Metro-Regional Transportation Solutions for the 21st Century:

City-County Innovation Through TEA-21

a report by the Joint Center for Sustainable Communities
The Joint Center for Sustainable Communities represents an important collaboration between the U.S. Conference of Mayors (USCM) and the National Association of Counties (NACo) on behalf of our nation’s communities. Its primary mission is to provide a forum for cities and counties to work together to develop long-term policies and programs that will lead to economic enhancement, environmental stewardship and social well-being—the three pillars of sustainable communities. The Joint Center helps local elected officials build sustainable communities by promoting community leadership initiatives, providing technical assistance and training, and conducting community policy and educational forums.

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Metro-Regional Transportation Solutions for the 21st Century
Five years ago, the National Association of Counties (NACo) and the United States Conference of Mayors (USCM) came together to support what eventually became the Transportation Efficiency Act for the 21st Century, commonly referred to as ‘TEA-21’. While there were many reasons for this, one of the most important was to give local governments increased opportunity and flexibility to innovate—to design and implement transportation solutions that improved quality of life for all American citizens. Looking back over the four years that have elapsed since passage of TEA-21, it is clear that this goal has been achieved. By working together through TEA-21, mayors and county officials around the country have developed extremely creative and highly effective initiatives that link citizens to jobs, decrease commuting time, ease accessibility to community resources, and reduce negative environmental impacts.

The following report from the Joint Center for Sustainable Communities—the partnership between the United States Conference of Mayors and the National Association of Counties—highlights some of the best transportation related efforts initiated by cities and counties since TEA-21’s passage. These case studies demonstrate the benefit of multi-jurisdictional partnership, and provide mayors and county officials in other regions across America with solid guidance and insights on addressing similar challenges in their communities. Each featured community will share their story with others, and we encourage our readers to contact them and learn from their experiences.

As Co-Chairs of the Joint Center, we are committed to fostering partnerships between cities and counties that can replicate the successes detailed throughout this report. These partnerships can only be achieved through collaboration, innovation, and persistence. By dedicating themselves to these principles, mayors and county officials have in a relatively short period of time been able to enhance service provision, reach out to constituents and the private sector, and spur increased innovation that has lead to remarkable progress in communities across the country.

Mayors and county officials learned several important lessons along the way. They have developed strong opinions on what has helped, and what has hindered them in making progress towards solving our many transportation challenges. But as the level of government closest to the people, we possess unique insight not only on what has been done, but what can be done in the future for the betterment of our communities. Through this report, and in the weeks and months to follow, we look forward to sharing those insights and working with our partners in federal and state government and the private sector to assure that our cities and counties are strong, vibrant places for all Americans to live, work, and raise their families.

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President
United States Conference of Mayors

Commissioner Kenneth A. Mayfield
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President
National Association of Counties
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*Metro-Regional Transportation Solutions for the 21st Century*
Dear Mayor/County Official:

Next year, Congress plans to reauthorize the Transportation Equity Act for the 21st Century (TEA-21). How has this landmark law worked to help cities and counties expand transportation choices and build more livable communities? This report attempts to answer that question through eight case studies.

The case studies, which all represent multi-jurisdictional collaborations, were identified after canvassing the communities that make up the USCM/NACo Joint Center for Sustainable Communities. In summary form, they include:

The Trinity Railway Express (TRE). A commuter rail collaboration involving the Cities of Fort Worth and Dallas and Tarrant and Dallas Counties, the TRE provides a vitally needed rail link between Dallas and Fort Worth along a publicly-owned 34-mile corridor. Engineers estimate it is removing the equivalent of one lane of traffic off the busy airport freeway during rush hour. Intermodalism is an important feature of this new system, exemplified by a new transportation center in downtown Fort Worth that is bringing together the TRE, Amtrak, city buses, taxis and automobiles. Flexible TEA-21 funds and FTA formula dollars made this project possible.

The Southeast Michigan Job Access-Reverse Commute Program. The City of Detroit, the Southeast Michigan Council of Governments, transit agencies, and organizations located in nearby counties have come together to form the Transportation-to-Work Coalition for Southeast Michigan. Together, this coalition is building a regional capacity to respond to mobility challenges quickly, creatively, and appropriately. Current program elements include: re-orienting traditional line-haul services, developing feeder van services that accommodate “trip chaining,” contracting with taxi services for emergency rides, and establishing a network of mobility managers to ensure all services are used efficiently and effectively. TEA-21 Job Access and Reverse Commute (JARC) dollars have provided more than $2 million in federal funds for this effort.

The San Pablo Avenue Enhanced Bus Project. Starting June 2003, “enhanced” bus service will integrate transit and traffic operations of nine cities and two counties, along the heavily-congested San Pablo Avenue Corridor in California’s East Bay. The project includes the implementation of several bus rapid transit (BRT) attributes such as: off-vehicle fare collection; new low floor, multiple-door buses; limited stops; bus arrival information; and traffic signal prioritization. Because of its multi-jurisdictional and multi-functional nature, the project has been able to attract a variety of funding partners. The two largest funding sources have been TEA-21’s Congestion Management and Air Quality Improvement Program and California’s Transportation Funds for Clean Air.

“Urban Reserve” Planning in the Portland, Oregon, Metropolitan Region. In December 1998, the Portland metropolitan region expanded its Urban Growth Boundary—a line that sep-
arates land that can be developed from land that is to remain farm and forest—to include an area of about 1,500 acres. Using a Transportation and Community and System Preservation (TCSP) grant from the U.S. Department of Transportation, this region has developed a master plan to balance the transportation, land-use and environmental impacts of expanded urbanization. In the process, the region has experimented with cutting-edge approaches to addressing natural resource protection such as sub-watershed planning and Green Streets.

**Commuter Rail Planning in Treasure Valley, Idaho.** In the fall of 2000, the City of Boise acquired 18 miles of rail right-of-way and trackage from the Union Pacific Railroad. The plan is for this right-of-way and trackage to anchor a future commuter rail system for the Treasure Valley region, an area that encompasses Ada and Canyon Counties in Southwest Idaho. Another goal is to support reinstatement of Amtrak service to Boise. An earlier TEA-21 Transportation and Community and System Preservation pilot grant laid the groundwork for considering new transportation alternatives in the region including commuter rail.

**Integrated Land Use/Transportation Planning in Charlotte-Mecklenburg County, North Carolina.** With local official leadership and substantial public involvement, Charlotte-Mecklenburg has endorsed a “centers and corridors” development pattern. This means high-density development will be steered to five main corridors (the region’s economic centers), and transportation systems will be designed to serve and reinforce more compact land uses. In Nov. 1998, this overall approach got a boost when the citizens of Charlotte-Mecklenburg approved a half-cent sales tax increase that, along with TEA-21 New Starts funds, will eventually bring rapid transit to the area’s five main corridors.

**AZTech.** The Phoenix metropolitan area in Maricopa County is the second fastest growing metro region in the U.S. To help combat increasing congestion due to urban sprawl, the region’s principal jurisdictions—Maricopa County and the cities of Avondale, Chandler, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, Surprise and Tempe—have created AZTech. AZTech’s goal is to develop and integrate intelligent transportation systems (ITS) for the Phoenix metro region, building from a $7.5 million ISTEA demonstration grant awarded to the area in 1996.

**Joint Greenbelt/Trail Planning in Columbia-Boone County, Missouri.** Using federal Transportation Enhancement funds, Columbia and Boone County are constructing new walking/biking trails. But these are more than just individual trails. They are also helping to fulfill a long-held vision for a greenbelt system that will one day encircle the entire Columbia metro area. More recently, citizens have proposed using the trail links as a stepping stone to building a comprehensive 379-mile transportation system for bicyclists and pedestrians that would allow residents and tourists to get anywhere in the metro area by non-auto modes.

**One note:** These cases studies were prepared over the course of 2002. Each one represents a snapshot in time. Please contact the staff persons listed at the end of each case study to obtain the most current information on these projects.
Attitudes are hard to change. But that’s what’s happening in the Dallas/Fort Worth metroplex, where a new commuter rail system—the Trinity Railway Express (TRE)—is narrowing the 35-mile gap between two great downtowns, creating the conditions for a regional economy powerful enough to compete with the largest metropolitan economies of the world. Along the way, multi-jurisdictional cooperation and the concept of transportation choice are replacing age-old rivalries and “highways-only” thinking. Ridership on the TRE has exceeded all expectations, and the metroplex now sees possibilities for an expansive mass transit system not only to move passengers but to stimulate economic development. Currently, almost 300 miles of passenger rail lines are planned for the metroplex, with more under consideration. Intermodalism is also an important feature of this new system, exemplified by a new transportation center in downtown Fort Worth that is bringing together the TRE, Amtrak, city buses, taxis and automobiles.

Introduction

The Dallas/Fort Worth metroplex in Dallas and Tarrant Counties is one of the fastest-growing regions in the United States. The introduction of commuter rail service between Fort Worth and Dallas represents this region’s determination to overcome local rivalries and undertake cooperative investments in order to gain a greater share of the global marketplace. Working together, local communities in North Texas are providing a first-rate, seamless public transit system for all customers in the region—something often cited by corporations as critical for business relocation and expansion.

Local officials have worked since the early 1980s to set up the 35-mile, $300 million express rail service, which now serves nine stations and is anchored at each end by restored railroad stations: the 1916 Dallas Union Station and the 1931 art deco Texas & Pacific Passenger Terminal in Fort Worth. Five of the stations serve communities outside Fort Worth and Dallas city limits proper, in Northeast Tarrant and Dallas Counties.

The TRE represents the largest regional cooperative venture since the Dallas-Fort Worth International Airport was built in the early 1970s. The seeds for the service were sown when a trustee for the then-bankrupt Chicago, Rock Island & Pacific Railroad contacted local officials about purchasing the rail corridor that links the region’s two central business districts. Although passenger rail transit was only a glimmer at that point, foresighted local officials saw the value in preserving the corridor and together with federal and state assistance bought it for $33 million in 1984.

From the outset, the venture was an equal partnership. In an inter-local agreement, Dallas and Fort Worth divvied up responsibilities for maintaining and overseeing the track while it continued to be
used for freight, providing the two cities with a modicum of revenue from lease-back arrangements.

Around 1989 interest in developing commuter rail service became serious. Recognizing the complexity of such an undertaking, the decision was made to transfer responsibility for construction, operation and financing to the then relatively young transportation authorities serving Dallas and Fort Worth—the DART and the T—which not only had the mandate for providing these sorts of services, but also the dedicated funding sources to generate whatever local share would be necessary to match federal grant dollars.

Getting the commuter rail service up and running still took time once the decision was made to move forward. There were protracted negotiations with freight railroads and delays in receiving equipment. In 1996, however, the first ten miles of the service—between Dallas and the City of Irving—were completed. A second stretch of 17 miles, adding four more stops, opened in Sept. 2000. Then in Dec. 2001 service to two stops in downtown Fort Worth was initiated—to the Fort Worth Intermodal Transportation Center and to the Texas & Pacific Passenger Terminal.

Finding ways to maintain a 50:50 balance of power has been a high priority, and influenced the decision to contract out operations of the rail line to a private operator, Herzog Transit Services. Track maintenance and dispatching are also provided under contract with the Burlington Northern Santa Fe, which has rights to operate freight trains on the line, as does the Union Pacific.

TRE trains, some double-decker, now leave downtown Fort Worth Monday through Saturday for downtown Dallas, a trip that takes approximately 60 minutes terminus-to-terminus. Trains run every half hour during rush hours and every hour during non-peak periods, departing as early as 5:35 a.m. and returning as late as 12:13 a.m. The round-trip fare is $4 if you cross county lines, $2 if you stay within one county. Travelers can reach DFW International Airport by transferring to a shuttle bus.

Two features of the system are encouraging intermodal travel. One is a new $14 million, 31,000 square foot Intermodal Transportation Center (ITC) in downtown Fort Worth. Built to capture the historical feel of old train stations, the ITC has been designed as a transportation hub where travelers can connect to a variety of modes all in one place. Amtrak, for example, has baggage handling facilities inside the ITC and shares platform space with the TRE. Negotiations are underway to eventually make Greyhound bus services part of the mix.

The second feature that is making movement between modes easier in the region is the single fare structure DART and the T established in Sept. 2000—in which tickets and passes from either agency are accepted in each other’s service areas. A unified fare structure was no easy feat to accomplish given two separate agencies with different policy boards, funding bases, and organizational styles. But both transportation authorities knew an integrated, seamless fare structure was essential for making the TRE attractive and easy to use, and overcame what initially appeared liked insurmountable barriers.

Benefits
What are the principal benefits of the new service? First, there’s the reliability, convenience and affordability. People can now get to and from their work quickly and comfortably.

Second, commuter rail is a major component of the metro region’s strategy for reducing traffic congestion (some of the worst in the nation) and air...
pollution (a designated “serious” non-attainment area for ozone). For its share, TRE is doing better than expected: ridership is averaging 7,500 weekday riders, with some Saturdays exceeding 8,000 customers. The conventional wisdom before service started was it would be used by commuters only, but almost from the beginning there has been a significant demand for midday and Saturday service. The service has become particularly popular as a way to get to professional basketball and hockey games and to attend big-name concerts.

Third, TRE is playing an important role in assisting the revitalization of central city commercial districts and neighborhoods. Public officials see the commuter rail stations as hubs for new residential and commercial development, and are looking for ways to enhance their attractiveness through new sidewalks, street lighting, landscaping and the like.

Finally, TRE’s success has given local leaders the confidence to pursue other joint transportation projects: most recently a rail access study for DFW International Airport involving DART, the T, DFW and the area council of governments. No one in 1983 would have predicted that today the region would be committed to a 300+ mile passenger rail system! As a result of TRE, the region can see with its own eyes an alternative model for serving the metroplex’s rapidly growing population with increased mobility and less reliance on the automobile.

Funding
Public ownership of the corridor has made TRE one of the most economically feasible commuter rail systems in the nation to construct, and considerably less expensive than building a light rail system because it runs along existing railroad freight tracks.

The total cost of the 35-mile line was around $300 million, relying on capital funding from federal ISTEA/TEA-21 programs, the Texas Department of Transportation, and local dedicated sales tax revenue. The line’s annual operating budget is approximately $10 million.

The Future
The area’s population is expected to close to double over the next 25 years (from 4.5 million to 7.9 million), exacerbating an already bad traffic situation. Auto trips that used to take 15 minutes can now take 40 minutes during rush hour, according to a recent congestion study.

The success of TRE has encouraged the region to consider other innovative transit alternatives to meet future transportation needs. A regional mass transit summit held in March focused on changing institutional structures to further rail implementation.

Regional planners are also looking at implementing sustainable development concepts such as transit-oriented development. Housing-retail projects at the DART light-rail station on Mockingbird Lane in Dallas provide a model for the type of dense urban development that would help the region reduce vehicle miles traveled and spur use of mass transit, thus improving air quality. Around the Mockingbird station developers have spent millions of dollars to build offices, lofts and retail space that are now attracting businesses of the caliber of Virgin Records and the Gap.

Planners are also considering initiating shuttle bus service from TRE stations to major employers in suburban Dallas and Tarrant Counties. The shuttle service would help more isolated suburban businesses having difficulty hiring or retaining workers connect to the labor-rich central cities.

In the meantime, TRE is focused on maximizing service on its current system by double-tracking more of the line, and extending service to DFW International Airport, effectively making DFW the surface “transportation hub of the metroplex.”
Lessons Learned

- Often the public has to be able to see a rail system before it can comprehend what it can mean for a region.
- On mass transit issues, communities should present a united front, rather than letting regional infighting get in the way. Dallas and Fort Worth have come to understand that its competitors are really Singapore and Silicon Valley, not one another.
- The 50-50 partnership has been key to the success of the project. As a result, the T cares just as much about the “Dallas side” of the TRE as DART does, and vice versa.
- Consider contracting out the day-to-day operations of the system to minimize tension between the principals.
- A common fare structure is critical. Residents who get on in the middle of the TRE corridor do not care who owns it or who is collecting the fares; they just want to get to their destination.
- Be patient. Impatience might not allow one to have the foresight or perseverance to see a worthy project through to completion.

The TRE is a shining example of what a region can accomplish when it works together. It is the nation’s first example of connecting two major metropolitan centers and an airport with commuter rail. It is also the first modern commuter rail line in the southwestern U.S.

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The Trinity Railway Express:
What ISTEA/TEA-21 Has Meant

- With ISTEA, for the first time there was the flexibility to use highway funds for all modes of transportation. Gone were the rigid rules saying these monies are for highways and these are for rail and “never the twain shall meet.” The flexibility has been critical in overcoming the naysayers.
- ISTEA/TEA-21’s concentration on intermodal/multimodal was ideally suited for a project like the TRE, which is the epitome of multimodalism.
- ISTEA provoked a re-education process at the regional/COG level. Elected officials began to see the changing priorities that were manifesting themselves at the federal level and that helped to lay the groundwork for everyone to see a future that was not just roads.
- There is a major concern that the federal government will decrease its funding share for transit projects from 80:20 to 50:50. If that had been the funding formula in ’83, the region is not sure it would be where it is today. The higher funding formula allowed the region to get beyond barriers holding it back from getting started. With ISTEA, it had a reliable source of funding to initiate the first phase of the TRE project.
Job Access and Reverse Commute

The City of Detroit and Livingston, Macomb, Monroe, Oakland, Washtenaw, and Wayne Counties, Michigan

Making Transportation a Resource, Not a Barrier

The Detroit metro region is challenged when it comes to providing welfare recipients and other low-income workers, including persons with disabilities, with job opportunities. First, there is the severe spatial mismatch between where the unemployed live, and where the areas of greatest job growth are. Then, there is the fact that the region ranks near the bottom among the nation’s top 20 large urban areas in terms of miles of transit service per capita and local transit funding. (Many suburban and rural areas have no public transit services whatsoever.) Finally, in “the car capital of the world,” significant numbers of adults in Southeast Michigan do not own a personal vehicle (22 percent in Detroit).

Recognizing that job access and reverse commute issues are complex and cannot be solved by one jurisdiction alone, the City of Detroit, the Southeast Michigan Council of Governments, transit agencies, and organizations located in nearby counties have come together to form the Transportation-to-Work Coalition for Southeast Michigan. The result has been the creation of a comprehensive job access program that draws on the talents and resources of existing transit providers, the metropolitan planning organization (MPO), human service agencies, employers, job development agencies, and faith-based organizations.

Through collaboration, the Transportation-to-Work Coalition for Southeast Michigan is building a regional capacity to respond to mobility challenges quickly, creatively, and appropriately. Current efforts include re-orienting traditional line-haul services, developing feeder van services that accommodate “trip chaining,” subsidizing auto ownership, contracting with taxi services for emergency rides, and establishing a network of mobility managers to ensure that all services are used efficiently and effectively.

Introduction

Detroit Mayor Kwame M. Kilpatrick has made transportation a priority for his administration. The lack of adequate transportation-to-work services creates a significant hardship for Detroit residents who need to travel to suburban communities for employment. In his testimony before the U.S. Senate Banking Committee in June 2002, Mayor Kilpatrick spoke about the success of the Detroit Job Access program. Although the program has evolved into a regional initiative, its focus remains on linking eligible Detroit residents to suburban jobs.
Poverty is a significant problem in Southeast Michigan. Slightly more than half a million of the region’s almost five million people are considered to live at or below the poverty level. Further, many Southeast Michigan communities have poverty rates more than double the region’s average, thus complicating the problem even more by creating pockets of deep poverty that are spatially isolated. Clearly, transportation is considered key in helping to move these individuals out of poverty.

The Transportation-to-Work Coalition for Southeast Michigan represents a collaborative process that has been ongoing since 1998. It meets at least eight times per year to review progress on addressing the gaps in transportation-to-work services in the region, while subcommittees of the mobility managers and job developers meet more frequently.

The purpose of the coalition was originally to identify and fill gaps in transportation-to-work services for Detroit residents receiving public assistance. Over time, as its understanding of the issues has improved, and its membership has grown to encompass representatives from much of the seven-county region, its mission has broadened.

Now the coalition’s primary focus is to build a coordinated regional transportation-to-work system involving public transit, private van services, taxi services, and personal autos. Significant needs identified by the coalition are: more links between line-haul routes, more services for persons with disabilities, more services that supplement line-haul routes, more rides to established bus routes, and more special services to accommodate “trip chaining” (enabling intermediate stops to, e.g., pick up or drop off a child at school.)

Through the implementation of several pilot projects and an intensive 3-year planning process, the coalition has identified the best strategies to address the transportation-to-work needs of welfare reform program participants and low-income workers. As a result of this process, a comprehensive plan, which guides the coalition to this day, has been developed by SEMCOG. This plan has been successful in receiving financial support from all levels of government. Specifically, TEA-21 Job Access and Reverse Commute (JARC) dollars have provided more than $2 million in federal funds. An equivalent amount has been provided in local and state funding.

Members of the Transportation-to-Work Coalition of Southeast Michigan include:

- the City of Detroit Employment and Training Department (a Michigan Works! agency and Detroit’s administrative agency for workforce development services)
- the Southeast Michigan Council of Governments (SEMCOG—the 7-county region’s MPO)
- the Michigan Department of Transportation
- the Detroit Department of Transportation (DDOT) and the Suburban Mobility Authority for Regional Transportation (SMART) (the region’s two line-haul public transit operators)
- the Wayne County Family Independence Agency (the local Temporary Assistance for Needy Families (TANF) agency)
- the Oakland County Workforce Development Division and the Southeast Michigan Community Alliance (the two Michigan Works! agencies for Oakland, balance of Wayne, and Monroe Counties)
- Wayne State University School of Engineering Enabling Technology Lab
- numerous welfare reform and other job placement agencies; agencies specializing in services to disabled persons; private van providers; mobility managers; employers; and local chambers of commerce

Connecting Central City Jobseekers to Employment Opportunities in the Suburbs

Despite the fact that Detroit is recovering from many years of economic decline, with new businesses and homes replacing abandoned factories and vacant lots, in the near future these significant job-producing developments will not change the overall trend of slower job growth in the city than in the suburbs. Outside Detroit, the job picture is very bright. Oakland, Macomb, and western Wayne County, for instance, are expected to have a combined total of almost 400,000 new jobs over the next 20 years.

Significant public transportation gaps, however, make linking Detroit’s low-income residents to the employment-rich suburbs a substantial challenge for policymakers and job developers. Just for starters,
DDOT, the city transit operator, does not travel outside of Detroit. SMART, the line-haul operator that serves the suburbs, is prohibited from providing services in many suburban communities that have elected not to fund transit service. And where SMART service does exist, many routes stop in the evening before the end of work shifts. Service on weekends and holidays is even more limited or may not exist at all. How then do welfare recipients, car-less and responsible for one or more children, make workable transportation arrangements that will allow them to hold down a job at a suburban location that may be 30 miles away from their home?

**Detroit’s Job Access Strategy:** These are steep challenges, and the Transportation-to-Work Coalition’s answer has been to develop a “family of options” that in one way or another will meet the needs of its target group. The overall strategy involves modifying fixed-route services to the extent possible to provide improved distribution to employment sites, and then layering on paratransit and demand-response or shuttle van services to fill in the gaps. Following are the six primary elements of the strategy:

- **Line-haul transit route adjustments** to respond to employment needs of low-income people and welfare recipients. SMART, the suburban line-haul transit operator, has added four new routes to provide expanded service from Detroit into high-density employment destinations in Wayne, Oakland, and Macomb Counties.

- **Feeder van services** to extend and expand the reach of existing line-haul transit services. If public transit cannot efficiently link low-income workers to their job locations, demand-response and shuttle van services fill in the gaps. On Detroit’s east side, in a neighborhood where high numbers of other welfare recipients live, DDOT established a “flex” route that allows riders to make intermediate stops before connecting to a fixed-route bus line. Vans can be provided at the end of line-haul routes as well if SMART stops too far away for riders to walk easily and safely to job sites.

- **Taxi services** to provide emergency and guaranteed rides to work or home.

- **An auto ownership program** to help welfare recipients or low-income workers acquire personal vehicles. Depending on eligibility, individuals may acquire seed loans and TANF support for auto purchases, ownership training, insurance, registration, and repairs. If JARC funds are used, applicants must be willing to operate their vehicle as a carpool and carry additional riders.

- **Tax credits to employers** who subsidize transportation provided by JARC/welfare reform funds, and to continue services after grant subsidies end. This is a creative way to use the federal government’s “Commuter Choice” initiative, which is designed to encourage employers to provide incentives for employees to ride share or take public transportation to work.

- **Mobility managers** to tie everything together. Their job is to provide trip planning support to job developers, case managers, and welfare clients. The long-term goal is to network the region’s mobility managers (currently four) in order to maximize their ability to ensure transportation is provided by the closest and most
logical provider. A common automated scheduling/dispatching system will soon be operational.

Job access services are available through one means or another 24 hours per day, 7 days a week. The estimated subsidy per passenger round trip is currently around $25.00.

**Intra-Suburban JARC Services**

The original focus of Southeast Michigan’s Transportation-to-Work Coalition was on the needs of low-income persons and welfare recipients living in Detroit, where the poverty rate is 26 percent. However, through the development of an area-wide plan, the coalition has identified other areas in the region where welfare recipients and other low-income persons do not have an adequate transportation network to connect them to employment opportunities.

Throughout the region, pockets of poverty exist where welfare recipients and low-income individuals are isolated from the prosperity elsewhere in the area. In Wayne County, numerous municipalities other than Detroit have significant proportions of residents living below the poverty level. These include Highland Park, with 38 percent of its residents living in poverty, Hamtramck (27 percent), Ecorse (23 percent), and Rouge River (22 percent). In eastern Washtenaw County, Ypsilanti has 24 percent of its population living in poverty. Pontiac, in wealthy Oakland County, has a poverty rate of 22 percent.

Following are examples of ways the coalition has evolved to include the concerns of neighboring communities and counties:

**Wayne and Monroe Counties:** Downriver Community Conference (DCC) provides mobility management and transportation services for welfare recipients and low-income persons in southern Wayne and Monroe Counties. Its approach is to augment existing line-haul transit through shuttles that operate Monday through Friday (22 hours a day); vouchers for weekend and holiday cab fare; and carpool/rideshare matching services. (DCC is a long-time workforce development provider. Its board is made up of 18 communities located to the south and west of Detroit in southern Wayne County.)

**Oakland and Macomb Counties:** Oakland County Michigan Works! Workforce Development Division’s One-Stop Career Service Centers use vans to fill service gaps in suburban line-haul services, coordinating where possible with community-based transportation providers. Non-custodial parents and ex-offenders are special target groups for these services.

**Rural Washtenaw, Wayne, Oakland, and Livingston Counties:** Northfield Human Services has long been the only source of public transportation in some of the rural portions of Washtenaw, Wayne, Oakland, and Livingston Counties. JARC funds have enabled it to add mobility management capabilities, extend its hours of operation, increase coordination of rides to childcare, and offer other supportive services.

**Rural Oakland County:** Ride With Pride transports adult citizens with disabilities to and from work in western Oakland County. It operates curb-to-curb service Monday through Friday, from 7 to 7.

**Accomplishments**

Over 10,000 passengers benefit from Job Access-funded services each month. Working with
DDOT, SMART, and private van providers, there are now 279 new service stops connecting employers previously not geographically reachable by transit. In addition, job access vans are providing transportation service to hundreds of new employment sites not previously accessible by transit. Vans are also providing significant numbers of trips to childcare facilities, training sites, job interviews, and drug screening facilities.

Most Promising Strategies for Jobs Access/Reverse Commute in Southeast Michigan

While Southeast Michigan’s Job Access program is still in its formative years, the Transportation-to-Work Coalition can identify certain approaches that look like winners:

• **Inclusive, regional collaboration.** For an effort like this to work, everyone in the region who has a piece of the welfare-to-work problem should be at the table. This includes governments at all levels and in all jurisdictions, including the MPO, public and private transportation providers, workforce development agencies, employers, social workers, job developers, planners, and riders.

• **A multifaceted, holistic approach.** There needs to be multiple solutions available—a “family of options,” if you will—everything from public transit to vans to, in certain circumstances, taxis and car ownership plans. This approach recognizes that as an individual moves from welfare dependency to economic self-sufficiency, transportation needs change. What doesn’t work is a “one size fits all” approach.

• **A network of mobility managers.** These are the central points of contact for job developers, employers, and individual riders. Through them, job placement agencies, employers, and riders learn about available transportation resources. Also, transit providers learn about unmet demand. The most successful van routes involve employers and job developers working closely with mobility managers to maximize van utilization.

• **A network of referral agencies.** By broadening the number and type of agencies referring riders through the mobility managers, the positive impact of the service on the community is elevated, and ridership diversity is increased. Many low-income riders, including persons with disabilities, are now able to obtain jobs in suburban locations.

• **The feeder van model.** A top objective is to develop transportation services that augment, but do not duplicate, existing public transit services. Feeder vans that follow a “hub and spoke” model are an ideal way to achieve this objective.

• **Finding ways to accommodate trip chaining.** Many people do not go straight to/from work. They often have to make childcare stops on the way. Finding ways to make it easier for riders to “trip chain” (i.e., reduce total travel time) will increase the likelihood they will be able to hold down a job.

Challenges

Through substantial multi-jurisdictional cooperation, Southeast Michigan’s Job Access program is seeing steadily increasing ridership, including expanded opportunities for persons with disabilities. But there are still significant challenges:

• **How to sustain services if, or when, JARC funds come to an end?** The coalition is working to build support among the employer community by promoting the federal “commuter choice” benefit. So far, however, employers have been reluctant to commit their own resources. Rider contributions are now required by the job access program, but the full cost of unsubsidized private van services exceed what most entry level workers can afford.

• **How to effectively communicate the importance of a well-funded, comprehensive public transportation system for a healthy regional economy and quality of life?** In a region where low-income people without cars are geographically isolated from high employment suburban areas, publicly-supported transportation is essential for the achievement of individual economic self-sufficiency. However, Southeast Michigan ranks close to last among large metro areas in terms of spending on transit because many local municipalities and counties are unwilling to fund public transit. Mayor Kilpatrick and many others in the region and across the state are pursuing initiatives that would reverse this trend and build a successful transportation-to-work program.

• **How to get efficiency in the face of high rider turnover and long commute distances?** These factors make it hard to get per rider costs down. Closer integration of land use, transportation and economic development planning would open the door to more cost-effective and practi-
Job Access in Southeast Michigan: What TEA-21 Has Meant

- TEA-21's JARC program has enabled jurisdictions/agencies that traditionally have not worked together to join forces. Now there is a common focus—to make transportation a resource, not a barrier, in getting people to jobs. Rural and suburban areas have joined with Detroit to address common issues and develop common solutions.

- Most notable has been the change in the way the coalition partners interact. Before, the different “systems” operated in relative isolation. Now, after four years of meeting, there is a spirit of cooperative problem-solving that has directly impacted service designs and funding allocations. As examples: transit systems have adjusted their routes or in some way modified their services in response to information provided by the workforce development system; grant dollars, once solely designated for the region’s urban center, are now distributed to benefit economically disadvantaged individuals throughout the region.

- JARC has removed the barriers that previously restricted transportation providers. Prior to the receipt of JARC funds, service could only be provided to active Work First participants for a limited period of time. JARC enables service to be offered to other low-income persons, including former welfare recipients, persons with disabilities, homeless individuals, ex-offenders, older youth, and the working poor. In addition, there is no time limit on the service, enabling riders to establish themselves at their places of work, stabilize their financial situation, and prepare to move to the next level in the family of transportation options. This allows providers to leverage their resources better by building partnerships with a broad array of human service agencies.

- Ways to improve JARC? Make grants available on a multi-year basis to increase funding reliability and allow for long-term planning; provide short-term, on-site technical consulting; allow grant monies to be used for trips to educational conferences and training opportunities; offer more generous tax benefits to employers so they have a greater incentive to subsidize services; and add incentives that will enable and encourage local governments to contribute to transportation-to-work services.
Congestion Mitigation and Air Quality Improvement

The Cities of Albany, Berkeley, El Cerrito, Emeryville, Hercules, Oakland, Pinole, Richmond, and San Pablo in Alameda and Contra Costa Counties, California

The East Bay Embraces “Enhanced” Bus Service to Ease Traffic Congestion Along a Major Transportation Corridor

Here's the situation: You're an elected official in a major metropolitan area. The primary travel route that goes through your community is heavily congested. But you can't figure out what to do about it because the roadway is only a segment of a much larger, 18-mile corridor that passes through eight other cities in two separate counties. Complicating everything is that each of the cities has its own transportation department with a different approach to fighting traffic congestion. What's probably most frustrating is that the traffic signals from one community to the next aren't connected so they can't be synchronized. You've got passable bus service, but you sense it could be much better. Multi-jurisdictional cooperation is so bad you're suing the neighboring city over a development proposal you believe will only worsen traffic. How can you get to a more productive place?

In the early 1990s, San Pablo Avenue—one of the busiest retail/office and industrialized corridors in the East Bay—had become a battleground for inter-jurisdictional squabbling. There were immobilizing, frustrating disagreements between the communities arising from conflicting approaches to transportation and land use management. Ironically, in 1995 litigation over a proposed development opened the door for a more productive approach to addressing transportation issues related to San Pablo Avenue. In that year, a court settlement agreement required the cities of Berkeley, Emeryville, and Oakland and the area's line-haul transit operator, AC Transit, to undertake a corridor study with the Alameda County Congestion Management Agency (ACCMA). The idea was to provide a way for the entities to more systematically resolve the underlying problems leading to the litigation.

ACCMA was the logical entity to turn to because it had been created four years earlier by a joint-powers agreement between Alameda County and all of its cities to help make it easier for local government to tackle the increasingly complex problem of traffic congestion.

Other agencies invited to participate in the corridor study were the City of Albany; Caltrans, the state department of transportation; and the Metropolitan Transportation Commission, the regional planning organization. Together, the four cities and the four agencies started a broad-based dialogue on the near, immediate, and long-term strategies necessary to serve the needs of residents, businesses, and other users of the transportation systems in the San Pablo Avenue corridor.

Getting down to work, the study group first solicited input from the community, thereby setting
the stage for development of a set of common goals for the corridor. These ranged broadly from enhancing economic vitality and quality of life to addressing through-traffic, improving mobility and accessibility, and minimizing the environmental impacts of transportation.

Finding the combination of strategies to meet these goals was not easy, and meant looking beyond the region’s borders to the rest of the world for models. In a series of technical workshops, the study group learned about the latest innovations in traffic operations and bus transit, and explored totally new solutions.

What were these innovations? In the case of traffic operations, they involved using “smart” technologies to improve traffic flow. In the case of mass transit, they covered new kinds of “rapid” transit where special buses operate so frequently they mimic rail in terms of service quality.

In 1997, the study group came to the end of its information-gathering phase, and approved a multi-faceted congestion plan. This centered on doing two things simultaneously and in coordination: interconnecting all of the jurisdiction’s traffic signals and introducing a new rapid bus service (later to be known as “enhanced” bus service).

But soon after implementation got underway, the study group realized their plan had one major shortcoming: it stopped at the county line (or just a little past it, at the Bart “Del Norte” station), while the corridor itself extended another 11 miles northward into Contra Costa County. Everyone soon recognized that without involving the communities to the north, it would be impossible to achieve maximum service efficiencies.

This awareness led to inclusion into the corridor study group of the Contra Costa cities of El Cerrito, Richmond, Pinole, San Pablo and Hercules as well as the West Contra Costa Transportation Advisory Committee, an arm of the Contra Costa Transportation Authority/Congestion Management Agency. Once these entities joined the study group, all of the necessary ingredients were in place for the plan to work—a plan which has served as the basis for joint transportation decision-making for the full 18-mile corridor ever since.

**The San Pablo Avenue Corridor Plan**

The San Pablo Avenue Corridor plan is bold in two respects. First, it covers a large physical area and many jurisdictions, demanding the communities make difficult trade-offs in order to improve transportation for all. Second, it addresses issues not usually approached in traditional transportation projects. These issues include aesthetics (making transportation improvements that enhance the visual appeal of the corridor), quality of life (using transportation options as a means to enhance residents’ quality of life), and economic vitality (making transportation investments in a way that supports economic activity).

**Integrating transit and traffic operations:** For some time, national transportation policy-makers have decried the lack of coordination among traffic and transit operators at the regional level. In the San Pablo Corridor plan, city traffic engineers are called upon to work with one another and with the line-haul transit provider (AC Transit) to implement a variety of bus priority and other measures that will reduce dwell time and improve bus speed and reliability.

So what will this look like when fully implemented? Imagine a new type of bus service—one that has the look and feel of rail, without the fixed guideways or the high capital cost of rail. At transit stations, passengers will buy prepaid fare tickets—rather than spend time fumbling for cash while boarding. They will have no bus steps to climb up; low-floors will let passengers step on and off buses quickly, speeding boarding and reducing time spent idling at station stops. The buses will have a built-in ability to extend green lights at major intersections, minimizing time wasted at red lights. At traffic choke

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**Key Features of Enhanced Bus Service**

- Rail-like stations and boarding platforms
- Off-vehicle fare collection
- New low-floor, multiple-door buses to expedite boarding and alighting
- Limited number of stops to reduce overall travel time
- Traffic signal priority to reduce intersection delays
- Special queue lanes to allow buses to bypass traffic tie-ups at intersections
- Arrival information at bus stops to enhance overall perception of system reliability
- Relocated bus stops to the far side of the intersection
- Logo and branding on all buses and shelters to maximize visibility of the service
points, transit-only lanes will help keep buses moving. Altogether, it is estimated that rapid bus capital improvements combined with traffic signal improvements will reduce travel times by up to one third and improve service reliability significantly.

But the beauty of these innovations is that not only will transit service be improved, so will travel for all users of the corridor. Everyone will benefit from improved traffic flows due to signal interconnection and other Intelligent Transportation System (ITS) improvements (see Appendix A at the end of this report for more on ITS and the San Pablo Avenue Corridor).

**Other Plan Elements:** While enhanced bus service and traffic signal coordination are the predominant features of the plan, it relies on other transportation system management techniques as well. These include:

- Improving biking and walking routes throughout the corridor. (Currently, there are system discontinuities when you cross from one jurisdiction to the next.)
- Making modest capital improvements to improve the visual appearance of the corridor so citizens feel safer walking, biking and using public transit in the corridor. (Various portions of the corridor are currently visually unappealing. Cleaner streets and sidewalks, more street benches, well-maintained bus stops, graffiti abatement, and landscaped medians will help this situation.)

**Division of Responsibilities**

To carry out the San Pablo Avenue Corridor plan, responsibilities have been divvied up as follows:

- **Local communities:** coordination with AC Transit over relocation of bus stops, bus stop enhancement plans, and streetscape/sidewalk improvements.

- **The two congestion management agencies (ACCMA and the Contra Costa Transportation Authority/Congestion Management Agency):** identification of program funds to implement physical and operational improvements; advancement of bus stop design efforts; retention of managers/contractors; resolution of property and other right-of-way issues; and definition of the Intelligent Transportation System program.

- **AC Transit:** implementation of the bus service plan; coordination with local communities regarding location of bus stops; and development of logo/signage plans.

- **San Pablo Policy Advisory Committee (includes elected officials from the involved jurisdictions):** prioritization of capital improvement funds; implementation of “transit first” policies; and development of a unified design for bus stops.

**Next Steps**

Project energy is now focused on rolling out the innovative “enhanced” bus service by June 2003. To date, traffic signals from one end of the corridor to the other have been interconnected; signals have been wired to give longer green lights to transit buses; and new low-floor buses have been purchased. What remains is moving bus stops, upgrading bus shelters according to the design principles approved by the corridor advisory committee, and implementing additional portions of the ITS program.

Once that happens, the question will be whether
transit stops connected to enhanced bus service can be effective anchors for development, much as rail stations have proven to be in various regions of the country. The San Pablo Avenue, an economically attractive corridor where development potential is high, will offer a good testing ground for this question. To ensure as much success as possible in this direction, the advisory committee is watching development activity closely and where possible working with private developers to maximize joint development opportunities.

Costs
The estimated total costs for this project are around $70 million. Because of its multi-jurisdictional and multi-functional nature, the project has been able to attract a variety of funding partners. The two largest funding sources have been TEA-21’s CMAQ (Congestion Management and Air Quality Improvement) Program and the state’s Transportation Funds for Clean Air.

Lessons Learned
Projects that start out in a contentious atmosphere can be transformed into ones that build a culture of cooperation and enhance the quality of life for all. The first meeting of the San Pablo Avenue Corridor committee was so difficult that agency representatives refused to elect a chair for fear of giving any organization the upper hand. Now, eight years later, the committee has evolved into a collegial group, whose members genuinely care beyond their own borders. Key factors in turning this situation around were:

- **A neutral convener.** ACCMA is a non-operating agency, whose stake is the whole corridor not any individual part.
- **A strong project manager who provides continuity over time.** Somebody must keep their eye on the end goals.
- **Good technical consultants** who can communicate the experts’ material to the elected officials and their staff in a way that everybody can understand.
- **At least one elected official who takes on the role of project champion.** They are essential for bringing along other local elected officials and creating support at higher levels of government. They also provide enthusiasm when spirits sag.

Other advice from the San Pablo Avenue advisory committee:

- **Start small and build steadily from there.** The initial MOU between the jurisdictions covered a discrete, fairly non-controversial task—to interconnect all the corridor’s traffic signals. Success in that phase laid the foundation for the rest of the project.
- **Develop trusting relationships with your partners.** If some aspect of the project does not work out, you then have a secure base to try something else.
- **Keep focused on your goals.** It is easy for tensions to mount over small things, e.g., over a bus stop design guideline. Remind yourselves that you have higher mountains to climb.

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ISTEA/TEA-21’s Role

• ISTEA/TEA-21 shifted the emphasis from how to get as many automobiles as you can down the street, to a multi-modal and economic development perspective, tying the transportation system to the community.

• The broader approach under TEA-21 has facilitated the development of multi-functional projects that can achieve broad buy-in from communities with very different values and needs. For example, on one level this project is about improving traffic signals. On another it is about developing an upgraded bus service. In the case of Berkeley, it might not have been as interested in the project if it had been just a signal coordination project, but as a transit improvement project it has been very interested in it. For another city, the reverse case could be made.

• The corridor approach advanced in ISTEA/TEA-21 has altered the outlook of the communities along the San Pablo corridor. The communities claim they now look beyond their own transportation needs to “the greater good.” So today, if a proposal is unworkable for one jurisdiction, the group will make adjustments until it fits everyone’s needs. Before, group members claim the attitude was “pretty much everybody for themselves.”

• The focus on multi-modal coordination has led to greater total system efficiencies along the San Pablo corridor. AC Transit cites, for example, an increased understanding of the interplay between transit service and highway traffic signals, and how optimizing the connection between the two systems can cut running time, improve service and reduce costs. As a result, AC Transit has taken the unusual step of hiring a full-time traffic engineer to participate in the implementation of this element of the project and extending the concept to its four other trunk corridors.

• The region doubts a corridor effort like this would have been possible without ISTEA/TEA-21. Either the project would not have been eligible under the old system of categories or it would have demanded patching together so many different highway and transit programs to render it impractical.

• Under this project, the region has demonstrated it can work together. As a result, spin-off partnerships are starting to take hold.

• Suggested Improvements: Balance capital and operating subsidies better. The concern is that once the capital improvements have been made along the corridor, there will not be adequate operating funds to run the service.
What is the best way to plan a new community? This is a difficult question to answer, but recent experience in the Portland metropolitan region provides important insights. In December 1998, the Portland metropolitan region expanded its Urban Growth Boundary—a line that separates land that can be developed from land that is to remain farm and forest—to include an area of about 1,500 acres. The new area designated for urbanization, known as Pleasant Valley, is located east of Portland and immediately south of the city of Gresham in Multnomah and Clackamas Counties. To ensure environmentally sensitive growth in the new area, Portland Metro—the region’s transportation and land-use agency—applied for and received a Transportation and Community and System Preservation (TCSP) grant from the U.S. Department of Transportation. With these funds, an innovative multi-jurisdictional partnership has been undertaken for the purposes of developing a master plan to balance the transportation, land-use and environmental impacts of expansion. In the process, the region has experimented with cutting-edge approaches to address natural resource protection such as sub-watershed planning and Green Streets.

Background
The Portland metropolitan area has an urban growth boundary (UGB) that was established in 1979 and is maintained by the region’s transportation and land-use agency, Metro. It is a line that separates urban and rural land. By state law, Metro is required to maintain a 20-year supply of residential land within the UGB. This means, every five years, Metro must review the capacity within the UGB and, if needed, expand the boundary to meet the projected growth for the next 20 years. In December 1998, Metro expanded the UGB to include an area of about 1,500 acres in an area known as Pleasant Valley, located east of Portland and immediately south of the city of Gresham in Multnomah and Clackamas Counties.

Before an area such as Pleasant Valley can be formally incorporated into the UGB, however, Metro requires that the future governing jurisdiction(s) complete a conceptual master plan and adopt it into their comprehensive plans and development codes. In 1999, Metro applied for and received a $500,000 TCSP grant to help pay for a “master planning” process for the Pleasant Valley area.
These grants are designed to help communities plan and implement strategies that simultaneously improve the efficiency of their transportation system, reduce environmental impacts of transportation, and ensure efficient access to jobs, services and centers of trade.

After Metro received notice of winning the TCSP grant, it then entered into intergovernmental agreements with the cities of Portland and Gresham to carry out the project. While the primary project work was done by Gresham, Portland, and Metro staff, Multnomah and Clackamas counties and neighboring Happy Valley also were at the table.

The Project

The project was officially kicked off in October 2000, and was completed in June 2002. The goal for the participating jurisdictions—to arrive at a consensus on a preferred land-use, transportation and natural resource plan for the Pleasant Valley area—was met when the Steering Committee voted to recommend a final plan map and implementation strategies in May of 2002.

Community Involvement: Public involvement was crucial throughout the project, from start-up to implementation. In addition to mailings, newsletters, a special website and staff presentations, a series of community forums were held. The first forum brought together a wide variety of participants to review and refine information about the existing conditions in Pleasant Valley as well as issues related to land use, transportation, and natural resources. Another involved the community (population approximately 300), through small group discussions, in setting natural resource guidelines. There, staff presented examples of environmentally sensitive urban development as a first step toward integrating natural resources with transportation and land use. Altogether, there were five community forums held over the course of the project.

Concept Plan Alternatives: The third community forum engaged a broad cross-section of the public and produced four draft concepts representing alternative possible development scenarios for the valley, in terms of transportation, natural resources, land-use and infrastructure systems. While each concept represented a different possible development scenario, there were features common to all four. The common features were:

- A town center to serve as a community focus. It has a primary anchor, such as a grocery store, and supports civic, retail, medical, and professional and office uses. Apartments and townhomes are located above retail and office uses and adjacent to the town center. The town center connects regional transit service to community transit service. It features a plaza or community green and is adjacent to or near the open space system.
- Extensive natural resource protection and enhancement that protects existing natural areas and restores important vegetation and habitat around creeks, their tributaries and associate wetlands.
- A variety of housing in neighborhoods where walking is easy. Housing includes detached single-family homes on different lot sizes and multi-family/attached housing in the form of town-
homes, condominiums/co-housing, apartments and senior housing. The combined residential density of these areas is approximately 10 dwelling units per net residential acre.

- **Two to five-acre neighborhood parks and smaller “neighborhood greens”** that provide recreational opportunities and contribute neighborhood identity.

- **Three public schools** (two elementary and one middle school). New schools are near open space areas (learning opportunities) and adjacent to or near a developed park.

- **A well-connected system of arterial, collector and local streets and multi-use trails that are designed to enhance adjacent land uses.** Green Street designs (discussed later) are used to help minimize negative impacts of stormwater runoff.

**Hybrid Plan:** After a detailed analysis of the alternative plans revealed that no one plan met the adopted project goals, a draft hybrid plan was developed by the Coordinating Committee. Months of discussion and refinement by the Steering Committee and project staff led to a final preferred concept plan, which was endorsed by the Steering Committee in May 2002.

**Next Steps:** Outstanding issues to be resolved include: implementation of the concept plan by at least two cities and one county; and resolution of what jurisdiction will govern a 240-acre portion of the study area within Clackamas County. The first issue will involve establishing consistent development approaches for an area that has been designed as a seamless community. The second issue has arisen because Clackamas County requires urbanized areas to be served by cities. Gresham and Portland did not include the unincorporated portions of Clackamas County in their 1999 intergovernmental agreement that laid out what portion of Pleasant Valley will be governed by each city. The cities of Happy Valley and Gresham are now both interested in governing this sector.

**Innovative Tools for Natural Resource Protection**

The study area has several natural resource amenities that must be woven into a future urban setting. In particular, there is an extensive creek system (Kelley) that is part of the Endangered Species Act’s recent listing of threatened and endangered fish species. The Kelley Creek sub-basin drains into Johnson Creek, which flows through east Portland and historically has been subject to serious flooding problems. The challenge is to protect the listed species and minimize storm water run-off from urbanization that would worsen Johnson Creek flooding.

From Metro’s grant application through staff partnership commitments, the project has worked hard to include innovative approaches in resolving some of these difficult issues. In particular, it has relied on the following two innovative tools to accomplish its environmental goals:

- **Sub-watershed modeling** to determine the existing health of the stream system and set goals to achieve a properly functioning condition for each sub-watershed area. Coupled with an inventory of potentially significant habitat and species, the project has delimited an environmentally sensitive/restoration area. This area, comprising about 475 acres (30 percent of the...
land), has been eliminated from the buildable land inventory. The final determination of how much of this area needs to be preserved, restored or managed with less intensive urbanization is contingent upon follow-up analyses that will determine habitat significance.

- **Building and maintaining environmentally sound streets** to infiltrate, store and even treat stormwater within the street right-of-way, rather than piping stormwater to streams. Metro’s transportation division has conducted an assessment of needed culvert retrofits on major streets and best practices for constructing new stream crossings as the region grows. It has also prepared a Green Streets handbook to provide guidelines for construction and maintenance of environmentally-sustainable streets at the regional and local level. The new street guidelines and stream crossing practices will be incorporated into the Pleasant Valley plan. The cities of Gresham and Portland transportation staff support the Green Streets designs and practices and have committed to carry the recommendations forward for adoption into code.

**Lessons Learned**

Natural resources can make up a system that can be an organizing element around which a master planning process revolves. This approach essentially flips the traditional master planning process on its head: land uses and transportation are now organized around the idea of a connected, restored natural resource system, instead of the other way around. At present, in most cases, natural resource systems are what are thought about after everything else has been decided.

To initiate a “natural resources first” planning process, start by developing a Green Map. To do this, invite citizens to chart the green places, environmental resources and socially-significant sites in their community. Green Maps can show the interconnections between society, nature and the built environment, helping residents make lower impact lifestyle choices and discover ways to get involved in the urban ecology. Another exercise: compile information on the existing condition of natural resources on a sub-watershed basis. This can be done by holding a public forum where the current functioning of different sub-watersheds is described, and letting citizens debate how they should be functioning and what goals should be set to make them function better. Afterwards, incorporate the public’s reactions into a plan. (See Sub-Watershed Planning Steps in Appendix B at the end of this report.)

For the Pleasant Valley project, staff found five of the seven sub-watersheds in the study area were “negatively impacted” when they conducted a sub-watershed planning process. With this information, they now can create goals for each sub-watershed and prioritize restoration efforts including the use of Green Streets.

**Green Streets**, which rely less on pipes and more on trees and swales, offer a cost-effective opportunity for addressing stormwater run-off because rainwater is detained and infiltrated right on the spot through natural processes. They also permit community planners to be more creative in street designs, building vegetated swales and tree canopies that humanize streets and particularize them to their environment, thus adding to uniqueness of place. Needless to say, however, there are unanswered questions relating to the...
about Green Streets. What are the costs of maintaining them? How do you write development codes that allow and perhaps even encourage them? How do you build organizational capacities to construct them, given the high degree of cross-institutional cooperation required for implementation?

The bottom line? Introducing an ecologically-based planning process can cause major shifts in thinking to occur. The prevailing wisdom in the Pleasant Valley pilot was that any development would cause harm to the environment. As the project progressed, however, members of the community have come to realize that urbanization and smart development can actually improve and enhance the watershed, and perhaps eventually restore salmon runs.

What TEA-21’s TCSP Program Has Meant for the Portland Region

- The Portland region has been a leader in linking transportation and land-use planning. With this project, it has been able to go one step further—to tie in natural resource concerns.
- The grant application and its charge—to balance natural resources with other goals—has anchored the project. It has been a touchstone that staff have returned to time and again during the master planning process.
- TCSP’s financial resources enabled the participating entities to do the transportation modeling, the stormwater modeling, the inventory of natural resources, and the public participation process that made it possible to give equal weight to the three project elements—transportation, land use, and natural resources.
- Flexibility in the program was important—there were minimal restrictions.
- The study area is on the edge of three cities (Portland, Gresham, and Happy Valley) and within two counties (Multnomah and Clackamas). The TCSP grant served as a catalyst for the entities to come together to accomplish something difficult: devise consistent development approaches for a seamless community.
- Through the TCSP grant, the entities have come to know more about one another’s strengths and what they can do together when they leverage one another’s talents and skills. In this project, the City of Portland’s expertise in watershed modeling was married to Portland Metro’s research knowledge on Green Streets. As a result of working together on this project, there is an improved climate for future partnering.
- Two recommendations relating to reauthorization of TEA-21: keep the TCSP a competitive grant program; find ways to elevate the notion of Green Streets—in terms of both education and implementation.

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www.ci.gresham.or.us/departments/cedd
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In the fall of 2000, the City of Boise acquired 18 miles of rail right-of-way and trackage from the Union Pacific Railroad. The plan is for this right-of-way and trackage to anchor a future commuter rail system for the Treasure Valley region, an area that encompasses Ada and Canyon Counties in Southwest Idaho. Another goal is to support reinstatement of Amtrak service to Boise. Currently, the Treasure Valley’s public transportation authority—established just four years ago—is evaluating how commuter rail might function inside a 44-mile corridor, extending from Orchard to Nampa. At the same time, the Treasure Valley Partnership—a coalition of the region’s local elected officials—is looking at possible ways to begin guiding commercial and residential development along this rail corridor. Local leaders believe strategic decisions like these will make a powerful contribution to the region’s long-term objective of growing smarter.

Following is an interview with Boise Mayor H. Brent Coles and Ada County Commissioner Roger Simmons about this effort.

Q: Mayor Coles, tell us about the purchase of the rail right-of-way?

Coles: First off, you should know that we used to have passenger rail service in this region. The Treasure Valley Interurban Trolley, built mainly by developers and the electric utility around the turn of the 20th century, was a streetcar loop that joined all of the Treasure Valley cities together. When the automobile came along, of course, the interurban went away just like it did in many other parts of the country. For many years that right-of-way remained in place, however. But then in the 60s and the 70s we lost the rail corridor as well. That was an appalling mistake that we should never repeat. Had we had that interurban right-of-way today, it would be the backbone of a light rail system.

Q: How did you get control of the Union Pacific right-of-way?

Coles: A couple of years ago, the Union Pacific Railroad (UP) told us they were intent on abandoning 18 miles of track from Boise to their mainline. Because of the lesson we had learned from losing the interurban right-of-way, we as a community said absolutely not. So what Boise did was file a request with the Surface Transportation Board giving us the opportunity to gain public ownership of that right-of-way. After a lot of negotiating we came to an agreement: the UP agreed to donate 14 miles of the corridor to the city and we agreed to purchase the other four miles for approximately $2 million using general fund revenues. So by being aggressive, the city now owns that 18 miles of right-of-way plus the tracks on it.

Q: What are your plans for using this right-of-way?

Coles: That particular piece is very important because we want to see the Amtrak service we lost in 1997 restored, and Amtrak can’t come back to
Boise without that 18-mile stretch. But that 18 miles has value for another reason: it connects to another 26 miles of rail along which most of the cities in the Treasure Valley lie. Currently used exclusively for freight service, my vision is that one day this right-of-way will be used for both freight and passenger service and serve as the backbone for a regional multi-modal transportation system.

**Q:** So what’s needed, Commissioner Simmons, to make this vision become a reality?

**Simmons:** Well, in the last four years we’ve overcome one big obstacle. After years of pushing, our state legislature finally passed a law giving our citizens the opportunity to decide if they wanted to form a public transportation authority. Recognizing the need for alternatives to the automobile, voters in Ada and Canyon Counties overwhelmingly approved the creation of a two-county public transportation authority when they were given the chance in 1998. Known as ValleyRide, this new entity will now oversee and coordinate public transportation services in our community. Without ValleyRide, it’s pretty hard for me to visualize how we would go about establishing commuter rail in the Treasure Valley.

Unfortunately, however, when the state gave us permission to form a public transportation authority, it didn’t at the same time provide us with a dedicated source of funding to finance the sorts of investments we’re thinking about today. So that’s what we’re focused on achieving now. We’re working through the Idaho Association of Counties and the Association of Idaho Cities to come up with a consensus position so we don’t go into the state legislature with a number of different recommendations and come out with nothing. One of the things I’m looking for is a funding mechanism that will provide us with the flexibility to do a variety of things. For example, we need funding to allow us to build up our current transportation services (buses, vanpools, park-and-ride lots) to the point where they can act as feeders for a commuter rail service. Then we also need funding that will allow us to purchase rail corridors if that’s what we decide we need to do.

**Q:** How does land use planning fit in?

**Simmons:** Local elected officials here recently met for two and a half days with business leaders in the community to try to address land use issues in the Treasure Valley, and how we can tie in public transportation with land use. We have a unique situation in that we can look around the country and see what others have done and what mistakes they have been made, and hopefully learn from those mistakes and do it right the first time.

**Coles:** What we’re doing right now through our transportation authority is an analysis to provide local elected officials with the technical information they need to evaluate the rail corridor for future public transportation services in the Treasure Valley. This has prompted cities along the rail line to take a look at their comprehensive plans to see if they’re compatible with land-uses that would make sense along a rail corridor. They’re realizing that if they can show higher densities in their plans, property owners will become more interested in the rail line and more supportive of it.

**Q:** How has TEA-21 helped the Treasure Valley realize its new public transportation vision?

**Coles:** First of all, it opened up the eyes and minds of hard-core highway guys, whose mindsets
were we can build our way out of our congestion problems. Now they realize there are other alternatives that do in fact work, and they’re supporting linking land use planning to transportation planning like never before in America. This is an enormous success story of TEA-21.

It also provided us with a $510,000 Transportation and Community and System Preservation pilot grant to review our comprehensive plans in terms of projected growth for the region. Using the grant, we saw that if everybody builds out their comprehensive plans to meet the growth we’re projecting, what we’re going to end up with are jammed transportation corridors and a serious deterioration in quality of life. So the TCSP grant focused our region on saying “yes” we do need alternative transportation options. Then the rail line was just staring us in the face.

Q: Do either of you have any recommendations for the federal government regarding the upcoming reauthorization of TEA-21?

Coles: The federal government must be willing to fund rails just like they’ve funded highways. We’ve built a $100 million freeway interchange system through the City of Boise. We need a similar level of funding now to implement passenger rail.

Sept.11th just emphasized the need for alternatives to highways and airports. America has spent billions on highways, billions on airports and airways, now it’s time to give billions in like numbers to a rail system for America. Whether it’s high-speed rail linking America’s cities and regional economies or light rail systems within America’s cities, it’s time to do this.

Simmons: TCSP-style grants are very important to us. They should be used more, but the funding for them needs to be kept competitive and promote planning regionally. Overall, the federal government should provide more funds that can be used to develop innovative approaches to transportation—with maximum flexibility to use those funds.

Q: Any advice for other local elected officials?

Coles: Number One: do not give up any existing rail rights-of-ways anywhere in America. If you do have a rail corridor in your region, start thinking about how to acquire it and how you would construct commuter rail in it. If you don’t have an existing rail corridor, look around for a corridor that could be suitable for rapid transit—then somehow begin facilitating its preservation. Right now, all of us should be spending more time with our congressional delegations explaining the importance of rail to our communities, so that when they return to Washington, DC, they’ll support greater investment in rail transportation.

Simmons: Counties should stop looking at cities as that other entity and realize that people who live inside the cities are county residents too, and that folks who live over in other counties are affected by the things we do. The old saying is true: when you sneeze the folks across the county line catch the cold. My advice is to start burying the hatchet because if you want to pursue federal dollars, your best chance of obtaining them is through a cooperative effort. Our experience in the Treasure Valley is an example of how when you put together a cooperative foundation it benefits the entire region.

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The Treasure Valley Partnership: A Forum for Addressing Regional Growth

What’s a model vehicle for achieving regional consensus on difficult issues like building a commuter rail system? The Treasure Valley Partnership—a city-county coalition of local elected officials covering Ada and Canyon Counties and their eight major cities, Boise, Caldwell, Eagle, Garden, Meridian, Nampa, Parma, and Star.

Over the last two decades, the Treasure Valley has experienced tremendous growth in population and economic opportunity. While economic growth has been seen as desirable for both the region and the state, there have been concerns that its pace is starting to negatively affect the quality of life many residents have enjoyed for years. Cities once separated by miles, can now find themselves separated by just the width of a road. Farmland is being consumed at an ever increasing rate.

Everyone in the Valley has come to understand that without cooperative work on a multi-jurisdictional level, there will be no overall plan for growth. Understanding the need for leadership, in 1997 Boise Mayor H. Brent Coles took the first step and organized a meeting of elected officials in the two-county area. Out of this meeting was formed the Treasure Valley Partnership (TVP).

The TVP—now a 501(c)(3) organization—works cooperatively in four areas:
1. Creating coherent regional growth and development patterns.
2. Linking land use and transportation.
3. Protecting and enhancing recreational opportunities and open space.
4. Reinforcing separate community identities and sense of place.

Meeting once a month for more than five years now, the TVP can see progress in meeting its goals. Signs of success are:

• Cooperative work on coordinating comprehensive plans.
• Better regional awareness of overall issues.
• Regional air quality and water drainage studies, resulting in an agreement with the Idaho Department of Environmental Quality to work regionally on airshed problems.
• Shared work on transportation issues, including the establishment of a regional transit authority. (A regional transportation authority initiative passed with 70 percent voter approval in both Ada and Canyon Counties. The metropolitan planning organization, formerly operated for only Ada County, is now the planning authority for both counties.)
• A $250,000 grant to improve energy efficiency in city- and county-owned buildings.
• MOUs to improve emergency response and share infrastructure facilities.
• A regional open space trail.

In 1999, the TVP received a TEA-21 Transportation and Community and System Preservation pilot grant to help the area develop a regional approach to growth and preservation of quality of life. With this grant, the TVP has produced detailed maps of how the Treasure Valley is growing, plus a manual describing alternative development patterns. This project laid the groundwork for considering new transportation alternatives including commuter rail.
By 2015, all the remaining unincorporated parts of Mecklenburg County will have been annexed. Instead of watching idly as unlimited and wasteful sprawl takes over—eating up greenfields beyond the county’s borders—Mecklenburg and its principal city, Charlotte, have decided to take strong proactive steps to ensure growth within their jurisdictional boundaries. How? Through in-fill, reurbanization and regeneration. With local official leadership and substantial public involvement, Charlotte-Mecklenburg has endorsed a “centers and corridors” development pattern. This means high-density development will be steered to five main corridors (the region’s economic centers), and transportation systems will be designed to serve and reinforce more compact land uses. In Nov. 1998, this overall approach got a boost when the citizens of Charlotte-Mecklenburg approved a half-cent sales tax increase that, along with TEA-21 New Starts funds, will eventually bring rapid transit to the area’s five main corridors.

Background

In the counties surrounding Mecklenburg, population growth has begun to accelerate, jobs are being created at an increasing rate, and manufacturing and distribution businesses are beginning to relocate. By 2015, surrounding counties will make up the majority of the metropolitan area’s population and create more jobs than the core county.

As the core builds out and commercial development and residential growth shift to surrounding counties, Charlotte-Mecklenburg faces two dangers: becoming locked in and isolated, and losing its tax base. An outer beltway, currently under construction, makes this scenario a real possibility based upon the experience of other regions of the country.

But Charlotte-Mecklenburg plans to fight the natural tendency to sprawl. Working in its favor is a long list of assets: a booming financial services sector; a business-embracing culture; a well-designed transportation infrastructure; a major research university; exciting professional sports teams; and significant cultural offerings. Because of these strengths, the central city and core county will always remain geographically central to metro-area businesses and residents.

Despite all of these advantages, Charlotte-Mecklenburg knows, however, they will not be enough to preserve its long-term economic health. It must do more, and that more is centered around building transportation systems that will ensure the long-term residential stability and commercial viability of the central city and core county.

First Came the Centers and Corridors Approach

In 1994, the City of Charlotte and Mecklenburg County endorsed a “centers and corridors” vision, a comprehensive guide for future land-use and development in the region. Future development and redevelopment in the city-county would now be focused along five major transportation corri-
dors with strong potential for transit service and transit-oriented development.

The centers and corridors concept is seen as a way to shape future development by taking advantage of Charlotte-Mecklenburg’s simple and clear layout, which is radial and concentric in structure. This structure means that the majority of its office space, shopping centers, hotels, educational, entertainment and health facilities are located within or along clearly-delineated centers and corridors.

By graphically dividing the county into three functional parts, the centers and corridors approach provides an easy to grasp visual of how the city-county wants to grow. The three functional parts are:

**Centers**: Centers are focal points of mixed-use development. Healthy centers are those that retain higher levels of development and accessibility over time. The goal is to add and improve transit options so as to enhance long-term accessibility to centers.

**Corridors**: These are the city-county’s five major radial transportation arterials. They provide the foundation for high-density commercial and residential activity. The goal is to continue to improve transportation services to increase the capacity and enhance the accessibility for continued employment and higher-density residential development activity within corridors.

**Wedges**: These are the large areas formed between corridors where residential neighborhoods and communities have developed and continue to grow. The goal in these areas is to continue to maintain relatively lower densities and to provide needed infrastructure and other amenities.

For Charlotte-Mecklenburg, pushing development to existing centers and corridors is seen as the best hope for improving employment opportunities and housing choices, maximizing existing infrastructure and transportation, and thereby creating the greatest likelihood for producing a solid foundation for economic growth and quality of life.

**Then Came the Charlotte-Mecklenburg 2025 Integrated Transit/Land-Use Plan**

Adopting a “centers and corridors” approach only gets you part of the way if your objective is “smarter” growth patterns. You then have to find a way to tie transportation and land use together. In 1998, Charlotte-Mecklenburg did just that when it completed its 2025 Integrated Transit/Land-Use Plan.

The 2025 Integrated Transit/Land-Use Plan recommends rapid transit as a principal means of attaining the vision of the city-county’s “centers and corridors” approach. At the same time, it recognizes that for rapid transit to work effectively key changes in existing land-use patterns must be made. These include:

- Promoting more compact, pedestrian-friendly developments
- Encouraging a mix of multi-and single-family residential development
- Developing areas that include a mix of residential shopping and employment opportunities in close proximity

**Rapid Transit Options**: Rapid transit comes in several forms, and the city-county is now in the midst of evaluating which specific technology or combination of technologies best suits Charlotte-Mecklenburg’s five major corridors and the areas surrounding them. The rapid transit technologies under consideration include:

- **Commuter Rail**: Powered by diesel locomotives or possibly new Diesel Multiple Unit (DMU) technology. This is perceived to work best to link center cities and mid-size towns with suburban...
areas. Typically considered where an available railroad exists that can be shared.

- **Light Rail Transit**: Light rail transit stops and starts quickly and can operate in its own exclusive corridor or in the street with mixed traffic, making it ideal for short neighborhood connections. It has already been chosen as the preferred alternative for the area’s South Corridor.

- **Bus Rapid Transit**: This option consists of buses operating in exclusive busways with online stations similar to a rail system. Because bus rapid transit also can operate in the street with mixed traffic, it can be built in segments to bypass congestion.

**Next Steps**

Major Investment Studies completed in the remaining four corridors have recommended commuter rail in the North Corridor, light rail with some bus rapid transit in the Northeast Corridor, and bus rapid transit in the Southeast and West Corridors. The Metropolitan Transit Commission, established in 1998 to plan and oversee future transit service countywide, must now make final decisions regarding these recommendations.

**Funding**

In November 1998, Mecklenburg County citizens approved a half-cent sales tax increase to support implementation of the 2025 Integrated Transit/Land-Use Plan. Revenue generated from the half-penny is being used to match TEA-21 New Starts funds.

**Challenges Ahead**

Making rapid transit successful in Charlotte-Mecklenburg will require organizing land uses in a way that encourages residents, commuters, and visitors to use transit for one or more of their daily trips. Transit-oriented development—where a mixture of shopping, housing, and employment sites is located next to transit in a way that fosters vibrant live-work-play environments—is a good way to accomplish this.

The City understands it has a large education project ahead of itself if it is to be successful in steering commercial businesses and multi-family housing to its centers and corridors. To this end, it is beginning to revise its zoning regulations and land use policies to encourage mixed-used development siting around future transit stations—setting minimum densities for development in transit corridors and maximum densities for development in the wedge areas. The city-county has also prepared a “joint development” policy laying out principles as to how it will partner with the private sector around transit stations. (See Appendix C at the end of this report for Charlotte-Mecklenburg Transit Station Area Principles.)

**Lessons Learned**

1. Public outreach and citizen engagement needs to be taken very seriously. This is hugely time-consuming, and can be hugely controversial, but if not done right can jeopardize the entire endeavor. Charlotte-Mecklenburg attributes its success in getting passage of the half-cent sales tax to keeping the community informed and soliciting citizen input at all key decision points.

2. Successful transit/land-use efforts require a unified base of political support at the local level. Over the last ten years, city and county officials in Charlotte-Mecklenburg have provided a consistent vision for reshaping growth through more compact, transit-oriented develop-
What is a Major Investment Study?
A Major Investment Study is divided into five key phases. In addition to extensive community outreach throughout the process, public meetings are held at the end of each phase to get citizen input.

3. **Study Initiation**: During this phase, the corridor study team gathers fundamental information about the corridor, defines initial alternatives and develops evaluation criteria by which the alternatives can be measured. It gathers information on existing land-use and travel patterns and defines corridor needs. Citizens have an opportunity to express their opinions on what issues are important and which transit and land-use options should be studied.

4. **Initial Technical Analysis**: More detailed information is developed about the alternatives that were identified in the Study Initiation phase, including conceptual engineering and preliminary station area plans. The team develops information on current development trends, projected growth by alignment and projected ridership. Staff also evaluates the economic, environmental and financial impacts of each alternative. The community has the opportunity to suggest which alternatives best meet their needs and should be studied further.

5. **Refined Technical Analysis**: The corridor team further refines the alternatives and finalizes the alternative definitions, detailed land-use scenarios, and technical analyses to support the evaluation phase.

6. **Detailed Evaluation**: During this phase, the team uses the technical results and community input to evaluate the alternatives using the measures identified in the Study Initiation phase. These measures include land-use benefits, transit service effectiveness, cost-effectiveness and equity. Residents have an opportunity to express their views on the results of the study.

7. **Selection of the Locally Preferred Alternative**: Based on the technical analysis and public input, the Metropolitan Transit Commission selects a preferred alternative for the corridor, which is then put before the area’s metropolitan planning organization for adoption as part of its long-term transportation plan.

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Role of ISTEA/TEA-21

• TEA-21 has provided critical funding for rapid transit planning and now design work. Charlotte-Mecklenburg has obtained more than $20 million in TEA-21 funds over the last six years, the largest category of which has been New Starts. Once the Federal Transit Administration approves the city-county’s environmental impact statement for the South Corridor Light Rail project, the final phase of engineering for this light rail project will get underway. This will represent a major milestone in implementing the “centers and corridors” vision.

• TEA-21’s New Starts program elevated the importance of integrating land use and transportation planning, in particular coordinating development around transit stations. This emphasis has complemented perfectly the city-county’s new “centers and corridors” approach to development. What evidence can be found that transit planning as usual is not taking place? The city-county is spending on the order of 35-40 percent of its major investment study funds on land-use consultants.

• Future concern: Availability of federal funding to finance these sorts of projects. If New Starts financial support were to be eliminated or cut, that would seriously impact the ability of Charlotte-Mecklenburg to fulfill its transit/land-use vision.
Metro-Regional Transportation Solutions for the 21st Century

Intelligent Transportation Systems

Maricopa County and the Cities of Avondale, Chandler, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, Surprise and Tempe, Arizona

Using Intelligent Transportation Systems to Improve Regional Mobility and Traffic Safety

The Phoenix metropolitan area in Maricopa County is the second fastest growing metro region in the U.S. To help combat increasing congestion due to urban sprawl, the region’s principal jurisdictions—Maricopa County and the cities of Avondale, Chandler, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, Surprise and Tempe—have created AZTech. AZTech’s goal is to develop and integrate intelligent transportation systems (ITS) for the Phoenix metro region, building from a $7.5 million ISTEA demonstration grant awarded to the area in 1996. What is involved specifically? One, interconnecting the jurisdictions’ separate transportation systems so they can communicate with one another and, thus, more effectively respond to accidents and other traffic stoppers such as road closures. Two, developing innovative partnerships with the private sector so travelers can access real-time information on traffic conditions and transit availability from a variety of media devices—everything from a palm pilot to cable TV. Without these and other planned ITS improvements, time spent idling in traffic is projected to increase significantly over the next 20 years.

How AZTech Came into Being

The Phoenix region has had a long history of cooperative transportation operations planning, testing, and deployment. In 1988, following a two-year study, the region began putting in place “smart” transportation technologies along 106 miles of two interstate corridors that crisscross the metro area. These “smart” technologies included ramp metering, high-occupancy vehicle lanes, closed-circuit TV monitoring, variable message signing, and traffic interchange signaling. In 1991, construction of a transportation operations center, where all of these system components would be linked, was completed.

Meanwhile, other ITS-related activities were underway: Local jurisdictions were working to coordinate traffic signal timing throughout the region, and the metropolitan planning organization (MPO) was leading a study to map out what a regional “intelligent” transportation system might look like, along with a cooperative management structure to implement it.

So, when in early 1996, the U.S. Department of Transportation requested proposals to demonstrate how ITS could be deployed on a metro-wide basis, the Phoenix region had already laid much of the groundwork to start such an effort. It was able to quickly put together a grant application, using the MPO study as a base.
The promise of significant federal matching funds, however, provided the impetus for even further multi-jurisdictional coordination. The grant proposal required partners to submit intergovernmental agreements for committing and transferring funds among agencies, thus prompting agencies to seek and obligate these funds. Memoranda of understanding from nine jurisdictions eventually were submitted with the final proposal.

In the proposal, the county and the state were designated the lead management and administrative agencies—Maricopa County because of its active and early role in ITS planning and coordination in the region, the state because it owned most of the existing ITS infrastructure.

On Oct. 24, 1996, the region was awarded one of four federal model deployment grants. At this point, AZTech was officially born.

How AZTech Works
AZTech has five primary components:

- Eight high-priority corridors outfitted with vehicle detection technology, closed-circuit television cameras, and variable message signs.
- Transit vehicles equipped with automatic vehicle location technology for providing real-time bus location information.
- A transportation operations center where the AZTech server receives all of the data generated from the various ITS instruments, and is linked to satellite workstations in the partner cities and Maricopa County.
- A response team (called REACT) for incident management and emergency services on arterial roads.
- An advanced traveler information system for providing transportation users with real-time information on travel conditions and alternatives.

The transportation operations center serves as the information clearinghouse and primary control center for AZTech activities. It is staffed 24-7 and houses the AZTech server. From there, images and data from all parts of the system are shared with satellite workstations in each of the local jurisdictions, enabling them to make coordinated decisions regarding such things as traffic flow and fire and police dispatch. (Cameras and equipment belonging to the local jurisdictions can be controlled from the central command center, but only with the individual jurisdiction’s consent and/or notification.)

Ten Characteristics of AZTech
1. Regional public-private partnership. AZTech’s goal is to integrate the region’s 13 separate traffic and transit systems into a seamless multi-modal transportation system.
2. SMART Corridors. Smart Corridors are now a fixture of traffic management in Maricopa County. What makes them “smart” are closed-circuit TV cameras, variable message signs, vehicle detection devices, and coordinated traffic signalization.
3. Advanced traveler information system. Allows the region to collect, analyze, communicate and disseminate information so motorists can make informed decisions about when and how they make their trips.
4. Incident management coordination. Minimizes the impact an accident in one jurisdiction has on traffic in surrounding communities.
5. Operations integration. AZTech has created interoperable transportation systems such as traffic signals, erasing boundaries between jurisdictions.
6. Emergency management coordination. AZTech is now focused on regional collaboration between transportation and emergency response agencies.
7. Data archiving. AZTech is now developing the capability to consolidate ITS information, store it in a centralized archived data server, and make it available to a variety of stakeholders via a web interface.
8. Special events management. With AZTech, traffic management staff throughout the region can track event traffic, allowing a comprehensive approach to traffic control, traveler information, parking, and safety.
9. Regional procurement. Developed intergovernmental cooperative purchasing agreements for ITS equipment.
10. Telecommunications coordination. There are a broad range of wired and wireless media deployed in the region, many owned by local agencies, some leased from private sector partners. In the case of traveler information, the private sector may own the means for and the message being communicated.
This same technology—live traffic cameras, variable message signs and a vast network of fiberoptics and communications systems—also serves to provide motorists with information on traffic conditions, road closures, and accidents. The data gets from AZTech’s server to travelers through private vendors who, in exchange for disseminating the data in various forms, receive free access to the data. Currently, motorists in the Phoenix metro area can access real-time traveler information through websites, cable TV, palm computers, e-mail alerts, and at strategically-located kiosks.

Who Does What

The front-line members of AZTech are Maricopa County and the cities and towns that make up the Phoenix metro area, along with three local police and fire departments and two regional public transit agencies. Other members include: two metropolitan planning organizations, the Arizona Department of Transportation, the Federal Highway Administration, and 20 private companies.

The AZTech Executive Committee: This body sets policy direction, resolves conflicts, monitors progress, identifies future opportunities/potential roadblocks, and commits resources. It is comprised of the top transportation executives from each of the 13 public agency members.

Local Jurisdictions’ Responsibilities: While AZTech does not require local jurisdictions to put up significant capital funds, it does require significant dedications of staff time, cooperation, and commitment to maintain communications systems. Inter-governmental agreements lay out each public participant’s project roles and responsibilities, which include:

- Providing representatives to the AZTech project committees and working groups and supporting development of multi-jurisdictional interoperable systems.
- Providing staff support for construction and maintenance oversight, approval of plans, and administration of contracts and clearances related to project activities within one’s jurisdiction.
- Assuming responsibility for video and communications costs (estimated at $500/month) beyond the initial 60-month implementation period.
- Assuming responsibility for system operations related to one’s jurisdiction.
- Feeding local road construction, restrictions and incident information into the regional road closures and restrictions system.

Maricopa County Role: Provides overall program and project management and is responsible for work scheduling, budget control, technical work plan development, private contract administration and oversight of working groups.

Arizona Department of Transportation (ADOT) Role: Performs project administration duties such as financial reporting to meet federal grant requirements. It also operates the Transportation Operations Center—an 18,000 sq. ft. facility, which serves as the hub for AZTech data fusion and dissemination.

Private Sector Role: Through non-traditional partnerships with the private sector, AZTech is establishing an advanced traveler information service for the public. How this works: Private companies have contractual commitments to provide ongoing services over the project’s lifetime in exchange for free access to information from the AZTech server. These companies, in turn, receive their revenues from the sale of information products.
and services to travelers. Initially, AZTech provided some of the start-up funds for this effort. However, future advanced traveler information services are expected to have minimal public subsidies. Setting up a “business model” like this involves thinking carefully through issues such as data confidentiality, intellectual property rights, data access, and quality control.

**Funding**

In 1996, AZTech received a $7.5 million ITS grant from the U.S. Department of Transportation. This grant allowed the region to leverage an additional $24 million from state and local public sources and $5.4 million from private sources. Prior to receiving the federal grant, the Phoenix region had already made approximately $250 million in investments in intelligent transportation infrastructure.

**Challenges Ahead**

AZTech has created new regional operating teams and working groups that focus on resolving inter-jurisdictional problems. It also has expanded traffic management capabilities across the region, and demonstrated the benefits of exploring opportunities with private partners for advanced traveler information services.

Much work still remains, however, before the entire vision of a seamlessly integrated, multimodal, regional transportation system is fulfilled. Continued success will depend especially upon:

- **Fully integrating the public safety community into AZTech.** This is essential for regional success in both incident and emergency management. To date, AZTech has leveraged positive relationships with the Phoenix Fire Department to make new in-roads with other police and fire departments in the region.
- **Expanding the leadership and resource base to support the operations/management phase of the project.** The systems implemented through AZTech require ongoing operations and maintenance funding and skilled staffing to maximize their capabilities. Obtaining these resources has been a struggle for many jurisdictions, where funds must compete with many other public works priorities.

**Lessons Learned**

Regional ITS efforts provide significant traveler benefits, as well as substantially increase inter-jurisdictional communication. The AZTech program offers several lessons for other communities:

- A multi-jurisdictional system allows regional goals to be initiated and achieved.
- A regional architecture and common data server are critical foundations to the successful integration of ITS.
- Publicly funded traveler information websites that provide information about travel conditions are among the best investments of ITS funds.
- ITS applications, such as information websites and automatic vehicle location systems, lead to more effective transit management and help to maintain ridership.
- ITS programs like advanced signal systems, traveler information and REACT help reduce delays, crash risk, fuel consumption and emissions.
- Operations and maintenance costs are a major challenge to realizing and optimizing ITS benefits.
- Multi-community traffic signal coordination requires careful planning for maximum efficiency.
- The market for commercial applications of travel information is just emerging and is not fully developed.
- ITS integration can deliver regional benefits that extend beyond their original applications, such as operational benefits to city transportation agencies, police and fire.

Local elected officials serve as critical champions for ITS programs, breaking down institutional barriers and facilitating funding opportunities. Once they understand what ITS is, they will make it a priority to succeed!

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ITS In the Phoenix Metro Region: What ISTEA/TEA-21 Has Meant

• In 1996, the Phoenix metro area was selected as one of four sites around the country to demonstrate how ITS could be deployed on a regional basis. The $7.5 million grant it received from the federal government under ISTEA was the catalyst for what AZTech has become today. The grant drew other funding sources to it. Now, ITS is a line item in many local jurisdictions’ budgets.

• Since that one-time grant, TEA-21 CMAQ funds (roughly $6-7 million per year over the last four to five years) have made it possible to make the necessary signal system improvements to implement ITS. If it had not been for these funds, the region says it would have been severely limited in its ability to deploy its regional ITS program, if it all.

• ISTEA/TEA-21 represented a paradigm shift in transportation thinking. One of the principal underlying messages of the legislation was communities cannot build their way out of their traffic congestion problems; they must also find ways to manage what they have better using techniques such as ITS. ISTEA/TEA-21 served to educate traffic managers that ITS should be an important component of their program of projects, and that implementing it required a higher-level of expertise than many jurisdictions had at that point. Now, there are ITS specialists in most of the region’s jurisdictions.

• ISTEA/TEA-21 also encouraged communities to include transit in the development of their ITS programs. This has led to significantly more cooperation between transit and traffic operations in the Phoenix metro area, as well as an increasing recognition of the mutual dependency between the highway and transit modes.
The beauty of TEA-21 is that it offers communities the opportunity to integrate multiple objectives and design multi-purpose projects. Nowhere is this truer than in the metro area of Columbia, Missouri. Here, using federal Transportation Enhancement funds, the city and county are constructing new walking/biking trails. But these are more than just individual trails. They are also helping to fulfill a long-held vision for a greenbelt system that will one day encircle the entire metro area—an area that includes the City of Columbia plus surrounding unincorporated portions of Boone County. More recently, citizens have proposed using the trail links as a stepping stone to building a comprehensive 379-mile transportation system for bicyclists and pedestrians that would allow residents and tourists to get anywhere in the metro area by non-auto modes.

A Recreational Trail Network Takes Shape

Columbia and Boone County are blessed with many miles of nature trails. The prime example is the MKT Nature/Fitness Trail—a 4.7 mile trail running from downtown Flat Branch Park to the southwest. It was the first railroad conversion project in Missouri and serves as an excellent example of a multi-use trail offering opportunities to exercise or simply enjoy nature in a beautiful natural setting.

In recent years, new trails have been constructed in Columbia-Boone using TEA-21 Transportation Enhancement dollars. New trail improvements using these funds include:

- Boone County’s section of the MKT trail, which connects the city’s section of the MKT to Missouri’s KATY trail. This runs approximately 4.5 miles from Scott Boulevard to the KATY trail at McBaine.
- The newly finished 4.3 mile Bear Creek Trail in the northern part of Columbia extends from Columbia Cosmopolitan Recreation Area to Oakland Park.
- The Hinkson Creek Trail, a joint effort between the City of Columbia and the University of Missouri, connects Grindstone Nature Area/Capen Park to the MKT at the 1.9 mile marker. Based upon these efforts, slowly but surely, a network of recreational trails is evolving in Columbia-Boone County.

More than Just Trails Though

The federal Transportation Enhancement program offers extensive opportunities for communities to take unique and creative actions to integrate transportation with other local goals. In the case of the Columbia metro area, the Transportation Enhancement program has fostered new ways of thinking, allowing the region to consider how it can simultaneously protect watersheds, manage stormwater, preserve ecosystems, develop a natural corridor for wildlife, and establish a metro-wide pedestrian/bike network. Here’s how:

Joint Greenbelt/Trail Planning: Preliminary planning for the Bear Creek and Hinkson creek trails began as part of an effort to preserve open space along the City’s major creek corridors. Currently under consideration is a metro greenbelt master plan that would include all the major stream corridors in the metro area. This approach will enable community planners to coordinate protection of these corridors for flood control, scenic beauty, recreation and transportation. By developing trails along creeks on the west and the east sides of town in the years to come, the community
hopes to create a 20-to-30 mile greenbelt/nature trail loop that completely encircles Columbia.

**Using Greenbelt Trails to Support the Backbone of a Metro-Wide Pedestrian/Bike System:** The Hinkson and Bear Creek trail projects have inspired a new concept: a trail and “pedway” network that would make it safe and pleasant to walk, cycle, and wheel throughout the entire metropolitan area, thus giving citizens a real choice regarding the mode of transportation they elect for traveling to work, school, and recreation.

In response to citizen support, the City of Columbia adopted a “PedNet” master plan in July 2002 as part of the metropolitan planning organization’s 2025 long-range transportation plan. This comprehensive pedestrian/bicycle network (379 miles) will cover the entire Columbia metro area, and is envisioned to be built in pieces over the next 20 years. Designed to overlap with major city streets and the greenbelt loop discussed above, greenbelt trails would make up a significant portion of the system’s “backbone.”

### Next Steps

For multiple reasons, then, the city and county are committed to expansion of the existing trail system in the metro area.

As a planning aide, the City of Columbia Parks and Recreation Department has prepared a ranking of targeted land acquisitions for future trails. Factors used to determine the ranking include: the role the trail section would play in the overall goal to complete a “loop trail” around Columbia, areas currently or soon to be under development, the need to serve areas of expanding residential population, and current feasibility of acquisition.

Annexation or the use of special easements may be necessary to insure that adequate protection is given to critical greenbelt areas. A “greenspace trail” easement currently is defined in city ordinances, which gives the city the right to construct and maintain a pedestrian/bicycle or hiking trail within the easement.

### Costs

The estimated acquisition cost for a one-mile by 100-foot wide trail corridor ranges from $72,000 to $168,000. This represents a cost estimate range from $6,000 to $14,000 per acre. The lower-end estimate relates to properties located in flood plains, which have limited development potential. The upper range of cost encompasses land that is better suited for development, thus more valuable on the open market.

Boone County has numerous streams, which provide beauty and interest to the natural landscape. Unfortunately, the need for bridges over these streams increases the cost per mile for trail construction. The recent Bear Creek and Hinkson Creek recreation trail projects averaged just over one bridge per mile and probably represent a fairly accurate estimate of bridges per mile for many of this area’s proposed trails. Based on the number of bridges on these two trails, the estimated range for bridge costs per mile of trail is $150,000 to $250,000. These prices include contract installation, survey, architectural, and engineering fees.

The remaining cost factors are more constant, since there is less variation in design and construction of the actual gravel trail and trailhead access. The recent trail construction projects along Hinkson Creek and Bear Creek indicate a range from $105,000 to $175,000 cost per mile for recreational trail construction of this type, depending on whether or not an access is included.

Potential funding for future greenbelt projects...
includes federal and state grants (e.g. TEA-21 Transportation Enhancement funds), general fund revenues, targeted revenues (e.g. a quarter cent sales tax for greenbelt purposes), and stormwater utility revenues. Additional funding could come from private sources, such as foundations or other private concerns that provide money for greenbelt and/or trail projects.

Issues to be Resolved
As the region moves forward with this multifunctional approach, questions must be addressed. These include:

• How do you establish uniform design/construction standards for the development of trails within the greenbelt system?
• How do you effectively ensure that designated greenbelt corridors are preserved for future use, prior to being filled and developed?
• How do you provide as many uses as practical within the greenbelt that are appropriate for the nature of the corridor—without detracting from the scenic qualities of the greenbelt?
• How do you create cooperation between all the departments and agencies that may have facilities, easements, etc. in the greenbelt corridor, avoiding duplication of services and conflicts?
• Finally, can you use the greenbelt system to define future urban development and land uses?

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Benefits of TEA-21 for Improving Pedestrian/Biking in Columbia/Boone County

• Created an understanding that trails are part of the transportation system. This new understanding allowed the county to go forward with a trail project that now connects the city’s MKT trail to the state’s KATY trail.
• Provided essential resources to both the city and county to make trail improvements. Without federal transportation enhancement funds, it is doubtful these projects would have been undertaken.
• Encourages the planning of a trail network, thereby inserting discipline into how trail projects are selected for funding. More consideration is now given to how a proposed project fits in with the overall greenbelt trail plan. Awareness has been raised about what can be done on a community-wide basis.
• Promotes coordination of functions such as natural resource conservation, flood control, transportation, and scenic beauty.
• Suggestions for improvement: require state DOTs to solicit input from local governments on how states spend their share of transportation enhancement funds in order to ensure that state expenditures complement local efforts.
Appendix A

Intelligent Transportation Systems Are a Critical Component of Enhanced Bus Service Along the San Pablo Corridor

Enhanced bus service gains speed and reliability when it is combined with Intelligent Transportation Systems. In the East Bay, corridors that incorporate Intelligent Transportation Systems are dubbed “SMART Corridors”.

What are SMART Corridors? SMART Corridors permit efficient operation and management of existing roadway and transit resources through the integration and use of currently available technologies, combined with strengthened institutional ties and inter-jurisdictional coordination.

Why make the San Pablo Corridor a SMART Corridor? Currently, the 85 traffic signals from Oakland to Hercules are not connected, making it impossible to optimize the flow of the 25,000 to 35,000 vehicles that use the 18-mile corridor each day. A SMART Corridor will provide the jurisdictions with additional equipment and functionalities to enhance the effectiveness of their individual transportation management programs.

Four categories of benefits are:

1. Local Arterial Operations
   • Improves collection and dissemination of current travel conditions along arterials.
   • Provides accurate and timely information about corridor conditions for agency transportation managers and the public.
   • Introduces traffic responsive signal timing to improve traffic signal coordination and reduce delays along major corridors.

2. Freeway/Arterial Operations
   • Minimizes the intrusion of freeway traffic to local streets due to freeway congestion and freeway incidents.
   • Proactively manages traffic already diverted from the freeway to minimize its impacts on local arterials, and return regional traffic back to the freeway as soon as possible.
   • Provides for rapid response to and clearing of incidents on freeway and surface streets.

3. Transit Operations
   • Improves on-time performance of transit service.
   • Reduces the travel times for buses.
   • Provides real-time transit information at information kiosks.

4. Interagency Coordination
   • Improves sharing of resources for more unified transportation management operations.
   • Shares traffic information between agencies to improve coordination and management.
   • Provides the capability for shared control and operation of the SMART Corridor components.

What are the steps involved in implementing a SMART Corridor?

Step 1: Interconnect signals (now essentially complete along the San Pablo Corridor)
Step 2: Develop a communication network wherein all participating jurisdictions have the ability to exchange data.
Step 3: Put into place field devices to allow data collection and dissemination along the corridor.
Step 4: Integrate transit and traveler information.

In the San Pablo project, jurisdictions have entered into two binding agreements. One covers design and construction, a second ownership, operations, and management. It is expected that a special cost-sharing plan will need to be developed to address the on-going maintenance and operations costs of system components.
Appendix B

Sub-Watershed Planning Steps

Portland borrowed the concept of Sub-Watershed Planning from the City of Olympia, Washington. The process as outlined in a report titled Aquatic Habitat Evaluation and Management includes seven steps.

Step 1. Inventory Sub-Watershed Health
Sub-watershed health can be rated by a number of indicators. These include:
• percent impervious surface and forest coverage;
• health of wetlands;
• computer modeled hydrology and hydraulics;
• riparian habitat;
• in-stream habitat;
• stream water quality; and
• macro-invertebrates (bugs) or other biological indicators.

Step 2: Evaluate Sub-Watershed Health
The streams within each sub-watershed can be placed into one of three categories (properly functioning; impacted; and non-supporting) based on information about the above indicators.

Step 3: Create Goals for Each Sub-Watershed
Create goals for each sub-watershed, based on its current conditions and health category. These goals indicate the degree of protection and/or restoration that will be appropriate in each sub-watershed. For example, the goal for a sub-watershed labeled “impacted,” might be to protect existing natural resources to prevent the sub-watershed from becoming “non-supporting.”

Step 4: Create Management Objectives for Each Sub-Watershed
Create management objectives for each of the indicators of sub-watershed health. Draft transportation, land-use, and infrastructure alternatives to achieve sub-watershed objectives. For example, in a sub-watershed labeled “impacted” with the goal of protecting natural resources, a management objective might be to limit overall impervious surface area for the sub-watershed from climbing above 15 percent.

Step 5: Create Management Tools to Meet Objectives
The management tools are specific to each sub-watershed and are created to reach management objectives and goals. Possible tools that might be specified include: placing limitations on the amount of impervious surface allowed for new development; and requiring stormwater controls such as bioswales and green roofs to absorb surface runoff and rainwater.

A final product of this step is a “Resource Management Map,” which specifies the following:
• unbuildable areas;
• restoration areas; and
• buildable areas, with specific tools outlined to minimize impacts on sub-watershed health.

Step 6: Integrate Transportation and Land-Use Alternatives that Meet Goals
Model the impacts of land-use and transportation alternatives on the hydrology, riparian corridor, aquatic habitat, and water quality for each sub-watershed. Evaluate whether you will reach sub-watershed goals, estimate the predicted impacts, and recommend mitigation requirements.

Step 7: Re-Evaluate Goals
Re-evaluate whether the original goals are obtainable. Negotiate potential trade-offs between sub-watersheds.
Appendix C

Charlotte-Mecklenburg Transit Station Area Principles: Guidance for Future Development/Redevelopment at Transit Station Areas

Charlotte-Mecklenburg’s land use vision focuses future density residential and employment growth in transit station areas and major activity centers/hubs where it can be best accommodated by transportation services and other public facilities. Here are the principles it has adopted to guide future development at transit stations:

Mixture of Complementary Transit-Supportive Uses
- Provide a range of higher intensity uses including residential, office, service-oriented retail and civic uses that are transit supportive. Such a mix of land uses increases the attractiveness of the area and increases trip options for transit uses.
- Disallow automobile-dependent uses, such as automobile sales lots, car washes, and drive-thru windows.
- Provide uses that attract/generate pedestrian activity, particularly at ground floor level.
- Consider special traffic generators—such as cultural, educational, entertainment, and recreational uses—to locate either within or adjacent to station areas.
- Encourage multi-use developments which include a mixture of uses on the same site. Mixed-use developments, with a mixture of uses within the same building, are also encouraged.
- Encourage a mixture of housing types.
- Preserve and protect existing stable neighborhoods.
- Encourage development of workforce/affordable housing.
- Encourage upgrading of existing uses to make them more transit and pedestrian friendly.

Increased Land Use Intensity
Encourage higher densities for new development, concentrating the highest densities closest to the transit station and transitioning to lower densities adjacent to existing single-family neighborhoods.

In most cases, minimum densities for new residential development within 1/4 mile walking distance from a transit station will be 20 dwelling units per acre (net) or greater. Between 1/4 and 1/2 mile walking distance, the typical minimum density will be 15 dwelling units per acre (net) or greater.

In most cases, non-residential or mixed-use intensities within 1/4 mile walking distance from a transit station will be, at a minimum, 0.75 FAR (net). Between 1/4 and 1/2 mile walking distance from a transit station, the non-residential or mixed-use intensities will be, at a minimum, 0.50 FAR (net).

In some cases, station area plans will recommend lesser intensities or densities for new development. These lesser intensities might be necessary to preserve existing structures, to insure that new development is consistent with the character of existing transit supportive development, to protect existing neighborhoods, or to mitigate traffic impacts.

Pedestrian and Bicycle System
- Provide an extensive pedestrian system throughout the station area that will minimize walking distances for pedestrians.
- Eliminate gaps in the station area pedestrian networks.
- Establish pedestrian and bicycle connections between station areas and surrounding neighborhoods.
- Design the pedestrian system to be accessible, safe, and attractive for all users.
- Insure that the pedestrian network will accommodate large groups of pedestrians.
- Utilize planting strips/street trees, on-street parking, and/or bicycle lanes to separate pedestrians from vehicles.
- Encourage the provision of bicycle amenities, especially bicycle parking facilities.
**Street Network**
- Within station areas, design streets to be multi-modal, with an emphasis on pedestrian and bicycle circulation and set vehicular levels of service to reflect an emphasis on pedestrians and bicyclists.
- When necessary, redesign existing street intersections with a greater emphasis on safe and comfortable pedestrian and bicycle crossing.
- Develop an interconnected street network designed around a block system, with blocks a maximum length of 400’.
- Insure that the pedestrian network will accommodate large groups of pedestrians comfortably, especially within 1/4 mile of the station.
- Consider new mid-block street crosswalks in congested areas with long distances between signalized crossings.
- Incorporate traffic calming in the design of new streets.

**Parking**
- Reduce regulatory parking requirements in station areas and establish parking maximums.
- Minimize large surface parking lots (greater than two acres) for private development, especially within 1/4 mile of the station. Instead of surface lots, well-designed parking decks are preferred.
- Encourage shared parking facilities.

**Building and Site Design**
- Design buildings to front on public streets or on open spaces, with minimal setbacks and with windows and doors at street level instead of expansive blank walls.
- Locate building entrances to minimize the walking distance between the transit station and buildings.
- Locate surface parking, with the exception of on-street parking, to the rear of buildings and where necessary, provide pedestrian paths through surface parking to the station.
- Design parking structures to include active uses on the ground floor street frontage.
- Typically limit building heights to 120’, with the tallest and most intensely developed structures located near the transit station and buildings adjacent to established neighborhoods limited to low-rise structures.
- Screen unsightly elements, such as dumpsters, loading docks, service entrances, and outdoor storage, from the transitway.
- Take safety and security concerns into account during design.

**Streetscape**
- Design the streetscape to encourage pedestrian activity.
- Include elements such as street trees, pedestrian scale lighting, and benches in streetscape design.
- Place utilities underground whenever possible.

**Open Space**
- Establish public open spaces that act as development catalysts and serve as focal points around transit stations.
- Design open spaces to be centers of activity that include items such as benches, fountains, and public art.
- Orient surrounding buildings onto the open spaces.