something that looks so much like a freeway. But the 91-mile Houston system has become a quiet success. During a weekday rush hour, the six HOV lanes carry as many people as 24 freeway lanes. Up to a third of those people ride in buses. The comfortable, speedy service that HOV-lane buses provide to downtown from park-and-ride lots would be hard for any other mode of transit to beat. But if you aren't going to downtown, are going against the commute direction, or live inside the 610 Loop, the HOV lanes don't help. This is where rail might fit in.

Houston's first venture into light rail, the Main Street line, is a good example of a niche rail can fill. It ties together a corridor that has high current transit ridership, major sources of potential ridership, and potential for new, transit-friendly development. The Main Street Line is in large part a collector-distributor system. By collecting bus riders at transit centers at Fannin South, the Medical Center, and Wheeler, light rail will eliminate 1,200 bus trips a day. The rail line will also link destinations such as the Medical Center, Museum District, and Midtown to downtown, which is the hub of the bus system; riders from other parts of the city will be able to ride downtown on a bus (including the HOV-lane buses), then take the train to their final destination. South of the Medical Center, park-and-ride lots at Fannin South (owned by METRO) and Smithlands (owned by the Texas Medical Center) will provide satellite parking for the Medical Center. As downtown and Midtown residential development continues, light rail may find a new market: people who live along the corridor and work downtown or in the Medical Center.

No other city has built a first rail line that packs so much into so short a corridor. The Main Street line serves not one major employment center, but two; the Medical Center has as many employees as downtown San Diego. With about 30,000 weekday boardings, the 7.5-mile Main Street line is expected to carry about as many passengers as Sacramento's 18.3-mile system, Salt Lake City's 15-mile system, or Baltimore's 22.5-mile system.

The Main Street line was intended from the beginning to be suitable as the core of a bigger system. Even as construction was underway, METRO conducted three corridor studies: North/Hardy, Southeast-Universities, and Uptown-West Loop. When METRO released its draft METRO Solutions plan in April, all were included, in addition to an Inner Katy segment connecting the Galleria line to downtown, and a spur along Harrisburg Road — 41 more miles of light rail by 2025.

Unlike most light-rail systems, the proposed routes, like the Main Street line, were mainly in streets. That means slower speeds: an average of 15 miles per hour, including stops, for the Main Street line (speeds would be higher on the proposed extensions, which



Houston, Texas, METRO Rail **Operator:** Metropolitan Transit Authority of Harris County **Funding source:** 1% sales tax in service area, federal funds (capital only; no federal funds used in Main Street light rail) **Service area population:** 2.6 million **Bus weekday trips:** 336,000 on 1,417 vehicles

houston metropolitan transit authority

METRO Rail



Reliant Park station on the Main Street line.



Ensemble/HCC station.



Downtown Transit Center.



Passing the Rice Hotel.

would have fewer stops). But because the petrochemical industry continues to rely on freight rail, Houston does not have the convenient abandoned rail lines other cities have been able to use. All the studies considered using active or inactive railroad lines; only the Galleria line ended up with private right-of-way (along an abandoned rail line in the western parts of the Heights and along 610 north of Post Oak).

In many cases, private-right-of-way options were eliminated because they did not serve neighborhoods and thus attracted fewer riders. Street alignments are often more pedestrian-friendly and promotes redevelopment by making rail a visible element in the cityscape. This is the same trade-off other cities have faced. Most cities have opted to sacrifice service for inner-city neighborhoods in favor of faster trips for suburban commuters; Houston's HOV system made that option less attractive, because many of those commuters are already using transit.

Most light-rail systems have been designed to attract riders not currently using transit. Stereotypically, that means affluent white suburbanites. Inner-city, lower-income, and minority areas — the areas where bus ridership is usually concentrated — have been served incidentally. METRO's plan instead focused on these areas: the inner north side along Fulton, Cavalcade, and Airline; the near east side along Harrisburg; and the Third Ward and neighborhoods north of Hobby Airport. Of all the proposed lines, only the Galleria line would serve gentrified or well-to-do neighborhoods (the Heights and Post Oak), and it would also put a transit center on the edge of the dense, lower-income Gulfton apartment area. The proposed lines could dramatically improve transit service to lower-income areas, connecting residents to jobs and educational opportunities.

Public reaction to the draft plan supported METRO's strategy: Most commenters asked for more rail, not less. The Post Oak business community wanted a more direct connection to the Main Street line. Continental Airlines asked for a station at Intercontinental Airport, and even offered to put up money if express service were provided to downtown. Residents of the primarily Hispanic east side said that the Harrisburg line was not enough, and presented to METRO a proposal to extend the line further east, then south to Gulfgate Mall. The African-American community pointed out that Sunnyside, a populous, poor area west of Hobby, wasn't served. METRO listened. When the "final" plan was approved at the end of July, it had four

additions: a line along Highway 59 connecting Main Street to the Galleria; an extension of the Greenspoint line to Intercontinental; the Gulfgate line; and a branch to Sunnyside. The total: 24 more miles of rail and the support of key communities.

But there was a catch. In 1992, after killing a monorail system, Houston Mayor Bob Lanier had the METRO board send 25 percent of its revenue to local cities and the county for road improvements. The intent was to prevent METRO from building up a cash reserve that could be used for future rail, but the effect was to make small cities in the METRO service area dependent on the funds. The draft plan proposed ending this funding after 2009, which might mean tax increases in those cities. The METRO board members who represent them voted against the July 31 plan.

Negotiations behind the scenes created a new plan: The payments would continue through 2014, and bonds would be issued to start rail construction as soon as design can be finished. The tradeoff: less rail. The new "Phase II" plan included only 39.7 miles of rail lines by 2019, some of which were in the draft plan and some of which weren't. Both lines to the Galleria, the line to Gulfgate, and part of the Sunnyside line remained, but Greenspoint and both airports weren't included. The rest of the rail remains in the plan with funding and timing to be determined later. The board voted again on August 12; this time the small cities were largely on board.

Behind the scenes, though, not everyone was happy. When the board met August 18 to define ballot language, a 4-to-5 vote defeated the 39.7-mile plan. The sticking point was still the road funds; the solution was to delay the decision. A seriously scaled-down version of the original proposal — 22.1 miles of rail — could be built before 2012 without cutting off road funds; the board called for another election between 2009 and 2012 to approve funding for the rest. This plan received the cautious endorsement of ex-mayor Lanier, still a respected voice, and squeaked by the board 5-to-4.

The 22.1 miles to be put before voters (unless the board changes its mind again) are the northwards extension to Northline Mall, the Harrisburg line as far as the Magnolia Transit Center, the Southeast Line to the 610 Loop, and the Highway 59 line as far as Hillcroft. These would have been the first segments built under the previous plan, and their projected completion dates have not changed. Houston could still get the full 65 miles of rail by 2025 — but that would require at least

one more election and hard decisions later. That possibility isn't much consolation for the areas left out. The Post Oak business community clearly hoped for a boost from rail, but the new plan only gets near the area. The Heights — a progressive, pedestrian-friendly area that might welcome rail — gets nothing.

The board's strategy seems to be to avoid opposition. Historically, opponents have succeeded in convincing voters who supported rail in general to defeat specific plans. By getting Lanier out of the way and preserving road funds, METRO might defuse critics. Those moves, combined with high voter turnout on the East and near North sides, could be the key to passing a rail plan.

But the modest plan may also turn off voters. The Main Street line is widely perceived as too little rail in the wrong place, and the new plan could seem like more of the same. The neighborhoods that would be served are relatively unknown to many Houstonians, and many higher-profile destinations — the airports, the Galleria, I-10 — aren't included. Anti-rail forces will no doubt point out that voters along I-10, 290, I-59 north, and I-45 South won't find much direct benefit in a plan that barely extends beyond the 610 Loop.

The Post Oak line would have made a wonderful counter-argument. It would have served the Northwest Transit Center, at the corner of 610 and I-10 West. The I-10 HOV lane (which will become a toll lane, but will retain its express bus service) and the Highway 290 HOV lane converge here. Buses pass through the transit center before continuing on to downtown. Rail would let HOV bus riders transfer to the train for a quick ride to the center of the Post Oak office area, avoiding chronically backed-up traffic on the West Loop.

The plan does include service to a park-and-ride lot at Highway 59 and Hillcroft — which connects to the Westpark Toll Road and the 59 HOV lane. It also links the University of Houston, with 30,000 commuter students, to the downtown hub of the regional bus system.

Ultimately, though, other solutions may bring rail to the outer suburbs. In late May, County Commissioner Steve Radack proposed a diesel-powered commuter-rail operation on a little-used freight rail line along US 290, then on to downtown. Radack pointedly said that METRO wasn't required to operate the line, though he did not say where the money would come from. This plan is not a substitute for light rail: Commuter rail is well suited to suburban commutes but impractical elsewhere. It can't offer the frequency or close station spacing of light rail, nor can it run in city streets. But commuter rail and light rail do work well together. The 290 commuter line could meet light rail at the University of Houston-Downtown (and near the Northwest Transit Center if the Inner Katy line is built), allowing riders to transfer for the last leg of their trips to work. METRO is also participating in a study of a commuter rail line to Stafford, Sugar Land, Richmond, and Rosenberg; such a line would connect to the Main Street light-rail line at Fannin South.

Another way to reduce congestion on suburban freeways is to encourage inner-city development. North of downtown, the proposed lines pass abandoned rail

yards that could become high-density, transit-oriented developments. Those lines also serve the declining industrial area east of downtown, where new lofts are already sprouting. The system offers the possibility of living near a rail station and riding rail to work, shopping, entertainment, higher education, and even medical services.

Obviously, many questions remain about a plan that is necessarily sketchy. It makes no sense for METRO to spend money on detailed design before going to the voters, but a rail line's success depends not just on broad questions of alignment but on details such as station locations, coordination with buses, and streetscape design. So far METRO has demonstrated competence on these issues: The Main Street line is among the best-designed of the nation's street-running light-rail lines, with attractive landscaping, unintrusive but rider-friendly stations, and a reasonably efficient alignment that keeps trains from dodging through traffic or slowing down for curves, while still reserving lanes for cars. The biggest problem with the new rail line has been the disturbance caused by its construction; METRO claims it has learned lessons on that count.

The biggest question, though, is political: Will Houston voters support METRO's light-rail vision? To quiet critics, the board has cut an ambitious plan to a modest one. Dallas took only 14 years to design and build 44 miles of light rail; the ballot proposal would give Houston a 29.6-mile system 13 years after the Main Street line was approved. Los Angeles, which now boasts the biggest light-rail system in the United States, has 55 miles of light-rail track, with 38 more in planning or design (in addition to 17 miles of subway and 512 miles of commuter rail, all opened since 1990).

The cost to Houston-area taxpayers would be relatively modest. METRO's 39.7-mile plan would cost \$958 million, half of which would be paid by the federal government; rail construction would account for less than 5 percent of the total METRO budget from 2003 to 2025. Buses would receive four times as much capital funding as rail.

It's instructive, too, to compare the light-rail plan to other transit options. The monorail plan canceled by Lanier would have cost \$1.6 billion in 1991 dollars for only 14 miles. Widening the Katy Freeway is now estimated to cost \$1.7 billion; the Grand Parkway — 77 miles of highway through open country around Houston — may cost \$4 billion.

But voters won't approve the plan simply because it is economical; the question is whether it is part of the solution to Houston's traffic problems. METRO can make the case that it is. Lines to dense inner-city neighborhoods will attract riders the day they open. Cities such as San Diego have shown that an incremental approach — building short segments that eventually compose a true system — can work. METRO's planners have the maps to show that they are thinking regionally and that their proposed lines can connect and extend to serve more areas. They believe that Houston voters want rail, and that those voters will conclude a small start is better than nothing. ■



When it opens in January, the TMC Transit Center will connect light rail to buses with a skybridge across Fannin. Many of the riders on the Main Street line will make part of their trip by bus; the same would be true of an expanded light rail system in which light rail would be the high-capacity, higher-speed core of the bus system. The METRO plan includes improved commuter bus service, new express bus routes, additional transit centers, and expanded local service. METRO does not need voter approval to carry out these measures. But their inclusion in the plan is intended to send a message: Though rail will get the attention, METRO does not plan to neglect its bus riders.