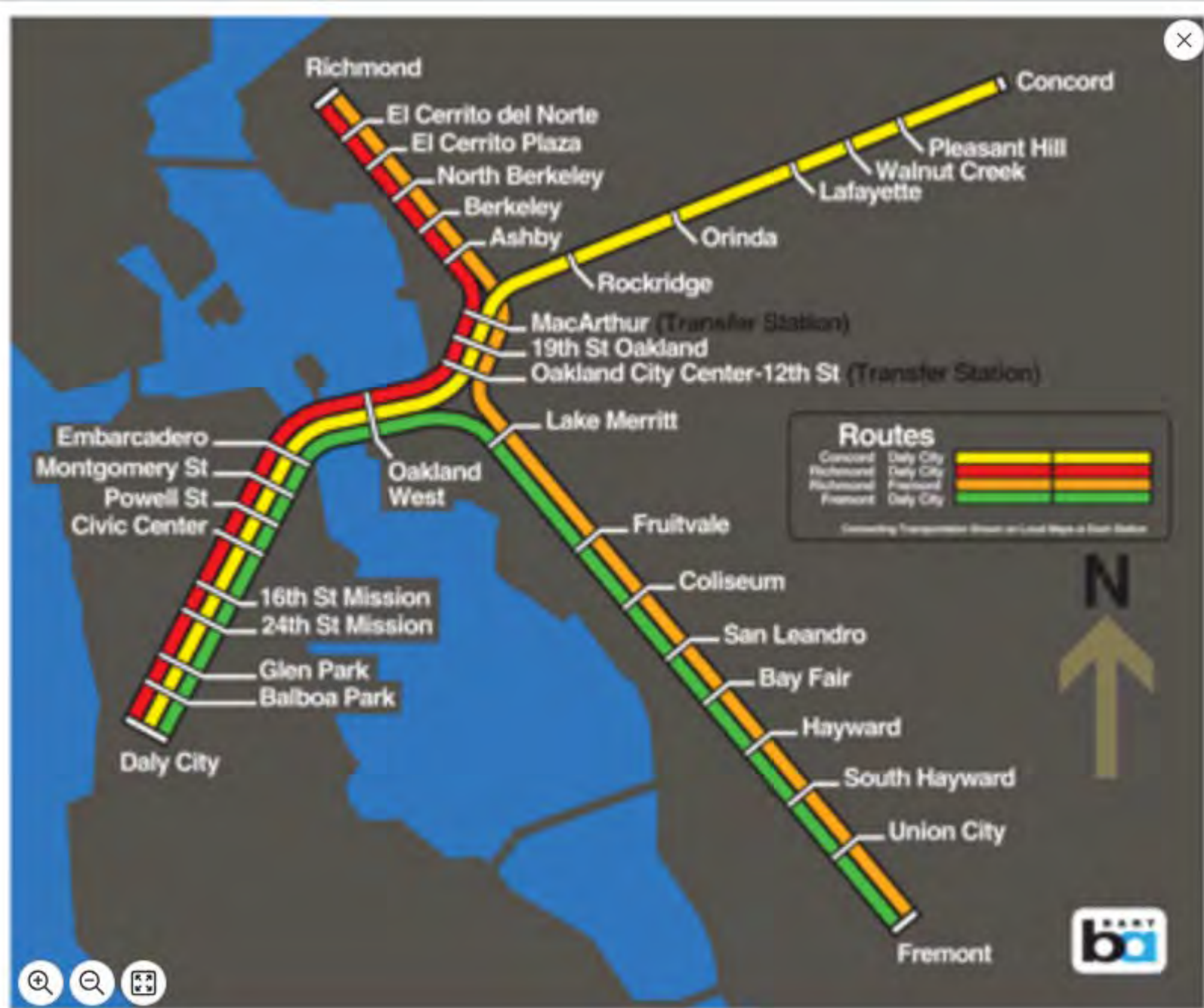


Daytime Service (Every day until 9pm)		
R	Red Line	Richmond - Millbrae
O	Orange Line	Richmond - Berryessa/North San José
Y	Yellow Line	Antioch - SFO Int'l Airport
G	Green Line	Daly City - Berryessa/North San José
B	Blue Line	Daly City - Dublin/Pleasanton
OAK	OAK Airport	Coliseum - Oakland Int'l Airport

Evening Service (Every day 9pm-Midnight)		
O	Orange Line	Richmond - Berryessa/North San José
Y	Yellow Line	Antioch - Millbrae
B	Blue Line	Daly City - Dublin/Pleasanton
OAK	OAK Airport	Coliseum - Oakland Int'l Airport
R	Red Line	No Service - Use O Y
G	Green Line	No Service - Use O B

Contact Us	Map Key
<p>BART Police (415) 864-0000 (415) 288-8995</p> <p>Customer Service BART Metro Line (415) 465-0002 Citizen Call Center (415) 475-0001</p> <p>www.bart.gov</p>	<p>Rail Connection</p> <p>Light Rail Connection</p> <p>BART Parking</p> <p>Transfer</p> <p>Transit Connection</p>

2024 BART System Map



Original BART map.



A History of BART: The Concept is Born



Artist's rendering of BART on the Golden Gate Bridge.

The following is a comprehensive narrative of the history of BART. You may also be interested in the book: [BART the Dramatic History of the Bay Area Rapid Transit System](#) written by retired BART spokesman Michael C. Healy and published by Heyday Books.

The BART Concept is Born

The BART story began in 1946. It began not by governmental fiat, but as a concept gradually evolving at informal gatherings of business and civic leaders on both sides of the San Francisco Bay. Facing a heavy post-war migration to the area and its consequent automobile boom, these people discussed ways of easing the mounting congestion that was clogging the bridges spanning the Bay. In 1947, a joint Army-Navy review Board concluded that another connecting link between San Francisco and Oakland would be needed in the years ahead to prevent intolerable congestion on the Bay Bridge. The link? An underwater tube devoted exclusively to high-speed electric trains.

Since 1911, visionaries had periodically brought up this Jules Verne concept. But now, pressure for a traffic solution increased with the population. In 1951, the State Legislature created the 26-member San Francisco Bay Area Rapid Transit Commission, comprised of representatives from each of the nine counties which touch the Bay. The Commission's charge was to study the Bay Area's long range transportation needs in the context of environmental problems and then recommend the best solution.

The Commission advised, in its final report in 1957, that any transportation plan must be coordinated with the area's total plan for future development. Since no development plan existed, the Commission prepared one itself. The result of their thoroughness is a master plan which did much to bring about coordinated planning in the Bay Area, and which was adopted a decade later by the Association of Bay Area Governments (ABAG).

The Commission's least-cost solution to traffic tie-ups was to recommend forming a five-county rapid transit district, whose mandate would be to build and operate a high-speed rapid rail network linking major commercial centers with suburban sub-centers.

The Commission stated that, "If the Bay Area is to be preserved as a fine place to live and work, a regional rapid transit system is essential to prevent total dependence on automobiles and freeways."

Thus was born the environmental concept underlying BART. Acting on the Commission's recommendations, in 1957, the Legislature formed the San Francisco Bay Area Rapid Transit District, comprising the five counties of Alameda, Contra Costa, Marin, San Francisco and San Mateo. At this time, the District was granted a taxing power of five cents per \$100 of assessed valuation. It also had authority to levy property taxes to support a general obligation bond issue, if approved by District voters. The State Legislature lowered the requirement for voter approval from 66 percent to 60 percent.

Between 1957 and 1962, engineering plans were developed for a system that would usher in a new era in rapid transit. Electric trains would run on grade-separated right-of-ways, reaching maximum speeds of 75-80 mph, averaging perhaps 45 mph, including station stops. Advanced transit cars, with sophisticated suspensions, braking and propulsion systems, and luxurious interiors, would be strong competition to "King Car" in the Bay Area. Stations would be pleasant, conveniently located, and striking architectural enhancements to their respective on-line communities.



BART employees in the 1970s.

Hundreds of meetings were held in the District communities to encourage local citizen participation in the development of routes and station locations. By midsummer, 1961, the final plan was submitted to the supervisors of the five District counties for approval. San Mateo County Supervisors were cool to the plan. Citing the high costs of a new system-plus adequate existing service from Southern Pacific commuter trains - they voted to withdraw their county from the District in December 1961.

With the District-wide tax base thus weakened by the withdrawal of San Mateo County, Marin County was forced to withdraw in early 1962 because its marginal tax base could not adequately absorb its share of BART's projected cost. Another important factor in Marin's withdrawal was an engineering controversy over the feasibility of carrying trains across the Golden Gate Bridge.

BART had started with a 16-member governing Board of Directors apportioned on county population size: four from Alameda and San Francisco Counties, three from Contra Costa and San Mateo, and two from Marin. When the District was reduced to three counties, the Board was reduced to 11 members: four from San Francisco and Alameda, and three from Contra Costa. Subsequently, in 1965, the District's enabling legislation was changed to apportion the BART Board with four Directors from each county, thus giving Contra Costa its fourth member on a 12-person Board. Two directors from each county, hence forth, were appointed by the County Board of Supervisors. The other two directors were appointed by committees of mayors of each county (with the exception of the City and County of San Francisco, whose sole mayor made these appointments).

The five-county plan was quickly revised to a three-county plan emphasizing rapid transit between San Francisco and the East Bay cities and suburbs of Contra Costa and Alameda counties. The new plan, elaborately detailed and presented as the "BART Composite Report, " was approved by supervisors of the three counties in July 1962, and placed on the ballot for the following November general election.

The plan required approval of 60 percent of the District's voters. It narrowly passed with a 61.2 percent vote District-wide, much to the surprise of many political experts who were confident it would fail. Indeed, one influential executive was reported to have said: "If I'd known the damn thing would have passed, I'd never have supported it. "

The voters approved a \$792 million bond issue to finance a 71.5 mile high-speed transit system, consisting of 33 stations serving 17 communities in the three counties. The proposal also included another needed transit project: rebuilding 3.5 miles of the San Francisco Municipal Railway. The new line would link muni streetcar lines directly with BART and Market Street stations, and four new Muni stations would be built.

The additional cost of the transbay tube – estimated at \$133 million – was to come from bonds issued by the California Toll Bridge Authority and secured by future Bay Area Bridge revenues. The additional cost of rolling stock, estimated at \$71 million, was to be funded primarily from bonds issued against future operating revenues. Thus, the total cost of the system, as of 1962, was projected at \$996 million. It would be the largest single public works project ever undertaken in the U.S. by the local citizenry.

After the election, engineers immediately started work on the final system designs, only to be halted by a taxpayer's suit filed against the District a month later. The validity of the bond election, and the legality of the District itself, were challenged. While the court ruled in favor of the District on both counts, six months of litigation cost \$12 million in construction delays. This would be the first of many delays from litigation and time-consuming negotiations involving 166 separate agreements reached with on-line cities, counties, and other special districts. The democratic processes of building a new transit system would prove to be major cost factors that, however necessary, were not foreseen.

A History of BART: The Project Begins



A section of the Transbay Tube being lowered into San Francisco Bay.

Previously:

[The Concept is Born](#)

BART construction officially began on June 19, 1964, with President Lyndon Johnson presiding over the ground-breaking ceremonies for the 4.4-mile Diablo Test Track between Concord and Walnut Creek in Contra Costa County. The test track, completed ten months later, was used to develop and evaluate sophisticated new design concepts for BART's transit car and automatic train control system.

In charge of construction management, overall design of system facilities, equipment and monitoring of BART's major contractors, were the District's General Engineering consultants, Parsons-Brinkerhoff-Tudor-Bechtel, or most commonly known as "PB-T-B"; a joint venture enterprise formed to manage all technical, as well as construction aspects of the BART project. PB-T-B was comprised of three well known engineering consultant firms: Parsons-Brinckerhoff-Quade & Douglas, of New York (who had done the original BART transportation plan); Tudor Engineering Company, of San Francisco; and Bechtel Corporation, of San Francisco.

Through this joint venture, the firms supplied (or recruited from the U.S. and abroad) the most impressive array of engineering talent ever assembled for a single public works project. The basis of the joint venture concept was that engineering specialists could be supplied as needed, moving on to other projects when their respective BART assignments were completed. This was considered less costly and more permanent than building up a large District staff.

Construction began on the Oakland subway in January, 1966. November of that year saw the first of 57 giant steel and concrete sections of the 3.8-mile transbay tube lowered to the bottom of the Bay by a small navy of construction barges and boats.

The 3.2-mile bore through the hard rock of the Berkeley Hills was completed in February, 1967, after 466 work days, to become the fourth longest vehicular tunnel in the U.S.

The first major equipment contract was awarded in May 1967 for the nation's first fully automatic train control system. Westinghouse Electric Corporation's low bid of \$26.1 million was \$3 million under the next bidder. Four other bidders were General Railway Signal Company, Philco-Ford Company, General Electric Company, and Westinghouse Air Brake Company. Although awarding of the contract to any company other than the low bidder would have been illegal, District officials were destined to face criticism and controversy as a result.

In July, 1967, work began on the Market Street subway and stations 80-100 feet below heavy downtown traffic. Against the combined pressure of mud and bay water, the work required one of the greatest concentrations of tunneling crews and equipment in construction history. Construction of the giant five-story-high stations beneath Market Street and the tunnels themselves, was accomplished under extremely difficult conditions imposed by the high water table in downtown San Francisco, plus an incredible maze of underground utilities installed over the last 100 years. The first tunneling in the western U.S. done entirely under compressed air conditions, the project produced a succession of "firsts" in constructing the subway and stations in a difficult mud and water environment.

Subway excavations were rich with buried ships and other memorabilia, providing a fascinating look back into nineteenth century San Francisco when the land-fill of lower Market Street and the Embarcadero was still open harbor. The huge construction effort reached its peak in 1969 with a contractor force of 5,000 working on the San Francisco subway and other parts of the system, the weekly payroll was more than \$1 million.

The final tunnel bore was "holed through" into the west end of the Montgomery Street Station on January 27, 1971. It marked the completion of tunneling work in the huge, two-level Market Street subway and climaxed six years of tunneling underground.

Tunneling under compressed air required a special medical center with equipment specialists for close monitoring of the "sandhog" construction force. Despite the complex problems of sandhogging, the BART project was completed with one of the best safety records in heavy construction.



BART employees in the 1970s

Engineering History was Made

The contract for the production and delivery of BART's revolutionary electric transit cars was signed with Rohr Industries, Inc., of Chula Vista, California, in July, 1969. The initial contract called for delivery of 250 cars, with the first 10 vehicles to serve as test prototypes.

Meanwhile, a truly great chapter was written in the history of civil engineering with the completion of the transbay tube structure in August, 1969. Constructed in 57 sections, and reposing on the bay floor as deep as 135 feet beneath the surface, the remarkable \$180 million structure took six years of toil and seismic studies to design, and less than three years to construct. Before it was closed to visitors for installation of tracks and electrification, many thousands of adventurous people had walked, jogged, and bicycled through the tube. It received a dozen major engineering awards and rapidly became famous, seeming to capture the imagination of visitors from all over the world. To youngsters, especially, the transbay tube is BART.

Unhappily, the major years of BART construction in the 1960's saw seven percent average annual inflation - more than double the rate anticipated by economists and allowed for in the project cost estimates. In this climate, before substantial federal grants were available, BART's financial history was inevitably a troubled one.

While delays and inflation were sapping capital reserves, pressures from public and governmental groups resulted in the relocation of 15 miles of right-of-way and 15 stations, as well as a general upgrading of station plans. Stations were also substantially altered during construction to include elevators and other facilities for seniors and the disabled at an added cost of \$10 million. The cost of the transbay tube rose to \$180 million from an original estimate of \$133 million.

Prime examples of how public pressures escalated the cost of the system are the Berkeley subway and the Ashby Station. After originally approving a combination aerial and subway line through Berkeley, that city later came to oppose the plan in favor of a subway-only line, which was much more expensive. The new plan necessitated redesign of the Ashby Station from an aerial to a subway facility. Extensive controversy and hearings ensued for the next 2 1/2 years, finally to be resolved by Berkeley residents voting to tax themselves additionally to finance the changes they wanted. Next, a Berkeley City Councilman filed a successful suit to redesign the Ashby Station, yet a second time, asserting the use of skylights in the original plans was not a true subway design.

The Berkeley situation resulted in a 2 1/2 year delay in subway construction, a 17-month delay in starting Ashby Station construction, and additional costs of \$18 million.

As early as 1966, it became increasingly clear that the District would fall short of funds to complete the system. The only apparent solutions were an infusion of more funds, or a drastic scaling-down of system miles to fit the original budget. Major construction contracts were rewritten and re-advertised in anticipation of the threatened cutbacks.

As the crisis deepened, BART directors refused to compromise the planned 71.5 mile system until every possible alternative could be explored. Finally, in April, 1969, after three years of debate, the State Legislature granted the District's request for \$150 million of authorizing the levying of a half-cent sales tax in the BART counties. The needed funds thus came from the sales of bonds pledged against the sales tax revenues.

A History of BART: The Project is Rescued



President Richard M. Nixon and his wife, Pat, take a BART ride.

Previously:

[The Project Begins](#)

With funds to complete the system assured, construction contracts were returned to their original scope, the work quickly reached peak level in 1969. But three years of financial uncertainty had taken their toll on work schedules. The shortage of funds had also held up ordering the transit cars. When the first 250 cars were finally ordered from low bidder Rohr Industries, of Chula Vista, California, the cost was \$80 million ... \$18 million more than the original cost estimate for the entire 450-car fleet. (Subsequently, 200 more transit cars were ordered for another \$80 million. Delivery of the total 450-car fleet would be completed by July 30, 1975.)

Meanwhile, federal monies had begun flowing into the project at an increasing rate, making possible a wide range of improvements over the original system plan. BART's widely-known "linear park", for example, was constructed under the aerial right-of-way through Albany and El Cerrito to demonstrate how function could combine with aesthetics to enhance community environments. A \$7.5 million program for systemwide landscaping and right-of-way beautification was partly funded by several of the largest federal grants ever made for this purpose. Of the \$160 million base cost of BART's 450-car fleet, 64 percent was funded by federal grants.

Included in the construction contract for the lower Market Street subway, awarded in the busy year of 1969, was the basic "box" structure for the Embarcadero Station. Not in the original plans, the system's 34th station was added as a result of increasing development of the lower Market Street area. Station funding was cooperative, with the San Francisco business community raising money for design, and BART spending \$25 million on construction. (Of the latter figure, \$16 million was raised by curtailing construction of the MUNI subway at the West Portal station instead of St. Francis Circle as originally planned.)

The \$315 million, received to date in federal capital grants, was an important factor in upgrading the system from original plans. Nonetheless, this federal aid is only 20 percent of the total \$1.6 billion investment in the system. (If BART were being built today, 80 percent of its capital costs could be federally funded under the U.S. Urban Mass Transportation Assistance Act of 1974.)

Thus, changes and improvements increased the valuation of the system considerably from the original estimates...a cost factor that is frequently and incorrectly confused with the true project cost over-runs on specific contracts.



Original BART map.

A New Railroad Takes Shape

As the project moved into 1970, the wide range of system construction passed its peak, and contracts were being completed with increasing frequency. An amorphous collection of excavations, stacks of lumber and brick, sections of rail, and giant spools of cabling was taken on the outlines of a finished railroad. Long suffering San Francisco businessmen were even beginning to recapture Market Street from the BART construction forces.

As the system neared completion, the construction engineers so long in charge began making way for a wide range of electronic engineers and technicians, computer experts, and other specialists. Their job was to install and prove out the automatic train control system, plus three maintenance shops and train yards at Hayward, Richmond and Concord, a staggering array of communications and wayside equipment.

The first prototype car was delivered in August, 1970. By early 1971, the ten test prototype transit cars were being operated on the Fremont line in a round-the-clock program to prove out the new design before it went into full-scale production. Meanwhile, at its San Jose plant, IBM was readying the first group of prototype fare collection machines, which it demonstrated to District Directors in October. Since it received an initial \$5 million contract in 1968, IBM had been developing a fully automated system to collect fares on a graduated (per mile) basis, as specified by BART, to provide equity between short and long distance riders.

In December, 1971, the District Board adopted the official inter-station fare schedule, ranging from 30 cents minimum to \$1.25 maximum fare. Also, approved the following month were 75 percent fare discounts for patrons over 65 or under 13 years of age, with discount tickets to be sold through local bank branches instead of at BART stations.

The 1971-72 period saw the gradual phase-out of major construction work, and the beginning of the transition from a construction-oriented organization to an operating railroad. New areas of emphasis included marketing, personnel training, planning feeder bus service to stations, and across-the-board preparations for revenue service. The District staff, up to 765 by mid-1972, had almost tripled in three years to build up the transportation and maintenance force for revenue service.

A study of an extension between Daly City Station and the San Francisco International Airport was concluded, and another study of an extension of shuttle access to the Oakland International Airport from the Coliseum Station was continued. Also extension studies for northwest San Francisco, the Pittsburg-Antioch area, and the Livermore-Pleasanton area.

The first segment of the system to open would be 28 miles between Fremont and MacArthur stations. In mid-1972, the District Board set Monday, September 11, as the first day of revenue service.

References

[BART Historical Timeline](#)

[Transbay Tube - Wikipedia](#)

[Transbay Tube Retrofit](#)