



Introduction



The Transportation Expansion (T-REX) Project has entered its second year of design and construction. Residents and commuters are watching the transformation of an aging and outdated highway system in metro Denver.

Old bridges have been demolished and replaced with longer, wider and more pedestrian-friendly structures. Buildings have come down to make way for wider highways and light rail facilities. Interchanges are being transformed to be safer and more efficient. New pavement is providing a smoother ride for thousands of vehicles each day. T-REX is on the move.

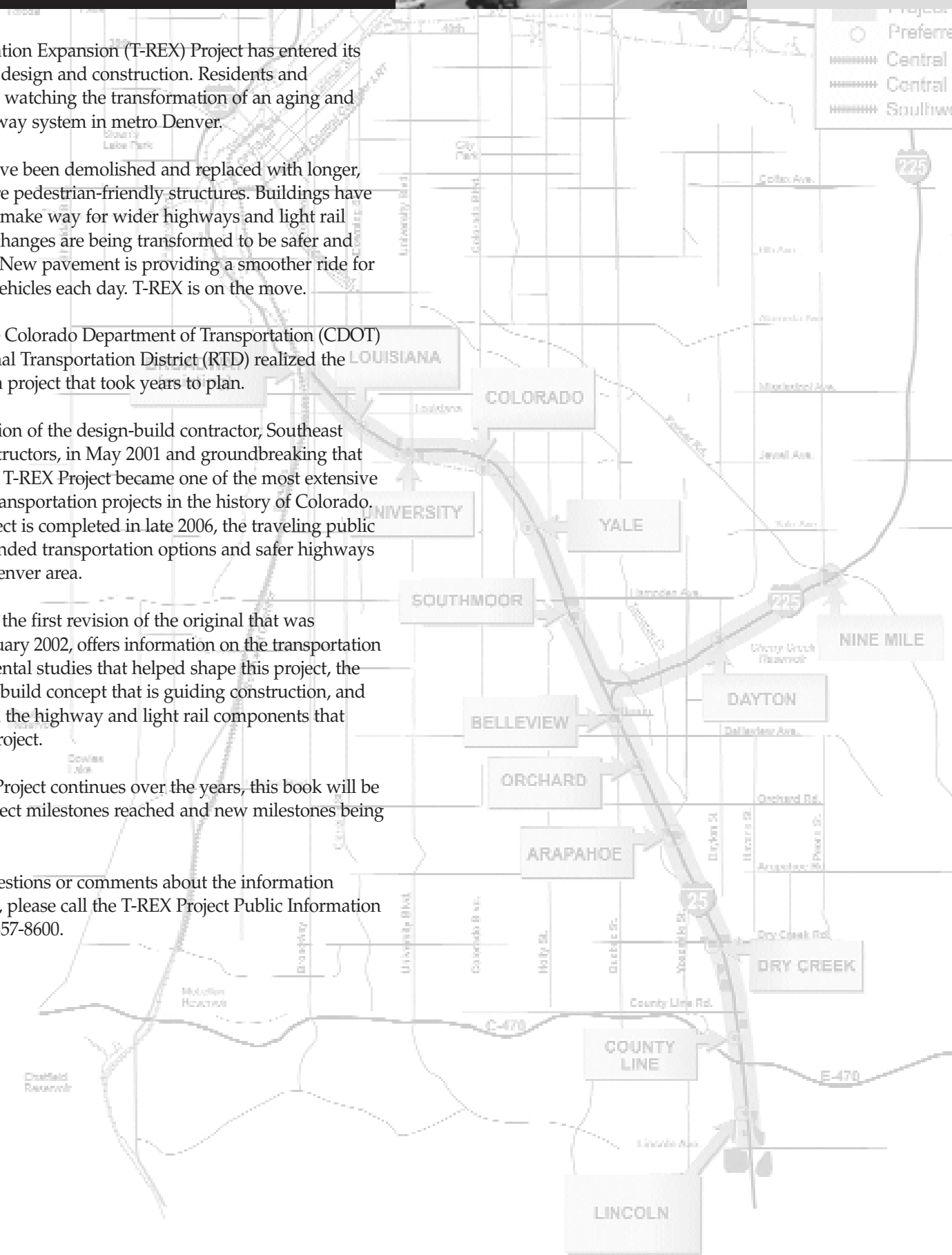
In fall 2001, the Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD) realized the beginnings of a project that took years to plan.

With the selection of the design-build contractor, Southeast Corridor Constructors, in May 2001 and groundbreaking that September, the T-REX Project became one of the most extensive multi-modal transportation projects in the history of Colorado. When the project is completed in late 2006, the traveling public will have expanded transportation options and safer highways in the metro Denver area.

This fact book, the first revision of the original that was released in January 2002, offers information on the transportation and environmental studies that helped shape this project, the unique design-build concept that is guiding construction, and information on the highway and light rail components that make up the project.

As the T-REX Project continues over the years, this book will be updated to reflect milestones reached and new milestones being developed.

If you have questions or comments about the information presented here, please call the T-REX Project Public Information Team at (303) 357-8600.



Southeast Corridor History



Highway History

In 1915, Colorado's total number of registered automobiles was 27,000. In 1923, the number of cars registered in the state had jumped to 188,000. Until the 1940s, the official north-south route through Colorado was called the Great North and South Highway. Generally, it followed today's U.S. 87 and 287 from Cheyenne through Denver, then U.S. 85 to Castle Rock. Santa Fe Drive was the primary north-south route through the city of Denver for most drivers, until the 1950s.

In 1944, the first consulting engineers were hired to consider a route for a north-south freeway through Denver, since the Santa Fe Drive route was becoming hopelessly clogged. This new freeway was originally called the Platte Valley Drive Road.

Considered for the Platte Valley Drive Road were: Federal Boulevard, Broadway, University and Colorado boulevards, and a route along Cherry Creek. Instead, the route that is now called the Valley Highway was adopted. Total cost, including rights of way, was estimated at \$14.5 million (in 1945 dollars).

Groundbreaking took place on Nov. 16, 1948, to construct a sewer and drainage system near 46th Avenue. The budget for the entire Valley Highway project (11.2 miles) was \$33 million.

The full length of the Valley Highway, from 52nd Avenue to Evans Avenue, was officially opened Nov. 23, 1958. When opened, it carried about 33,000 vehicles a day. In 1964, it carried 52,000 vehicles a day.

Construction of I-225 started at I-70 in 1964, and progressed in segments toward the south. Segments opened to traffic as completed. The official completion of I-225 was celebrated May 21, 1976. The highway's final 1.2 miles included the I-25/I-225 interchange. The addition of an interchange at Yosemite and Tamarac streets, not included in the original design of the highway, added more than a year to the project's timetable.

In the decade between 1985 and 1995, traffic on Colorado's interstates increased 43 percent. In 2000, a Texas-based institute that studies traffic issues identified the metro Denver area as the seventh most congested metropolitan area in the United States, and the I-25/I-225 interchange was identified as the 14th busiest interchange in the country.

In 1958, state transportation officials estimated the Valley Highway would carry about 127,000 vehicles per day, or 13,970 vehicles per hour. In 1998 the Valley Highway carried up to 230,000 cars a day. Additionally, I-225 was originally built to handle 50,000 vehicles per day along its 12-mile length. Today, the highway carries as many as 120,000 vehicles per day between Mississippi Avenue and I-25.

Transit History

In 1987, the Colorado Legislature created the Transit Construction Authority to design and construct rapid transit along Buchtel Boulevard from Broadway at I-25 to Holly Street. The authority was dissolved in 1989, when businesses and landowners along the route opposed it.

The concept of transit in the corridor was revived in a Denver Regional Council of Governments study in 1994, identifying the Southeast Corridor as the "major rapid transit corridor in all planning studies for rapid transit since 1973 ... possibly the highest ridership potential of all the proposed rapid transit corridors."

Corridor Growth

As metro Denver area development extended south during the 1960s and 1970s, it was clear that the Valley Highway needed widening. The corridor grew in sections toward the south. When the Denver Tech Center was first proposed in the mid 1970s, it was viewed as an unlikely enterprise, but it did galvanize the completion of construction on the I-225 corridor from Mississippi Avenue to I-25.

The Denver Tech Center grew slowly. A recession in the mid 1980s led many observers to declare it defunct. But more businesses moved to the new area, lured by open space for building, tax breaks from local municipalities, and access to employees who didn't want to commute downtown. The area began to bloom with showcase architecture – and more traffic.

One phenomenon that makes the Southeast Corridor particularly unique – and particularly well traveled – is that both the north and southbound lanes of the southeast corridor are busy during the day. In other words, almost as many commuters are driving south to the Denver Tech Center in the morning as are driving north to the downtown business district.

As the Denver Tech Center expanded southward, new office parks, such as Inverness and Meridian, were opened for development. Residential growth exploded, and the southeast area of metro Denver has been measured for the past decade as among the fastest growing in the United States.

The corridor connects the two major employment centers in the Denver metro area – the Denver Central Business District, or downtown, and the Southeast Business District, which includes the Denver Tech Center, Greenwood Village, Inverness, Meridian, and the city of Centennial. More than 180,000 people work in these two employment centers, and another 30,000 or so work along the corridor, including businesses along Colorado Boulevard, Evans Avenue, and University Boulevard. Meanwhile, forecasters expect downtown and the Denver Tech Center to continue to grow during the next 20 years.

Project Background

In 1992, the Denver Regional Council of Governments (DRCOG), which serves as a planning organization for the Denver metro area, commissioned a congestion study for the region. The study was to identify the most congested corridors in the Denver metro area, and to clarify whether those corridors had appropriate traffic management planning in place through the year 2015.

Although the Transportation Expansion (T-REX) Project corridor (I-25/I-225) had been identified as a likely candidate for highway expansion for more than 20 years, the DRCOG study was a wake-up call. It showed that expected growth along the corridor had already been surpassed, and the rate of growth was such that the highway was exceeding its original estimated maximum capacity of 180,000 vehicles a day.

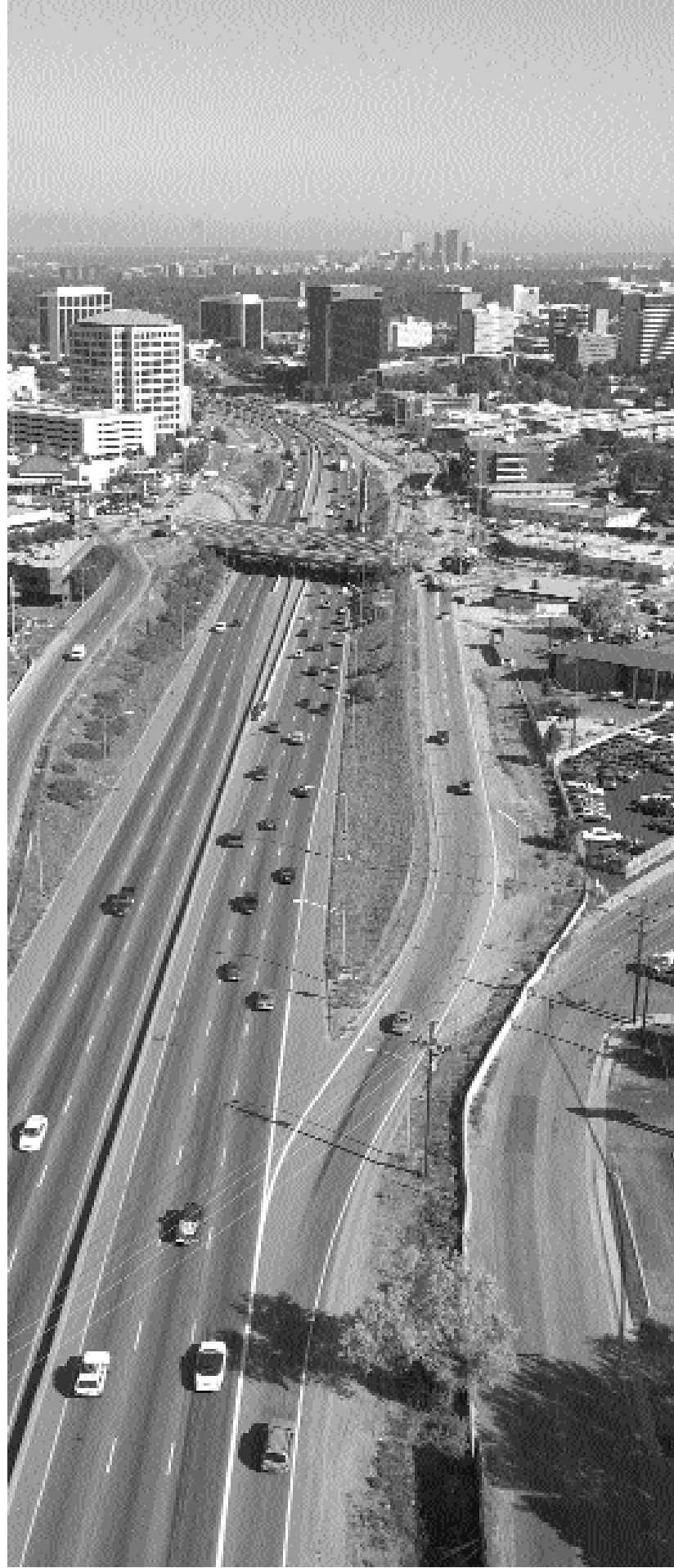
The DRCOG study also showed that traffic volumes in the corridor were rising even faster than increases in population and employment, a phenomenon that makes the congestion in the corridor that much more pressing.

The study recommended that not only should DRCOG and CDOT consider expanding the highway, it should incorporate some kind of mass transit element – such as light rail – into the mix as well.

Challenges with this recommendation were multiple: land along this urban corridor had been developed to such an extent over the past half-century that space for the expansion was very expensive; the corridor passes through several municipalities, which makes planning much more complicated; and, there was some controversy surrounding rail transit, in the years before the first light rail line in the Central Corridor.

Then, there was the dual nature of the project. Highway construction is the purview of CDOT, but not light rail transit. In metro Denver, light rail is the responsibility of the Regional Transportation District (RTD). In response to the 1992 study, RTD estimated that mass transit through the corridor could cost more than \$500 million, beyond any costs for highway expansion.

Because the corridor is in such a heavily developed urban area, there were a number of other issues. More than 20 bridges would have to be replaced, expanded, or repaired. The I-25/I-225 interchange, identified as the 14th most congested in the United States, would have to be completely reconstructed. Other interchanges would have to be rebuilt as the number of traffic lanes expanded. There was also the question of how to incorporate mass transit into a space already crowded with traditional traffic.



Project Background continued



Besides congestion and the growing development in the area, a number of basic infrastructure corrections needed to be made. Bridges built in the 1950s and 1960s were reaching a point where major repair was coming due. Drainage on the highway, a problem for decades, had to be fixed.

CDOT and RTD began studying the corridor together. For the short term, CDOT implemented ramp metering and some interchange improvements, and RTD steadily added park-n-Ride capacity and increased bus service to both major employment centers.

Still, there was a lot of debate as to the best long-term solution to the problem. Some people favored structuring the future of the corridor to force mass transit and carpooling; others actively opposed any kind of mass transit element, arguing that it would take lane space away from the highway. Different municipalities suggested different solutions; but of course, there needed to be one consistent plan to keep traffic flowing as smooth as possible throughout the corridor.

Below are some of the options put forward (1995 dollars):

- Building new freeway lanes: Cost: \$20 - \$25 million per lane per mile
- Double-deck existing freeway lanes: Cost: \$100 million per lane per mile
- Heavy rail: Cost: \$25 - \$100 million per mile
- Monorail: Cost: \$70 - \$100 million per mile

- “People Movers” on elevated right of way: Cost: \$50 million - \$75 million per mile
- Electric high-speed rail: Cost: \$75 - \$100 million per mile
- Maglev high-speed rail: Cost: \$100+ million per mile

Major Investment Study

In 1995, CDOT and RTD commissioned the Southeast Corridor Major Investment Study (MIS), in an effort to find the best solution to the ever-growing problem of congestion in the corridor. The MIS was one of several studies of transportation and growth in metro Denver conducted over the same period of time.

The MIS examined the entire length of the corridor, including I-25 from Broadway in the north to Lincoln Avenue in the south, and the spur of I-225, from the I-25 interchange to Parker Road in Aurora.

In addition to other transportation issues, the MIS identified the following:

Transit travel times versus the private auto

- A 1991 Denver Regional Council of Governments (DRCOG) study found local bus service travel times were about twice that of cars in the Transportation Expansion (T-REX) Project Corridor. Express bus travel times were closer to that of cars. Buses are subject to the same congestion as cars. Buses are further delayed by frequent stops to pick up passengers.



Project Background continued



Demand for additional transit services

- The Southeast Corridor Transportation Management Organization (SETMO) was formed to address transportation issues impacting the business community from the Denver Technological Center to Lincoln Avenue in Douglas County along I-25. In addition, the Southeast Transit Authority was formed to implement a new circulator bus service called the LINK.

Provision of Transit Service to the Southeast Business District

- Southeast Business District employers have been concerned with the inadequacy of transit service in the area, particularly for people unable to find affordable transportation. This situation makes it difficult for businesses in the Southeast Business District to recruit and retain employees.

In 1997, DRCOG adopted the MIS recommendations, which included:

- 19.7 miles of new, double-track light rail: 15.2 miles from the current Broadway station to a new station at Lincoln Avenue in Douglas County, and 4.5 miles along I-225 from Parker Road to a brand-new I-25/I-225 interchange
- Thirteen new light rail stations
- Highway improvements to address safety and operation: increasing lanes and reconfiguring several interchanges, replacing 13 bridges and repairing nine others, replacing drainage systems, and widening shoulder space along the highway
- Improved pedestrian/bicycle facilities
- Transportation Management elements, such as added

High Occupancy Vehicle (HOV) lanes and other strategies to encourage carpooling

Light rail transit was endorsed because:

- It has significantly less impact to existing residences and businesses in the corridor and to natural resources, such as wetlands, parks, and historic properties
- Its capital costs are as much as \$200 million less than the Bus/HOV alternative
- It has the greatest potential carrying capacity
- It has the best travel time
- It requires the lowest investment per user
- It has stronger potential for joint development
- It is reliable and safe
- It has community support

Environmental Impact Statement

In 1998, CDOT and RTD joined forces to create a unique entity called the Southeast Corridor Project Team, to design and build improvements in the corridor together. In March 1998, the first public open house was hosted as part of the Environmental Impact Statement (EIS) process for the T-REX Project to consider issues other than nearby wetlands and wildlife. While environmental issues are a large part of the EIS, so is the current and future justification for the project, the incorporation of public comment, and some design of the project – enough to make an accurate estimate of actual costs. The EIS considered consequences of a number of options, including a “no-build” alternative. It also considered right of way and condemnation issues.



Project Background continued



An aggressive public involvement program, which included a series of public open houses, provided information to the public while giving them the opportunity to participate in the Project's environmental planning process. Four rounds of public open houses, in addition to numerous presentations to public and civic groups, took place during the environmental planning process, as required by the National Environmental Policy Act (NEPA).

In September 1998, DRCOG adopted the Metro Vision 2020 Regional Transportation Plan (Fiscally Constrained Element). The long-range agreement focuses on improving transportation in metro Denver by using various kinds of mass transit and pedestrian/bicycle transportation options, building highway improvements and encouraging transportation management programs, such as expanding traffic signal coordination on arterial streets and upgrading ramp metering equipment. The T-REX Project was prominently featured in the plan, bringing it further to the attention of the public.

With the initiation of the EIS process, the question of how to pay for the T-REX Project became an issue for public debate and consideration. Gov. Bill Owens signed a new law in June 1999, allowing Colorado to use Transportation Revenue Anticipation Notes (TRANS) for budgeting purposes. TRANS allowed CDOT to borrow against federal monies not yet granted to the state. Other legislative efforts in the 1999 session were also required to keep the T-REX project on track, including:

- House Bill 1325 (Transportation Revenue Anticipation Notes) allows the Colorado Department of Transportation to issue transportation revenue anticipation notes to fund transportation projects.
- House Bill 1206 provides funding to complete 28 Strategic Transportation Projects, including the Southeast Corridor Project.
- House Bill 1324 (Design-Build/Best Value) allows contract selection based on design-build best value, rather than low bid.
- House Bill 1327 (Co-development) allows for increased private participation in public transportation transfer facilities.
- House Bill 1294 (Areas in special district) authorizes landowners adjacent to existing RTD boundaries to petition for inclusion into the RTD tax district.

On Nov. 2, 1999 voters approved two separate bond initiatives that allowed funding for the project and endorsed the concept of light rail through the corridor. These two bond issuances

meant that CDOT and RTD could proceed with the project without having to divert funds earmarked for other construction. It also meant that the project could move forward as a whole, instead of being designed and built in segments. Instead of different contractors bidding on those different parts, a single contractor group could bid for the entire project. The November 1999 vote gave CDOT and RTD a unique opportunity to join together in asking for federal grants and municipal matching funds.

The Environmental Impact Statement was completed in 18 months, with a Record of Decision signed in March 2000. In addition to the light rail improvements, significant highway expansion elements were added to the original MIS recommendations. Federal support of the project came in the form of a \$525 million Full Funding Grant Agreement in November 2000. Local municipalities joined forces and contributed millions of dollars to help ensure federal financial support for the light rail construction.

In anticipation of the selection of the design-build contractor and to signify the beginning of this momentous construction effort, the Southeast Corridor Multi-Modal Transportation Project changed its name and became the Transportation Expansion Project, or T-REX Project. In May 2001, the Southeast Corridor Constructors (SECC), a joint venture between Kiewit Construction and Parsons Transportation Group, was selected to build the \$1.67 billion project. Due to the innovative funding and design-build approach, the schedule and cost savings are significant, with SECC planning to finish the project in fall 2006, almost two years ahead of the schedule established by CDOT and RTD.

Project Scope



The T-REX Project will increase transit options, enhance safety for motorists, replace aging infrastructure, improve mobility, reduce travel time and congestion on some nearby arterial streets, and support rapidly growing residential and commercial areas served by the Southeast Corridor.

Staff from the Colorado Department of Transportation (CDOT), the Regional Transportation District (RTD), and consultants are partnering with Southeast Corridor Constructors, the design-build contractor, to build the largest transportation project in the history of Colorado. Working together, sharing office space and building an integrated team allows for close cooperation and direct oversight of the project.

T-REX will:

- Add 19 miles of double-track light rail, connecting to the existing system at Broadway in Denver and extending along the west side of I-25 to Lincoln Avenue in Douglas County, and in the median of I-225 from I-25 to Parker Road in Aurora
- Build 13 stations, with park-n-Rides at 12 of the stations
- Add 34 light rail vehicles to RTD's fleet
- Construct a new light rail maintenance facility in Englewood

The light rail transit line will connect to the Central Corridor line providing service to downtown Denver, the new Central Platte Valley line providing service to Invesco Field at Mile High, Elitch Gardens, Pepsi Center, and the Denver Union Terminal, and to the Southwest Corridor line providing service to Denver's southwest suburbs.

On I-25, T-REX will:

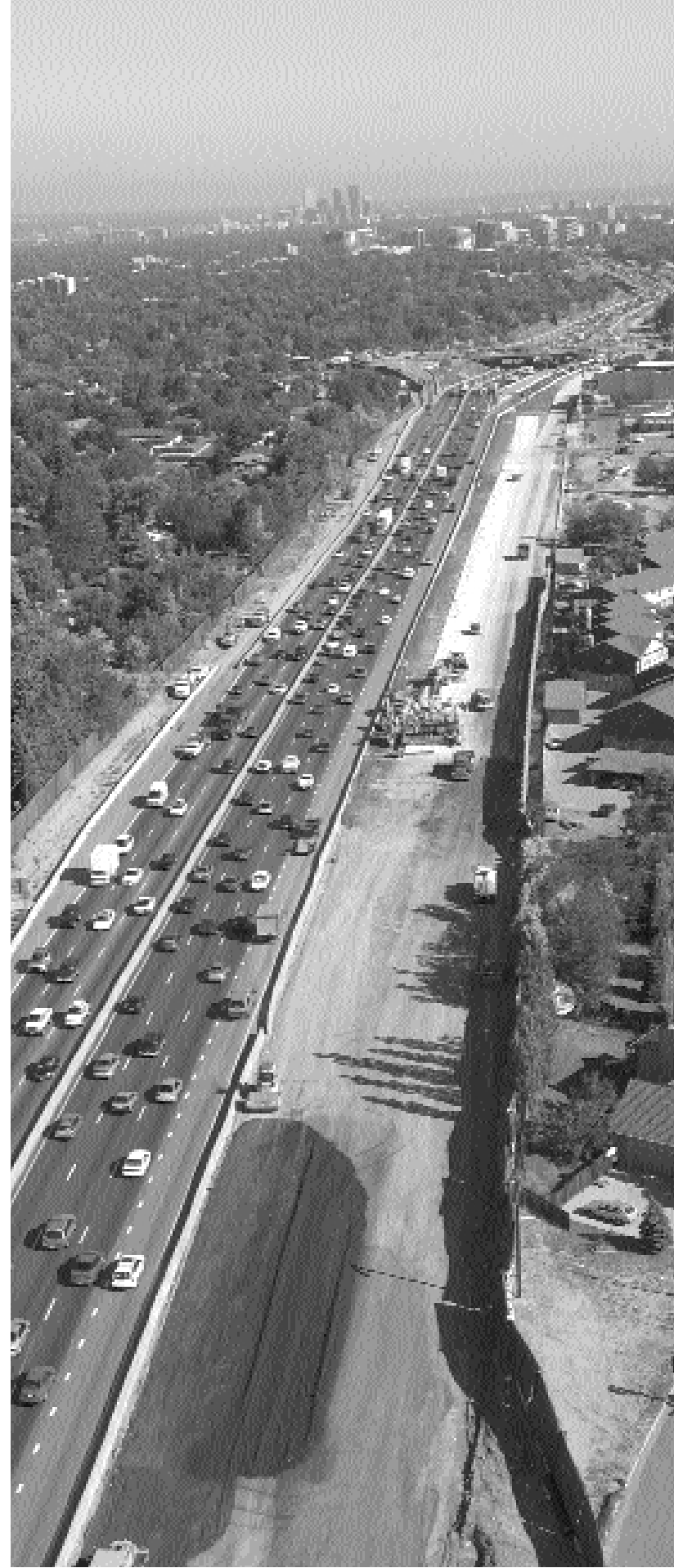
- Add one through lane in each direction from Logan Street to I-225 (for a total of four lanes in each direction)
- Add two through lanes in each direction from I-225 to the C-470/E-470 interchange (for a total of five lanes in each direction)

On I-225, T-REX will:

- Add one through lane in each direction from Parker Road in Aurora to I-25 (for a total of three lanes in each direction)

T-REX also will:

- Reconstruct eight interchanges, including I-25/I-225
- Reconstruct and widen numerous bridges
- Improve drainage
- Enhance safety
- Add and improve shoulders
- Improve ramps and acceleration/deceleration lanes



Agency Partnerships



The Transportation Expansion Project (T-REX), formerly known as the Southeast Corridor Multi-Modal Transportation Project, is the result of a unique partnership between the Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD). The two agencies are combining highway and light rail elements in one single project – a partnership that is one of the first in the United States. CDOT and RTD are taking this unique approach because the T-REX Project addresses highway mobility and safety issues, while offering travelers the option of riding light rail through the corridor.

CDOT and RTD formally entered this working relationship when Tom Norton, CDOT executive director, and Cal Marsella, RTD general manager, signed an Intergovernmental Agreement (IGA) on Sept. 9, 1999. The IGA outlined the responsibilities of each agency, a project description, an explanation of the design-build concept and the proposed method of financing the project.

By signing the agreement, both agencies agreed to work together to finance and construct T-REX and to enter into a single design-build contract for both the design and construction of transportation improvements using a “best value” rather than a low-bid approach for contracting. The agreement also outlined the development of specifications for the project, the composition of the team to select the design-build contractor, and how the project would comply with state and federal laws regarding Disadvantaged Business Enterprises.

This unique working agreement also includes cooperation between two federal agencies.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) developed a unique agreement regarding their work on T-REX. The Interagency Agreement outlines guiding principles and designates responsibilities for each of the agencies. FHWA and FTA officials signed their Interagency Agreement on Oct. 7, 1999.

FHWA and FTA agreed to “cooperatively work together to seamlessly implement the U.S. Department of Transportation ... procedures that pertain to the Transportation Expansion Project in a manner that embodies the ‘One DOT’ approach.”

CDOT, RTD, FHWA and FTA have agreed to work together in a similar manner that embodies a “One DOT” approach. CDOT, RTD and the federal management team are coordinating efforts on T-REX.

All four agencies agreed to the following goals for the project on Nov. 11, 1999:

- To minimize inconvenience to the public
- To meet or beat the total program budget of \$1.67 billion
- To provide for a quality project
- To meet or beat the schedule to be fully operational by June 30, 2008*

**The T-REX contractor, Southeast Corridor Constructors, has committed to finishing the project by fall 2006.*



Partnering



What is partnering?

While a written contract establishes the legal requirements of each party on a construction project, partnering is a structured process that defines the working relationship among the parties. That working relationship is based on a covenant of good faith and fair dealing, with emphasis on a core set of partnering tools that include commitment to mutual goals, an issue-resolution process, and frequent joint evaluation of team effectiveness.

The objective is to positively affect the project goals, which include safety, quality, budget, schedule and perhaps others on the project.

Partnering on T-REX

The partnering process on the Transportation Expansion (T-REX) Project has been developed based on the principles of collaboration, accountability and consistency. Collaboration among all team members is critical in a design-build environment, where the number of issues requiring decisions and the speed of decision making increases dramatically from the typical design-bid-build project delivery method. Individual accountability is crucial within an organization that developed as quickly as the T-REX organization and will continually evolve as the various phases of the project initiate and complete. Finally, consistent communication is essential within an organization comprised of more than 20 task-force teams.

Executive-Level Partnering

Critical to the success of any partnering endeavor is the active support and commitment of executive managers. On T-REX, executives from CDOT, RTD, FHWA, FTA and their counterparts from Southeast Corridor Constructors began meeting in July 2001 in bimonthly Board of Directors partnering sessions. At the initial session, a project charter of mutual goals was finalized, a team evaluation process established, and principles on issue escalation agreed upon. During the partnering sessions, the team goals are reviewed, project status is provided by the project management team, key issues are discussed, and action plans are established.

Project-Level Partnering

The comprehensive approach to partnering involving the project management team through the 20-plus task force teams includes the following activities:

Initial partnering sessions: Each task force team had their own initial partnering session to develop team goals and an issue-escalation ladder specific to its discipline needs. Follow-up sessions take place periodically throughout the project.

Monthly partnering reports: The co-leads of each task-force team submit a monthly report that summarizes deal-breakers (issues where task force members are in disagreement and have reached an impasse, requiring escalation), rocks (issues that are being worked on but not needing escalation), goal progress, and status of team relationships. These reports are rolled up into a master report of all task force teams that is reviewed by the project management steering committee once a month. Co-leads from select task force teams are rotated into this meeting to provide an in-depth explanation of their monthly team results. The information generated from these reports is consolidated and presented to the Executive Board of Directors bimonthly.

Issue-escalation meetings: When task force members or co-leads reach an impasse on the resolution of a specific issue, the partnering process requires them to escalate the issue to the next level of management. The issue is either resolved or continues to be escalated through the levels of management. If all levels of management are exhausted in this effort, the issue can be taken to a neutral Dispute Review Board, which exists to assist the team in resolving the issue.



Project Funding



The Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD) worked jointly to pursue federal and local funding for the Transportation Expansion (T-REX) Project.

The Southeast Corridor financial plan assumes that 60 percent of light rail funds to finance the capital costs will come from the Federal Transit Administration (FTA) and that 40 percent will come from local sources.

Financing features include:

- No new taxes
- No increased taxes
- Cost savings from accelerating construction
- Financing the highway elements through bonding future federal allocations
- Funding the transit elements through bonding from sales tax revenues, federal funds from the FTA, and local matching funds from various municipalities and jurisdictions

The total projected cost of the project is \$1.67 billion.

- The design-build contract with Southeast Corridor Constructors is worth \$1.18 billion.
- The light rail component will cost \$879 million. Forty percent of the light rail funds (\$437 million) will come from RTD and local matching funds. The FTA's \$525 million Full Funding Grant Agreement will fund the remaining 60 percent.
- The highway component will cost \$795 million and will be funded with a combination of Highway Users Tax fund dollars, Senate Bill 97-01 money and bonding/federal revenues.

Other elements in the T-REX budget, but not included in the SECC contract are:

- The purchase of 34 new light rail vehicles – \$91.8 million.
- The cost to design and build the new Elati Light Rail Maintenance Facility – \$39.5 million.
- The purchase of ticket vending machines for the new light rail lines – estimated at \$3 million to \$4 million.



Design-Build Philosophy



The Transportation Expansion Project (T-REX) is being constructed using the design-build delivery method.

Design-build allows for a single contractor team to design and build the entire project, for a predetermined price, under the oversight of CDOT and RTD. Using the traditional design-bid-build approach, a project as large and complex as this could take 20 years or more to build. That is because the traditional approach would mean that the design plans would be completed first, then contractors would bid on and build sections one at a time. Design-build means a faster and less expensive project, with many opportunities for innovation.

CDOT and RTD provided preliminary engineering design and requirements to Southeast Corridor Constructors (SECC) as part of the Request for Proposal. SECC, the design-build contractor, used the preliminary plans to complete the design. Construction and design take place simultaneously. For example, SECC can demolish a bridge and order construction materials, while completing the final design for the new bridge structure.

Using the design-build delivery method, construction can be completed much faster by the contractor. Examples of previously successful design-build construction include the Hudson-Bergen

Light Rail Line in New Jersey, the Foothills Transportation Corridor in Santa Ana, Calif., the Alameda Transportation Corridor in Los Angeles, the E-470 toll road in Denver and the I-15 reconstruction project in Salt Lake City.

SECC was selected based on an evaluation of its technical and price proposal using a best-value evaluation process.

SECC and the Transportation Expansion Project team are co-located in several buildings along the project. Engineers, designers and other staff members from the contractor's team and the T-REX Project team share office space throughout the life of the project. This facilitates better communication and faster problem solving and conflict resolution.

Several elements of the T-REX Project are not included in the design-build contract. Those elements include the new Elati light rail maintenance facility, the new light rail vehicles for the corridor, the fare-collection system and the Nine Mile parking structure at I-225 and Parker Road in Aurora.



Light Rail Facts



History

The Regional Transportation District's (RTD) light rail transit (LRT) was first established in Denver in October 1994, 44 years after the last trolley line stopped operations. RTD's initial 5.3-mile-long Central Corridor line was built without new taxes or federal money. It links the Broadway light rail station, south of downtown Denver at I-25, to 30th and Downing north of downtown. This line serves the Auraria Campus and downtown Denver, providing service for downtown offices, cultural centers, hotels, shopping, restaurants and entertainment.

RTD's second light rail line opened July 14, 2000 with service along the Southwest Corridor, stretching from the Broadway station through Englewood and ending at Mineral Avenue in Littleton.

The Central Platte Valley line, which opened April 5, 2002, provides service to the Denver Union Terminal north of downtown Denver. The Central Platte Valley line serves educational, entertainment, sports and cultural venues in central Denver and in the city's popular Lower Downtown, or LoDo district.

The southeast line serving the T-REX Corridor line will open for revenue service by late 2006. The T-REX Project is fully compatible and connects with the existing LRT system at the Broadway light rail station.

Fare collection

RTD utilizes a self-service fare collection method on its rail system. Passengers may purchase passes at a number of locations or a variety of tickets from ticket vending machines at each station. Because fares operate on the honor system, riders may be asked to provide proof-of-payment by uniformed RTD security staff.

Power Source

Light rail trains operate on electric power from overhead power lines. Power is converted from AC power to 750 volts of DC power at 16 traction power substations located along the corridor.

Signals/Switches

An upgraded train control system will be installed along the corridor and portions of the existing system. Wayside signals will incorporate automatic train stop (ATS) as an added safety feature and will allow headways of 130 seconds. The technology allows for future conversion to cab signals.

Communications

A new central control facility will be in constant communication with light rail vehicles. The T-REX project also includes a new Supervisory Control and Data Acquisition (SCADA) system on the entire light rail system. This allows continuous monitoring and control of the system from a central location. The communication equipment includes closed-circuit television, passenger information systems and vehicle location information. This equipment will work in conjunction with wayside communication bungalows located along the light rail right of way.

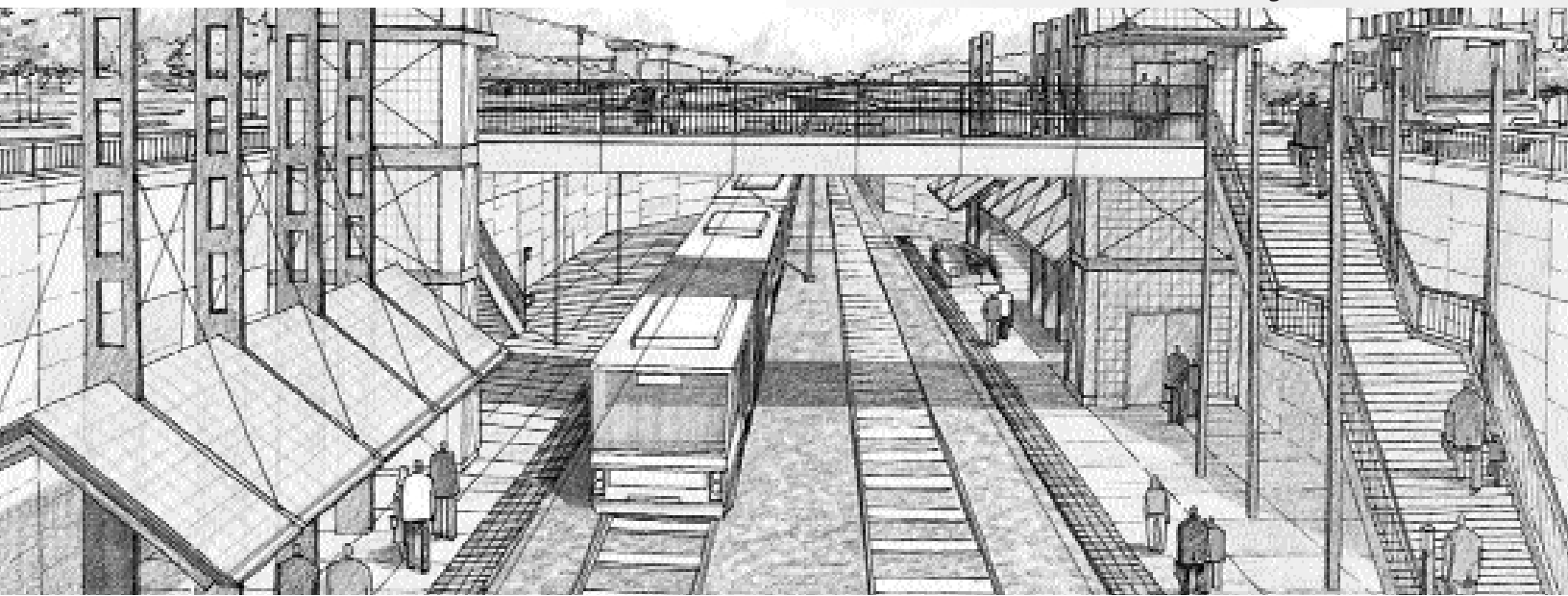
Light Rail Vehicles (LRVs)

Thirty-four Siemens SD-160 light rail vehicles will be acquired for the project bringing RTD's fleet to 83. The new vehicles are fully compatible with the current fleet of light rail vehicles. The vehicles are 80 feet long, and carry 150 passengers. The new LRVs will incorporate AC propulsion.

Light Rail Tracks

Light rail trains will operate on 19 miles of double-track line. Switches and pocket tracks are located along the line to assure flexibility in the event of disruptions. The rail is continuously

Artist Rendering of the Colorado Station



Light Rail Facts continued



welded and rests on concrete ties for a smooth and quiet ride. The tracks for the line will run on the west side of I-25 from Broadway to Lincoln Avenue in Douglas County. The tracks on I-225 will run in the median from the I-25 interchange to the Nine Mile park-n-Ride facility at Parker Road in Aurora.

The tracks will be completely grade separated at all roadway crossings, which means the tracks will not interfere with street traffic along the corridor. This will ensure increased safety, operational efficiency and speed. In addition the new LRT junction at I-25/I-225, it is grade-separated to eliminate train conflicts at this key location.

The steel used to manufacture the tracks was recycled from the former Mile High Stadium, the long-time home of the Denver Broncos. The steel was set aside following the demolition of Mile High and shipped to Pueblo, Colo., where it was melted down and formed into rail for the new T-REX light rail extension. The rail is inscribed "Mile High to T-REX."

Bus Connections

Passengers may connect to light rail from bus routes at each of the 13 light rail stations. Fifty-nine bus routes are planned to serve light rail stations along the new line.

Light Rail Stations

The new line will have 13 light rail stations. Each will include:

- A bus plaza or area for bus bays
- A light rail platform (to enter and exit trains)
- A kiss-n-Ride drop-off
- Landscaping
- High block platforms for accessibility
- Bicycle parking

With the exception of the Louisiana Station, all stations will have park-n-Ride facilities. The project will provide more than 6,200 parking spaces along the corridor.

Light Rail Station location parking spaces proposed

Along I-25:

- Louisiana Avenue 0
- University Boulevard 540
- Colorado Boulevard 363
- Yale Avenue 129
- Southmoor 788
- Belleview Avenue 59
- Orchard Road 48
- Arapahoe Road 817
- Dry Creek Road 235
- County Line Road 388
- Lincoln Avenue 1,120

Along I-225:

- Dayton Street 250
- Nine Mile (Parker Road) 1,235

Each light rail station will include features so passengers can wait for trains in safety and comfort.

- Three overhead shelters will cover the ramps and center of each platform.
- Windscreens will provide protection from wind.
- Crash, splash and glare barriers in depressed or median stations will protect transit patrons from the adjacent highway.

Stations will have benches, trash receptacles, ticket vending machines, message boards, lights, warning strips next to tracks, telephones, bike racks and lockers.

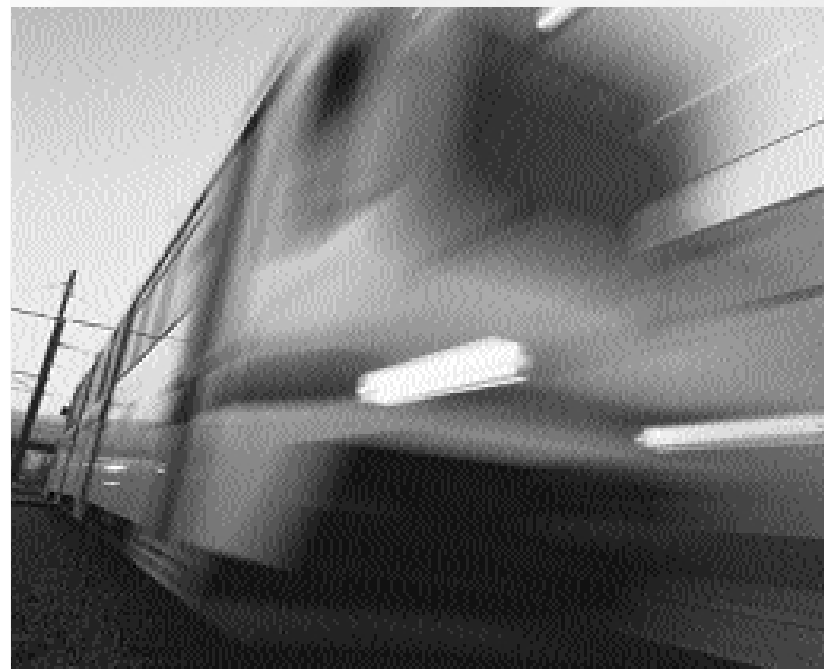
All stations are designed to meet Americans with Disabilities Act (ADA) standards. Each light rail boarding area will have stairs and elevators or ramps for strollers, wheelchairs and other wheeled devices. Twenty-seven elevators are being installed on the project.

A new public address and video-messaging system will be installed at key stations along the entire system.

Park-n-ride facilities will include handicap-accessible parking, benches, roadway and pedestrian area lighting, emergency phones and closed-circuit TV cameras for security.

Bus transfer plazas will have shelters at each bus bay, trash receptacles, bike racks, lockers, lighting and signage.

The park-n-Ride, kiss-n-Ride and bus transfer plazas will be landscaped to comply with local landscape standards.



Light Rail Facts continued



Several stations will be integrated with ongoing Transit Oriented Development (TOD).

Light Rail Transit Operations

Hours of operation

Currently, light rail service operates from 4:30 a.m. to 1:30 a.m.

Peak service hours: 6 to 9 a.m. and 4 to 6 p.m., Monday through Friday.

Off-peak service hours are all other times and weekends.

Planned Train Frequency

Lincoln Avenue/Downtown

Peak hours: Light rail trains are planned to leave the Lincoln Avenue Station every seven minutes. These trains will alternate between the Central Line and the Central Platte Valley spur.

Off-peak hours: Light rail trains are planned to leave the Lincoln Station every 15 minutes.

Nine Mile to Downtown

Peak hours: Light rail trains are planned to leave the Nine Mile Station for downtown every 7-1/2 minutes.

Off-peak hours: Light rail trains are planned to leave the Nine Mile Station for downtown every 15 minutes.

Nine Mile to Lincoln Avenue

Peak hours: Light rail trains are planned to leave the Nine Mile Station for Lincoln Avenue every seven minutes.

Off-peak hours: Light rail trains are planned to leave the Nine Mile Station for Lincoln Avenue every 15 minutes. Trains will travel at speeds up to 55 mph.

As the project nears completion, RTD will review service patterns to develop a final schedule.

Safety and Security

Several safety and security measures are being incorporated into T-REX. These include:

- Closed-circuit television (CCTV) at platforms, passageways and parking areas
- Compliance to safety codes
- Access for emergency-response personnel
- Emergency telephones connected directly to 911 at stations
- A new operations control central and communications system that allows continuous monitoring and control of the light rail system
- All project elements will be certified for safety before entering service



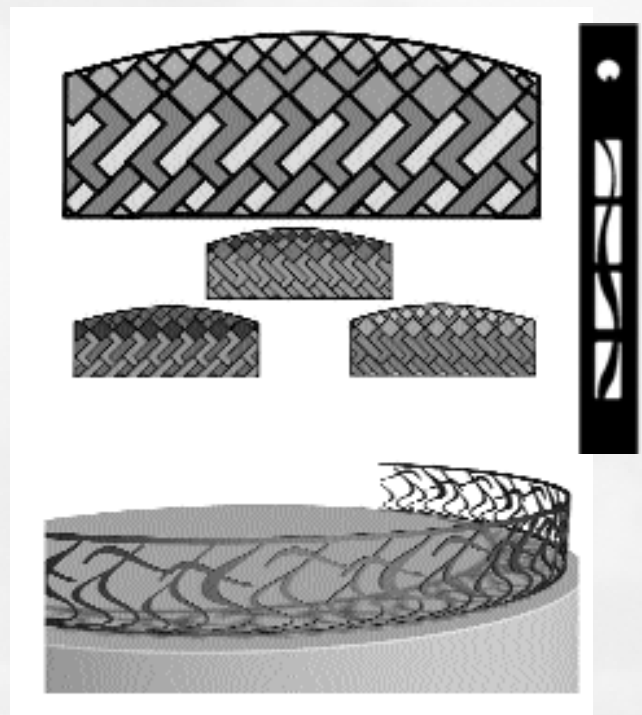
art-n-Transit

RTD created a committee of local volunteers that will help decide what public art is installed in the new light rail stations. The T-REX Art Advisory Committee, formed in late 2001, is made up of artists and community members, representatives from the project and RTD.

Art at the stations is important because it helps create a sense of shared value. It discourages vandalism, while at the same time celebrates the cultural diversity and richness of the community. Public art also helps provide a connection between neighborhoods and transit, adding value to the transit system and community as a whole.

The committee will consider issues such as community identity and values, aesthetic excellence, how the art fits with the architecture and the look of the community, and the enduring value of the artwork for the Denver region.

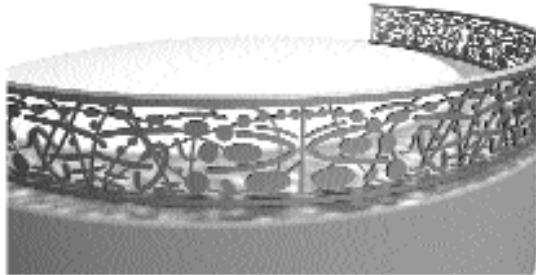
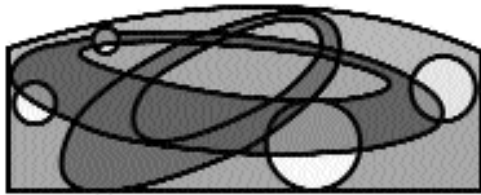
Artists have already developed enhanced concepts for functional elements of the system, such as railings, seating and shelters. They are also identifying the best sites or opportunities for site-specific art commissions.



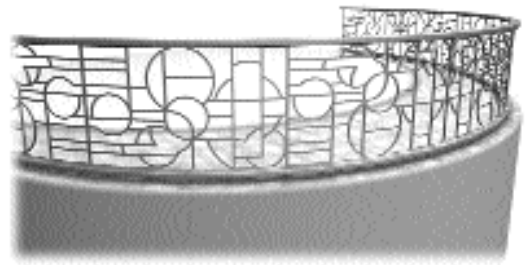
Louisiana Station
Moving People Theme



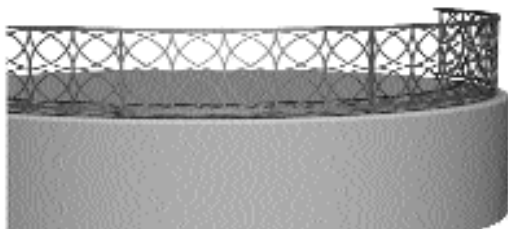
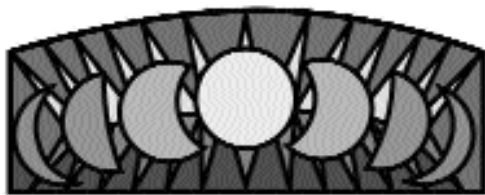
art-n-Transit, continued



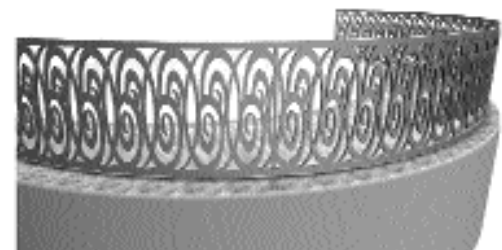
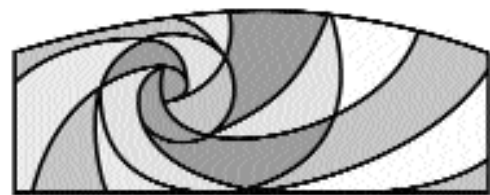
University Station
Academics/Orbits Theme



Colorado Station
Activities/Coming Together Theme



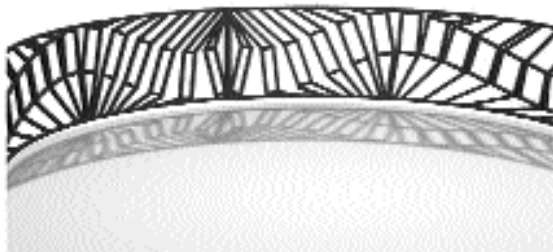
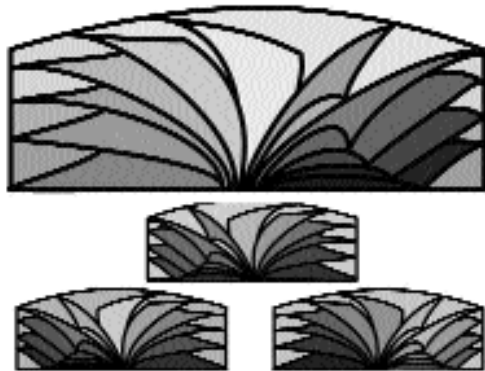
Yale Station
Phases of Moon Theme



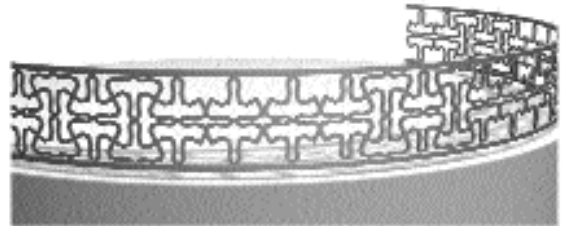
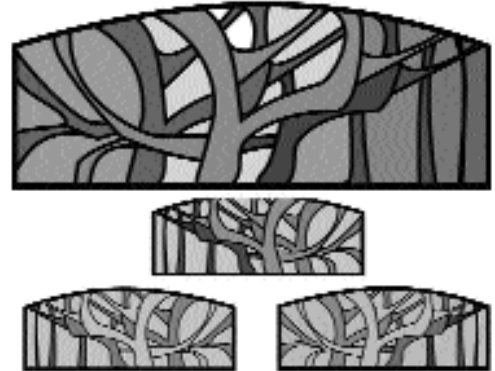
Southmoor Station
Spiral of Light Theme



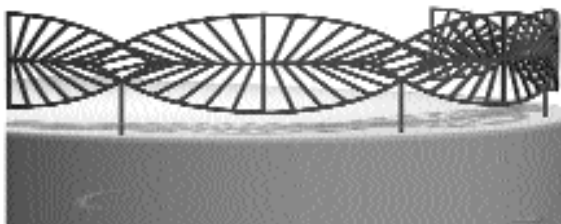
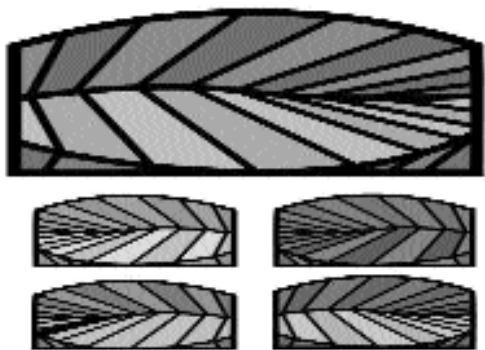
art-n-Transit, continued



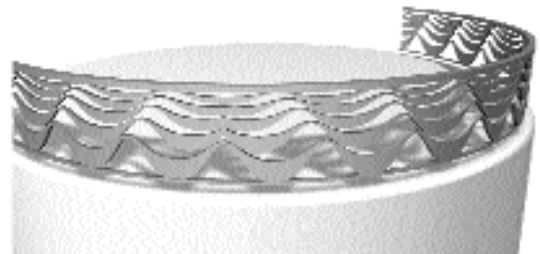
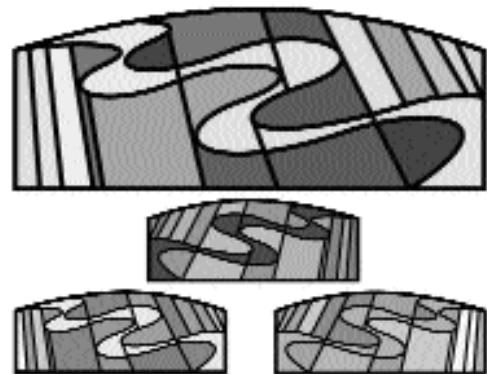
Belleview Station
Joining of Two Lines/Book Theme



Orchard Station
Orchard/Apple Theme



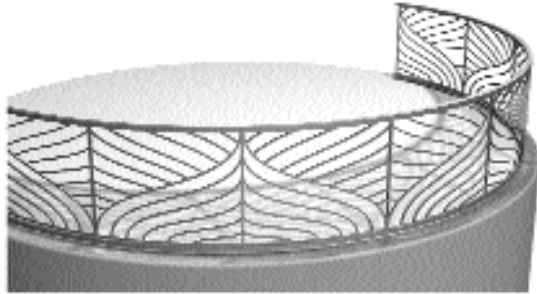
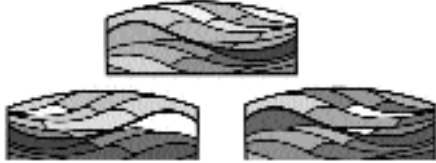
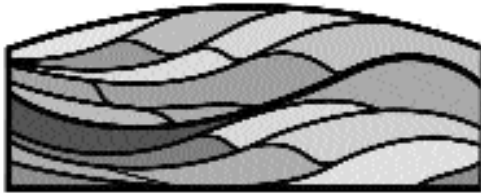
Arapahoe Station
Feathers/Leaves Theme



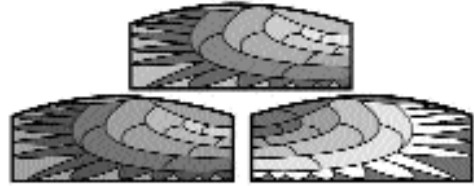
Dry Creek Station
Flowing Stream Theme



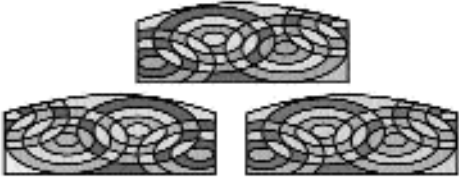
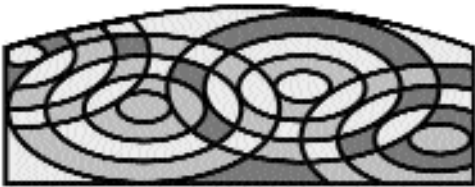
art-n-Transit, continued



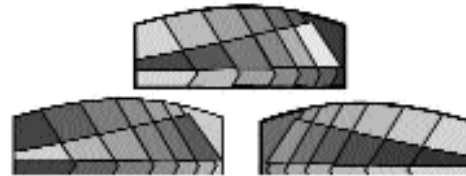
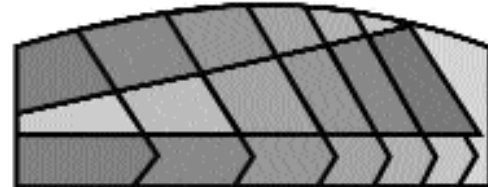
County Line Station
Countryside Theme



Lincoln Station
Flight/Taking Off Theme



Dayton Station
Falling Rain Theme



Nine Mile Station
Moving Train Theme

Right-of-Way Issues



To the greatest extent possible, Transportation Expansion (T-REX) Project construction is taking place within the available right of way of I-25 and I-225 owned by CDOT and RTD. However, the widening of I-25 and the construction of light rail transit and related facilities required some right-of-way purchases. By the end of 2002, working with a \$100 million budget, the T-REX Project acquired six single-family homes, two duplexes and two apartment buildings. It negotiated 30 total acquisitions and 172 partial acquisitions. The T-REX Project contractor, Southeast Corridor Constructors, is responsible for obtaining temporary easements during construction and may acquire additional right of way to accommodate project design changes.

To ensure all the property owners and residents were treated fairly, the T-REX team followed established federal procedures to buy properties and to relocate residents and businesses.

Once owners received an offer for their property, occupants had at least 90 days to move, and no one had to move until they found comparable replacement housing.

All residents and tenants were eligible for relocation assistance and compensation. To further help, the T-REX team took every precaution to minimize the inconvenience to everyone who moved.

Each party worked directly with a relocation expert who served

as an advocate for the homeowner or tenant. The relocation expert worked one-on-one with residents and tenants to evaluate their needs and provide help by:

- Explaining homeowner/tenant rights
- Helping with financing
- Contacting realtors and movers
- Locating replacement housing

Individuals also received relocation benefits, which varied depending on individual circumstances.

The benefits included:

- Help finding comparable replacement housing that is decent, safe and sanitary
- Help replacing housing costs, including money to supplement a home purchase, money to supplement rent, and down payment assistance
- Moving costs

Businesses were also eligible for replacement property costs and moving costs. As with residential properties, the T-REX Project purchased business properties, and relocation experts helped businesses move.





Utilities located within the proposed right of way are being moved to accommodate highway widening and construction of light rail transit. Utility relocation for T-REX involves many different metro area utility companies.

Utility service will be maintained during construction when services are switched to new lines. Also, the use of utility detour routes or redundant systems will reduce service outages. Utilities that may be impacted include:

- Electricity
- Telephones
- Cable TV
- Natural gas
- Sanitary sewer
- Storm sewer
- Water
- Fiber optic

All utility locations were identified before construction began to minimize disruption of customer service and to reduce safety hazards during construction. All utility relocation work is being performed by utility companies or qualified contractors in accordance with all state and local laws and safe work practices.

The T-REX utility project goals are to:

- Minimize inconvenience to the public by ensuring utility service continuity
- Ensure safety in all aspects of the project
- meet or beat the total program utility budget for both T-REX and the utility companies
- Provide for a quality project for both T-REX and the utility companies
- Implement and maintain the design-build utility schedule to achieve the overall project schedule
- Apply teamwork among the participants – T-REX, Southeast Corridor Constructors, utility companies – to achieve the common goal.

To prepare the T-REX corridor for construction, utility experts had to complete numerous activities. Those included:

- 600 locations throughout the corridor were potholed and surveyed, in an effort to accurately locate utilities (gas, electric, water, cable, telephone and others) without destroying property.
- 1,051 manholes were opened throughout the corridor to record the size and elevation of utility pipes below surface.
- Identifying 45 utility companies within the corridor that

have responsibility for 800 separate utilities. About 400 of those utilities were to be relocated. In addition, 200 new power feeds for various new facilities along the corridor were identified.

- Ownership and maintenance of all streetlights within the corridor became the responsibility of Southeast Corridor Constructors (SECC), the T-REX Project contractor. A new highway lighting system is being installed, located primarily in the median of I-25 and I-225.
- Colorado Senate Bill 00-203 was passed and signed in spring 2000, providing for a “master” relocation agreement, or Project Specific Utility Relocation Agreement (PSURA). The law required a new level of cooperation and coordination among utility companies and the contractor, essential for ensuring the success of statewide design-build projects. Ten Public Utility PSURAs and eight Private Utility PSURAs were required on the T-REX Project.
- Completing approximately \$2.5 million of utility relocation work, prior to SECC receiving its Notice to Proceed.
- Using new boring technologies to reduce inconvenience to the traveling public by eliminating the need to relocate utilities by open cuts on roads.





Among the many safety enhancements the Transportation Expansion (T-REX) Project will bring to the I-25/I-225 corridor will be a new highway lighting system.

The project's contractor, Southeast Corridor Constructors (SECC), developed the new lighting system, which was approved by T-REX. The new lighting system addresses driver safety, while considering residents living near the highway. The new lighting system will comply with the requirements of legislation passed by the Colorado Legislature in 2001. The bill, which addresses light pollution, requires the use of lamps that reduce light pollution, or light which impacts surrounding properties.

T-REX, using criteria established by other highway construction projects around the United States and widely accepted engineering guidelines, developed limits for the amount of light that will reach buildings outside the highway right of way.

The original highway lighting design for the T-REX Project required 40-foot light poles with 400-watt lamps every 180 feet on both sides of I-25 and I-225. This design required more than 1,500 light poles for the 17-mile project. The new design uses 1,000-watt lamps mounted on 65-foot poles placed about every 370 feet in the highway median. This reduces the number of light poles required to about 250. In addition, since poles are in the highway median, they will be 68 feet to 80 feet further away from properties adjacent to the highways. The lighting will be phased in over the course of the project.

Median lighting advantages include:

- The number of light poles on the project will be reduced significantly, enhancing the visual appearance and improving driver safety
- Lighting uniformity will be superior to the original design
- Light pollution to adjoining properties will be minimized by using more efficient lamps and shields where necessary
- Future maintenance will be reduced because fewer light poles and lamps are required
- Future energy costs for the system will be less than the original design

T-REX Protects the Environment



The Transportation Expansion Project (T-REX) team and the Southeast Corridor Constructors (SECC) team use every means available to minimize the project's impact on the environment, including wildlife. Measures include working with local municipalities and state and federal agencies to comply with all established local ordinances and state and federal laws.

SECC, recognizing the need to minimize the impact of noise on residents during the demolition of bridges in the City and County of Denver, devised an innovative temporary noise wall using freight trailers modified with special noise-dampening skirts. The trailers proved to be an effective means of mitigating noise during the demolition of bridges. The contractor also implemented a hotel voucher program, that provided residents living closest to the demolition projects the opportunity to stay in hotels.

To ensure the success of the noise mitigation program, SECC representatives and the City and County of Denver continuously monitor noise levels on the project. Residents also have access to a telephone hotline to report excessive noise levels.

The T-REX Project team and the contractor work closely with local, state and national agencies to ensure environmental impacts are minimized during construction. Measures include:

Air quality

- Suppressing dust through watering or other methods
- Covering trucks hauling soil
- Stabilizing and covering stockpile areas
- Replanting exposed areas
- Washing construction equipment to minimize tracking debris from construction sites
- Monitoring air quality during construction

Water Quality

- Adhering to local and state erosion control requirements
- Treating contaminated trench water
- Avoiding impacts to wetlands and other sensitive habitats
- Developing stormwater practices required for the Colorado Department of Transportation's Municipal Stormwater Permit
- Adhering to U.S. Army Corps of Engineers limits regarding filling in wetlands and streams

Noise/vibration

- Where necessary, building temporary noise barriers during construction
- Minimizing the length of construction in residential areas
- Minimizing nighttime construction in residential areas
- Routing truck traffic away from residential streets, where possible
- Combining noisy operations to occur simultaneously
- Accomplishing high-noise construction activities during the day, whenever possible



Noise Walls



The Colorado Department of Transportation (CDOT) uses noise walls along roadways to mitigate noise from highway traffic. Noise walls are usually made of masonry or concrete panels and are usually between 10 to 16 feet high. Noise walls are not the same as retaining walls, which can range in height from three to 20 feet. Retaining walls can sometimes work as noise barriers as well, depending on how they are built and where they are placed.

Noise assessment plays a role in major CDOT and RTD projects, and the Transportation Expansion (T-REX) Project is no exception. Southeast Corridor Constructors (SECC), the project's design-build contractor, is required to assure that the noise of construction and traffic is reduced as much as reasonably possible.

The contractor's work will be supplemented by the T-REX Project team's previous work with local residents and businesses on the wall design. All existing wood noise walls will be replaced with a new masonry or concrete noise wall.

Noise walls will not mitigate all traffic noise. Before a wall is installed, the mitigation must first be determined to be both feasible and reasonable. Mitigation measures, such as noise barrier walls, are considered feasible if the noise wall can achieve a minimum of a five-decibel noise reduction, and the noise walls do not create any safety or unacceptable maintenance problems.

The T-REX Project Team conducted a preliminary noise analysis in the southeast corridor, as required by the National Environmental Policy Act (NEPA). SECC is completing the final

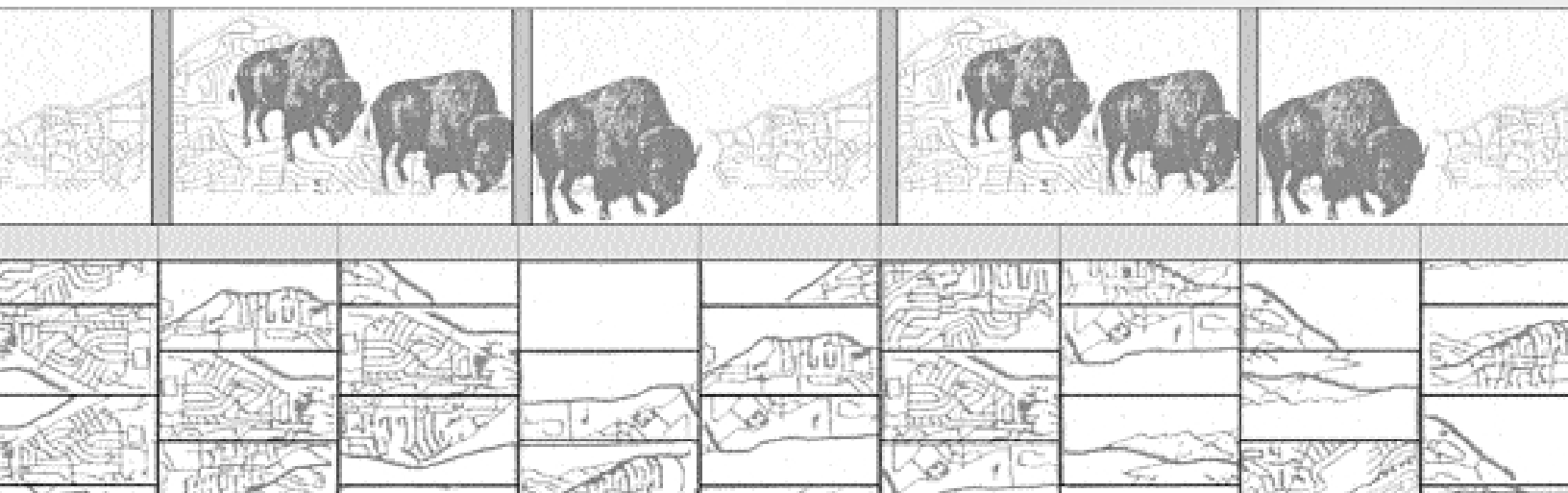
noise analyses, with more complete design and construction detail.

Noise levels and traffic volumes are modeled to determine where it makes the most sense to build noise walls. This analysis presents a likely picture of where noise walls would be the most effective, which is between Logan Street and Quincy on I-25, and along segments of I-225. Essentially, where there are residences along I-25 and I-225, there may be walls.

The contractor has located the walls to be as effective as possible. The project also has an established process if the community chooses to change the wall planned for a specific location.

The T-REX Project Team met with neighborhood associations, local elected officials and other groups regarding noise wall design, in an effort to incorporate local input as much as possible.

To minimize graffiti on noise walls, a non-toxic coating will be applied to the walls in the public right of way.



Urban Design



The Transportation Expansion (T-REX) Project team provided the public with specific detail for all urban design elements, including bridge architecture, retaining and noise wall appearance, landscaping, light rail stations and related architecture. This was done to ensure all the elements reflect their surroundings and to ensure the quality of the finished project.

The T-REX Project Urban Design Team met one-on-one with neighborhood residents, homeowner associations and municipalities to gather input on the proposed design concepts for the corridor's appearance. These meetings were critical for two reasons:

- Neighborhoods and municipalities had a chance to voice their needs and concerns regarding corridor aesthetics
- They had a chance to endorse the proposed concepts and improvements

It also provided these groups an opportunity to participate by:

- Identifying how local communities will be identified and represented through the urban design elements
- Enhancing communities through private participation

Groups taking part in the urban design process included:

- East Holly Hills Homeowners Association (HOA)
- City of Greenwood Village
- Wellington Square HOA
- Southmoor Park Neighborhood
- Washington Park East Neighborhood
- University Park Neighborhood
- Promontory Townhomes
- Southmoor West Townhomes
- Southmoor Park East HOA
- West University Community Association
- City and County of Denver
- Southeast Transportation Mobility Organization (SETMO)
- East Colorado HOA
- Joint Southeast Public Improvements Association (JSPIA)
- Douglas County
- Arapahoe County
- Arapahoe County HOAs

All registered neighborhood association presidents and local municipalities were invited to meet with the T-REX Project team. The meetings provided the team with a list of suggestions and concerns, including:

- Green space
- Noise abatement
- Aesthetics of walls
- Landscaping
- Right-of-way fencing
- Improved pedestrian and bicycle access to light rail stations and across I-25 and I-225

The T-REX Project's urban design plan integrates community input into much of the design of the highway and light rail improvements. It includes the design and detail of bridge architecture, retaining and noise wall appearance, landscapes, light rail transit stations and related architecture.

Members of the T-REX Project team received the Urban Design and Planning Merit Award for excellence in landscape architecture. The award was presented to the T-REX Urban Design Team for its careful stewardship, wise planning and artful design. The Colorado Chapter of the American Society of Landscape Architects (ASLA), a national professional organization, presented the Urban Design and Planning Merit Award.



Bridges/Interchanges



Light rail stations are portals to the light rail system, and bridges are the gateways to the communities that lie along the Transportation Expansion (T-REX) Project corridor. Bridges are the highly visible links that ensure smooth traffic flow. Also, they support recreational activities such as biking, walking and running.

A number of bridges along the I-25 corridor have been or will be replaced. Most of these will be in the area from Logan Street to Evans Avenue, where bridges built in the 1950s are beginning to show their age. New bridges also will be built where the new highway lanes and light rail require more clearance.

These bridges have been replaced:

- Franklin Street
- Steele Street
- Washington Street

Work is in progress to replace the Louisiana Avenue, Downing Street, University Boulevard and Evans Avenue bridges.

These bridges on I-25 will be replaced during 2003:

- Logan Street
- Emerson Street
- Quincy Avenue

On I-225, the northbound and southbound bridges over Cherry Creek will be widened.

These bridges along I-25 are being widened to accommodate additional traffic lanes:

- Colorado Boulevard
- Belleview Avenue
- Orchard Road
- Arapahoe Road
- Dry Creek Road
- County Line Road

The Highline Canal/Bike Path under I-25, south of Yale, is being improved for pedestrians and bicyclists.

In addition, the I-25/I-225 interchange is being reconfigured and reconstructed to improve safety and to accommodate the addition of light rail.

Light rail bridges will be built along I-25 at:

- Broadway
- University Boulevard
- Yale Avenue
- Highline Canal/Bike Path
- I-25/I-225
- Belleview Avenue
- Orchard Road
- Arapahoe Road
- Dry Creek Road
- County Line Road
- C-470

Light rail bridges will be built along I-225 at:

- DTC Boulevard
- I-225 at Cherry Creek
- Parker Road

Light rail along I-25 will go through short tunnels at:

- Colorado Boulevard
- Evans Avenue
- Hampden Avenue
- I-25/I-225 Interchange



Drainage Upgrades



Rapid and dense residential and business growth along the corridor has increased storm water runoff, which must be controlled effectively. The 40-year-old storm water system that serves the north end of the Transportation Expansion (T-REX) Project, especially between Broadway and University Boulevard, has contributed to highway flooding on I-25 during heavy rains and following heavy snows. Floods, which shut down the highway at Logan Street, occur once every three to five years. During the 1990s, flooding was serious enough to close the highway four times.

The new drainage system will be easy to maintain and designed to handle rain from a 100-year flood (a flood that occurs once every century). Facilities designed to remove pollutants and enhance storm water quality are proposed at the University Boulevard and the Colorado Boulevard interchanges, as well as other areas of the corridor.

In the Narrows section of I-25, the area between Broadway and University, a new box culvert storm sewer trunk main is planned along the south side of the highway, from Broadway to Veterans Park (near University Boulevard). In August 2002, crews completed boring a tunnel, 13 feet in diameter, under Mississippi Avenue, from just west of Broadway to I-25 and Logan. The new 13-foot tunnel replaces a 42-inch pipe. This tunnel will carry storm water to the South Platte River, just west of the Broadway/I-25 interchange. Additional storm sewers are being constructed under Buchtel Boulevard, which parallels I-25 on the east and west in the Narrows. The new storm sewers will connect to the drainage systems under Mississippi and Arizona avenues, which also empty into the South Platte River.

The existing storm sewer in the median of I-225 from the I-25 interchange north to Parker Road will be relocated, to accommodate the light rail line.

The cost to replace the existing drainage system is estimated at \$50 million for the entire 20-mile project. Of that, approximately \$21 million will be spent to replace the storm sewer system in the Narrows area.



Mississippi Outfall Tunnel Boring Machine

Intelligent Transportation Systems (ITS)



Intelligent Transportation Systems (ITS) represents the next step in the evolution of transportation. As information technologies and advances in electronics continue to revolutionize all aspects of our modern-day world, they are also being applied to our transportation network. These technologies include the latest in computers, electronics, communication and safety systems.

ITS has an important role in the Transportation Expansion (T-REX) Project during construction and will play an integral role once the project is complete. During construction, ITS technologies monitor traffic on the interstates and roads most likely used as alternate routes by drivers.

ITS technologies also provide a crucial connection in helping appropriate agencies respond to emergencies on and off the highways, both during and after construction.

During T-REX construction, a number of ITS elements are being used to minimize inconvenience to the public. Elements include:

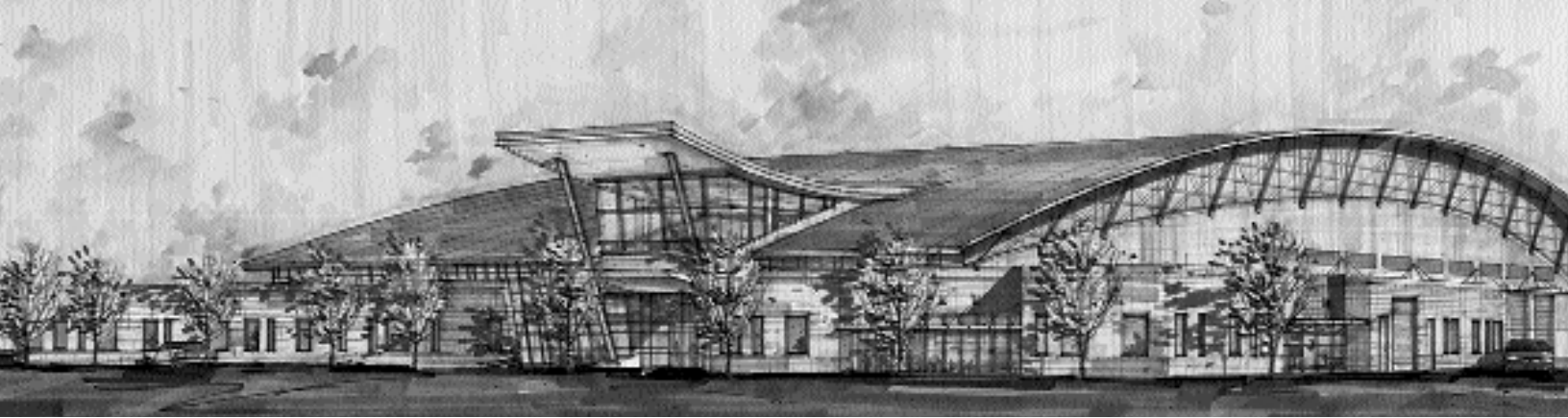
- Expanded ramp metering to regulate traffic entering onto I-25
- An enhanced courtesy patrol in the T-REX construction zone to help stranded motorists
- An enhanced network of closed-circuit cameras and vehicle detectors to monitor traffic on the interstates and on major feeder roads
- Highway advisory radios and variable message signs to provide travelers with up-to-date construction and traffic information
- An interim traffic operations center operated by the T-REX contractor, Southeast Corridor Constructors, to monitor traffic conditions and coordinate response with state and local agencies

The completed T-REX project includes ITS components to:

- Monitor freeway incidents (congestion, crashes, etc.) to better manage traffic flow
- Regulate traffic entering the highways (ramp metering)
- Provide travelers with traffic updates
- Provide transit riders with real time bus and train arrival information
- Make service announcements at major bus and rail stations
- Support the operation of a parking management system at major rail stations
- Provide priority movement to buses at selected park-n-Rides



Light Rail Maintenance Facility



As light rail transit expands in the metro Denver area, the new Elati Light Rail Maintenance Facility is being constructed to accommodate approximately 100 light rail vehicles, including 34 new Southeast Corridor light rail vehicles, and the rest of RTD's expanding fleet. The Elati facility is being built adjacent to the existing Southwest Corridor light rail line on the west side of Yale Avenue and Elati Streets, along the boundary of the City of Englewood and the City and County of Denver.

The new 125,000-square-foot maintenance facility is being constructed at the site of the former General Iron Works facility. The Elati Light Rail Maintenance Facility will incorporate requirements for maintenance, inspections, light rail vehicle storage and operations offices. Groundbreaking for the new \$40 million facility was held in July 2002. Personnel are scheduled to begin moving to the facility in April 2004 and the Elati Facility is planned to be fully operational in November 2004.

When completed, the new Elati Light Rail Maintenance Facility will provide an attractive structure and a cleaner site for the surrounding neighborhood and the City of Englewood. "Light maintenance" activities will include routine service and

cleaning, such as washing the vehicles, replacing broken windshields and replacing brakes. It also includes minor repairs and component rebuilds. The maintenance facility will be large enough to store 100 light rail vehicles, the number of vehicles expected to be operating by 2020.

More than 280 people may be employed at the facility, which will operate 24 hours a day. Staff will include administrative workers, facility personnel to maintain the property, and service and maintenance people who will inspect and maintain light rail vehicles. Mechanics will make minor repairs on the vehicles, and train operators will begin and end their routes from the maintenance facility.

The Elati Maintenance Facility will join the existing Mariposa light rail maintenance facility, which is south of the 10th and Osage light rail station, adjacent to RTD's Southwest light rail line. Mariposa will be converted to primarily a heavy repair facility as the fleet ages. It will also house the central control facility.



Public Information Program



The Transportation Expansion (T-REX) Project recognizes the importance of public information in all phases of the project, as well as the need to identify and resolve issues and concerns raised by citizens. The public information program concentrates on minimizing inconvenience to the public. The primary public information objective is to develop and maintain a high level of communication that creates an informed public, knowledgeable about the T-REX Project. The T-REX Public Information Team and the Southeast Corridor Constructors PI Team is one team, with one vision, speaking with one voice.

Successful communication requires that the T-REX team and Southeast Corridor Constructors be prepared to respond to public comment and concerns in an accurate, consistent and timely effort. An effective partnership with those impacted by the project and the general public is critical to developing a successful transportation system. This requires establishing two-way communications strategies that:

- Convey information and respond to feedback from the public
- Help the community develop ownership and pride in the T-REX Project
- Mitigate construction impacts to the greatest degree possible by developing an effective relationship with Southeast Corridor Constructors
- Convey completion of key project milestones

The T-REX Public Information (PI) team developed a comprehensive strategic communications plan. The PI team uses a grassroots approach in its public information program. Public outreach is accomplished through a variety of means, including:

- Presentations to service organizations, homeowners associations, large employers in the area, school groups and others concerned with the project's impact.
- *Tracking T-REX* and *Inside T-REX*, e-mail newsletters distributed every two weeks with project updates and construction-related information.
- Staffing telephone call centers at local television stations.
- A highly interactive Web site serving as a one-stop resource for real-time traffic and construction information, schedules and ways to cope with construction.
- Booths at a variety of community events reaching thousands of residents, including those from minority communities.
- The T-REX *INFOVan*, a colorfully decorated multi-media-equipped van staffed by PI Team members at various community events and at project milestone events.
- The establishment of a public affairs task force for local, state and national government representatives.

- An aggressive media relations program that encourages the local media to report on T-REX and the project's long-term benefits to the community.
- Responding to calls to the T-REX Project 24-hour telephone hotline.

The Hotline Information Reporting System (HIRSYS) is used to track contacts with the community, media and other stakeholders. HIRSYS contacts are compiled monthly and serve as a valuable tool in identifying project information needs and areas of interest in the community.

The Public Information Team also relies on feedback received from periodic research conducted by independent organizations. The research results are used to identify trends in community opinion about the project and help the team in developing new strategies and tactics for public outreach.





The number one goal of the Transportation Expansion (T-REX) Project team is to minimize inconvenience to the public. To achieve that goal, the project team is working with a number of business and transportation groups to develop TransOptions, to help employers and employees cope with getting to work and back home as quickly and easily as possible.

Among the TransOptions strategies are:

- Carpooling – neighbors take turns driving each other to work
- Vanpooling – similar to carpooling, only bigger
- Public transit – bus and light rail service
- Alternative work schedules – working non-traditional hours
- Teleworking – use new technology to work, without the commute
- Walking – pedestrian access is expanding
- Biking – get fit on the way to work
- On-site amenities at businesses – day care centers, shuttles, etc.

The Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD) have dedicated \$3 million to help employers and employees deal with the construction process. This is the first time the agencies have earmarked funds to support TransOptions. The funds are used to support:

- RTD bus subsidies
- Internet-based transit and transportation service information
- Vanpool subsidies
- Commuter education and outreach programs

Vanpool subsidies

First-time vanpool participants get 50 percent off of their first three months in vanpools traveling through the T-REX corridor.

Transit subsidies

EcoPass Program – Annual bus and light rail pass that employers can purchase for employees. T-REX offers a 50 percent discount to new applicants.

Individual ValuPass program – Annual bus and light rail pass that employers or individuals can purchase. First time applicants are eligible for a T-REX discount that will allow them to purchase a 12-month pass for the price of eight months.

Commuter Check Program – Transit voucher that is exchanged monthly for a bus or light rail pass. All applicants can receive the T-REX discount of 50 percent off the face value of all vouchers.

Employers Pass Outlet Program – Employers order monthly transit passes to sell at an outlet at their business. The T-REX discount is 50 percent off the face value of all passes.

Guaranteed Ride Home – Employees that take transit to work receive a free taxi ride home in case of emergency. The program is free for employees in the T-REX corridor who purchase Individual ValuPasses and is already included in the EcoPass and Vanpool programs.

To further encourage the use of carpools, vanpools and transit, T-REX opened temporary Bus/High Occupancy Vehicle (HOV) lanes in fall 2002. The far left lanes will run in each direction on I-25 from Evans Avenue to Dry Creek Road.

Bus/HOV Lane Facts:

- Lanes are available to commuters with two or more people per vehicle, including buses and vanpools
- Lanes are Bus/HOV lanes during weekday peak hours (6-9 a.m. and 3-6:30 p.m.). Lanes are open for general public use all other times
- Lanes include special pullouts for law enforcement to enforce proper use of the lanes
- Lanes will remain operating until fall 2006

Several transportation management organizations and associations in the metro Denver area are supporting the TransOptions effort. Supported by T-REX, the organizations, which provide free consultations and services to businesses, include:

- Southeast Business Partnership – for the Denver Tech Center, Inverness and Meridian business parks
- Transportation Solutions – for the Cherry Creek and Colorado Boulevard corridor
- Downtown Denver Partnership – for the central business district
- DRCOG – for vanpool and carpool efforts

www.goTransOptions.com



T-REX Protects People and Property

The Transportation Expansion (T-REX) Project is committed to building this highway and light rail project in the safest as well as the most cost-effective manner possible for the people who work on it, travel through it and live next to the construction. For T-REX and its contractor, Southeast Corridor Constructors (SECC), safety is the top priority for workers, motorists and communities bordering the project. Safety is emphasized 24 hours a day, in all weather conditions.

Partner Controlled Insurance Program

A unique attribute of this project is the Partner Controlled Insurance Program (PCIP), which was developed by the Colorado Department of Transportation (CDOT) and the Regional Transportation District (RTD). Controlled insurance programs are fairly common in the construction industry, but what makes T-REX different is the partnership formed between the project owners and the builder. Both entities share the development, decision making and any resulting savings from a well-managed program.

To be successful, all contractors and subcontractors must subscribe to the same project-instituted insurance policies. Consolidating reporting and costs in this manner can save the project millions of dollars, while providing assured and streamlined control, and a higher level of overall safety performance by participants. Any resulting shared savings are returned to the primary contractor, subcontractors, owners, and ultimately the taxpayers. T-REX officials believe no other construction project in the United States has a Controlled Insurance program that is managed this way.

A construction project as massive as T-REX requires a rather complicated insurance program to ensure proper coverage. Large-value coverage, which include workers' compensation, general, excess and professional liability, pollution, builders' risk, and railroad-protective liability are used on T-REX. These policies are provided by five separate insurance companies and managed by an insurance broker.

The general liability and workers' compensation provider offers dedicated loss control, claims adjusting and injury case management staff that work closely with respective staff. These on-site and local project services help assure reporting accuracy, documentation and contractor compliance. These services are available to assist all contractors, subcontractors and the public before, during and after incidents that lead to claims.

The project owners provide valuable oversight and help through the CDOT and RTD risk managers, as well as a full-time, on-site RTD systems safety manager and a construction safety technician. Additionally, the T-REX Project's federal partners, the Federal Transit Administration and the Federal Highway Administration have a role in ensuring project safety.

Building T-REX Safely

Ultimately, SECC is responsible for project safety. SECC was selected as the contractor, in part because of its industry-leading safety experience, internal safety culture and reputation. SECC was required to provide acceptable programs, people, and adequate financial resources to successfully manage this project.

The contractor's safety program is comprehensive and far-reaching. It involves each manager, superintendent, foreman and construction worker – where the safety rubber meets the road.



Quality Management



One of the Transportation Expansion (T-REX) Project's four goals is "to provide for a quality project." This simply stated goal is the driving force behind a systematic approach to ensuring that all work produced on T-REX complies with governing requirements. This approach includes multiple levels of involvement.

Quality Control

Quality control includes all the operational techniques and activities used to fulfill a set of quantitatively or qualitatively stated requirements. These activities are typically carried out at the production level and include such activities as work planning, training, and process control. T-REX Project contractors must document their quality control approaches and methods in Quality Management Plans that are approved by the T-REX team. If work is subcontracted, the subcontractor must meet these requirements.

Quality Assurance

Quality assurance is a management tool typically fulfilled by staff independent of those producing the work. Quality assurance includes all of the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that the product will fulfill quality requirements and will satisfy given needs. For the T-REX design-build contract, Southeast Corridor Constructors (SECC), the T-REX contractor, achieved international quality standard (ISO9001-2000) certification of its program within 12 months of Notice to Proceed. Certification demonstrates that SECC has a systematic approach to fulfilling quality requirements.

Quality Oversight

Having made effective quality control and quality assurance programs conditions within its contracts, the Colorado Department of Transportation and the Regional Transportation District have developed systematic approaches to verifying that work products comply with governing requirements and that quality control and quality assurance programs are being effectively implemented by its contractors. These approaches include a comprehensive compliance audit program covering all aspects of the work and verification testing of materials to validate contractor test results. Information from these programs provides feedback to the contractor for continuous improvement. It also allows the owners to accept the work with confidence that it's been done correctly.

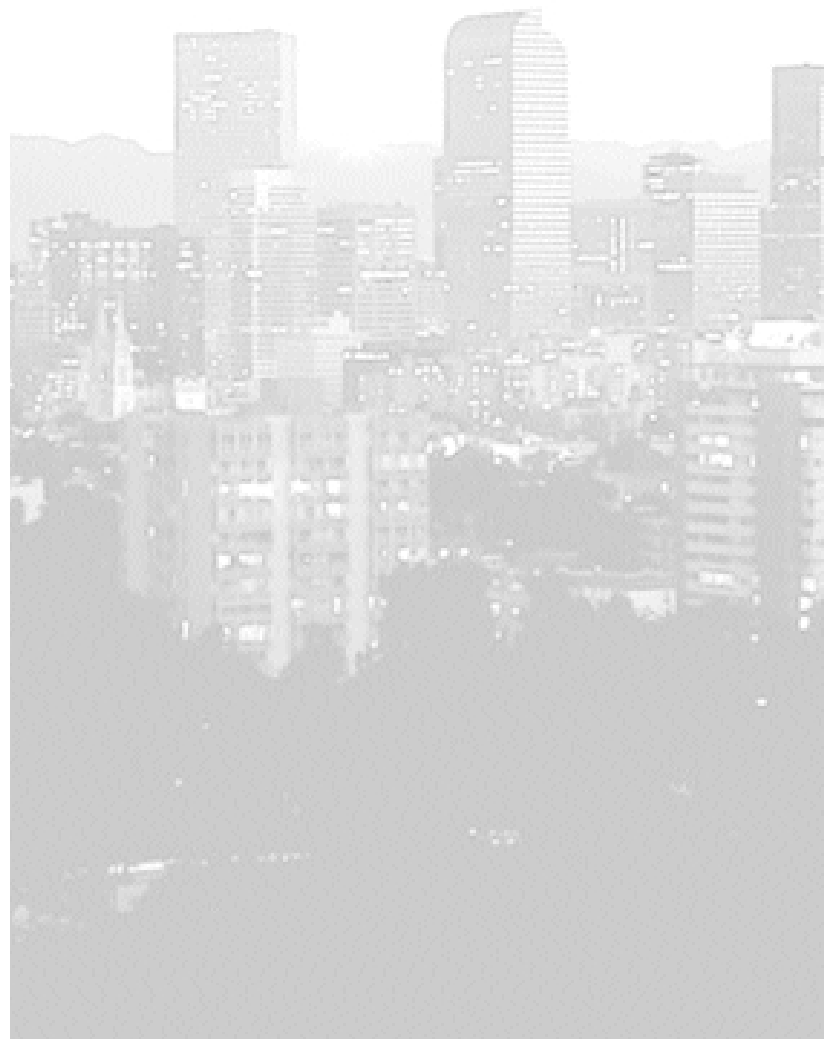
Southeast Corridor Constructors Quality Plan

Southeast Corridor Constructors (SECC), the T-REX Project design-build contractor, is dedicated to instilling an emphasis on quality and integrating quality into every aspect of the T-REX Project. The SECC Quality Management Plan provides the framework for ensuring this focus on quality.

The plan provides integrated quality procedures and guidelines for the design and construction of the Transportation Expansion (T-REX) Project. This plan has been designed

- (a) to meet the requirements of the ISO 9001:2000 standard;
- (b) in accordance with contract requirements, to satisfy the intent of the Federal Transit Administration's Quality Assurance and Quality Control Guidelines (FTA-MA-06-0189-92-1), March 1992; and
- (c) to meet the contract requirements of the Construction Quality Management Plan.

The highest element in this plan is the Quality System Manual, which describes SECC's quality system and focuses on what is required to achieve quality in the context of Project requirements.





ADA – Americans with Disabilities Act. A federal mandate requiring public facilities to be accessible to the disabled.

Baseline survey – An initial survey, which is used as a comparison for all subsequent surveys.

Best value – Term applied to the selection of a contractor, which allows evaluation of the bidder to be based on the solutions they provide, rather than awarding the project to the lowest bidder.

Bike locker – An enclosed box in which a cyclist may store and lock a bicycle.

Bus bay – A place for buses to stop and drop off or pick up riders who are continuing or ending their travels using light rail.

Bus transfer plaza – A facility including bus bays, bus shelters, and bike racks and lockers for riders who are continuing or ending their travels using light rail.

CBD – Central Business District; an area of Denver in which approximately 112,000 people work.

CCTV – Closed-circuit Television; a means of providing surveillance in which cameras record activities at specific sites and monitored at a central location.

CDOT – Colorado Department of Transportation

Central control – A facility for communications with light rail vehicles.

Central Corridor – Light rail transit line that provides service to downtown Denver.

Communications bungalow – A facility housing communications equipment, including closed-circuit television, audio messages and vehicle location information. Every light rail station will have such a facility where equipment will be operated and monitored.

Design-bid-build – Traditional method of construction in which the design is fully completed, then the bidding process occurs, and finally construction begins. This method is slower than the design-build method being used on the T-REX project.

Design-build – Construction method in which the client provides preliminary engineering design and guidelines (approximately 30 percent of the project) to a team of designers and builders. This team completes the design

based on their methods, expertise and innovations with oversight from the client. Construction may occur as design takes place, providing a much shorter time frame for project completion. This method is the one used for the T-REX project.

Design-build contractor – The company hired to build the project, Southeast Corridor Contractors.

DRCOG – Denver Regional Council of Governments

DTC – Denver Technological Center

EIS – Environmental Impact Statement; a document required by the National Environmental Policy Act of 1969.

FEIS – Final Environmental Impact Statement

FHWA – Federal Highway Administration

FTA – Federal Transit Administration

Highblock – A concrete ramp structure with an overhead shelter that allows persons with disabilities, wheelchairs, strollers or other circumstances to access the light rail vehicle. The highblock is necessary because the floor of light rail vehicles is approximately three feet above the boarding platform and accessible by stairs.

HOA – Homeowners Association

HOV – High Occupancy Vehicle

I-25 – Interstate 25; the only north-south freeway in Colorado.

In-kind – Non-cash, usually donations of material goods.

ITS – Intelligent Transportation Systems; technology, such as cameras and ramp meters, used to monitor traffic and parking availability and communication devices, such as variable message signs to convey the information to travelers.

Kiss-n-Ride – A drop-off point for light rail riders to be left at the station by the driver of a vehicle.

Light rail maintenance facility – A facility for light maintenance to serve the Central Line, the Southeast and Southwest Corridors, and the Central Platte Valley Spur. Routine cleaning and repair of light rail vehicles will take place at the facility.



Light rail station – Stations in which travelers may board light rail vehicles.

LINK – A circulator bus service implemented by the Southeast Transit Authority.

Local match – A type of grant funding that matches federally provided funds with funding from local sources. The Southeast Corridor project funding will include 40 percent from local matches, including Regional Transportation District funding, contributions from local agencies and individuals and non-cash donations.

LRT – Light Rail Transit; an additional 19 miles will be constructed, connecting to the Central Corridor line and Central Platte Valley line, providing service to downtown Denver and to the Southwest Corridor line, providing service to Englewood and Littleton.

LRV – Light Rail Vehicle; trains powered by overhead electricity. They travel up to 55 miles per hour and accommodate up to 150 passengers per car.

MIS – Major Investment Study; the Southeast Corridor MIS began in 1995 and examined overall corridor mobility needs and identified and analyzed solutions. The recommendations from the MIS were incorporated into the Year 2020 Plan for the region.

MSE – Mechanically Stabilized Earth; a construction method for retaining walls, in which concrete panels are interlocked and stacked to create a wall. Their stability comes from fabric straps, which are integrated with the soil behind the wall, using the weight of the soil to hold the wall in place. This method is useful in tight places where there is no room to provide a slope transition between two different grades.

Multi-modal – Many ways; the Southeast Corridor project aims to improve travel time and enhance safety along I-25 and I-225 by more than a single change. Highway work including additional lanes, improvements to interchanges, drainage upgrades and construction of light rail are a multi-modal approach. The T-REX Project also will include enhancements for pedestrians, bicycles and joggers.

NEPA – National Environmental Policy Act; established in 1969 and applicable to federal agencies, requiring them to produce an Environmental Impact Statement before construction.

No-Action – An alternative considered and rejected that would have done nothing to alleviate congestion or improve safety along the Southeast Corridor.

Noise wall – Also called a sound wall; a concrete or masonry wall paralleling a roadway and designed to mitigate roadway noise. In the past, noise walls were constructed from wood fencing.

One DOT – The approach used by the Federal Highway Administration and the Federal Transit Administration to work together on T-REX.

One Voice – The approach used by the T-REX Project Team to ensure a consistent and meaningful message is communicated to the public impacted by the project.

Park-n-Ride – A place for light rail riders to park their cars before boarding the train or bus.

Platform – Where light rail patrons enter and exit the train.

Project Owners – The T-REX Project owners are the Colorado Department of Transportation and the Regional Transportation District.

Retaining wall – Walls constructed where there are changes in grade or slope.

ROW – Right of Way; the parcels of land adjacent to the roadway and light rail transit along the construction project. Widening of I-25 and construction of light rail transit made it necessary to purchase additional right of way.

RTD – Regional Transportation District

RFP – Request for Proposal; a legal document that specifies how a project will be built. It offers instructions to bidders and provides a scope of work and other important information that will govern the construction of a project. Design-build teams bid for the right to construct the project.

Retaining wall – A wall used to transition between two different grades without the need for a slope.

SBD – Southeast Business District; an area in Denver in which approximately 120,000 people work. The district includes the Denver Technological Center, Greenwood Village, Inverness, Meridian and Greenwood Plaza business parks.

SECC – Southeast Corridor Contractors, the T-REX design-build contractor.



SETMO – Southeast Corridor Transportation Management Organization; this group addresses transportation issues that impact the business community from the Denver Technological Center to Lincoln Avenue along I-25.

Sound wall – See *noise wall*.

STA – Southeast Transit Authority

TABOR – Taxpayer’s Bill of Rights; the Regional Transportation District was granted approval for exemption from the revenue and spending limitations of TABOR until the year 2026.

TPSS – Traction Power Substations; places where power is converted from AC power to DC power, to provide electricity for light rail vehicles. The Southeast Corridor light rail transit system will have 16 such stations.

TransOptions – A number of transportation options available to employers and employees to help them cope with traveling through T-REX.

T-REX Project – Transportation Expansion Project; this area includes Interstate 25 from Broadway in Denver to Lincoln Avenue in Douglas County and I-225 from I-25 to Parker Road. Traveled by more than 200,000 vehicles per day.

TVM – Ticket Vending Machine; a large machine from which light rail patrons may purchase tickets.

Urban design – An element of design that focuses on aesthetics, or what people see, use and perceive. These may include park-n-Rides, boarding platforms, bridge architecture, landscape and wall imagery.

Windscreen – A wall on light rail platforms designed to provide protection from the wind.

USDOT – United States Department of Transportation

For more information about the T-REX Project, call (303) 786-TREX, or visit the project Web site at www.trexproject.com.

