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CITY HALL
LOS ANGELES, CALIFORNIA 90012

**COMMENTS SUBMITTED BY THE CITY OF LOS ANGELES BEFORE THE
NATIONAL SURFACE TRANSPORTATION POLICY AND REVENUE STUDY
COMMISSION**

**FIELD HEARING ON FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Introduction

Chairperson Mary Peters and members of the Commission, welcome to Los Angeles and thank you for this opportunity to provide input as you work to examine the condition and future needs of the nation's surface transportation system, as well as the short and long-term funding solutions to support and expand the nation's roadway system. Clearly, these issues are critical to Los Angeles, not only because of our size, but also because of the complexity of our transportation network and the number of people who live, work and drive in the region. We are faced with the challenge of addressing existing traffic congestion and planning for growth, reducing greenhouse gasses and global warming, while supporting increased demand for goods movement and fostering economic development. It is a daunting task, but we are working on a variety of initiatives and engaging in a wide variety of policy discussion to meet these challenges. The City's elected officials will continue to meet with transportation experts and the industry to work together to balance the needs of the traveling public. This is a continually evolving discussion and we look forward to not only offering our thoughts on the opportunities and challenges for surface transportation in the City of Los Angeles, but also to learning from other stakeholders across the nation. The purpose of the following testimony is to provide the Commission with a snapshot of what is happening in Los Angeles with respect to surface transportation. We look forward to participating in an ongoing dialogue with the Commission on all these subject areas.

Recommendations

The federal government has had an evolving role in addressing the nation's surface transportation needs. As the following testimony will describe, the City of Los Angeles would like to recommend that the federal government:

- Return to being a funding partner with local entities for transit operations to help address the growing need for these services.
- Require a full analysis of any new innovative federal financial proposals to ensure that they do not negatively impact local governmental relationships.
- Require an integrated approach in transportation capital project funding that reflects the direct relationship between land use and transportation infrastructure to ensure that projects are developed to serve surrounding communities, not just built those at the terminus of a project.
- Provide additional funds to conduct planning studies that will foster cooperation of various disciplines, such as transportation, land use, housing engineering and economic development, to develop a sensible and seamless transportation network.
- Develop a national transportation funding model that reflects fair financial partnerships with full and equitable participation by all levels of government.
- Allow the issuance of letters of no prejudice if a project sponsor wants to use their own funds to move a project forward and be reimbursed by the federal dollars at a later date.
- Allow cities to access any project funds in any year of the Federal Transportation Improvement Program.
- Identify a solid funding commitment to design and construct earmarked projects, as well as allow flexibility to use annual appropriations among projects that are ready to start, instead of requiring that all projects wait for complete funding.
- Provide flexibility in the overall federal match requirements that would allow jurisdictions to provide different matches each year, as long as the overall average match remains the same.
- Pursue the concept of a new "mobility block grant" for large metropolitan areas that would provide funding for large-scale transportation projects with a balance of highway and transit funds.
- Allow the use of federal airport funds to be used for off-site transportation improvements if they are used to mitigate impacts directly related to airport activities.
- Engage in an open and ongoing dialogue with Los Angeles as our transportation priorities evolve.

Context

In the Southern California region, population more than doubled from 1960 to 2000, however, our freeway capacity increased by less than 30 percent. Consequently, the City's congestion has increased dramatically, affecting both person travel and goods movement. In 2003, a traveler during peak periods in Los Angeles/Orange Counties experienced 93 hours of annual travel delay, the highest among major metropolitan areas, at a total cost of \$10.7 billion. If current trends persist, travel delay is expected to more than double by 2030. A major reason for this increase is the projected population growth in the region of an estimated six million people by

2030. This is the equivalent of adding two cities the size of Chicago to the existing Southern California population.

Our focus on addressing traffic congestion is not just with an eye toward reducing the number of vehicles on the roadways, but improving air quality, fostering economic development to become the cleanest and greenest big city in America.

Future Federal Financing of the Surface Transportation System

The Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) authorized many projects and programs that the City is actively engaged in implementing. It is clear that surface transportation needs far exceed available revenues. This situation, coupled with a looming Highway Trust Fund financial crisis, necessitates a serious reexamination of the current federal role and priorities in addressing the national transportation needs.

The Commission has been challenged with identifying short- and long-term alternatives to replace or supplement the fuel tax as the principal revenue source to support the Highway Trust Fund over the next 30 years. It is imperative that action takes place to close the national funding gap and prevent the Highway Trust Fund from going into deficit. While indexing the motor fuel tax has the most substantial short-term impact on closing the gap, we are concerned about the sustainability of this strategy and look forward to continuing our discussion of this issue. Consideration must also be given to how alternative fuels will contribute to sustaining and improving the transportation network as the nation addresses global warming through reduced dependency on fossil fuels and increased fuel efficiency.

The State of California and the region has worked very hard to do our part in maintaining the purchasing power of scarce transportation dollars. For example:

- The Transportation Development Act (TDA), shifted a ¼ cent state sales tax to mass transportation needs of the 58 counties in the state. In doing so, it created the first permanent source of state revenue that could be spent on transit operations.
- Proposition 42 permanently dedicate revenues from the state's share of the sales tax on gasoline to transportation projects.
- Proposition 1A provides increased protection of Proposition 42 funds to ensure they remain dedicated to transportation projects.
- Local Proposition A and Proposition C Programs are funded by two 1/2 cent sales tax measures approved by Los Angeles County voters to finance a Transit Development Program.
- Proposition 1B provides \$19 billion in new funding to make safety improvements and repairs to state highways, upgrades freeways to reduce congestion, repairs local streets and roads, upgrades highways along major transportation corridors, improves seismic safety of local bridges, expands public transit, helps complete the state's network of car pool lanes, reduces air pollution, and improves anti-terrorism security at ports.

These efforts document the willingness of California residents to shoulder part of the financial burden of improving and expanding the transportation network. Unfortunately, the federal government has not mirrored these efforts, which has resulted in a diminishing national contribution to the transportation needs in Los Angeles. A fair share partnership must be developed with full and equitable participation by all levels of government.

Besides the obvious and wide-spread need for more federal dollars for transportation, there is also a need for steady funding over a federal authorization bill period. Cash flow problems are often as detrimental to expeditiously moving a project forward as a lack of funding. The efficient development and construction of transportation projects cannot be done if a total amount of funding is not identified, as well as a clear and dependable distribution schedule. The following is a list of recommendations that would provide the necessary flexibility to existing administrative barriers that reduce our ability to effectively execute transportation projects:

- Allow the issuance of letters of no prejudice if a project sponsor wants to use their own funds to move a project forward and be reimbursed by the federal dollars at a later date.
- Allow cities to access any project funds in any year of the Federal Transportation Improvement Program.
- For earmarked projects, there needs to be flexibility of annual appropriations among projects that are ready to start, instead of having all projects wait for complete funding, and provide a solid commitment to design and construction for a project.
- Provide flexibility in the overall federal match requirements that would allow jurisdictions to provide different matches each year, as long as the overall average match remains the same.
- Pursue the concept of a new “mobility block grant” for large metropolitan areas that would provide funding for large-scale transportation projects with a balance of highway and transit funds.

City Initiatives

It is interesting to note that a survey conducted by the Southern California Association of Government's (SCAG) 2006 State of the Region report found that 53 percent of respondents indicated that they would not consider switching to an alternative mode of transportation regardless of the price of gasoline, primarily due to the lack of options. Providing more transportation choices for the public is therefore a very high priority for the City of Los Angeles. Accordingly, the City, along with various regional partners, including the Los Angeles County Metropolitan Transportation Authority (Metro) and the State Department of Transportation (Caltrans), has embarked on an aggressive expansion of alternate travel modes, including the Metro Red Line subway, four other highly successful light rail lines, improvement of the bus service, the Metro Orange Line busway project in the San Fernando Valley; new and expanded HOV lanes and other highway improvement projects; and the development of infrastructure that supports the region's public transportation services, such as commuter rail stations, park and ride lots to serve express and local bus services and transit hubs at which local, regional and express bus passengers transfer. The following are just a few of the public transit initiatives undertaken by the City of Los Angeles.

Increased Demand for Transit Services

The City is constantly challenged to expand service and initiate new DASH and Commuter Express routes, as well as increasing the number of Dial-A-Ride vehicles. Unfortunately, costs to provide transit service is escalating at a frightening rate. This reality, coupled with an expanding aging population, will continue to place even more pressure on the City to provide more transit service. Unfortunately, operating dollars are scarce and the full burden to continually expand transit services falls upon local entities.

DASH Service - As the second largest public transit providers in Los Angeles County, the Los Angeles Department of Transportation (LADOT) provides local bus service through the operation of 230 buses called the Community DASH program. Growing out of community needs for transit service that could circulate around neighborhoods as well as distribute riders to regional transportation services, DASH services are one of the most unique networks of transit services in the nation. Currently, the City operates 27 community DASH routes and seven DASH routes in downtown Los Angeles serving an estimated 28 million passengers every year. This requires an annual investment of \$24 million. One hundred percent of the DASH fleet uses alternative fuels, using compressed natural gas and propane.

Commuter Express - LADOT also provides sixteen non-stop and limited bus service lines called "Commuter Express" between residential areas and major work centers during peak commuting hours in Los Angeles and into Ventura County, which services 2.4 million people annually. Commuter Express vehicles also "double" as shuttles between downtown locations to Union Station to link rail commuters in a quick and efficient manner. The City spends \$11 million on this service.

Dial-A-Ride - The City operates this service as part of an overall "Cityride" program that provides subsidized transportation services for individuals aged 65 and older and those persons who qualify as being mobility-challenged. The City ride program began in 1993 with the responsibility of equitably distributing special transportation services and discount fare programs throughout the City. Program participants can choose from many travel options from taxi service to dial-a-ride vans to private lift-van services to fixed route transit services operated by LADOT or Metro. Specifically, Dial-A-Ride services provided by 73 wheelchair-lift equipped vans that serve 85,000 riders annually. The City invests \$5.5 million annually in providing this important transit service.

Subway to the Sea – the City Council and the Metro Board have been discussing an extension of the Metro Red Line (dubbed "Subway to the Sea") along Wilshire Boulevard from its current terminus at Western Avenue to West Los Angeles. This will provide a vitally-needed transit link in the most densely populated corridor in Los Angeles. We are working at the federal level to lift the ban on further subway construction, but there will be a need for federal financial assistance to construct such a large capital project.

Exposition Light Rail Line - Construction of this project from downtown to the City of Culver City and ultimately to the ocean, is being planned with transit-oriented developments along the alignment to ensure its utility to local communities and the region as a whole. We have learned

over the years that building a heavy or light rail line is only the first step – the provision of infrastructure linkage, such as parking structures, other transit lines and housing are vital to building an integrated transportation network. Continued funding is necessary to undertake studies that will identify what is needed.

Smart Growth Strategies to Improve the Link between Land Use and Transportation

One approach that the City is using to achieve congestion relief is through “smart growth” strategies, including: focusing new residential and commercial development near existing employment centers, transit centers and along key arterials, and promoting mixed-use development; transit oriented development (TOD) planning near light rail stations; and “smart growth zoning,” such as mixed-use, adaptive reuse, and density bonus at transit stops and job centers. There is a realization that the continued “urban sprawl” land use pattern that is symbolic of Southern California does not make efficient use of existing infrastructure, compounds already serious problems of poor air quality and traffic congestion and removes potential open space resources.

Metro is currently building five light rail stations for the Metro Gold Line Eastside Extension (Eastside Project) in the City of Los Angeles and plans to construct eleven stations for the Exposition Light Rail Transit Project (Exposition Line) in or adjacent to the City. Over the years, we have discovered that construction of major transportation projects is only the first step in developing a workable system. The stations for the Metro projects present opportunities for economic development, transit-oriented development and joint development in their surrounding areas. Additionally, the southern area of downtown Los Angeles is slowly undergoing an exciting transformation as land that has long been underutilized is targeted for residential and commercial development. Investment in the transportation infrastructure is needed to stimulate these uses and ensure their success.

Specifically, South Los Angeles currently lacks adequate transportation services, particularly linkages to major transportation services that are necessary to serve residents, traffic congestion and support economic development. The City is partnering with Metro so that as they develop Exposition Line, the City will use this as an opportunity to develop an overall land use and transportation plan to ensure that transit oriented developments will be built around the stations and that transportation projects and programs will link existing and future activity centers or that there will be complimentary transit corridors.

The City of Los Angeles is working with other municipalities to examine the link between transportation and surrounding land uses, as well as in-depth planning studies that could lead to creative solutions to long-standing problems. Working together, the Metro Board members directed resources in the Agency’s 2006-07 budget to ensure that additional staff and funding was appropriated to:

- Initiate major investment studies for the extension of the Metro Red Line to the Westside of Los Angeles and along a light rail regional connector in downtown.

- The possible development of a little-used freight rail line for passenger rail (the Harbor subdivision) right-of-way from downtown Los Angeles to Los Angeles International Airport and Wilmington.
- Complete a study on environmental issues and further design on the I-710 North extension.
- Provide additional technical support on the Goods Movement Action Plan and to increase monitoring and administrative responsibilities associated with SAFETEA-LU.
- Provide contributions to various stakeholders and transportation partners for a major corridor study of the SR-91/I-605 corridor; a third phase of a study on mixed-use centers and transit corridors demand.
- Conduct a joint study with the Orange County Transportation Authority (OCTA) to develop, evaluate and recommend transportation improvements focused on issues at the Los Angeles-Orange County border.
- Prepare a study on the I-10 South Los Angeles Master Plan, as described above.
- Prepare twelve bicycle transit bike access hub plans.

Engineering Solutions to Reducing Congestion

ATSAC and Signal Synchronization - One method of optimizing the existing highway system is through implementation of automated traffic signal timing systems. The Automated Traffic Surveillance and Control (ATSAC) System is a state-of-the-art traffic signal synchronization system created by LADOT. ATSAC is a computer-based traffic signal control system that monitors traffic conditions and system performance, selects appropriate signal timing strategies, and performs equipment diagnostics and alert functions. Sensors in the street detect the passage of vehicles, vehicle speed, and the level of congestion. If required, the signal timing is either automatically changed by the ATSAC computers or manually changed by the operator to address current traffic conditions. Evaluation studies of the ATSAC System show that travel times, traffic signal delay, vehicular stops, air emissions and fuel use are significantly reduced.

Transit Priority System (TPS) - The Transit Priority System was designed and implemented by LADOT to assist Metro in improving the bus speeds of the Metro Rapid Bus service. The system serves to improve the on-time performance of the Rapid buses by adjusting the signal timing at intersections for buses as their approach to the intersection is detected. The Rapid buses are equipped with unique transponders that can be detected when traveling over the embedded roadway loop detectors. If a bus is late or beyond the scheduled headway, then the downstream traffic signal control will provide signal priority to help the bus catch up with the scheduled headway. The TPS is also used to provide real-time next-bus arrival information to passengers waiting at bus stations.

TPS is currently deployed at more than 1,000 intersections along 14 major transit routes in the City of Los Angeles. The \$30 million project provides Metro buses with traffic signal priority at signalized intersections to reduce the number and duration of stops. The project has resulted in a 12% improvement in bus speed. It is anticipated that service along an additional 13 routes will be constructed in the next 2-3 years.

Real Time Traffic Information - Real time vehicle speeds for Los Angeles arterial streets are displayed at trafficinfo.lacity.org. This information is designed to alert drivers to current travel conditions on the network and is another tool to help manage traffic and reduce congestion. The source of the information is the traffic detectors installed as part of the on-going expansion of the City's ATISAC system. This information is intended to assist motorists in making more informed decisions on travel routes and the budgeting of trip time.

Increasing National Demand for Goods Movement

The transportation network of Los Angeles, and specifically the links to major ports of entry and airports, supports the global economy. Southern California has reached a critical point in our ability to support trade and travel that benefits the region without unduly suffering a myriad of negative local impacts.

Los Angeles Ports – Forty-three percent of all waterborne freight container traffic at U.S. ports is handled by the Ports of Los Angeles and Long Beach. In 2005, the Los Angeles/Long Beach port complex ranked fifth in the world in TEU (20-foot equivalent container units) traffic. It is estimated that by 2030, the Ports forecast that TEU volume could reach 44.7 million, tripling current levels.

Either lack of port capacity and/or inadequate landside transportation infrastructure capacity will limit TEU volume to substantially lower numbers absent aggressive investment in regional infrastructure solutions. Rapid reliable freight transport is widely recognized as a key to global competitiveness. This will have national implications and place our economic strength at risk. The federal government must play a leadership role and partner with local jurisdictions given that eighty percent of the trade through the San Pedro port complex is produced or consumed elsewhere, underscoring the national significance of these Ports.

The nearly \$200 billion in trade passing through the ports in 2003 supported a national total of 2 million jobs, which paid over \$61 billion in income. Southern California trade provided the nation with \$208 billion in economic output. While Southern California, and the City of Los Angeles in particular, provide the infrastructure necessary for these services to the nation, yet our residents uniquely endure substantial local burdens, including traffic congestion, air pollution, noise, public health impacts and costs, visual blight, and freight-related safety incidents.

The transportation of these goods by truck is growing and further burdens the City's existing infrastructure. Nearly all of the short-haul and a significant share of medium- and long-haul movement of goods are transported by truck. Severe congestion due to truck traffic is expected to worsen in the City's major transportation corridors. Forecasts of greater regional population and employment, and projections of increasing international and domestic trade volumes, all lead to worsening congestion and the potential for gridlock occurring within the City's surface transportation system. The federal government must support our local and state efforts with increased funding.

Airports - Los Angeles World Airports (LAWA) owns and operates four airports, including Los Angeles International (LAX), LA/Ontario International, LA/Palmdale Regional and Van Nuys.

These facilities attract and support national and international activity throughout Southern California. LAX is the number one international gateway to Asia/Pacific and is served by nearly 90 passenger and cargo airlines. In 2005 more than 61 million people traveled through LAX. A commerce leader, its ever-expanding air cargo system handled more than 2.1 million tons of goods and international freight is more than 50 percent of this total. LAX handled 70 percent of the passengers, 75 percent of the air cargo, and 95 percent of the international passengers and cargo traffic in the five-county Southern California region. This is generated by aviation activity, by off-airport expenditures related to the use of aviation services, and by money that is re-spent and circulated throughout the local economy. In fact, one in 20 jobs in Southern California is attributed to LAX operations.

LAWA recognizes that there is a need, over the long term, to decentralize aviation activity within the region, in particular to limit the growth of LAX. Decentralization will become increasingly important as it is estimated that air passenger demand in the region will double by 2030. One of the key challenges for LAX is the lack of direct transit access. Without a direct connection to transit services, a growth in vehicular traffic will continue to use the surrounding streets and freeways to access the airport, thereby impacting surrounding residential communities and surrounding businesses. The City's ultimate goal is to develop LAX into a world class airport; however, federal dollars are needed to for direct mass transit linkages.

In the Inland Empire, LAWA is working with the City of Ontario to develop a list of transportation projects to improve access between Ontario and the I-10 and SR-60 freeways. These projects include grade separations, street widenings, interchange improvements, and Smart Street conversions. While State transportation bond funds will be sought for the high priority projects on the list, much more Federal funding will be required to complete all the needed projects.

Since existing regulations limit the use of federal funds to on-airport roadways, vitally-needed nearby transportation improvements that directly serve the airport cannot often be constructed. This limitation must be reexamined to allow City's to provide network solutions.

Air Quality and Goods Movement - As part of the City's efforts to reduce greenhouse gasses and address global warming, the City is participating in several port-related initiatives. One example is the San Pedro Bay Ports Clean Air Action Plan (CAAP). Through the CAAP, the Ports of Long Beach/Los Angeles (POLB/POLA) are addressing air quality problems and existing transportation system deficiencies throughout Southern California by proposing to implement several critical environmental and transportation system projects to reduce truck and auto emissions. This will be done through a variety of measures, including truck engine emission reductions, absolute ports truck trip reductions (via increased rail), and roadway congestion reduction. Fewer trucks on the road will reduce delays for all motorists, which in turn improves reliability for all supply chain entities.

Another City initiative is the Pacific Ports Air Quality Collaborative. Through this effort, a forum has been established to facilitate the exchange of ideas and encourage collaboration on air quality issues among all the Pacific Rim ports. Informal and formal relationships have been

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foster to develop effective and coordinated voluntary emissions reduction strategies that transcend the potential of a single port.

The nation's economy will only function efficiently with an integrated national transportation system. We look forward to developing projects and programs in conjunction with the federal government to further develop and maintain the nation's surface transportation network to the maximum extent possible.

Conclusion

The City of Los Angeles appreciates the time and effort made by the Commission to hold a field hearing in Los Angeles. The City is well aware of the scope and breadth of Commission's work and the complexity of the challenge. We urge the Commission to recognize the City of Los Angeles as a nationally significant transportation and goods movement hub and to recommend appropriate infrastructure investment policies so that future federal funding priorities can reflect such a view point. Furthermore, we would encourage the Commission to consider future funding legislation which could provide improved flexibility in making good use of funding. The tremendous pressure facing the City of Los Angeles is making it difficult to address our short-term needs while not losing sight of the necessary long-term needs. As everyone knows, there are no easy answers, but we are confident that a comprehensive and effective approach to addressing the nation's transportation challenges will be made through the work of this Commission.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

*California Transportation Commission Background Briefing Materials
Issues for 2007*

California Transportation Commission

Author: John Barna

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

California Transportation Commission
Background Briefing Material
National Surface Transportation Policy and Revenue Study Commission
Excerpts from the California Transportation Commission
2006 Annual Report

Issues for 2007

The infusion of Proposition 42 funding and the passage of Propositions 1A and 1B have generated optimism in the transportation community that the period of underinvestment in the beginning of the decade has given way to a time of plenty. Clearly this was the intent of both the Schwarzenegger administration and the Legislature in providing transportation funding as part of the 2006-07 budget and in passing Senate Bill 1266 (Perata; Chapter 25, Statutes of 2006), which authorized Proposition 1B. Key issues in 2007 will be building on this momentum to implement Proposition 1B appropriately and to push toward addressing the need for enhanced, stable funding for transportation, as well as revisiting key policy issues involved in public-private partnerships, project delivery, and meeting the state's massive rehabilitation and maintenance needs for the entire transportation network.

Implementing Proposition 1B

The Commission initiated a series of efforts in the summer of 2006 to prepare for the passage of Proposition 1B. In order to meet the statutory deadlines for the Corridor Mobility Improvement Account (CMIA)—the most important of which is initial adoption of the program by March 1, 2007—the Commission had to jumpstart the guideline development process ahead of the election. The Commission reached out to many in the transportation community to assist in the development of the CMIA guidelines. Through the hard work of many in the community, the Commission was able to consider draft guidelines at its October 2006 meeting and to adopt the CMIA guidelines on November 8, 2006 at its meeting in Jackson—a day after the voters approved Proposition 1B.

Caltrans and regional transportation agencies are poised to nominate CMIA projects to the Commission by January 16. In the run-up to the nomination date, Commission staff has continued to impress upon the transportation community the need to take advantage of the unique opportunity that the voters have provided by emphasizing early and efficient delivery of CMIA projects and by focusing on achieving corridor-level congestion relief and connectivity benefits.

The Commission intends to make programming benefits and enhanced attention to project delivery hallmarks of the discretionary Proposition 1B programs, particularly the CMIA and the Trade Corridors Improvement Fund (TCIF). The Commission will also pay more attention to benefits and delivery as part of the 2006 State Transportation Improvement Program (STIP) Augmentation and the 2006 State Highway Operation and Protection Programs (SHOPP) Augmentation.

Over the first six months of 2007, the Commission will adopt the initial CMIA program, the 2006 STIP Augmentation, and the SR-99 Bond Act Program. Following the lead of the Legislature, the Commission would also like to adopt an initial State-Local Partnership Program for implementation as early as possible in the 2007-08 fiscal year.

The various implementation issues involved in the State-Local Partnership Program may require additional legislation that could push implementation of the program into the next fiscal year. At a minimum, the Commission would like draft SLPP guidelines to serve as the basis of any additional legislation.

Similarly, the Commission will be drafting guidelines for implementing the TCIF so that if further legislation is required enough work has been completed to provide an adequate framework and context for legislative direction. These guidelines will need to take into consideration the administration's *Goods Movement Action Plan* and the California Marine and Intermodal Transportation System Advisory Council effort initiated by the Legislature.

The Commission, working with Caltrans and the eleven councils of government along SR-99, adopted guidelines for the SR-99 bond-funded improvement program at its December 2006 meeting. The SR-99 program will be on the same schedule as the CMIA, with project submittals due by January 16 and program adoption by March 1. The regional agencies and Caltrans agreed that 85 percent, or \$850 million, of the \$1 billion available would be targeted for priority improvements in the San Joaquin Valley portion of the corridor, and 15 percent, or \$150 million, would be dedicated to improvements in the Sacramento Valley. In both sections of the corridor, priority projects will be consistent with *The State Route 99 Business Plan Element of the Master Plan* and *The Route 70/99 Corridor Business Plan*.

The STIP and SHOPP augmentations will follow established guidelines and procedures for those programs. However, the Commission assumes that the bond funds designated for those programs will be fully available for allocation beginning with the 2007-08 fiscal year. For this STIP augmentation the Commission intends to exercise a fair amount of discretion within the parameters of the STIP formulae. The SHOPP augmentation will require coordination between Caltrans and the Commission to ensure that funds are invested strategically and for maximum benefit and delivery.

All told, the Commission's view is that a sizable budget appropriation request is warranted as part of the 2007-08 budget process, not only for the programs within the purview of the Commission but also for the transit capital and local road elements of the bond package.

Pursuing Stable State Transportation Financing

Notwithstanding the substantial and welcome shots in the arm that Propositions 1A and 1B provide, transportation in California still needs a stable revenue source to fund existing capital programs. The gas tax, both the state and federal portions, is no longer adequate to meet all the major capital needs in transportation. With the 2006 STIP, and now with the bond proceeds from Proposition 1B, transportation is dependent on General Fund dollars to pay for capacity enhancing projects. Reliance on the General Fund means reliance on the annual state budget process.

At this point, it is unclear what ramifications this situation has on the development and implementation of a multi-year capital program. However, if recent history is any guide, the Commission will need to be prepared to alter its allocation strategy depending on the funds available through appropriation.

An added impetus to reestablish a dedicated, special funding source is that the Federal Highway Trust Fund will likely not have enough resources to meet all of its obligations by the end of the decade. This will be a driving force behind the next round of federal transportation reauthorization coming in 2009.

The Commission suggests that the Legislature consider convening a Blue Ribbon Commission on Future Transportation Funding Needs to examine the options for enhancing transportation revenues and to consider additional ways to raise revenues, especially in light of the Legislature's and administration's support for alternative fuel vehicles. Alternative fuels are either not presently assessed any fees or taxes, like gasoline and diesel are, or they are assessed a lower tax, and the Commission thinks this mismatch raises issues of equity that the Legislature should address.

Meeting the Rehabilitation and Maintenance Needs of the State Highway System

As has been pointed above, California is under-investing in the rehabilitation and maintenance needs of the state highway system. The state's gas tax can now only cover between fifty and sixty percent of the annual rehabilitation need in the SHOPP, rapidly increasing the number of distressed lane miles on the system. In 2001-02, the amount of distressed lanes miles was approximately 10,400. The number in 2005-06 was more than 13,800. Caltrans estimates that every dollar of preventative maintenance saves six dollars in rehabilitation and twenty dollars in major reconstruction costs. This under-investment is unsafe and has led to California having the second worst road conditions in the nation. Californians pay an estimated \$500 per vehicle on repairs because of our poor road conditions.

Pavement rehabilitation is not the only area of the SHOPP in need of increased funding. Safety, mobility, safety roadside rest stops, landscaping, mandates (such as storm water run-off) all need significantly enhanced funding to meet the state's needs.

Although Caltrans will be presenting a 2007 Ten-Year SHOPP to the Commission for its approval, the Commission finds the massive rehabilitation needs requires immediate attention. To that end, the Commission would suggest that the Legislature and the administration consider the following funding strategies for the 2007-08 fiscal year.

- Pursue Grant Anticipation Revenue Notes (GARVEE Bonds) to bring forward up federal transportation funds that could be targeted to the state's top SHOPP pavement rehabilitation and safety needs.
- Program a 2006 SHOPP augmentation with the \$500 million in dedicated SHOPP funding in Proposition 1B. When combined with the GARVEE strategy above and the proposed \$1.9 billion in regular SHOPP funding for 2007-08, Caltrans could have more than \$4 billion in resources available.
- Evaluate the possibility of converting unprogrammed Public Transportation Account (PTA) capacity into near-term SHOPP funding. Given the current lack of suitable transit capital projects to absorb PTA funding, the unprogrammed capacity could be tapped to supplement the \$4 billion cited above.

The tremendous SHOPP needs are matched by equally large and important rehabilitation and maintenance needs at the city and county levels. The historic and

chronic under-investment in transportation has created a situation in California in which neither capacity nor maintenance needs can adequately be met at all levels of government. The rehabilitation needs underscore the need for stable, dedicated transportation funding that grows with economic activity and transportation use.

Creating Public-Private Partnerships in Transportation in California

Much was made in 2006 about the need for California to adopt up-to-date public-private partnership powers. The passage of Assembly Bill (AB) 680 in 1989 (Baker; Chapter 107, Statutes of 1989), which called for four public-private partnership demonstration projects, ignited a fire of public-private partnership legislation in more than 20 states. This fire has overtaken the state's initial attempts, which resulted in the SR 91 Express Lanes in Orange County and the nearly-completed SR 125 toll road in San Diego County. While Texas, Virginia, Florida, Illinois, Indiana, Colorado and many other states embraced public-private partnerships as a key strategy for developing and implementing major transportation projects, California has only now begun to examine public-private partnerships seriously.

The passage of AB 1467 (Nuñez; Chapter 32, Statutes of 2006) signaled the state's willingness to re-enter the public-private partnership fray. The bill calls for four goods—movement related public-private partnership demonstration projects—two in the north and two in the south. The bill also calls for implementation of high-occupancy toll (HOT) lanes around the state. HOT lanes, such as the 91 Express Lanes, enable solo drivers to use a high-occupancy vehicle (HOV) by paying a toll.

The Commission is responsible for implementing AB 1467 and recommending suitable partnerships to the Legislature for its concurrence. AB 521 (Runner; Chapter 107, Statutes of 2006) clarified the way in which the Legislature can consider the partnership proposals, mandating that the Legislature can only disapprove of the proposals. Notwithstanding this change, AB 1467 contains several implementation challenges, the most noticeable of which is the prohibition against auto tolls. Without the ability to toll automobiles, it is unclear whether truck tolls can generate enough revenues to enable truck-only toll lanes to be built.

As a result, the Commission recommends that the Legislature and the administration revisit the public-private partnership issue in 2007. The success of countries and other states with similar political, demographic, environmental, and transportation challenges suggests that the institutional challenges to public-private partnerships can be overcome.

A key threshold question that needs to be answered in the policy debate is where will the funding come from to build the transportation capacity a California with 40 to 45 million people will need. Proposition 1B is a much-needed shot in the arm for transportation funding; however, the resources in Proposition 1B are inadequate to deal with the capacity needs of 2015 and beyond. Based on the experience of other countries and states, gas and sales taxes cannot be raised high enough to meet these needs; tolls and user fees are necessary to pay for the needed mobility.

However, the Commission recognizes that the current political and transportation environment requires developing a new California approach to public-private partnerships. Such an approach might emphasize the need for public-public-private

partnerships in which the State and regional agencies enter into agreements that the private sector implements with appropriate public-sector oversight on toll rates, procurement, and implementation. And, the next iteration of public-private partnership legislation needs to include design-build authority for at least the public-private partnership projects.

Enhancing System Performance Measures and Project Delivery

Proposition 1B affords the Commission and the entire transportation community the opportunity to move away from programming projects to programming benefits that deliver real results for the traveling public.

Caltrans and transportation agencies need to measure these benefits quantitatively, review them periodically, and maintain the benefits over time. Key to system performance measurement is having good, well-maintained monitoring equipment deployed throughout the system. The Commission's emphasis on corridor management plans as part of the CMIA, coupled with the funding in Proposition 1B for intelligent transportation system (ITS) projects, provide the wherewithal to monitor more of the transportation network in real time and to manage congestion so that travelers have mobility choices to deal with ongoing congestion and accidents.

Enhanced system performance measures is a key first step toward incorporating more demand management strategies that will squeeze out even more capacity in constrained corridors.

Programming benefits also means a renewed emphasis on project delivery that values early implementation and project cost savings. Transportation projects are clearly complex undertakings, requiring years to implement. The complexity has increased significantly with the high costs of materials and shortages of available contractors. In 2007, the Legislature and the administration may want to turn attention to ways in which materials and labor can be made more readily available at more stable prices. The administration's efforts in this regard have generated positive momentum that is starting to show results.

Another way to enhance project delivery is for the Legislature to approve design-build legislation. The Commission has long supported design-build, especially for large, complex projects. Design-build is not appropriate for all projects, but generally offers time savings that provide mobility benefits more rapidly than the traditional design-bid-build procurement method.

Investing to Support Goods Movement and Logistics

California is set to embark on the first effort in the nation to dedicate transportation investments toward improving the flow of goods to, from and through the state. Through the TCIF, Proposition 1B provides \$2 billion in funding for the Commission to invest in goods movement projects and strategies that increase capacity, improve throughput, enhance velocity, and contribute to improved air quality.

The economic value of logistics and goods movement to California is immense. The dollar value of the cargo shipped through the Port of Los Angeles and the Port of Long Beach came to nearly \$260 billion in 2005. The value of air cargo at Los Angeles

International Airport and San Francisco International Airport was a combined \$130 billion that year.

A key factor to maintaining the health of the logistics industry in California is improved ground access in and around major goods movement facilities, like ports, airports, and intermodal rail facilities. The growth in logistics activity has enhanced congestion on the major highways, roadways and railways serving these facilities. The ability to now begin addressing the drag that congestion has on the velocity and throughput of goods in California can not only enhance the state's economic prospects but can improve the overall mobility picture, especially in the key urban areas.

The growth in logistics activity has also contributed to increased concentrations of poor air quality in, and around, major goods movement facilities. In recognition of the twin challenges of congestion and air quality, the administration launched an effort in 2005 to develop a Goods Movement Action Plan that proposes policy options and strategies for improving ground access while at the same time improving air quality. This Plan has been submitted to the Commission and will be a key factor in the Commission's efforts to develop guidelines and criteria for implementing the TCIF. The Commission will also consider the recommendations of the Legislature's California Marine and Intermodal Transportation System Advisory Council report, as well as regional agency planning efforts—including the joint Clean Air Plan of the Port of Los Angeles and the Port of Long Beach.

The Commission will be convening a TCIF guideline and criteria work group in early January. It is Commission staff's intent to have guidelines before the Commission in the spring for consideration. The Commission will need to maintain close coordination with the Legislature on several key policy areas involved in implementing the TCIF, such as:

- The role and types of private-sector funding match for TCIF dollars. The TCIF requires at least a one-to-one match and much discussion has occurred over what types of funding would be appropriate and feasible, from truck tolls to container fees. Sorting out what funding would be suitable may fall to the Legislature to decide.
- The coordination of infrastructure investments with emission reduction investments. The opportunity exists to target air emission reduction strategies that complement corridor-level capacity investments. It is the Commission's view that the administration and the Legislature should provide direction to the responsible agencies that takes advantage of this opportunity.
- The appropriate roles for the public and private sectors in developing, funding and implementing TCIF projects and strategies. The Commission will now be interacting with ports, railroads, and other business interests in a new way. The ability to invest a public dollar to gain public benefit, while being matched or leveraged by a private dollar for private benefit, should be thought through carefully.

Preparing for the Next Round of Federal Transportation Reauthorization

The passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) last year established what California can expect in terms of federal transportation funding and policy direction from 2005 to 2009. A sobering expectation is that the Federal Highway Trust Fund will not have sufficient resources to meet all of its obligations by the end of the current reauthorization period. For a large donor state like California the uncertainty of federal funding at the end of the decade places additional pressure on how the Commission, Caltrans and regional agencies plan, program and implement projects across all the programs—both the existing programs and the new Proposition 1B programs.

As federal funding becomes more constrained, it is not necessarily the case that state funding will be able to make up the difference, even with the massive infusion that Proposition 1B provides. During the SAFETEA-LU deliberations California transportation interests spoke with one voice, which helped the state overall. With the next round of reauthorization just around the corner, it is vital that the state's transportation interests speak with one voice again. The passage of Proposition 1B and the protection of Proposition 42 under Proposition 1A demonstrate what the state's voters are willing to do to address the state's transportation needs. The passage of sales tax measures for transportation demonstrate what voters at the county level are willing to do. A key part of the California message ought to be that the federal government needs to fund its share, especially in the goods movement area.

To help guide the development of new revenue options, Congress and the Bush administration created the National Surface Transportation Policy and Revenue Study Commission. The hearings this Commission will have in California, as well as its overall deliberations, are an opportunity for California to present a unified position, one that is an extension of the unified position the transportation community took in supporting the passage of Propositions 1A and 1B. From the CTC's perspective, maintaining a consistent approach to improving the state's funding picture, while implementing Proposition 1B expeditiously, is the best game plan for success at the federal level. The continuing support of the Legislature of this unified position is an important element of the federal game plan.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***Expanded Use of Public Private Partnerships Will Accelerate the
Development of Transportation Infrastructure and Reduce Pressure on
Public Finance***

Bay Area Economic Forum

Author: R. Sean Randolph

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



A Partnership of the Association
of Bay Area Governments
and the Bay Area Council

Submission to Surface Transportation Policy and Revenue Study
Commission
Los Angeles, California Hearing
February 21-22, 2007

R. Sean Randolph
President & CEO
Bay Area Economic Forum
201 California Street, Suite 1450
San Francisco, CA 94111
(415) 981-7117, sean@bayeconfor.org

**EXPANDED USE OF PUBLIC-PRIVATE PARTNERSHIPS WILL
ACCELERATE THE DEVELOPMENT OF TRANSPORTATION
INFRASTRUCTURE AND REDUCE PRESSUR ON PUBLIC FINANCE**

This white paper is presented to the Commission in executive summary format, to reflect the findings of a report released by the Bay Area Economic Forum in June 2006, *Investing in California's Infrastructure: How to Ensure Value for Money and Protect California's Competitive Position in the National and Global Economy*. Full detail on the report and its recommendations is available on request from the Bay Area Economic Forum or can be downloaded from its website at www.bayeconfor.org.

Over the last 45 years the State of California has invested an average of 2.5% per year of gross state product in infrastructure. Despite the passage of the largest bond package in the state's history in November 2006 (\$37 billion), a large gap remains between the funding available and the magnitude of the state's infrastructure needs. To meet the historical 2.5% level of investment, the state would need to spend \$527 billion over ten years. As California's overall level of indebtedness approaches the limits considered prudent by the investment community, debt funding threatens to crowd out other priorities, including the ability to issue future bonds for long-term infrastructure development and other projects. California's infrastructure needs and its fiscal limitations therefore require new, more creative methods of infrastructure funding.

At one level this calls for a multi-year infrastructure investment plan, and multi-year life cycle planning for infrastructure investment. As a financing mechanism for infrastructure projects, the experience of the United Kingdom with Public Private Partnerships (PPP) and Private Finance (PI) across a range of projects and sectors shows the potential for net savings of 15%-30% of a project's life cycle cost. The UK offers a relevant model because its economy is approximately the size of California's, its level of development is comparable, and the UK and California share a broad range of similar social values including environmental protection and labor rights. The UK experience, documented over fifteen years,

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Forum was founded in 1988
to promote the economic vitality
of the Bay Area. It is governed by
leaders in business, government,
labor, higher education
and the community.*

E-mail
info@bayeconfor.org

201 California Street
Suite 1450
San Francisco, CA 94111
(415) 981-7117
Fax (415) 981-6408

illustrates what has worked and what hasn't using this financing methodology. The success of the model developed in the UK is reflected in the fact that it has been supported and sustained throughout this period by a succession of both Conservative and Labor governments, and enjoys broad support within both the business and organized labor communities. Similar results are being obtained from similar processes in countries throughout the world and over 28 states in the U.S. now have policies in place a number of which far exceed California's, leaving California at a comparative disadvantage in the financing available for public infrastructure and in the efficiency with which its available public funds are deployed.

A particularly promising funding method for California would combine the purchase of infrastructure from the private sector with the purchase of private sector services, in which the private sector designs, finances, builds and operates facilities (DBFO), under output specifications determined by public sector managers. To be effective such projects have to transfer risk from the public to the private sector and achieve significant improvements in project timing, productivity and financing. As a general rule such PPP contracts should also be based on output specifications (in which threshold objectives are specified, but the means for best achieving them are left to the private sector bidders) set by government managers, as opposed to input specifications (in which public managers specify in advance the structure and detail of project delivery).

While it may be appropriate for many projects, not all public infrastructure projects lend themselves to public-private partnerships. Methods to determine the specific appropriateness of any given project for a PPP (as opposed to a purely public project) have been developed and tested in the UK, specifically the Public-Private Comparator, which creates a transparent series of decision-making gateways that must be used by government decision makers to determine the appropriateness of each project for private vs. conventional public finance. All major public infrastructure projects in the UK must document that the Public-Private Comparator has been applied.

Effective deployment of this methodology requires preparation, improved levels of accountability, and a significant change in culture within the government agencies responsible for its administration. Appropriate application of this methodology, however, offers the opportunity to achieve a 15%-30% in costs over a project's life cycle, principally by accelerating the pace of product delivery. Given the magnitude of California's infrastructure needs, particularly in transportation, limits on the state's ability to prudently borrow, and the internationally proven efficacy of this model, public-private partnerships using the privately finance DBFO model offers an important and increasingly necessary option to accelerate the development of critical infrastructure and conserve limited public resources.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
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Expanding Use of Tolls for Funding Border Infrastructure

San Diego Association of Governments

Author: Gary Gallegos

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Surface Transportation Policy and Revenue Study Commission
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Author: Mr. Gary Gallegos, Executive Director
San Diego Association of Governments (SANDAG)
401 B Street, Suite 800, San Diego, CA 92101
619-699-1990
gga@sandag.org

Expanding Use of Tolls for Funding Border Infrastructure

Executive Summary:

Border regions face the challenge of balancing security and the efficient movement of people and goods through the international ports of entry. Over time, delays at the border have increased and become more unpredictable. Inadequate infrastructure capacity at the border crossings between the San Diego region and Baja California currently creates traffic congestion and delays for cross-border personal trips and freight movements that cost the U.S. and Mexican economies an estimated \$6 billion in gross output and more than 51,000 jobs in 2005. Two-hour or longer delays in freight movement at the Otay Mesa – Mesa de Otay Port of Entry (POE) are significantly impacting productivity, industry competitiveness, and lost business income at the regional, state, and national level.

To avoid further economic losses, it is becoming increasingly important to evaluate the feasibility of funding border transportation infrastructure through public-private partnerships. On behalf of Caltrans, SANDAG conducted a study to assess whether the East Otay Mesa POE - a proposed border crossing between San Diego and Tijuana - and State Route 11 could be financed as toll facilities. This analysis concluded that the State Route (SR) 11 toll road is a potentially good investment provided that there are sufficient external resources to cover the capital and operations and maintenance costs of the East Otay Mesa POE. Some level of public participation would be needed to attract sufficient private capital to finance construction and management of the border crossing.

An alternative for addressing shortfalls of traditional funding sources for POE infrastructure and operations as well as for transportation facilities serving POEs is to expand the use of tolls to fund border infrastructure and pursue a public-private partnership for the East Otay Mesa POE and SR 11 project.

Background Information

Ports of Entry: Gateways to Global Competitiveness

The land-based ports of entry linking California and Baja California are gateways to a growing economic relationship between the United States and Mexico. Mexico is the United States' second-largest trading partner, after Canada. In 2006, the United States traded \$307 billion in goods with Mexico, and the increase in bilateral trade is expected to continue. Mexico also is California's number one export market, with exports reaching \$17.7 billion in 2005.

In 2005, the Otay Mesa-Mesa de Otay Port of Entry (POE) handled \$24.4 billion worth of goods in both directions, transported in more than 1.4 million trucks. The Otay Mesa commercial POE ranks first California and third along the entire U.S.-Mexico border in terms of trade value.

However, delays at the San Diego-Baja California POEs for freight movements and crossborder personal travel have increased and have become more unpredictable. Wait times at the border are a result of growth in crossborder travel and transportation infrastructure that has failed to keep pace with this growth, coupled with stricter security screenings. These delays were estimated to cost the California economy \$6 billion in lost output and a loss of more than 51,000 jobs in 2005. Both output and job losses are projected to more than double in the next ten years, if no steps are taken to improve border crossing, and transportation infrastructure and management.¹

Trade is the fastest expanding component of the San Diego regional economy. Two-hour or longer delays in freight movement at the Otay Mesa POE are significantly impacting productivity, industry competitiveness, and lost business income at the regional, state, and national level. Lengthy wait times also discourage personal trips, which cross predominantly at the San Ysidro-Puerta México POE. San Ysidro is the busiest passenger border crossing along the United States-Mexico border. In fact, it is reported to be the busiest land port of entry in the world.

To address the need for expanded crossborder travel capacity, Caltrans and SANDAG, in collaboration with other governmental agencies on both sides of the border, are working towards the implementation of a new POE about two miles east of the Otay Mesa-Mesa de Otay border crossing. The proposed State Route (SR) 11 would link the new East Otay Mesa-Otay II POE to SR 905 and SR 125 (the South Bay Expressway) — a privately-funded toll road scheduled to open in mid-2007. In Mexico, the Otay II border station would connect to the Tijuana-Tecate toll road and the 28-mile Tijuana-Rosarito Corridor, which opened to traffic in 2006.

Financing Concept: Developing a Revenue Source through Tolls or Fees

In today's global economy, there is a growing opportunity cost of waiting for traditional federal and state funding to build needed POE and transportation infrastructure. To avoid further economic losses at the regional, state, and national levels, it is becoming increasingly important to evaluate the East Otay Mesa POE and SR 11 as a public-private partnership.

¹ SANDAG, *Economic Impacts of Wait Times at the San Diego-Baja California Border*, 2006

Tolls and users fees have the potential to fund the necessary infrastructure for a new border crossing. In turn, users would benefit by crossing the border faster and with enhanced security. This approach would avoid competition for scarce public funding with other regional or border transportation investment priorities while ensuring timely implementation of this necessary investment. The tolls and/or fees would provide a revenue stream that could be bonded against to provide the necessary funds to construct and operate the new border crossing much sooner than if relying on traditional federal and state sources.

On behalf of Caltrans, SANDAG conducted a financial feasibility analysis to assess the viability of using tolls and/or fees to establish a revenue stream that would cover the East Otay Mesa POE and SR 11 project costs, including the ability of the project to attract capital (debt or private equity) at a reasonable cost. HDR-HLB Decisions Economics was retained to perform this assessment.²

Toll Feasibility Findings

Traffic, revenue, cost, and financial risk models were developed for the SR 11 and East Otay Mesa POE financial feasibility analysis. A peer review panel evaluated the models, verified data accuracy, and assessed whether assumptions were reasonable. Participants included local, state, and federal government agencies in the United States and Mexico, and universities from both sides of the border.

The main conclusion of the analysis is that the SR 11 toll road is a potentially good investment provided that there are sufficient external resources to cover the capital and Operations and Maintenance (O&M) costs of the East Otay Mesa POE. However, SR 11 cannot be considered without the East Otay Mesa POE. Accordingly, public participation would be necessary to attract sufficient private capital to finance construction and management of the East Otay Mesa POE. A grant or other financing mechanism with back-loaded debt service/repayments would be needed (possibly a low-interest loan from the Transportation Infrastructure Finance and Innovation Act or TIFIA).

Strengths, weaknesses, and an assessment of the investor market can be summarized as follows:

Strengths

- The East Otay Mesa POE and SR 11 would be an alternative border crossing to increasingly congested facilities at Otay Mesa and San Ysidro.
- New facilities would offer dramatic travel time savings for users.
- Travelers continuing to use the free POEs would experience small reductions in wait times that when combined, would amount to a sizable public benefit.
- Over the next several decades, population growth in the region, especially in Mexico, would lead to success of the toll facilities.

Weaknesses

² SANDAG, *State Route 11 Toll Road and East Otay Mesa Port of Entry Financial Feasibility Study*, 2006.

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- Estimated construction and operational costs for SR 11 and the East Otay Mesa POE are quite expensive.
- As with most toll road start-ups, a financing plan with relatively low obligations in early years of operations would be needed to be viable.

Investor Market Assessment

- Analysis reveals that to cover the capital and O&M cost of SR 11 with toll revenues, \$50 million in external funds would be needed. Both SR 11 and the East Otay Mesa POE would require \$400 million in external funds to pay for construction costs.
- Integration with the Mexican toll road would lower the total cost burden due to increased diversion from the Tecate POE.

Alternatives and/or Recommendations:

Crossborder travel demand between the San Diego region and Baja California continues to grow while border crossing and transportation infrastructure remains fixed, creating longer delays and greater economic losses. Governmental agencies and businesses on both sides of the border believe the San Diego-Tijuana region may be facing the last opportunity to build a new POE that would reduce delays and improve both the economy and security. Rapid growth in the City of Tijuana has left only one vacant area adjacent to the international border where a POE could be located, and the City of Tijuana has taken steps to restrict its land use for a future POE.

Recommendations

- Pursue a public-private partnership to attract private capital and expedite the implementation of the East Otay Mesa POE and SR 11.
- Work with Congressional and state delegations to obtain the necessary approvals to charge tolls and/or fees the new border crossing and SR 11.
- Conduct a more complete financial analysis to explore the potential of non-toll revenues to make up revenue short falls, especially in POE O&M costs. Also, explore with U.S. Customs and Border Protection (CBP) a shared approach to cover the East Otay Mesa POE O&M costs to ensure premium service.
- Obtain a Presidential Permit from the federal government for the East Otay Mesa POE.



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COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***Introduction Material from the OCTA Comprehensive Annual Financial
Report for Fiscal Year Ended June 30, 2006***

Orange County Transportation Authority

Author: Arthur Leahy

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

**INTRODUCTION MATERIAL FROM THE
OCTA COMPREHENSIVE ANNUAL
FINANCIAL REPORT FOR FISCAL YEAR
ENDED JUNE 30, 2006**



AFFILIATED AGENCIES

Orange County
Transit District

Local Transportation
Authority

Service Authority for
Freeway Emergencies

Consolidated Transportation
Service Agency

Congestion Management
Agency

Service Authority for
Abandoned Vehicles

November 7, 2006

The Board of Directors
Orange County Transportation Authority
550 South Main Street
Orange, CA 92863

State law requires the Orange County Transportation Authority (OCTA) to publish within six months of the close of the fiscal year a complete set of financial statements presented in conformity with accounting principles generally accepted in the United States (GAAP) and audited in accordance with auditing standards generally accepted in the United States by independent certified public accountants. Pursuant to that requirement, we hereby issue the Comprehensive Annual Financial Report (CAFR) of OCTA for the fiscal year ended June 30, 2006.

This report consists of management's representations concerning the finances of OCTA. Consequently, management assumes full responsibility for the completeness and reliability of all information presented in this report. To provide a reasonable basis for making these representations, OCTA management has established a system of comprehensive internal controls designed both to protect OCTA's assets from loss, theft or misuse, and to compile sufficient reliable information for the preparation of OCTA's financial statements in conformity with GAAP. Because the cost of internal control should not outweigh its benefits, OCTA's comprehensive framework of internal control has been designed to provide reasonable rather than absolute assurance that the financial statements will be free from material misstatement. As management, we assert that, to the best of our knowledge and belief, this financial report is complete and reliable in all material respects. The enclosed data presents the financial position and results of operations of OCTA on a government-wide and fund basis. All disclosures necessary to enable the reader to gain an understanding of OCTA's financial activities have been included.

OCTA's financial statements have been audited by Macias Gini & O'Connell LLP. The goal of the independent audit was to provide reasonable assurance that the financial statements of OCTA for the fiscal year ended June 30, 2006, are free of material misstatement. The independent audit involved examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; assessing the accounting principles used and significant estimates made by management; and evaluating the

overall financial statement presentation. Macias Gini & O'Connell LLP concluded, based upon the audit, that there was a reasonable basis for rendering an unqualified opinion that OCTA's financial statements for the fiscal year ended June 30, 2006, are fairly presented in conformity with GAAP. The independent auditor's report is presented as the first component of the financial section of this report.

The independent audit of the financial statements of OCTA was part of a broader, federally mandated Single Audit designed to meet the special needs of federal grantor agencies. The standards governing Single Audit engagements require the independent auditor to report not only on the fair presentation of the financial statements in accordance with GAAP, but also on the government's internal control and compliance with legal requirements, with a special emphasis on internal control and legal requirements involving the administration of federal awards in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States. These reports are available in OCTA's separately issued Single Audit report.

GAAP requires that management provide a narrative introduction, overview and analysis to accompany the basic financial statements in the form of Management's Discussion and Analysis (MD&A). This letter of transmittal is designed to complement MD&A and should be read in conjunction with it. OCTA's MD&A can be found immediately following the report of the independent auditors.

This Comprehensive Annual Financial Report is presented in three sections:

- **Introductory:** Including the letter of transmittal, organization charts and information, and financial reporting awards.
- **Financial:** Including the independent auditor's report, the basic financial statements with accompanying notes, required supplementary information including the MD&A, and other supplementary information related to combining fund statements and schedules.
- **Statistical:** Including selected financial and nonfinancial data relating to OCTA on a multiple-year basis, as well as demographic information relating to the County of Orange, California (County), where OCTA provides transportation planning and services.

Profile of OCTA

OCTA was established by state law and began serving the public on June 20, 1991. An 18-member Board of Directors (Board) governs OCTA and consists of five members of the Orange County Board of Supervisors, 10 city representatives selected by all of the cities within the County, two public members selected by the other 15 Board Members, and a representative appointed by the Governor of California serving in a non-voting capacity. A Chief Executive Officer manages OCTA and acts in accordance with the directions, goals and policies approved by the Board.

OCTA provides coordinated, efficient, and accountable transportation planning and services within Orange County. Former agencies and funds which were consolidated to form OCTA include: the Orange County Transportation Commission, the Orange County Transit District (OCTD), the Consolidated Transportation Services Agency, the Orange County Local Transportation Authority (OCLTA), the Orange County Service Authority for Freeway Emergencies (SAFE), the Orange County Congestion Management Agency, the Orange County Service Authority for Abandoned Vehicles (SAAV), the State Transit Assistance Fund, the Local Transportation Fund, the Orange County Unified Transportation Trust (OCUTT), and the Transit Development Reserve. On January 3, 2003, OCTA began operating the 91 Express Lanes, a toll facility on a 10-mile segment of the Riverside Freeway (SR-91) between the Riverside/Orange County Line and the Costa Mesa Freeway (SR-55).

Establishment of the consolidated transportation authority has saved County taxpayers tens of millions of dollars through increased efficiency and elimination of duplicative efforts. At the same time, service and investment in transportation have increased, providing the County with a progressive, effective, and comprehensive transportation system. OCTA has seven primary service programs that support the transportation system in Orange County: bus operations, commuter rail, Measure M, bus rapid transit, 91 Express Lanes, planning and capital projects, and motorist and other services.

OCTA accounts for its operations by using separate funds to manage and report all financial activities of its many programs. The general fund finances most of the administrative and planning functions of OCTA, and includes the Finance, Administration, and Human Resources; Development; Labor Relations & Civil Rights; and External Affairs divisions as well as the Chief Executive Officer's Executive Office, Clerk of the Board, and Internal Audit Department. Special revenue and capital projects funds are used to account for many of OCTA's revenue sources restricted by law or Board policy. A debt service fund is used to account for debt service activities related to OCLTA's sales tax revenue bonds. Enterprise funds are used to account for operations of the

OCTD, 91 Express Lanes and Orange County Taxicab Administration Program (OCTAP).

Revenue sources consist primarily of sales tax apportionments, farebox collections, tolls and related fees, gasoline sales tax, interest income, federal capital and operating assistance grants, state grants, property taxes, and vehicle registration fees. On November 6, 1990, the voters of Orange County passed Measure M, which provided for a local transactions and use tax of 1/2 percent for 20 years to pay for a wide variety of freeway, road and transit improvements in the County. A 1/4 percent sales tax, as outlined in state law, provides operating assistance for transit service, as well as a small percentage for planning and administrative support. Over the next five years, \$38 million from this source will be diverted annually to the County; however, over the next seven years, OCTA will be receiving \$23 million of the County of Orange share of gas tax revenue annually from the State of California in exchange for these diverted funds. The diverted money will be used by the County as part of its bankruptcy recovery effort. OCTA also receives 5.88 percent of total statewide receipts for sales and use taxes on gasoline and diesel fuel.

Every year, OCTA develops its staffing, operating, and capital plans for the upcoming fiscal year. The product of this effort is the fiscal year budget. The budget outlines the expected funding sources and uses of funds that represent OCTA's year-long commitment to transportation projects and services. The budget also presents the projected fund balance for all funds that encompass OCTA. The budget is recorded in OCTA's accounting system, where it is compared with actual performance. Staff ensures that the budget is adopted by the Board of Directors before the beginning of each fiscal year. During the fiscal year, all major budget revisions and updates are presented to the Board for consideration and adoption.

Once adopted, staff ensures that the Board is kept well informed of budget versus actual performance. Budget control is accomplished through the following means:

- On a monthly basis, staff reviews actual monthly and year-to-date performance against the budget and provides a forecast for the remainder of the fiscal year. As part of this review, all materially significant variances and revisions are explained.
- On a quarterly basis, as part of the Board's regular agenda, staff reports OCTA's financial results in the Quarterly Budget Status Report. This report compares actual quarterly and year-to-date performance to budget in the areas of revenue, staffing, operating and capital expenditures. The quarterly budget status report for the fourth quarter summarizes the full year's performance against the approved budget.

OCTA monitors its long-term financial condition by updating a 20-year Comprehensive Business Plan (CBP) each year. The CBP is a business-planning tool designed to assist the OCTA in implementing its strategic goals and objectives. The CBP encapsulates OCTA's programs and outlines goals and objectives over the next 20 years, as articulated by the Board of Directors. Through the use of financial modeling and divisional input and review, a comprehensive study of economic influences and programmatic needs and objectives are incorporated into a business-planning document. The CBP validates the feasibility of proposed program and service levels, anticipates a variable economic environment, and identifies and proposes policy direction. The CBP is an evolving document that is updated annually in response to the ever-changing social, political, and economic environment. The CBP lays the foundation for the annual budget process.

The CBP projects service and capital requirements for the bus system. To ensure that adequate funds are available for future capital purchases, OCTA has set up a fixed asset reserve. Funds are deposited each year in the fixed asset reserve and withdrawn when necessary. Major cost drivers that could hinder the ability to provide increased levels of bus service in the future include changes in fuel prices, health care premiums, retirement rates, workers' compensation costs, and demand for federally-mandated service for persons with disabilities.

Other programs, such as commuter rail service and Freeway Service Patrol services, offered by OCTA are anticipated to have serious funding shortfalls within five to ten years unless another funding source is identified. Currently, both of these programs are included in the renewed Measure M Ordinance, a proposal to extend for 30 years a 1/2 cent local sales tax for transportation purposes. If the renewed Measure M Ordinance is passed by the voters, both of these programs would receive necessary funding to continue and expand service in 2011.

Factors Affecting Financial Condition

The information presented in the financial statements is perhaps best understood when it is considered from the broader perspective of the specific environment within which OCTA operates.

Orange County Economy

Orange County's diverse economy has had steady positive growth over the last several years. Traditional indicators point to a relatively stable regional economy over the next five years. OCTA continuously monitors changes in the economy because of the potential impact on future sales tax receipts and other revenues vital to the organization.

During 2005, Orange County has experienced employment growth of 2.3 percent. Recent forecasts for calendar year 2006 estimate growth of 1.7 percent. Six major industries account for approximately 85 percent of all jobs in the County: 43.6 percent services, 10.5 percent retail trade, 9.6 percent state and local government, 9.2 percent financial activities, 6.9 percent construction, and 5.5 percent wholesale trade. The remaining 15 percent consists of non-durable goods, durable goods, high technology, transportation and public utilities, and mineral extraction. Estimated employment within Orange County is 1.52 million workers for the calendar year 2006.

Economic projections on a national level indicate continued low unemployment and inflation rates. At the local level, the Orange County economy is projected to remain relatively stable.

Orange County's residents' personal income has grown from \$112 billion in 2002 to an estimated \$142 billion in calendar year 2006. Although the value of building permits is expected to remain steady at \$3.5 billion over the same period, projections point to a decline to \$3.2 billion in 2007. The change in the value of building permits in the County exemplifies the slowdown in housing starts, which will place downward pressure on the construction sector.

Summary of OCTA Activities and Services

2005 Outstanding Public Transportation System Achievement Award—The American Public Transportation Association (APTA) presented its 2005 Outstanding Public Transportation System Achievement Award to OCTA. The award honors an APTA public transportation system member demonstrating achievement in efficiency and effectiveness based on verifiable data concerning bus and paratransit performance for a consecutive three-year period and specific achievements in safety, operations, customer service, financial management, marketing, and community relations. OCTA was chosen over transportation systems in New York City, Chicago, San Francisco, and Portland to receive this prestigious award.

Bus Transit—The County's population continues to grow and currently numbers more than three million. This rapid growth places renewed importance on improving the County's public transit system and the mobility it provides residents. By the end of fiscal year 2006, more than 67.7 million passengers boarded OCTA buses, the highest ridership in the history of the agency. APTA ranked OCTA as the public transportation system with the 10th highest ridership in the United States (U.S.) during calendar year 2005. This growing ridership reflects the continuing success of OCTA's "Putting Customers First" program. Since much of OCTA's ridership is transit dependent, the continuous improvement of local bus service plays a vital role in the County's economy.

OCTA aggressively marketed its local bus service to youths and senior citizens, two very important discretionary ridership audiences. To capture the growing youth segment, OCTA developed the Youth Summer Saver Bus Pass. With the theme, "Be There. Do That," the program encourages youths age 18 and younger to use public transportation during the summer months. The Youth Summer Saver Bus Pass also acted as a discount card good at over 80 popular County destinations.

In September 2004, OCTA inaugurated the "youthNmotion" program, a partnership effort with local schools and youth organizations to encourage youth bus ridership. Now in its second year, OCTA continued conducting lively interactive presentations at schools and youth clubs demonstrating how easy it is to ride the bus. More than 15,236 youths age 11 to 16 participated in the program.

OCTA's outreach program for senior citizens entitled, "Be There," entered its second year. Through an easy-to-follow brochure and hands-on presentations with a fun trial bus ride at senior centers, OCTA outreach staff demonstrated how easy and economical it is for seniors to get wherever they want to go by bus. During fiscal year 2006, 10,000 seniors were reached through presentations, senior fairs and expositions.

OCTA continued offering its Employer Pass (E-Pass) program. E-Pass, created to foster relationships with the employer community, is an annual bus pass exclusively for employers to make available to their employees. Employees have unlimited use of OCTA buses and employers are charged 60 cents per boarding while the E-Pass is in effect. E-Pass provides employees with a convenient annual swipe card to make boarding the bus easy. During fiscal year 2006, the E-Pass program generated a total of 606,340 boardings.

The University Pass (U-Pass) allows universities to provide growing student enrollments with convenient transportation and ease on-campus parking constraints. With the U-Pass, students, faculty, and staff swipe their validated campus IDs and get unlimited access to OCTA buses while the school is charged 75 cents per boarding up to a maximum of \$30 per month. California State University, Fullerton and the University of California, Irvine—two of the largest campuses in the County—have U-Pass programs in effect. The U-Pass program generated 539,396 boardings during fiscal year 2006.

OCTA continued its College Pass program exclusively for college students, faculty and staff. The program offers two special discounted passes: the Quarter Pass, good for 75 days and the Semester Pass, good for 120 days. With rising gasoline prices and a shortage of parking facilities at many campuses, College Pass affords economical and dependable transportation for students.

The transit infrastructure expanded with the opening in May 2005 of OCTA's fourth bus facility, the Santa Ana Maintenance and Operations Center. This state-of-the-art operations and maintenance facility can accommodate 259 large buses and provides convenient access to many of OCTA's most heavily used bus routes. A compressed natural gas (CNG) fueling system is under construction at the facility capable of fueling over 200 CNG buses scheduled to arrive in March 2007.

91 Express Lanes— During fiscal year 2006, drivers took 14,182,916 trips on the 91 Express Lanes toll road. Traffic volume increased 11.3 percent over the previous year. Yet commuters were able to get where they wanted to go faster and easier.

OCTA achieved these positive results by implementing an innovative congestion management policy. The policy encourages commuters to carpool to reduce the number of vehicles in the lanes, and also motivates them to commute when there is less traffic. OCTA's "Three Ride Free" program allows carpools of three or more to use the high occupancy vehicle three plus (HOV3+) lane on the 91 Express Lanes for free during most hours and at a 50 percent discount during high demand times. During fiscal year 2006, HOV3+ trips reached 2,876,345—a 13.8 percent increase over fiscal year 2005.

For 91 Express Lanes customers, the speedy commute gave them a priceless gift of time. According to a June 2006 Customer Satisfaction Survey, users reported saving about 38 minutes per trip in the afternoon by using the toll road.

OCTA's policy of maximizing the number of vehicles that can travel in the 91 Express Lanes continues to demonstrate positive results. Traffic increased in all categories during fiscal year 2006. Full toll trips increased by 10.7 percent and carpools of three or more rose 13.8 percent over the previous year.

Freeway Improvements—Freeway improvements continue to be the cornerstone and most visible component of the Measure M Traffic Improvement and Growth Management Plan approved by County voters in 1990. Since the creation of OCTA, the Board made accelerating freeway construction a top priority to provide transportation relief to motorists as quickly as possible.

While the majority of Measure M freeway improvements are nearly complete, OCTA continues to plan other projects well into the future. This will require OCTA to aggressively seek federal, state and private sector funding of long-term projects. Nevertheless, a number of projects experienced significant progress in the last year including:

San Diego Freeway (I-405): The \$135.8 million project designed to improve traffic flow and safety at the I-405/SR-55 interchange near Costa Mesa, one of the 10 busiest freeway interchanges in the nation, was completed in

September 2005. Access to shopping, business, and entertainment clustered in the South Coast Metro area of Costa Mesa has been improved. The new "braided" configuration eliminated traffic weaving and improved traffic safety for vehicles exiting at Bristol Street from northbound I-405 in relation to motorists traveling southbound on SR-55 connecting to northbound I-405. The final improvement for this area, the addition of an on-ramp to northbound I-405 from Anton Boulevard, was completed and opened on July 5, 2005.

Santa Ana Freeway (I-5): The majority of improvements to the I-5 in Orange County have been completed using Measure M dollars combined with federal and local funding. Construction began in May 2006 to widen the last two miles of I-5 from the Riverside Freeway (SR-91) Interchange up to the Los Angeles County line through the City of Buena Park. Measure M is contributing nearly \$179 million toward the \$314 million project, known as the I-5 Gateway Project. The I-5 Gateway Project will provide travelers on the I-5 with one new carpool and one additional general purpose lane in each direction, as well as auxiliary lanes to make entering and exiting the freeway safer and easier. Completion is scheduled for mid-2010.

Garden Grove Freeway (SR-22): The \$550 million SR-22 improvement project is underway. The project covers approximately 12 miles through the cities of Westminster, Garden Grove, Santa Ana and Orange, and will add carpool lanes, auxiliary lanes and several interchange improvements along the freeway. An elevated connector designed to eliminate weaving will also be added, separating the southbound Orange Freeway (SR-57) connector and The City Drive ramps on the westbound SR-22. OCTA is using the design-build method to improve the SR-22, with a single contract firm for final engineering and construction. By using the design-build process—a first for OCTA and a first in the State of California on an active freeway—the project can be completed more efficiently and save years in the process. The project is scheduled to take 800 days and will be complete in November 2006.

Freeway Chokepoints—A major area of emphasis for OCTA is identifying and improving freeway chokepoint areas throughout Orange County. Chokepoints are freeway bottleneck locations where diverging roadway operations are hampered by unusually heavy weaving and merging. Remedies for chokepoints include the addition of auxiliary lanes between interchanges, interchange or ramp modifications, re-striping and improved signage, as well as the extension of auxiliary lanes through interchanges when warranted by high traffic volumes. The Freeway Chokepoint Program has over 32 projects under development along the I-5, SR-55, SR-57, SR-91, and I-405. The total construction cost estimates to fix all of the bottlenecks exceed \$800 million and will require a blend of federal, state, and local funding.

OCTA and Caltrans, in conjunction with local jurisdictions, are working cooperatively to develop a slate of "shelf-ready" projects that can be brought forward as funding becomes available. Significant progress has been achieved with several projects constructed or advancing to the next stages of development. OCTA has had to overcome issues related to non-compete restrictions and the state budget crisis. Most recently, however, elimination of the toll road non-compete agreement on the SR-91 allowed the completion of four project study reports for chokepoint improvements to the SR-91 corridor along the following locations:

- SR-91 westbound from SR-55 to Tustin Avenue
- SR-91 westbound from SR-57 to I-5
- SR-91 eastbound from SR-241 to Corona Expressway (SR-71)
- SR-91 eastbound/westbound from Eastern Toll Road (SR-241) to Imperial Highway

The improvements under study on the eastbound SR-91 between SR-241 and SR-71 will complement two westbound projects that were completed in spring 2004. This project is now in the Project Report/Environmental Document phase. In addition to the SR-91 improvements, OCTA is developing conceptual improvements to the I-5/SR-55 interchange in central Orange County. Beyond these efforts, OCTA and Caltrans are continuing to develop freeway chokepoint improvement projects at the following locations:

- I-5 southbound at Culver Drive
- I-5 southbound at Oso Parkway
- I-5 southbound at Avenida Pico
- I-5 southbound at Camino Capistrano
- SR-57 northbound from Orangethorpe Avenue to Lambert Road
- SR-57 northbound from Katella Avenue to Lincoln Avenue
- I-405 from Magnolia Avenue to Beach Boulevard

The development work underway focuses on preliminary engineering and environmental analysis to refine these projects for design and construction. Three projects have advanced to the final design phase:

- I-405 from Magnolia Avenue to Beach Boulevard
- I-5 southbound at Culver Drive
- I-5 southbound at Oso Parkway

Major Investment Studies—In addition to the projects listed above, OCTA is conducting several Major Investment Studies (MIS) to improve travel on Orange County freeways.

Central County Corridor Study: After eight months of study and comments from more than a thousand community members, the OCTA Board approved further study of options to improve mobility in central Orange County. The next phase of the Central County Corridor MIS involves a detailed analysis of engineering issues and costs associated with five conceptual alternatives, including arterial street improvements, extension of the SR-57 from the SR-22 to the I-405 along the Santa Ana River riverbed, widening the SR-55, and transit improvements in central Orange County. The new study will get under way in early 2007 and take 12 to 18 months to complete. It will ultimately provide a recommendation for a comprehensive strategy to improve travel in central Orange County. During the study, the public, community leaders, and local officials will have several opportunities to provide comments and input to the study.

The San Diego Freeway (I-405) Study: This major study spanned the I-405 corridor from the San Gabriel River Freeway (I-605) to the Corona del Mar Freeway (SR-73). After soliciting input from the public, elected officials, and business and community leaders, the technical team reviewed the 13 conceptual alternatives for feasibility and cost effectiveness and reduced the number of alternatives to two: a minimal widening option and moderate widening option. In October 2005, the OCTA Board selected Alternative 4 (minimal widening option) as the Locally Preferred Strategy. Alternative 4 adds a general purpose lane in each direction between Brookhurst Street and the I-605. It adds auxiliary lanes, linking an on-ramp to the next off-ramp, in many locations. The next step is to complete a project study report, which is the precursor to an environmental impact report.

South Orange County Major Investment Study: OCTA is focused on developing solutions that will improve mobility in the southern portion of Orange County. The study area extends from just south of the Costa Mesa Freeway (SR-55) to the San Diego County border and from the foothills on the east to the Pacific coast. The first phase of the South Orange County MIS was launched in early 2006 and consists of research to compile traffic data and gathering information from the 14 cities that are stakeholders in the area as well as other involved agencies. From these activities a Purpose and Need Statement will be created to provide a framework for developing conceptual alternatives. Further study will include continued technical analysis and a comprehensive public outreach program to gather additional information about possible transportation solutions. The study is expected to conclude in December 2007 with the selection of a Locally Preferred Strategy that will include varied solutions such as roadway capacity improvements, mass transit and other options.

Riverside County to Orange County Corridor Study: The OCTA and the Riverside County Transportation Commission (RCTC), in partnership with the Foothill/Eastern Transportation Corridor Agency (TCA), joined together to improve mobility between Orange and Riverside counties. The Riverside County — Orange County MIS began in Summer 2004 and consisted of working with the public to identify the key concerns and issues related to improving mobility between the two counties. After 18 months of study, including extensive public outreach, the OCTA and RCTC boards of directors both approved a package of recommendations on moving forward to improve mobility between the two counties. The recommendations included:

- Establish the Riverside Freeway (SR-91) between the Costa Mesa Freeway (SR-55) and the Corona Freeway (I-15) as a priority for improving transportation between Riverside and Orange counties.
 - Emphasize SR-91 improvements between the Foothill/Eastern Transportation Corridor (SR-241) and I-15 first, followed by improvements between SR-55 and SR-241.
- Continue to work with the Foothill/Eastern Transportation Corridor Agency to:
 - Develop a mutually acceptable plan to improve the connection between the SR-241 and SR-91 corridors
 - Accelerate capacity improvements on Eastern Toll Road (SR-133), SR-241 and Eastern Toll Road (SR-261) to optimize their use and improve travel between Riverside and Orange counties.
- Continue to evaluate costs and impacts for a new corridor within the existing Riverside Freeway (SR-91) right-of-way through a preliminary engineering process in cooperation with other agencies.
- Continue to study the technical feasibility of a new corridor concept (between the City of Corona and the City of Irvine) including costs, risks, joint-use opportunities, benefits and potential funding options in cooperation with the OCTA/RCTC, TCA, Metropolitan Water District, and other interested agencies.
- Continue to study Ortega Highway (SR-74), focusing on making operational/safety improvements on SR-74.

Streets and Roads—Local streets and roads provide daily transportation for Orange County's more than three million residents and are a critical component of the County's vast transportation network. There are presently more than 7,200 miles of local streets and roads within Orange County.

OCTA sets priorities and allocates funding to local governments to supplement their programs for maintaining and improving roadways. Projects include the elimination of potholes, rough surfaces and bottlenecks, as well as increasing street and road capacity to improve mobility and reduce traffic congestion throughout the County.

During fiscal year 2006, OCTA allocated approximately \$58 million in Measure M funds to local cities and the County for the improvement and maintenance of local and regional streets and roads, interchanges and intersections. Since the passage of Measure M in 1990, local cities and the County have received more than \$765 million in Measure M revenues.

Paratransit—OCTA operates curb-to-curb paratransit van service for persons with disabilities. This service, known as ACCESS, is mandated by the Americans with Disabilities Act (ADA) and is intended to provide public transit service to persons who are unable to use regular fixed-route buses. ACCESS service requires the completion of an eligibility process to determine the rider's transportation limitations. Demand for ACCESS has continued to grow since its inception in 1993. ACCESS provided 1,147,247 unlinked trips during fiscal year 2006, an increase of 11.5 percent from the previous fiscal year.

In an effort to manage future growth and still provide quality service that meets ADA requirements, OCTA implemented several Paratransit Growth Management strategies to manage paratransit ridership growth. The strategies included: increasing the efficiency of OCTA's ADA paratransit service; educating the disabled community on the value of OCTA's 100 percent accessible fixed route service; creating a more balanced fare structure consistent with ADA requirements; and increasing overall fixed route services for our customers with special needs.

With these strategies, OCTA developed and implemented several effective programs. The Senior Mobility Program, which supplies operating funds and retired vehicles to local cities' senior programs, provided more than 16,500 trips per month to elderly persons. OCTA partnered with the Orange County Office on Aging, cities and senior centers throughout the County to provide special service such as nutrition transportation via contracted taxi providers. OCTA partners with special agencies to transport developmentally disabled adults to and from vocational programs, and also with local senior service agencies to furnish an operating subsidy to transport disabled adults to day care centers. OCTA introduced Reduced Fare IDs that allow paratransit customers to use the

100 percent accessible fixed-route service for only \$0.25. OCTA also initiated the Late Night ACCESS Program by contracting with a taxi company to provide transportation for paratransit customers requiring service between 10 p.m. and 4 a.m.

Commuter Rail (Metrolink)—Commuter rail service is operated by the Southern California Regional Rail Authority (SCRRA) and is popularly known as Metrolink. SCRRA is a joint powers authority formed by transportation agencies in five counties including OCTA. Metrolink serves Orange County with 44 train trips per day along three commuter rail lines:

- Orange County Line with station stops in Oceanside, San Clemente, San Juan Capistrano, Laguna Niguel/Mission Viejo, Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Norwalk/Santa Fe Springs, Commerce and Downtown Los Angeles
- Inland Empire/Orange County (IEOC) Line serving stations in San Bernardino, Riverside Downtown, Riverside-La Sierra, North Main Corona, West Corona, Anaheim Canyon, Orange, Santa Ana, Tustin, Irvine, Laguna Niguel/Mission Viejo, San Juan Capistrano, San Clemente and Oceanside
- 91 Line serving stations in Riverside Downtown, Riverside-La Sierra, North Main Corona, West Corona, Fullerton, Norwalk/Santa Fe Springs, Commerce and Downtown Los Angeles

During fiscal year 2006, total commuter rail ridership for the three lines serving Orange County (including the Metrolink riders on Amtrak) exceeded 3.5 million passengers.

OCTA and the City of Buena Park are in the process adding a new Metrolink station in Buena Park. Groundbreaking took place on December 15, 2005, for the new station, which will be the eleventh Orange County Metrolink station. Located in the City of Buena Park, the new station will serve the surrounding community and offer north Orange County residents an alternate Metrolink stop in addition to the existing station in Fullerton. Construction is scheduled for completion in February 2007.

On Saturday, June 3, OCTA introduced Metrolink Weekends, a new weekend commuter rail service on the Orange County (OC) Line from Oceanside to Los Angeles Union Station. On July 15, Metrolink Weekends service expanded to the Inland Empire-Orange County (IEOC) Line, affording passengers a choice of visiting San Bernardino and the Inland Empire or heading west by train to the beaches of San Clemente and Oceanside. To promote ridership for the new weekend commuter service member agencies agreed to offer 50 percent off the

regular weekday fares through December 31, 2006. In addition, to further encourage weekend ridership, a "Free Station" promotion one weekend day each month will be held at each of the ten Orange County Metrolink stations. The first station promotion was Saturday, June 24, at the Laguna Niguel Station. Approximately 500 people took advantage of the free round-trip ride. On July 29, more than 1,000 people turned out to ride from the Orange Station.

Advanced Transit—As directed by the Board, OCTA staff proposed a five-year program for advanced transit within Orange County. The components of the program include:

- Implementing three bus rapid transit (BRT) projects serving Harbor Boulevard, Westminster/17th Street, and a 28-mile corridor from the Brea Mall to the Irvine Transportation Center.
- Constructing transitway/high occupancy vehicle (HOV) drop ramps to activity centers on the San Diego Freeway (I-405). The 28-mile BRT corridor from the Brea Mall to the Irvine Transportation Center could be enhanced by using the HOV lanes for BRT by constructing drop ramps to the I-405 at Bear Street and Von Karman Avenue. These drop ramps would allow BRT to directly serve John Wayne Airport and activity centers in Costa Mesa and Irvine.
- Adding West and Central Orange County HOV lane connectors to complement the improvements to the Garden Grove Freeway (SR-22). HOV lane connectors at the confluence of the SR-22, I-405 and the San Gabriel Freeway (I-605) would enhance congestion relief, improve mobility and complete a continuous system of HOV lanes that also could be used to link express buses on five freeways.
- Expanding Metrolink service between Laguna Niguel and Fullerton to provide all-day, evening and weekend service within Orange County every 20 to 30 minutes seven days a week.
- Investing in gateways to regional rail by interconnecting Metrolink commuter rail service to future high speed rail lines that would serve distant areas such as the San Francisco Bay Area, Los Angeles, San Diego and Ontario Airport.
- Extending the reach of the Metrolink commuter rail by providing funding to cities to identify ways to make Metrolink more convenient to more people.

Motorist and Other Services—OCTA also facilitates other state and locally funded programs primarily related to motorist services.

Service Authority for Freeway Emergencies (SAFE)—Orange County broke new ground in 1987 when it pioneered a solar-powered cellular technology call box system. During 2003, the entire network was equipped with Text Telephone assistance devices for the hearing impaired. The program is funded by a \$1 per year fee on vehicles registered in Orange County. SAFE now operates and maintains 544 call boxes throughout Orange County after a reduction of 582 call boxes because of the proliferation of cellular phone usage. In fiscal year 2006, 15,600 calls (an average of 1,310 calls per month) were received through the SAFE call box network.

Freeway Service Patrol (FSP)—Orange County's FSP, which consists of a fleet of dedicated tow trucks that patrol the County's vast freeway system, helps to keep freeways flowing freely by removing disabled cars and other physical impediments. By assisting drivers with dead batteries, empty gas tanks, and flat tires, traffic congestion from freeway incidents has been greatly reduced.

FSP is sponsored by SAFE and the California Highway Patrol and is funded by California State Highway funds administered by Caltrans and matching funds from SAFE. This program is part of an overall plan to significantly improve freeway traffic flow and reduce smog caused by stop-and-go congestion. During fiscal year 2006, the FSP program assisted an estimated 70,000 stranded motorists (an average of 5,800 assists per month) on Orange County freeways and public toll roads utilizing 35 tow trucks during peak hours and five tow trucks during midday hours.

Service Authority for Abandoned Vehicles (SAAV)—Established in October 1991, SAAV funds the cost of removing abandoned vehicles from roadsides throughout Orange County. Funded by a \$1 per vehicle registration fee, this program allows the County and its 34 cities to remove unsightly and potentially dangerous vehicles from local Orange County streets and roads. Using SAAV funds for this purpose means that cities do not have to use important law enforcement and code enforcement funds on vehicle removal. During fiscal year 2006, the SAAV program funded the removal of 9,096 abandoned vehicles from Orange County streets.

Orange County Taxicab Administration Program (OCTAP)—California cities are required by law to regulate taxicabs. OCTAP, a regulatory program operated by OCTA, was formed to regulate taxicab companies, drivers, and vehicles on behalf of Orange County's 34 cities as well as the County. OCTAP began operation in January 1998. The service is funded by fees paid by taxicab drivers and operators, requiring no tax subsidies. Prior to

OCTAP, each taxicab company and its affiliated drivers had to follow a variety of rules and regulations established by each of the cities in which they operated. This made the task of ensuring compliance with taxicab rules and regulations difficult and time consuming. OCTAP was established to alleviate the administrative burden from local cities, centralize the issuance of permits to taxicab companies and drivers, and eliminate duplication of efforts. Enforcement is conducted by local police departments. All 34 cities in Orange County and the County itself have now joined the program, ensuring added efficiency and effectiveness for local governments countywide. By the end of fiscal year 2006, OCTAP was responsible for the permitting of 20 taxi companies, 675 taxicabs and 1,003 taxi drivers.

Cash Management—OCTA's Treasury/Public Finance Department contracts with several private sector investment management firms to manage the majority of OCTA's cash assets. Separate investment accounts are maintained for the proceeds and the interest earnings from each of OCTA's debt issues. The remainder of OCTA's cash and investments are maintained in commingled accounts, with interest earnings allocated to the respective funds and accounts based on daily dollar average balances.

Each of the investment manager's accounts is monitored on a daily basis by the Treasury/Public Finance Department to ensure compliance with OCTA's investment policy. The investment policy has been adopted by OCTA's Board of Directors and is approved annually to ensure that it complies with all applicable laws and regulations and that the policy meets OCTA's foremost investment objective: safeguarding of principal.

OCTA maintains commercial checking accounts at Bank of the West for the purposes of issuing payroll and general accounts payable. The bank collateralizes all balances over the \$100,000 covered by the Federal Deposit Insurance Corporation with a pooled collateral account held by the financial institution's trust department in OCTA's name.

The Treasury/Public Finance Department prepares monthly reports for presentation to the Finance and Administration Committee of the Board and quarterly reports for the Board. These reports review compliance with OCTA's investment policy, as well as the overall performance of OCTA's investment portfolio.

Debt Administration—As of June 30, 2006, OCTA's outstanding debt consisting of bonds, commercial paper notes, certificates of participation, and capital leases was \$589 million, net of unamortized amounts. The current portion of this debt totals \$79 million. Final maturity of the Measure M Sales Tax Revenue Bonds is scheduled for 2011, when the current Measure M sales tax program expires. OCTA refinanced the taxable bonds assumed in the 91 Express Lanes purchase with tax-exempt bonds in November 2003. These

bonds final maturity is scheduled for December 2030. Final maturity for the transit certificates of participation is scheduled for July 2007. The commercial paper notes have a maximum maturity of 270 days, and OCTA has entered into an irrevocable direct-pay letter of credit reimbursement agreement with Dexia Bank to provide liquidity support for the commercial paper notes.

Risk Management—OCTA management is of the opinion that recorded liabilities for OCTA's self-insured claims are adequate, and resources are being accumulated in the internal service funds to meet potential losses. In addition, a series of training and wellness programs for OCTA administrative, maintenance and coach operator employees seek to evaluate and control losses in health and workers' compensation claims. Defensive driving, customer service and assistance, and other coach operator training programs seek to control general claim exposure.

Pension Benefits—A majority of OCTA's employees participate in the Orange County Employees Retirement System, which is a cost-sharing, multiple-employer defined benefit plan. A nominal number of employees participate in the Public Employees' Retirement System of the State of California. Financial activities for the two retirement systems are not included in this document as the Board does not oversee the retirement systems.

Awards and Acknowledgments

The Government Finance Officers Association (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the OCTA for its comprehensive annual financial report for the fiscal year ended June 30, 2005. This was the 23rd straight year OCTA or its predecessor agency has received this prestigious award. In order to be awarded a Certificate of Achievement, OCTA published an easily readable and efficiently organized comprehensive annual financial report. This report satisfied both accounting principles generally accepted in the U.S. and applicable legal requirements.

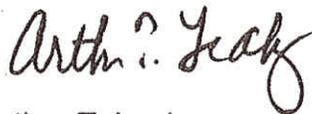
A Certificate of Achievement is valid for a period of one year only. We believe our current comprehensive annual financial report continues to meet the Certificate of Achievement Program's requirements, and we are submitting it to the GFOA to determine its eligibility for another certificate.

The California Society of Municipal Finance Officers (CSMFO) awarded a Certificate of Award for Outstanding Financial Reporting to the OCTA for its comprehensive annual financial report for the fiscal year ended June 30, 2005. This was the fourth straight year OCTA has received the award. The certificate is issued in recognition of meeting professional standards and criteria in reporting which reflect a high level of quality in the annual financial statements and in the underlying accounting system from which the reports were prepared. Due to program changes at the CSMFO, we are no longer eligible to submit our

comprehensive annual financial report if we also submit it to the GFOA for an award. Therefore, we will be submitting our report to the GFOA to determine its eligibility for an award.

The preparation of the Comprehensive Annual Financial Report on an efficient basis required the dedication of staff in many OCTA departments. We wish to express our appreciation to all the department managers and staff who assisted and contributed to the preparation of this report, as well as our independent auditors for their participation in the review and preparation of this report. We are especially grateful for the dedicated efforts over the past few years of the Accounting and Financial Reporting Department staff, who have prepared for and coordinated our implementation and continued support of the new financial reporting model. Special appreciation is extended to the Board for its support for efforts to excel in the operational and financial management of OCTA.

Respectfully submitted,



Arthur T. Leahy
Chief Executive Officer



James S. Kenan
Executive Director of Finance, Administration and Human Resources



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Supplemental Material 91 Express Lane Schedule

Orange County Transportation Authority

Author: Arthur Leahy

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

SUPPLEMENTAL MATERIALS

91 EXPRESS LANES SCHEDULE

**INTRODUCTION MATERIAL FROM THE
OCTA COMPREHENSIVE ANNUAL
FINANCIAL REPORT FOR FISCAL YEAR
ENDED JUNE 30, 2006**

91 EXPRESS LANES SCHEDULE

SUPPLEMENTAL MATERIALS

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**INTRODUCTION MATERIAL FROM THE
OCTA COMPREHENSIVE ANNUAL
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91 EXPRESS LANES SCHEDULE



Toll Schedule
Effective January 1, 2007

Eastbound
55 to Riverside Co. Line

	Sun	M	Tu	W	Th	F	Sat
Midnight	1.15	1.15	1.15	1.15	1.15	1.15	1.15
1:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
2:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
3:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
4:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
5:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
6:00 am	1.15	1.85	1.85	1.85	1.85	1.85	1.15
7:00 am	1.15	1.85	1.85	1.85	1.85	1.85	1.15
8:00 am	1.50	1.85	1.85	1.85	1.85	1.85	1.85
9:00 am	1.50	1.85	1.85	1.85	1.85	1.85	1.85
10:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.30
11:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.30
Noon	2.70	1.85	1.85	1.85	1.85	2.80	2.70
1:00 pm	2.70	2.55	2.55	2.55	2.80	2.70	2.70
2:00 pm	2.70	3.70	3.70	3.70	3.80	2.70	2.70
3:00 pm	2.30	3.95	3.95	3.95	4.20	2.70	2.70
4:00 pm	2.30	6.65	8.00	8.50	9.25	8.50	2.70
5:00 pm	2.30	6.65	7.75	6.50	9.25	7.25	2.70
6:00 pm	2.30	3.95	4.70	4.20	5.75	4.75	2.30
7:00 pm	2.30	2.80	2.80	2.80	4.00	4.00	1.85
8:00 pm	2.30	1.85	1.85	1.85	2.55	4.00	1.85
9:00 pm	1.15	1.85	1.85	1.85	1.85	2.55	1.85
10:00 pm	1.15	1.15	1.15	1.15	1.15	1.85	1.15
11:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15



Toll Schedule
Effective January 1, 2007

Westbound
Riverside Co. Line to 55

	Sun	M	Tu	W	Th	F	Sat
Midnight	1.15	1.15	1.15	1.15	1.15	1.15	1.15
1:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
2:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
3:00 am	1.15	1.15	1.15	1.15	1.15	1.15	1.15
4:00 am	1.15	2.20	2.20	2.20	2.20	2.20	1.15
5:00 am	1.15	3.60	3.60	3.60	3.60	3.45	1.15
6:00 am	1.15	3.70	3.70	3.70	3.70	3.60	1.15
7:00 am	1.15	2.40	2.40	2.40	2.40	3.95	1.60
8:00 am	1.60	3.70	3.70	3.70	3.70	3.60	1.60
9:00 am	1.60	2.95	2.95	2.95	2.95	2.95	2.30
10:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.30
11:00 am	2.30	1.85	1.85	1.85	1.85	1.85	2.60
Noon	2.30	1.85	1.85	1.85	1.85	1.85	2.60
1:00 pm	2.60	1.85	1.85	1.85	1.85	1.85	2.60
2:00 pm	2.60	1.85	1.85	1.85	1.85	1.85	2.60
3:00 pm	2.60	1.85	1.85	1.85	1.85	2.30	2.60
4:00 pm	2.75	1.85	1.85	1.85	1.85	2.30	2.75
5:00 pm	2.75	1.85	1.85	1.85	1.85	2.30	2.75
6:00 pm	2.75	1.85	1.85	1.85	1.85	2.70	2.30
7:00 pm	2.30	1.15	1.15	1.15	1.15	1.85	1.85
8:00 pm	2.30	1.15	1.15	1.15	1.15	1.15	1.15
9:00 pm	2.30	1.15	1.15	1.15	1.15	1.15	1.15
10:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15
11:00 pm	1.15	1.15	1.15	1.15	1.15	1.15	1.15



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

National Transit Policy and Implementation in California

Thompson Coburn LLP

Author: Kent Woodman

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

**NATIONAL SURFACE TRANSPORTATION POLICY
AND REVENUE STUDY COMMISSION**

BACKGROUND BRIEFING MATERIALS

**KENT WOODMAN
PARTNER, THOMPSON COBURN LLP**

**NATIONAL SURFACE TRANSPORTATION POLICY
AND REVENUE STUDY COMMISSION**

FIELD HEARING

BACKGROUND BRIEFING MATERIALS

by

**Kent Woodman
Thompson Coburn LLP**

NATIONAL TRANSIT POLICY AND IMPLEMENTATION IN CALIFORNIA

The following Background Briefing Materials are intended to supplement and expand the testimony of Kent Woodman before the National Surface Transportation Policy and Revenue Study Commission in Los Angeles, California, on February 22, 2007. The focus of the testimony is the Federal Government's program for the funding of New Starts transit projects, as administered by the Federal Transit Administration (FTA).

INTRODUCTION

The FTA is responsible for administering a program of technical assistance and grants to state and local public entities to fund public transit capital and operating expenses, as well as planning, research, and development. The grant programs administered by the FTA are funded as part of the U.S. Department of Transportation (DOT) annual budget. The President's budget for fiscal year 2008 recommends \$9.422 billion for the FTA programs, consisting of \$7.872 billion in formula and bus grants and \$1.4 billion in Capital Investment Grants for the

construction of new fixed guideway systems. Sources of funding for the FTA programs are the General Fund of the U.S. Treasury and the Mass Transit Account of the Highway Trust Fund.¹

New fixed guideway systems funded by FTA include subways, light rail, commuter rail, and bus rapid transit (BRT)—which are collectively referred to as “New Starts”. Although the New Starts program makes up less than 15% of the annual FTA budget, it is the most visible of all the FTA grant programs, and receives the greatest attention within the Administration, on Capitol Hill, and among public transit agencies across the U.S. A good argument can be made that the New Starts program² is one of the most intricate and challenging discretionary grant programs in the Federal Government.

The following materials will provide a brief history of the New Starts program, a review of its current structure and requirements, an identification of some critical policy issues and problems, and some ideas for change.

PROGRAM HISTORY

Thirty years ago, in the early years of the FTA grant program, New Starts projects around the country were fairly limited in number, and the process for providing Federal funding for those projects was relatively uncomplicated. New projects were built by MARTA in Atlanta, BART in the Bay Area, and Washington Metro in D.C., and projects were being planned in cities like Miami, Portland, San Diego, and Los Angeles. Overall, however, public transit in the United States in the early days of the FTA program consisted primarily of extensive capital infrastructure in what are referred to as the “old rail cities” – Boston, New York, Philadelphia, and Chicago -- while in most other areas in the United States urban transit consisted primarily of bus systems, often serving primarily the transit dependent, with limited capital investment or transit infrastructure.

¹ One cent (\$.01) of the Federal gasoline tax is deposited into the Mass Transit Account and made available for public transit capital grants.

² The statutory provisions detailing the requirements of the FTA New Starts program are set forth in Section 5309 of Title 49, United States Code.

In the late 1970's and early 1980's that picture began to change, and since that time the interest in New Starts projects nationwide has basically exploded. Perhaps this is due to larger amounts of Federal transit funding being available; it may also reflect an increased public and political awareness (particularly in western and southern States) of ever-greater mobility problems and the key economic role of transit capital investments in the vitality of our cities. Whatever the combination of reasons, few would dispute that the landscape has shifted dramatically nationwide. The State of California is perhaps the most striking example of this phenomenon—in a State famous for its love of the automobile, New Starts projects have literally been constructed from one end of the State to another in the past 20-25 years—San Diego, North County, Los Angeles MTA, Santa Clara, Sacramento, BART extensions, and Muni in San Francisco. In terms of nationwide interest, by 2004 there were almost 80 proposed projects in the New Starts “pipeline”.³ The recent SAFETEA-LU legislation offers an even more dramatic picture of the level of interest, where over 250 New Starts projects were “authorized” for alternatives analysis and preliminary engineering.

This nationwide growth has lead, inevitably, to intense competition for Federal funds. It has also resulted in project sponsors contributing a higher share of the project cost than the traditional 80-20 Federal local match. The increased State and local funding for projects is probably best illustrated in the State of California. For example, in the past 20-25 years, over \$8.6 billion has been spent building fixed guideway projects in Los Angeles County, and over 60% of that cost has been paid with State and local funds. Several Los Angeles projects (i.e., Long Beach Blue Line, Green Line, Pasadena Gold Line, Orange Line, and Exposition Phase 1) have been built without any Federal New Starts funding.

THE CORE POLICY QUESTION

Given this nationwide demand and Federal funding picture, it should come as no surprise that even with a relatively healthy FTA budget (as noted, about 1.4 billion annually in discretionary Section 5309 New Starts funding), there is not nearly enough Federal assistance available to build all of the potential New Starts projects being developed across the U.S.

³ New Starts Working Group estimate.

Simply stated, there are too many projects nationwide chasing too few public dollars – the demand for Federal funds far exceeds the amount of Federal New Starts funding available.⁴ This has led to a critical policy question at the Federal level -- who gets the money, or perhaps better stated, how do you *decide* who gets the money? While the Congressional appropriations committees have historically had the ultimate say on this issue through the process of “earmarking”, since the early 1980’s there has been a growing consensus in the Administration and the Congress that there needs to be an objective way to answer this question.

EVOLUTION OF THE NEW STARTS PROGRAM

In the early 1980’s, FTA saw the need for some criteria or standards to attempt to answer the question of which New Starts projects should be funded, with the goal (ideally) of selecting the “best” projects on the basis of merit and also of identifying the projects that did not warrant Federal investment. The primary focus in FTA’s initial policy documents was on the *cost effectiveness* of various projects -- which was expressed in terms of the incremental cost per incremental transit rider.⁵ FTA also attempted, in its early policies, to establish a threshold that a project needed to pass in order to be eligible for Federal New Starts funding.

Since FTA’s 1984 Policy Statement, both the New Starts evaluation criteria and the Federal review process have become increasingly complex and detailed. Statutory criteria were introduced for the first time in 1987, in the Surface Transportation and Uniform Relocation Act⁶, and were then expanded in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This was followed by an additional FTA Policy Statement in 1996⁷, and by further legislative amendments and refinements by the Congress in 1998 in the Transportation Equity

⁴ For example, if only 100 of the 250 SAFETEA-LU authorized New Starts projects were constructed, at an average cost of \$500 million, the total demand would be \$50 billion. To meet this demand, the New Starts program, if it grew by 5% per year over the next 10 years, would provide about \$18 Billion.

⁵ See Statement of Policy on Major Urban Mass Transportation Capital Investments. 49 FR 21284, May 18, 1984.

⁶ Public Law 100-17.

⁷ FTA Statement of Policy, 61 FR 67093, December 19, 1996, amended 62 FR 60756, November 12, 1997.

Act for the 21st Century.⁸ The next major step was FTA's Rule on Major Capital Investment Projects⁹ in 2000, which was the first rulemaking setting forth New Starts evaluation and rating criteria and a project development process.

Most recently, the Congress enacted further changes to the New Starts process and evaluation system in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.¹⁰ Among other things, SAFETEA-LU reiterated the elements of FTA's project justification and local financial commitment evaluation rating process, established a five-point rating scale (high, medium-high, medium, medium-low, low), and created a "simpler" program for projects with less than \$75 million in Federal funding and less than \$250 million in capital cost (called "Small Starts"). SAFETEA-LU also directed FTA to issue a revised New Starts regulation, which FTA intends to initiate by a Notice of Proposed Rulemaking in March 2007, with a final rule anticipated in 2008.

The goals of the Federal evaluation system, and the objectives of the congressional and administrative efforts to develop criteria and a rating system, are extremely well intentioned and even laudatory as a matter of public policy. In these days of focus on the problems of congressional earmarking, the New Starts program represents a unique effort to actually award Federal dollars on the basis of merit and to direct public investment to the best projects. The FTA staff who implement the New Starts program are dedicated and well intentioned. The fundamental problem, from my perspective, is one of "overkill". In its effort to exercise due diligence over Federal funds and the New Starts program, FTA has developed a system so complicated, so replete with reports and analyses, and so fraught with delays, that it now obstructs one of the agency's fundamental goals – to assist communities in building critically needed transit projects. The result is delay and frustration for New Starts project sponsors, and

⁸ Referred to as TEA-21, Public Law 105-178.

⁹ 49 C.F.R. 611 (December 7, 2000).

¹⁰ SAFETEA-LU, Public Law 109-59 (August 10, 2005).

even in some cases decisions by grantees to design and build new fixed guideway projects without Federal discretionary funding.¹¹

NEW STARTS PROGRAM TODAY

The New Starts Program has evolved today into a major industry that consumes the time of FTA staff, local agency grantee staff, engineering firms, planning firms, construction companies, financial consultants, project management oversight consultants, lobbyists, and even lawyers. Here are the primary outlines of the program –

1. **Annual New Starts Submittal and Ratings** -- Candidate New Starts projects must be evaluated and rated on an annual basis by the FTA and its consultants, using criteria established by the Congress and refined and expanded by FTA. Project sponsors must submit detailed materials to FTA, usually in August of each year, in order for their project to be evaluated. Projects are rated by FTA on the basis of the following criteria.
 - ***Project Justification***, which evaluates mobility improvements, cost effectiveness, land use, environmental benefits, and operating efficiencies. The most critical and complicated element of the Project Justification evaluation is the current FTA method of rating cost effectiveness -- the Transportation System User Benefit (TSUB). The TSUB is intended to show the incremental transit “user benefits” per dollar of transit investment (including factors such as travel times savings for existing riders). Grantees must develop and use elaborate modeling systems in order to generate a TSUB “number” for their project, and FTA has established “breakpoints” to determine the rating to assign to projects based on their TSUB number. This TSUB number effectively counts for fifty percent (50%) of the Project Justification rating (the other 50% is land use).
 - ***Local Financial Commitment***, which evaluates the grantee’s local financial commitment in order to assess its stability, reliability, and availability during the Project term, as well as the extent of the local “overmatch (i.e., the grantee’s

¹¹ According to estimates from the New Starts Working Group, the number of projects in the New Starts pipeline has decreased from the high of 80 in 2004, perhaps due to the time delays and burdens of the New Starts project development system.

contribution in excess of the statutorily required 20% local share).¹² FTA assesses overmatch on a project specific basis, rather than looking to the grantee's overall financial contribution to new fixed guideway projects in its service area. As a result, the fact that a grantee may construct entire projects without any Section 5309 New Starts funding is not taken into account in the FTA rating system.

2. **Project Development "Gateways"** -- New Starts projects undergo a multi-stage project development process -- that is, alternatives analysis, preliminary engineering, final design, and construction -- and must receive approval from FTA to advance through the various states of project development. Grantees must apply for permission to enter a particular stage and must support that request with specific documentation and actions required by FTA. Regardless of the grantee's own project schedule and needs, a project cannot proceed -- and therefore is effectively stopped in its tracks -- until FTA gives the green light to proceed to the next stage. As noted below, the completion of this project development process takes several years.
3. **NEPA Clearance** -- Almost all New Starts projects must receive full clearance under the National Environmental Policy Act (NEPA) -- that is preparation of a Draft Environmental Impact Statement (EIS), preparation, and adoption by the local project sponsor of a Final EIS, and issuance of a Record of Decision (ROD) by FTA. While there are clearly public policy justifications for an environmental review of New Starts projects, the unfortunate fact is that the EIS process as administered by FTA is extremely time consuming, with frequent delays and resulting schedule uncertainty. When combined with the processing and delays inherent in the project development gateways, this "perfect storm" of Federal reviews makes it extremely difficult for a grantee to develop and follow a coherent critical path schedule.
4. **FTA and Consultant "Due Diligence" Reviews** -- In order to protect the Federal investment and assure that a project is in fact "ready" to begin design and construction,

¹² The statutory matching ratio for FTA funded capital projects, including New Starts, is 80% Federal and 20% local. Due to the competition for New Starts funds and FTA's emphasis on a higher local share, most New Starts projects have a local share contribution more in the 40-50% range.

FTA has established a detailed system for its due diligence reviews. A significant element of this due diligence is the extensive review by two FTA consultants, the project management oversight consultant (PMO) and the financial management oversight consultant (FMO). For projects seeking a multiyear funding agreement from FTA (referred to as a Full Funding Grant Agreement and described in more detail below), these two consultants must prepare detailed and lengthy reports (for the PMO, this is a cost-to-complete report and a risk assessment; for the FMO, this is a financial capacity report). These reports take months to generate, review, refine, and finalize.

In addition, there are numerous other grantee plans and reports (as noted below) that the New Starts grantee must prepare and submit to FTA for due diligence review during the project development process.

The combined effects of these due diligence reviews, the NEPA process, and the requirement for FTA approval to advance from one stage of project development to the next has significantly increased the time it takes to advance a project from the start of alternatives analysis to the completion of final design. One analysis shows that this process, which took approximately five years in 1991, now takes twice as long.¹³

5. ***FFGA Process -- Plan and Program Reviews*** -- In order for a New Starts project to receive construction funding from FTA, it must develop and enter into a Full Funding Grant Agreement (FFGA) with FTA. Under a FFGA, the Federal Government makes a multi-year contingent commitment (subject to appropriations) of New Starts funds for the Project. The New Starts grantee makes a firm commitment of the State/local share of funds to build the project, commits to a project scope, schedule, and budget, and commits to paying all the cost increases and overruns with local dollars. There are currently 11 existing FFGAs, and the FTA budget proposal for FY 2008 lists two “pending” FFGAs and two “proposed” FFGAs.

¹³ New Starts Working Group estimate for FY 2004-2006 is that on average it takes 10 years to complete the process from alternatives analysis through final design.

The FFGA is the “Pot of Gold” at the end of the lengthy FTA project development process. It is coveted by grantees because it represents a multi-year Federal “contingent commitment” of funds for the design and construction of the New Starts project, and serves as a relatively good assurance that the annual New Starts funding amounts established in the FFGA budget will actually be provided by the congressional appropriations committees.¹⁴

The FFGA process, which normally commences in earnest around the time the grantee seeks approval from FTA to enter final design, involves the submittal of detailed supporting documents to FTA and the PMOC for Federal review and, in some cases, Federal approval. The current FTA process for development of a New Starts project includes at least 20 steps/actions that must be taken in order to obtain a Full Funding Grant Agreement.¹⁵ In addition to a detailed Project scope, budget and schedule, these submittals include a project management plan, a safety and security plan, a real estate acquisition plan, a bus fleet management plan, a rail fleet management plan, and a value engineering plan. As could be expected, development of the FFGA “package” normally takes well over a year, and FTA issues or concerns with any of these submittals can cause the process to last even longer.

6. **Approval of FFGA** -- After the FFGA package is complete as a substantive matter (all documents prepared and all plans submitted and approved), there is then an elaborate review process in Washington D.C. The first step consists of Administration review -- by FTA, the Office of the Secretary of Transportation, and OMB (in sequential order), which normally runs 60-75 days. The FFGA package is then submitted to the Congress for a statutorily mandated congressional review period of 60 days. In effect, this amounts to four months or more of final review in Washington. Because the grantee must complete

¹⁴ Although the ultimate decision on New Starts funding allocations comes from the Congress in the appropriations process, the Appropriations Committees in recent years have generally followed the practice of honoring the annual New Starts amounts in the various FFGA budgets, as the first priority or “drawdown” in New Starts funding.

¹⁵ See Full Funding Grant Agreements Guidance, FTA Circular 5200.1A, Appendix C, FFGA Application Document Checklist.

all its plans and programs, as well as substantially advance final design, before the FFGA package can be finalized, this final 4 month period is essentially “dead time” for the grantee. The grantee normally ready to begin construction, but it is frozen by the Federal process.

SPECIFIC RECOMMENDATIONS

In a nutshell, this elaborate “due diligence” structure creates enormous problems in terms of time and resources for grantees trying to build New Starts projects. New Starts Projects are multi-million dollar public works projects, and as such require development and adherence to a strict critical path schedule. As expressed by one transit general manager, in the implementation of a New Starts project, the biggest risk factor has become the Federal Government. In addition, New Starts grantees incur substantial “soft costs” in developing the plans and reports described above, addressing issues raised by FTA and its PMO and FMO, and complying with the numerous FTA requirements.

1. **Simplification of New Starts Evaluation and Rating Process** -- One of the areas in significant need of reform is FTA’s New Starts review and evaluation process. A good example is the review and rating of the Project Justification factor, particularly the heavy emphasis on the “TSUB number” as the measurement of cost-effectiveness. While the TSUB factor has merit in concept, FTA appears to be seeking a precise quantitative model that will permit highly refined differentiations in the comparison of projects. Not only is this enormously time-consuming at both the Federal and local level, as well as expensive to grantees, but also both the precision of the numbers generated and the public policy benefits of this highly quantitative analysis are questionable. As the Los Angeles County MTA has suggested, “analytical perfection should not be the goal”.¹⁶ A more reasonable approach would seem to be to develop a simpler, easier to use system that would simply identify the best and worst projects, in terms of cost-effectiveness.

¹⁶ Los Angeles County MTA comments on FTA Docket Number 2006-23636, March 10, 2006, page 4. See also comments of the American Public Transportation Association (APTA) (same FTA docket), p. 11.

Another troubling aspect of the evaluation and rating system is the fact that FTA does not “score” a significant portion of the Project Justification materials developed and submitted by project sponsors. Specifically, the extensive environmental benefits, operating efficiencies, and mobility benefits¹⁷ information submitted in the annual New Starts submittal is evaluated by FTA, but is not actually scored in the overall Project Justification rating. The only factors scored are cost-effectiveness (TSUB) and land use (which each count 50%). It would seem much more appropriate, if FTA is going to require grantees to provide this information, for FTA to develop a simple scoring methodology for each of the statutory criteria. This would not only be much more consistent with the Congressional intent reflected in the establishment of multiple statutory criteria, but it would also serve to de-emphasize the overly quantitative aspects of the TSUB number.

Finally, in the local financial contribution evaluation and rating, it would be far more equitable for FTA to take into account all of the project sponsor’s new fixed guideway investments in its geographic area, not just its share of the particular project being rated. This would recognize the true level of local financial commitment to transit capital projects, and would also provide incentives for increase local funding.

2. Bilateral Commitment to Timeframes for Processing NEPA and Other Documents --

The Federal Government is the only participant in the New Starts Project development process that does not have to make any commitments regarding the schedule for its actions. The project sponsor, local funding partners, engineering firms, design firms, construction companies, and other third party contractors all must agree to and comply with specific timetables for their actions.

A good example of an area that would benefit greatly from mutual time commitments is the review and evaluation of alternatives and the analysis of environmental impacts under the National Environmental Policy Act and the Implementing regulations of FTA/FHWA

¹⁷ While mobility benefits information is not separately scored, it is used as a “tie breaker” in the event of a difference between the cost effectiveness (TSUB) and land use ratings.

and the Council on Environmental Quality.¹⁸ There are legitimate concerns about the extensive amount of time currently required for the preparation and review of the Draft Environmental Impact Statement (Draft EIS) and Final EIS and the ultimate issuance of a Record of Decision (ROD) by FTA. The NEPA process, from publication of a Notice of Intent to issuance of the ROD, normally takes two to three years or more to complete. This time period is particularly critical for New Starts transit projects, because most of the substantive project development work (i.e. final design, property acquisition, construction) cannot commence prior to issuance of the ROD or a Finding of No Significant Impact.

Compliance with the actual time periods mandated by the FTA/FHWA environmental regulations would clearly permit a faster environmental review process. The actual regulatory time periods are as follows: the draft EIS must be available for 15 days in advance of the public hearing; there must be not less than 45 days for comments on the Draft EIS; and there must be at least 30 days between publication of the Final EIS and the issuance of the ROD.¹⁹ There are obviously other defined activities and significant work that must be accomplished in the NEPA process, but those activities do not have a mandatory time-frame under the regulations. In practice, it is some of those other steps (such as FTA's review of the Administrative draft of the Draft EIS; FTA approval to publish the Draft and Final EIS, etc.) which are often the most time consuming and create major schedule uncertainty for the grantee.

There is no compelling reason that the public policy benefits of the Federal environmental review process cannot be fully satisfied through a more disciplined and time sensitive approach to the NEPA process. For example, FTA and the project sponsor could agree to a bilateral schedule for each of the major milestones in the preparation and review of the NEPA documents, such as (A) a commitment by the grantee to provide the administrative draft of the Draft EIS to FTA by a time certain after the close of public

¹⁸ The FTA/FHWA regulations are found at 23 CFR 771 et seq; the CEQ regulations are found at 40 CFR 1506.1 et seq.

¹⁹ See 23 C.F.R. 771.123(h), (i); 127.

comments; (B) a commitment by FTA to complete its review and comments on the administrative draft with specified period of time; (C) a mutually agreed target date for publication of the Final EIS; and (D) a commitment by FTA to issue the ROD by a time certain after approval and publication of the Final EIS.

The overall project development process would greatly benefit if this type of bilateral schedule were adopted for the other FTA-required plans and reports described above (i.e., the PMO reports, the grantee's project management plan, etc.). Under the current system, the grantee essentially submits materials and waits for FTA or its consultants to respond - - with no timeframe, schedule, or response commitment on the part of FTA. This would be totally unacceptable in a normal critical path schedule for designing and building a project, and it is an area of the FTA New Starts process that cries out for change and improvement.

3. **Alternative Approach to Due Diligence Reviews and Risk Allocation** -- As described above, the FTA New Starts process has evolved over the years into an increasingly detailed and onerous "due diligence" process for the review, evaluation, and oversight of New Starts projects. This process does have the legitimate public policy goal of assuring that Federal transit funds are directed toward the best transit investments and that project cost estimates, revenue projections, and transit user benefit estimates are realistic and achievable. Notwithstanding these noteworthy goals, there is a serious question of whether the actual value of this oversight has become outweighed by the extensive and time consuming burden it places on local agency project sponsors, and also whether this oversight is consistent with the actual allocation of project risk.

For example, one of the most time consuming aspects of this process is the preparation of various documents (the PMO and FMO Reports, the grantee's project management plan, etc.) that are required as part of the FFGA process. The preparation of these various plans and documents by the grantee, following by extensive review by FTA and its consultants, adds months of time to the process.

One of the significant deficiencies in this current risk assessment approach is that it does not seem to provide any basis for evaluating the type or degree of risk based on the scope and complexity of the project involved (i.e. a BRT project as compared to a subway tunnel). More importantly, the current approach fails to take into account the actual level of risk to the Federal Government, and the extent to which that risk has been transferred to the local grantee.

Specifically, for a number of years FTA has utilized the FFGA to limit its financial exposure in New Starts projects, by placing an absolute limit or “cap” on the amount of Section 5309 New Starts funds that will be provided for the Project, and thereby shifting all of the risk for cost increases, overruns, scope changes, and schedule delays to the grantee. Since the grantee commits in the FFGA to paying all project cost increases, *all* of the financial risk is on the grantee. The most appropriate approach would be to place the primary burden for risk assessment and due diligence on the party actually bearing the financial risk. The current New Starts model is fundamentally counter-intuitive, in that it requires that the Federal Government retain an extensive and time-consuming due diligence and risk assessment role, but it places essentially no financial risk on the Federal Government.

In light of the actual allocation of risk, a more justifiable approach would be for FTA to limit the type and number of plans and programs that the grantee must develop (and FTA review) in the project development process and, in particular, to significantly reduce or eliminate the role of the PMOC and the FMO in oversight and reviews. In exchange, FTA could require the grantee to be responsible for conducting its own risk assessment and preparing and validating its own financial plan for the project, and providing FTA with guarantees or self certifications in those areas and other project management matters. In other words, in exchange for less Federal oversight, the grantee would accept full financial and performance responsibility for its own project, including responsibility for any estimates and projections that prove to be incorrect.

4. **Reduction in Time Period From ROD to Construction** -- FTA needs to take some specific action to reduce the amount of time between issuance of the environmental Record of Decision and the start of design and construction.

Under the FTA/FHWA environmental regulations, a New Starts grantee would appear to be allowed to commence activities such as final design and construction after the issuance of the ROD. However, under the FTA New Starts process, there are additional and time consuming post-ROD steps and approvals that must occur before a grantee may actually commence design and construction of its project. For example, the grantee must first obtain FTA's approval to enter final design. This step involves a built-in structural delay, since FTA is provided 120 days to consider a request to enter Final Design²⁰, and normally FTA does not begin serious evaluation of such a request until the ROD has been issued. Since at this point by definition preliminary engineering and the NEPA process have been completed, the time required for FTA's final design approval is essentially "dead time" in terms of advancing the project.

Following final design approval, FTA and the grantee must then complete the development of the FFGA package for the project (as described above).²¹ This is also the time period during which the majority of the PMO and FMO reviews take place. The net result is that the time from issuance of the ROD until the execution of the FFGA is often well over a year, and can be as long as two years. Since execution of the FFGA normally constitutes the commencement of construction activities, this means that the actual construction for the project is normally not permitted to commence until well over a year after the issuance of the ROD. This is a problem for almost all New Starts projects, and the problem is even more significant for New Starts projects using a design-build project delivery system, since the current FTA model can negate many of the scheduling and delivery advantages of a design-build approach.

²⁰ See Major Capital Investment Projects Final Rule, 49 CFR 611.7(c).

²¹ See 49 CFR 611.7(d).

FTA could greatly improve the New Starts process if it would allow the grantee to proceed with design and limited construction activities as soon as possible following the ROD. Even if the grantee had to proceed at its own risk, removing this artificial constraint would save time and money by allowing the project to advance as promptly as the design and procurement processes will allow.

CONCLUSION

Over the years, the Administration and the Congress have designed a very well intentioned but increasingly complex and burdensome system for the development and evaluation of New starts projects. The extremely detailed reviews and analyses now required under that system are in dramatic need of streamlining and reform so that FTA can successfully implement its mission of assisting in the timely development of critically needed transit projects.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

The West Coast Corridor System: A National Asset and Priority

The West Coast Corridor Coalition

Author: Multiple Authors

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

**The West Coast Corridor System:
A National Asset and Priority**

*A White Paper from
The West Coast Corridor Coalition*

February 2004

- Executive Summary -

This special report is a call for national participation in investments that will assure the West Coast corridor system meets the demands placed upon it.

Global Gateways

The West Coast corridor system links the United States' largest trading partners with our nation's economy. Millions of consumers and jobs from Boston to San Diego, from Seattle to Miami, depend on a robust and capable West Coast corridor system.

World trade is an increasingly important factor in the health of the domestic economy. During the 1990s, the value of U.S. international trade more than doubled, from \$891 billion to almost \$2 trillion. Trade rose from 13 percent of national output in 1990 to more than 20 percent in 2000.

Canada and Mexico vie with Japan and China as the U.S.' largest trade partners. Each day, \$1 billion in goods moves between Canada and the U.S., and almost \$400 million between Mexico and the U.S. Each day, one million people cross the U.S. - Mexico border while one-third of a million cross the U.S. - Canada border.

The West Coast Corridor pulses with commerce, personal travel and tourism. It is the nexus of APEC (Asia-Pacific Economic Cooperation) and NAFTA (the North American Free Trade Agreement). In a 1995 study for USDOT, the Denver-based Center for the New West identified the West Coast Corridor System as one of only two NAFTA trade corridors that links the three nations in a high level of economic activity.

The West Coast in World Trade

The value of containers moving through the five largest West Coast ports exceeds \$300 billion a year. The three largest California ports account for 39.6% of containerized cargo trade in the U.S. This is more than three times (3.12x) California's share of national population. The two largest Washington ports handle 8.2% of total container traffic in the U.S. – 3.64 times the national population share of the state.

Waterborne revenue cargo moving through California, Oregon and Washington ports has grown from 60 million tons in 1970 to 263 million tons in 2002. Driving

this process is an increase in container cargo from 8.7 million tons in 1970 to 184 million tons in 2002.

Analysts estimate that trans-Pacific imports to the U.S. will increase 5 to 7 percent each year over the next two decades. Even growth at the lower end of this range means container traffic in 2024 will be more than two and a half times current volume.

The Cost of Capacity Constraints

At the very time when trade is becoming a vital factor in the economy, the capabilities of critical cargo handling facilities and intermodal links are being stretched beyond capacity. If the US is to enhance the West Coast Corridor as a national economic and security asset, a funding commitment is required as part of the federal reauthorization processes.

Today, the cost of infrastructure investment required to maintain the goods movement system is borne largely by gateway communities and regions. Despite the national benefits of trade, a disproportionate burden has fallen on geographic locales that site critical facilities. Equity issues aside, requiring regional sources to fund facilities of national benefit virtually assures shortfalls in capacity.

The importance of maritime commerce to the U.S. economy was dramatically illustrated by the shutdown of West Coast ports in September and October 2002. Ten days on non-operation along the coast led to a 23-day backlog of disrupted trade valued at nearly \$10 billion.

Since the shutdown, labor and management have come together on a forward-looking strategy. Future disruptions are unlikely to be due to disputes on the docks. But constraints at terminals and intermodal centers, on highways or rail lines, can have similar effects. Bottlenecks develop gradually and have cumulative impacts. The resulting delays and congestion add costs to the economy and environment in reduced mobility, disrupted schedules, higher product prices and greater pollution.

A Multi-Jurisdictional Approach

One effect of a new generation of federal transportation legislation is the rise of multi-jurisdictional alliances and coalitions. Combination of entities -- states, regions, cities, commissions, authorities, and not-for-profit organizations -- join together to study and solve transportation issues. The West Coast Corridor Coalition is one of those new alliances, designed to provide regional, multimodal solutions to transportation needs.

Our call for a national investment has three phases. The level of resources required grows with each phase, reaching a point where the coalition itself cannot support these funding needs and has to extend its partnership to the rest of the country.

Phase 1 is focused on building the coalition. Costs are minimal (thousands of dollars) and are typically financed by coalition members. Phase 2 is devoted to research, education and communication. Its costs are typically greater (ranging from hundreds of thousands to several million dollars) and are funded through a variety of sources, including Federal grants (earmarks, discretionary or formula) and own-source funds (state money).

Phase 3 is implementation of big-ticket projects (hundreds of millions to billions of dollars). For members to meet the public funding requirements, coalition projects must compete with other funding needs confronting members, including preservation of existing infrastructure and other committed capital projects.

Financing Goods Movement

The federal reauthorization debate is central to this nation's transportation future. Higher real levels of funding more fully address crucial needs and reduce conflict among legitimate, competing uses of funds including goods mobility, transit, general capacity, and mitigation of project impacts.

An important initiative related to reauthorization comes from Congresswoman Juanita Millender-McDonald, (D-Los Angeles), founder of the Goods Movement Caucus in the House. She has introduced legislation to support "Goods Movement Projects of National Economic Significance." HR 3398 would provide \$17.6 billion over the six-year reauthorization to finance critical freight mobility projects. Half the amount would be in discretionary funds for state and local priorities, and half would be distributed to "infrastructure of national significance."

In March 2003, the California Marine and Intermodal Transportation Strategic Advisory Committee (CALMITSAC) published a report on marine transport requirements.. Its roster of high-priority projects supporting the marine transportation system that serves international trade totaled \$715 million for Northern California and \$3.8 billion for Southern California.

In Washington State, the Freight Action Strategy (FAST) Corridor serving Puget Sound ports has a price tag of \$470 million for Phase I and \$262 million for Phase II. FAST Phase I leverages \$90 million in federal financing with local and state funds. Projects address capacity issues and community impacts arising from growth in trade-related goods movement. FAST Phase II seeks federal

participation in funding strategically selected projects that justify national support.

At numerous points along the West Coast Corridor, infrastructure investments required for national freight mobility fall largely upon states and regions. Examples include I-5, I-405 and I-90 through the Seattle metroplex, the interface of land and marine transport in Portland, repair of bridges essential to system functionality on I-5 in Oregon, upgrading California 99 as “Main Street” for the nation’s largest agricultural region, and port-corridor connectors such as I-580 and I-680 in the Bay Area and I-710 and State Route 60 in Southern California.

A goods movement investment strategy includes improvements in personal mobility as well. For example, if passenger trains move faster, cargo moves faster. The West Coast Corridor includes some of the most heavily used passenger rail routes in the U.S. Only the Northeast Corridor outpaces California and the Northwest in popular and viable passenger rail service. Yet, Class I freight rail capacity on the West Coast corridor system is much less well developed on north-south routes than east-west. West Coast rail can be an instance where passenger demand helps support needed additions to freight capacity.

Meeting freight mobility needs brings benefits to the U.S. economy even beyond the value of a robust trade infrastructure. In May 2003, Global Insight consultants released a study on the economic impact of the six-year, \$375 billion authorization level proposed by the House Transportation and Infrastructure Committee chaired by Rep. Don Young (R-AK). This study was sponsored by the American Public Transportation Association and the Transportation Construction Coalition.

Global Insight estimated the incremental impact of \$375 billion compared to the Administration’s original baseline of \$245 billion (since raised to \$275 billion). Over six years, the economic stimulus provided by the difference between the two amounts compared in the study is \$290 billion in national output (GDP), \$129 billion in household income, \$102 billion in growth-related federal revenues, and \$140 billion in state and local tax receipts.

The math is straightforward. Trade equals 20 percent of the U.S. economy, and West Coast ports handle half of all containerized trade. The region is struggling to keep pace with demands on the goods movement infrastructure, yet national investment in transportation nowhere reflects this reality.

To assure a robust economic future, the time has come for changes that recognize the need for national investment to protect a national benefit.

-White Paper-

**The West Coast Corridor System:
A National Asset and Priority**

Global Gateways

The economic vitality of the United States is inseparable from the global economy. World trade is an increasingly important factor in the health of the domestic economy. During the 1990s, the value of U.S. international trade grew from \$891 billion to almost \$2 trillion. Trade rose from 13 percent of national output in 1990 to more than 20 percent in 2000.

Millions of American jobs are tied to trade in four ways:

- Producing goods and services for export – where the U.S. still ranks #1.
- Using imported components to make finished products for domestic consumption and foreign markets.
- Selling imported goods to U.S. consumers and businesses at retail and wholesale outlets.
- Handling and facilitating the flow of trade goods movement at ports and within the U.S.

The West Coast in World Trade

Thanks to Pacific Rim dominance of world trade, West Coast ports handle a disproportionate share of containerized U.S. imports and exports. The Maritime Administration reported the following volumes of foreign and domestic container cargo traffic in 2002:

<i>Port</i>	<i>Thousands of 20-foot containers (TEU's)</i>		
	<i>Total</i>	<i>Import %</i>	<i>Export %</i>
Los Angeles	6,105	78.7%	21.3%
Long Beach	4,524	77.5	22.5
Oakland	1,698	49.2	50.8
Tacoma	1,471	48.7	51.3
Seattle	1,439	50.2	49.8

The value of containers moving through the West Coast's five largest ports exceeds \$300 billion a year. The three largest California ports account for 39.6% of containerized cargo trade in the U.S. This is more than three times (3.12x) California's share of national population. The two largest Washington ports handle 8.2% of total container traffic in the U.S. – 3.64 times the national population share of the state.

A large local market and direct routes to the east enable the two largest Southern California ports to handle 41.7% of nationwide container cargo imports. The three next largest West Coast ports have a close balance between imports and exports. Tacoma, Seattle and Oakland together handle a remarkable 27.3% of all U.S. container exports.

Ports on the Columbia River system, led by Portland, Oregon, are standouts in moving bulk cargo of grain, minerals and other products. These are virtually all exports. Portland, Oregon, and Kalama, Vancouver and Longview, Washington, handle 42.8% of West Coast bulk cargo movements. Total volume of 20 million-plus tons annually on the Lower Columbia ports is exceeded within the U.S. only by the Mississippi River system.

Waterborne revenue cargo moving through California, Oregon and Washington ports has grown from 60 million tons in 1970 to 263 million tons in 2002. Driving this process is an increase in container cargo from 8.7 million tons in 1970 to 184 million tons in 2002. Analysts estimate that transpacific imports to the U.S. will increase 5 – 7% annually for the next 20 years. Even growth at the lower end of this range means container traffic in 2024 will be more than two and a half times current volume.

The Cost of Capacity Constraints

The West Coast system of global gateways begins at marine ports and includes railroads, highways and other facilities and services that move freight within North America. At the very time when trade is becoming a vital factor in the economy, the capabilities of critical cargo handling facilities and intermodal links are being stretched beyond capacity.

The importance of maritime commerce to the U.S. economy was dramatically illustrated by the shut-down of West Coast ports in September and October 2002. Ten days on non-operation along the coast led to a 23-day backlog of disrupted trade valued at nearly \$10 billion.

Since the shutdown, labor and management have come together on a forward-looking strategy. Future disruptions are unlikely to be due to disputes on the docks. But constraints at terminals and intermodal centers, on highways or rail lines, can have similar effects. Bottlenecks develop gradually and have cumulative impacts. The resulting delays and congestion add costs to the economy and environment in reduced mobility, disrupted schedules, higher product prices and greater pollution.

Today, the cost of infrastructure investment required to maintain the goods movement system is borne largely by gateway communities and regions. Despite the national benefits of trade, a disproportionate burden has fallen on geographic locales that site critical facilities. Equity issues aside, requiring regional sources to fund facilities of national benefit virtually assures shortfalls in capacity.

One effect of West Coast pinch-points is that increasing volumes of trade are being shifted to all-water routes from Asia to the East Coast. The route eastward through the Panama Canal enjoys the low cost of waterborne movement but can take up to several days more time than “land bridge” routes that deposit cargo on the West Coast and then carry it by rail and truck to the rest of the U.S. The route westward from Southeast Asia through the Suez Canal reliably delivers to the U.S. East Coast in 22 days, versus a 21-day transit through U.S. West Coast ports. This speaks to the continuing need for freight infrastructure investment and efficiency improvements to keep the Western transportation system competitive as an option for Southeast Asia freight.

Three-Nation Trade Corridor

The West Coast is the nexus of APEC (Asia-Pacific Economic Cooperation) and NAFTA (the North American Free Trade Agreement). In a 1995 study for USDOT, the Center for the New West identified the West Coast Corridor System as one of only two NAFTA trade corridors that links the three nations in a high level of economic activity.

Currently, Canada and Mexico vie with Japan and China as the U.S.’ largest trade partners. Each day, \$1 billion in goods moves between Canada and the U.S., and almost \$400 million between Mexico and the U.S. Each day, one million people cross the U.S.- Mexico border while one-third of a million cross the U.S.-Canada border.

The busiest Canadian border crossing for commercial traffic outside the Province of Ontario is at the north end of the West Coast Corridor, where British Columbia and Washington meet. The busiest border crossing for people

movement in the world is at the south end of the West Coast Corridor, where California and Baja California meet.

Between these two points, the Corridor spans “from B.C. to B.C.” Its 1,360-mile length is a more direct route from border to border than I-35 (1,641 miles), I-75 (1,758 miles) or I-95 (1,950 miles). Moreover, the West Coast Corridor is the only three-nation route anchored by major urban centers at both ends. It is also the pace-setter in growth. Population rose 182% along the West Coast Corridor from 1950 to 2000, versus 120% along I-35, 120% along I-75, and 66% along I-95.

The West Coast Corridor pulses with commerce, personal travel and tourism. At the Oregon-California border, one of the more rural reaches of the Corridor with little local traffic, the estimated daily volume of 3,750 eighteen-wheel heavy trucks. This flow between the Northwest and California is equal to half that on Ambassador Bridge linking Detroit and Windsor, Ontario – the busiest commercial border crossing in North America.

Inter-Regional Trade

Data on trade among West Coast states reflect this reality. Washington State’s annual exports of farm produce, software, trucks, aircraft and lumber to California are \$17 billion – equal to the combined purchases of Japan, China and Canada. Washington exports to Oregon total \$12 billion. These two states buy an amount equal to Washington’s foreign exports. West Coast trade is one reason why truck traffic on I-5 in Washington grew faster than auto traffic, more than doubling between 1993 and 2002.

Similarly strong trade links exist between Washington and British Columbia, Oregon and Washington, Oregon and California, Baja California and California. Their high standing in trade-partner rankings receives less attention because they are not nation-to-nation.

Corroborating evidence for the importance of West Coast regional goods movement is offered by a Trade Impact Study completed in 2002 as part of Alameda Corridor-East. This project would extend high-capacity freight rail service for Pacific Rim marine cargoes moving through the Los Angeles metroplex to the rest of North America. The study measured the impact of the project in two ways: on the international trade of each U.S. region, and on the domestic trade of each region with California.

Upgrading rail capacity between Southern California ports and the rest of the country is of major value to all 7 regions except one – the Northwest, which has its own port capacity that serves Pacific Rim trade. At the same time, the value of California corridors for domestic trade is of greater value to the Northwest than

any other region except the Southwest, which includes California. These data demonstrate the importance of West inter-regional trade.

The infrastructure challenge of West Coast and NAFTA freight mobility comes on top of Pacific Rim goods movement. Truck and rail traffic is heavy between city pairs including Vancouver-Seattle, Seattle-Portland and San Francisco-Los Angeles. Volumes are driven by goods exchange among metro markets - and by north-south movement of containers and other cargo to eastbound rail and truck corridors of choice such as I-84 and I-40.

At numerous points along the West Coast Corridor, infrastructure investments required for national freight mobility fall largely upon states and regions. Examples include I-5 and I-405 through the Seattle metroplex, the interface of land and marine transport in Portland, repair of bridges essential to system functionality on I-5 in Oregon, upgrading California 99 as "Main Street" for the nation's largest agricultural region, and port-corridor connectors such as I-580 and I-680 in the Bay Area and I-710 and State Route 60 in Southern California.

A Multi-Modal Future

As the freight mobility challenge has grown, public and political perceptions have lagged reality. Yet, goods movement advocates must maintain perspective. Personal mobility by auto, bus and rail transit will remain a primary concern of the public. Moreover, freight solutions must be pursued in the context of people movement. Conflict between the two roles of transport should be minimized, while beneficial synergies are sought.

For example, by placing trains in a trench below grade, the Alameda Corridor project doubled freight train speeds and reconnected communities that were severed several times each day by grade crossings of freight rail. Thus, the Corridor enhanced both freight and passenger mobility. This is also the intent of dedicated truck-way proposals, which would enhance passenger car safety as well as mobility.

One of the most pressing transportation problems in North America is the lack of inter-connectivity between existing passenger services and facilities. On the freight side, making connections between marine cargo, rail and trucking is a major concern.

The effort to link modes so they are complementary creates more travel and transport options. This approach goes by the name of "multimodalism" (the

presence of more than one mode as a choice) or “intermodalism” (end-to-end connection of modes).

Many European countries have made great advances in passenger intermodalism, Ridership has risen dramatically, yet overall levels of driving between cities has also increased—albeit well below levels in North America. And while North American freight transport interests have made great strides in inter-modal connections, the amount of long distance freight, especially non-bulk cargo, transported by trucks continues to grow and add to traffic congestion in most metropolitan areas.

The West Coast Corridor System includes some of the most heavily used passenger rail routes in the U.S. Only the Northeast Corridor outpaces California and the Northwest in popular and economically sustainable passenger rail service. Yet, Class I freight rail capacity on the West Coast corridor system is much less well developed on north-south routes than east-west. West Coast rail may be an instance where passenger demand can help support needed additions to freight capacity.

A high level of public awareness about passenger rail brings needed attention to freight rail issues. There is a front-end challenge, however. Passenger trains move faster than freight trains, and the push is on for even higher speeds. This creates the problem of “over-taking” and the need for track bypass capacity to prevent conflicts between the two uses of rail transport.

Beyond the “normal high-end” range of about 80 m.p.h. there is growing interest in high-speed inter-city passenger rail that would move at 100 m.p.h., 200 m.p.h. or faster. A major reason for this interest is the potential for inter-city rail service to replace part of the demand for commuter air service. This could provide crucial relief for gate capacity at airports and would support travel security requirements in the post-9/11 era.

In sum, a “seamless” transportation system is inter-modal not only in optimizing marine, rail, truck and air transport of freight but in harmonizing personal mobility and goods movement. These are the two crucial dimensions of transport in supporting economic vitality and quality of life.

A Multi-Jurisdictional Approach: Key to Success

One result of a new generation of federal transportation legislation is the rise of complex, multi-jurisdictional alliances and coalitions. Combinations of entities -- states, MPOs, cities, commissions, authorities, and not-for-profit organizations -- join together to study and solve transportation issues.

The typical multi-jurisdiction transportation “issue” of previous decades was as basic as two adjoining cities that desired to share transit service, or neighboring states that wanted a new bridge on the river that formed their boundary. Much has been learned from these beginnings, and today the issues are more complex. States and regions compete for position in the global marketplace while seeking to attract new jobs and retain existing workers. In response to these complex issues, transportation has witnessed the evolution of more complex alliances.

Various coalitions have arisen whose mission is to study transportation issues and implement solutions across jurisdictional lines. The proliferation of high priority corridors, international border crossing initiatives, and new economic alliances suggest that more new coalitions will be formed. The formation of a West Coast Corridor Coalition to compete for federal funding is in response to the region’s role in national economic competitiveness as well as the in the interest of the region’s residents.

The Challenge of Coalition Funding

Understanding the phases in coalition formation, and the challenges faced at each level, is essential to a successful coalition. Phase 1 is the process of building the coalition. Phase 2 is focused on a series of research, communications and education efforts. Phase 3 is the period of coordination and implementation. The West Coast Corridor Coalition is mid-way through Phase 1.

The level of resources needed grows with each phase, reaching a point where the coalition itself cannot support these funding needs and has to reach outside for support. The costs associated with Phase 1 are minimal (thousands of dollars) and are typically financed by coalition members. Phase 2 costs are typically greater (ranging from hundreds of thousands to several million dollars) are funded through a variety of sources, including Federal grants (earmarks, discretionary or formula) and own-source funds (state money).

Phase 3 is typically the implementation of big-ticket projects (hundreds of millions to billions of dollars). For public funding requirements to be met by the members themselves, the coalition projects must compete with other funding needs confronting the members (including preservation of existing infrastructure and other committed capital projects).

Hence, the success of most coalitions depends on the ability of the individual members to set priorities among their own projects that balance these priorities with the coalition’s objectives, and on the ability of the coalition to secure sufficient external funding.

Transportation Equity Act: A Legacy for Users (TEA-LU)

At its 2nd General Session on November 10, 2003, the West Coast Corridor Coalition adopted a Resolution on Federal Reauthorization of Transportation Financing. The Resolution noted that:

- The States of Alaska, Washington, Oregon and California represent an economy that as a separate nation would be 4th largest in the world.
- West Coast states are key links in trade with Canada and Mexico, and are major domestic origins and destinations in their own right as interconnected centers of economic activity;
- As the nexus of APEC and NAFTA, West Coast states play a unique role in growing the national economy while protecting national security, enabling the nation to receive benefits from trade, including jobs, economic output, and tax revenues.
- The West Coast share of national transportation funding reflects neither its share of total trade value nor the disproportionate burden it bears in supporting capital investments required to handle the flow of trade.

The Resolution commended the Administration for placing within reauthorization a greater emphasis on goods movement. It also urged suggested that the legislation should:

- state that strengthening the goods movement system is a national policy goal, consistent with economic development, national security and safety.
- back this policy with a commensurate commitment of resources; specifically, six-year authorizations that are increased significantly above current level;
- within a higher authorization, provide specific funding to meet the critical transport capacity needs facing West Coast states and regions as they address the economic and community impacts of growth in international and domestic trade.

“Equity language” in TEA-21 provides that at least 90.5% of federal transportation revenues are returned to the states where they were collected. Some reauthorization proposals would raise the minimum to 95%. The higher this percentage, the more difficult any reallocation to states that bear the cost of providing a national benefit by maintaining a global gateway. This constraint

suggests consideration of a new revenue source that is trade-related and would be spent entirely on infrastructure that supports trade-related goods movement.

The Goods Movement Caucus Initiative

An important initiative related to reauthorization comes from Congresswoman Juanita Millender-McDonald (D-Los Angeles) founder of the Goods Movement Caucus in the House. She has introduced legislation to support "Goods Movement Projects of National Economic Significance." HR 3398 would provide \$17.6 billion over the six-year reauthorization to finance critical freight mobility projects. Half the amount would be in discretionary funds for state and local priorities, and half would be distributed to "infrastructure of national significance."

In presenting her proposal, Rep. Millender-McDonald cited key statistics (1998): movement of \$7.4 trillion in goods on the nation's highway system, employing 10 million people, projected to grow in volume by 67% over the next two decades. She also noted that since 1970, U.S. population has grown by 40%, the number of vehicles has increased 100%, yet the nation's highway capacity has expanded by only 6%.

Infrastructure Investment: A Double Benefit

The TEA-LU debate is central to this nation's transportation future. Higher real levels of funding more fully address crucial needs and reduce conflict among legitimate, competing uses of funds including goods mobility, transit, general capacity, and mitigation of project impacts.

In March 2003, the California Marine and Intermodal Transportation Strategic Advisory Committee (CALMITSAC) published a report on marine transport infrastructure requirements. Its roster of high-priority projects supporting the marine transportation system that serves international trade totaled \$715 million for Northern California and \$3.8 billion for Southern California.

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Meeting such needs bring benefits to the U.S. economy, even beyond the value of a robust trade infrastructure. In May 2003, Global Insight consultants released a

study on the economic impact of the six-year, \$375 billion authorization level proposed by the House Transportation and Infrastructure Committee chaired by Rep. Don Young (R-AK). This study was commissioned by the American Public Transportation Association and the Transportation Construction Coalition.

Global Insight estimated the incremental impact of \$375 billion compared to the Administration’s original baseline of \$245 billion (since raised to \$245 billion). The data below measure the economic stimulus provided by the difference between the two amounts compared in the study:

<i>Economic indicator proposal</i>	<i>6-Year incremental impact of House</i>
National output (GDP)	\$290 billion
Household income	\$129 billion
Average increase per household	\$1,100
Net increase per household (after paying federal taxes added by the House bill)	\$800
Increase in federal tax receipts (from economic stimulus, not rate hikes)	\$102 billion
Increase in state and local tax receipts	\$140 billion

These data suggest that transportation infrastructure is an investment with a strongly positive benefit-cost ratio. Moreover, such investment is essential to the nation’s competitiveness at a time when transportation facilities in other nations are being upgraded and logistics systems are being transformed by technology.

ITS Secure Trilateral Trade Corridor

Available funding will never fully meet the need for new capital facilities. Thus an essential element in any strategy is to undertake operational improvements that optimize existing capacity. In the current environment, a realistic strategy must also protect and enhance security. The goal is “secured mobility” – efficient, secure and safe goods movement. A primary means to this goal is Intelligent Transportation Systems (ITS).

The most ambitious application of ITS is to support a secure trilateral trade corridor between the United States, Canada, and Mexico. Such a corridor would

use ITS to improve the productivity of freight movement between the three nations while ensuring the safety and security of commercial drivers, vehicles, and cargo.

The West Coast corridor system is the potential test bed for these concepts for several reasons:

- The West Coast's importance in the North American trade and transport network;
- The significant and complex freight mobility challenges faced by the West Coast;
- The track record of West Coast ITS deployment, based on a history of collaboration.

In turn, ITS is a good fit with the mission of the West Coast Corridor Coalition:

- It involves an intense need to focus on a system operations strategy;
- It supports strengthening inter-modal potential – such as the shift from truck to rail and short-sea shipping;
- It fits well with existing bi-national linkages on both ends of the Corridor.

Potential Partners

The Federal Highway Administration is undertaking research that supports many elements required in a secured trade corridor initiative. One goal of FHWA research is to identify the benefits of implementing ITS "best practices." The focal point for this analysis will be a freight process map that shows physical and data flows, identifies the touch points on hand-offs, and potential productivity and security gains that could be made with ITS technology or other methods of operation.

Michael Onder of FHWA says, "The West Coast Corridor is an area of heavy emphasis simply because of the stresses on the transportation network with the tremendous volumes of traffic, and the need for management strategies to help move freight and passenger traffic more efficiently."

Onder advises, "In improving the productivity and security of goods movement through the supply chain as it impacts the West Coast Corridor, a useful step is pre-project up front analysis between government and industry on the expected gains associated with introducing new technologies or methodologies of operation."

The Intelligent Transportation Society of America (ITSA) was established in 1991 to encourage the development and deployment of ITS in the U.S. ITSA's Commercial Vehicle and Freight Mobility (CVFM) Forum was created in 2002 to work on inter-modal freight technologies that save lives, time, and money; enhance quality of life; and strengthen homeland security.

Forum members include state and federal agencies; private sector carriers, shippers, vehicle and equipment manufacturers; and representatives of transportation agencies in Canada and Mexico.

The CVFM is partnering with USDOT, the Inter-modal Freight Technology Working Group (IFTWG), and other key stakeholders. Their goal is to integrate public and private ITS investments in commercial vehicle operations, port and terminal operations, international border clearance, fleet and vehicle management, traveler information, traffic management and incident response, to address congestion, safety, and security needs.

ITSA has a longstanding partnership with the I-95 Corridor Coalition on the East Coast and seeks to apply corridor-level ITS support for freight productivity and security on the West Coast, which it sees as a priority location for a secured trilateral trade corridor. ITS America will host the 2005 ITS World Congress in San Francisco, and hopes to showcase West Coast ITS deployments at that event. The CVFM wants to work with the West Coast Corridor Coalition to advance at least one ITS demonstration by that time.

Strategies and Payoffs

Potential ITS applications that could be pursued jointly by the West Coast Corridor Coalition and project partners include:

1. Demonstrate the ability to create a secure trade corridor between the United States, Canada, and Mexico from Alaska and British Columbia to Baja California. The corridor would enable trucks or containers to move across borders, past weigh stations and ports of entry, and through ports and terminals without delay but with a guarantee of in-transit security.
2. Evaluate and demonstrate ITS-based systems that can increase freight velocity and reduce dwell time at ports and terminals, including dedicated lanes for preferred customers, appointment systems, advanced notification of arrivals, and integration of gate clearance with metropolitan traffic management.
3. Integrate metropolitan and regional data on congestion, incidents, construction, weather and other emergencies to provide corridor-wide

traveler information that supports motor carrier routing and dispatching decisions as well as state and provincial emergency response activities.

4. Demonstrate the use of CVISN safety information and exchange systems to support law enforcement and first responders in tracking and responding to security risks.
5. Develop a corridor-wide oversize/overweight vehicle system enabling carriers to apply for and receive permits electronically, and enhance routing decision systems used by states and provinces for these vehicles.
6. Facilitate public/private efforts to improve supply chain management and risk management. One tool is the intermodal freight process map developed by the IFTWG. It provides physical and data flows associated with logistics patterns in the corridor, including key “handoffs” and potential information bottlenecks that affect productivity and security.
7. Develop future information systems at the corridor level, using CVISN and National ITS Architectures as blueprints. The work of Operation Safe Commerce in understanding freight container supply chains emanating from Los Angeles/Long Beach and Seattle/Tacoma can be leveraged in this effort.
8. Integrate highway, rail, and marine operational information to improve corridor-level management of system capacity, and to facilitate development of modal alternatives such as short-sea shipping.
9. Analyze the potential for truck-only lanes or automated technologies to “platoon” or “train” trucks along key segments of the Corridor.

Global Supply Chain Logistics

In a constrained environment for funding goods movement projects, the first step is to do a complete systemic review to determine what can be done to optimize existing capacity. This review must address operational and organizational factors that add to congestion and delay. If shortfalls persist despite implementing the results of this review and new facilities must be built, these should be designed to support and enhance operational factors.

The need for connectivity within the trade and transportation system should be apparent. Failure of infrastructure or operating systems at key ports of entry inevitably leads to failure in parts of the system further downstream in the distribution network. Lack of sufficient infrastructure and operating acumen in the system can result in disruptions that undermine reliable and efficient distribution of goods in a region, or throughout the nation.

Development of a relatively cost-efficient, well-managed and organized network of goods movement service providers and system users is essential. Functions

include ocean carrier terminal operations, truck and rail operations and transfer points, airports and air freight transport, distribution facilities, sorting and packing facilities. Every part of the system must be connected by management of the exchanges that occur among users and providers.

An understanding of the relationship between investment in infrastructure and performance of the goods movement system is critical to policy-makers. Significant investments have been made and are anticipated in transportation projects. Decision-makers, both private and public, must be prepared to justify these investments. Improvements in the logistics system reduce transportation costs and affect the productivity of businesses by providing better inventory management, allowing consolidation of activities at favorable locations, and providing access to factors of production such as a better labor force, improved quality of life for employees, and access to raw materials.

The recent lockout at the West Coast Ports crystallized thinking regarding the negative impact on the United States economy if principal gateways are closed even for a relatively short time. Conversely, the positive impact these key international gateways have on the nation must be nurtured and encouraged through well-developed strategies.

Infrastructure and technology improvements are essential to maintain the “line of least resistance” through key gateways to states within the Western region and beyond. In response to projected growth, the nation must ensure that the delivery system, which encompasses all components of freight transportation, is constantly improved and made more efficient.

As global freight volumes increase, ports and their rail/road connectors become choke-points in the global supply chain. The domestic distribution system has become so refined that manufacturers require inventories to be restocked within hours. Maintaining a minimal inventory of parts reduces costs but creates dependence on efficient and timely delivery of components. As congestion mounts, especially in urban areas, those responsible for meeting Just-In-Time (JIT) schedules must resort to innovative route and delivery solutions to meet customer requirements.

An inadequate level of financing relative to transportation infrastructure needs is likely to continue. A rising portion of funding will be spent on existing facilities for preventative maintenance, seismic retrofits, and repair of deterioration. The result will be a shortage of funds for new infrastructure projects.

Moreover, introduction of alternative fuels, more fuel-efficient engines, and increased public transit ridership as congestion worsens, will result in lower

overall revenues from gasoline taxes, further reducing the funding available for transportation projects.

Given these factors, and the inescapable fact that 100 million American households rely on freight transport to give them access to products made here and abroad, operational improvements are an essential element in providing goods movement capacity that is adequate to meet demand.

In Conclusion

The range of factors impacting transportation facilities and logistics is vast. They include operational, organizational, administrative, and legislative issues affecting land use, system capacity (port, passenger, transit, rail, truck and air), environment, safety and security, regulatory constraints, congestion relief strategies. Our concerns are for the current status of these issues. But our vision must extend to the near and long term future of the goods movement system on the West Coast and throughout the nation.

In practical terms, this means growing the pie and working smarter. These two essential elements require:

- A sustained effort to make clear the national significance of the West Coast corridor system;
- A focus on public investments in freight improvements that support capital and operational system solutions;
- A keen interest in the level at which reauthorization is funded;
- A call for national participation in investments that will assure the West Coast corridor system meets the demands placed upon it.

White Paper Review Group

USDOT

Harry Caldwell, Regal Decision Systems and FHWA emeritus
Christina Casgar, Office of the Secretary of USDOT

State Departments of Transportation

Barbara Ivanov, Washington DOT
Steve Kale, Oregon DOT
Richard Nordahl, Cal-Trans

Metropolitan Planning Organizations

Vivian Underwood (Anchorage)
Charles Kelly (Vancouver)
Jim Miller (Whatcom WA)
Peter Beaulieu, Puget Sound Regional Council (Seattle)
Al King, Lane COG (OR)
Rusty Selix (Cal-COG)
Therese McMillan, MTC (Bay Area)
Mark Griffin, SCAG (Greater Los Angeles)
Gary Gallegos (San Diego)
Humberto Inzunza (Baja California)

Maritime

Joseph Miniace, Pacific Maritime Association
James Spinosa, International Longshore & Warehouse Union
Lynn McClelland, U.S. Maritime Administration
Jeannie Beckett, Port of Tacoma
Gordon Palmer, Port of Stockton
Rick Wiederhorn, Port of Oakland
Kerry Cartwright, Port of Long Beach

Rail

James Dolan, John Gray, Robert Starzel - Union Pacific
Rollin Bredenberg, LaDonna DiCamillo, Patricia Otley - BNSF

Trucking

Larry Pursley, Washington Trucking Association

Mike Fisher, Les Schwab Tire Centers, Prineville OR
Patty Senecal, Transport Express, Inc.

White Paper Drafting Group

Bruce Agnew, Cascadia Project, Discovery Institute, Seattle

Paul Bingham, Global Insight, Washington DC

Don Breazeale, Don Breazeale & Associates, San Diego

Jeff Brown, California Senate Office of Research, Sacramento

Bob Gore, CH2Mhill, Sacramento

Arno Hart, Wilbur Smith & Associates, Los Angeles

Gill Hicks, Gill V. Hicks & Associates, Los Angeles

Mike Fischer, Cambridge Systematics, Oakland

Glenn Pascall, West Coast Corridor Coalition, Seattle



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Key Proposals for the Next Federal Transportation Reauthorization Bill

San Joaquin Council of Governments

Author: Dana Cowell

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

SURFACE TRANSPORTATION
POLICY AND REVENUE
STUDY COMMISSION

California's Great San Joaquin Valley

Key Proposals for the Next
Federal Transportation Reauthorization Bill

This paper provides a Metropolitan Planning Organization (MPO) perspective on key transportation issues facing the dynamic San Joaquin Valley in California, and how these issues may be addressed in the next federal reauthorization bill. The MPO's of the San Joaquin Valley include:

The San Joaquin Council of Governments
Council of Fresno Governments
Stanislaus Council of Governments
Madera County Transportation Commission
Kern Council of Governments
Tulare County Association of Governments
Merced County Association of Governments
Kings County Association of Governments

The eight agencies frequently work in concert to respond to issues and policy questions which encompass the entire valley. This includes a long standing working relationship with the San Joaquin Valley Air Pollution Control District, which is responsible for the San Joaquin Valley Air Basin.

The information contained in this paper does not necessarily represent the collective position of all the MPOs in the Great Valley. But it is intended to present ideas and options for the Committee's consideration that serves as a perspective from the heartland of California.

Contact Information

Dana Cowell, Deputy Director
San Joaquin Council of Governments
555 E. Weber Avenue
Stockton, CA 95202
Email: dcowell@sjcog.org
Phone: 209.468.3913

Snapshot of the Valley

The Great San Joaquin Valley is over 250 miles in length and includes eight counties in the geographic center of California (please refer to the enclosed map). The Valley is one of the most dynamic and fastest growing regions in California and the nation. Its current population of 3.7 million is already larger than 27 states. However, its projected population increase to 7.9 million by 2050 will be nothing short of a dramatic transformation. How we plan and invest in infrastructure over the next 50 years will play a critical role in reshaping the San Joaquin Valley.

This includes transportation investments that improve connectivity through the length of the Valley as well as programs which address the rapidly developing urban areas along the State Highway 99 Corridor. Within these urban areas congestion is expected to increase dramatically, placing a premium on additional capacity but also for the first time placing an emphasis on operational and technological approaches to efficiently manage system capacity. In order to achieve livable and sustainable communities in the midst of rapid urbanization greater emphasis must also be on a balanced transportation network. Strategies which achieve mobility by walking and bicycling must be given greater emphasis along with a more highly developed but efficiently planned transit system. However, in order for this more balanced network to represent a true option, transportation decisions must be closely aligned with land use decisions which make these options attractive, integrated and a primary local circulation and commute option.

The Valley Economy

If the valley were a separate state it would lead the nation in agricultural production. Agribusiness will continue to be a mainstay of our economy in the future. Preservation of agricultural resources- particularly our rich and diverse farmlands- in the midst of unprecedented urbanization is a policy imperative in the Valley. We must enhance farm to market routes to remain competitive in a global economy. For example, the Valley represents a large percentage of export products handled by the Port of Oakland. . The Valley's inland port, the Port of Stockton, which is the largest inland seaport in California has also experienced a significant increase in activity, both in export of agricultural product and import of commodities such as fertilizer that are key to Valley agricultural production.

Movement of agricultural products is vital to the Valley's economy and a significant component of California's contribution to international trade. While agriculture is and will remain crucial to the Valley's economy, economic development and diversification and job creation is one of the most challenging and important issues the San Joaquin Valley faces in the next 50 years. A recent report prepared by the Congressional Research Service found that by some measures the San Joaquin Valley is on a par with the Appalachians. In fact, average per capita income is 32.2% lower than the rest of California. In his executive order which created the California Partnership for the San Joaquin Valley, Governor Schwarzenegger noted that "the strength of California is tied to the economic success of the San Joaquin Valley. Improving the economy and the well being of the people of the Valley requires a concentrated and creative response from leaders at all levels of government and from community members."

One opportunity lies in diversification and development of the Valley's manufacturing base, where the timely delivery of materials and just in time delivery of products is critical. This places greater emphasis on development of the Valley's interregional routes and highway and rail connections to the Bay Area and Southern California. Supply chain management and logistics operations are also a critical and growing component of the Valley's economy. The availability of less expensive land, proximity to markets and existing highway and rail infrastructure are fundamental to location decisions by this economic sector. The ability to efficiently move goods and the availability of intermodal connections are fundamental to the continued development of this industry.

Goods Movement

The California Goods Movement Action Plan identifies the San Joaquin Valley as one of four principal goods movement corridors in the state, containing both highway and railroad routes that are vital for international trade. Truck movement on major highway routes in the San Joaquin Valley is more than double the statewide average. For example, on Highway 99 truck volumes account for 19 percent of total traffic in San Joaquin and Stanislaus Counties and 27 percent of total volume in Kern County. Logistical operations centered in the Valley and growth of international trade represents a significant component of overall capacity needs on Valley highways and puts particular pressure on connections such as I-580 to the Bay Area and I-5 to the Los Angeles Basin and Route 58 to the east. Targeted investments addressing goods movement must also consider rail capacity (public/private partnerships) and intermodal connections. Rail capacity on both of the mainline routes running through the Valley is becoming constrained.

Highway 99

The key transportation route in the San Joaquin Valley, the valley's "main street" is Highway 99. This north-south route connects all the major urban areas in the San Joaquin Valley. Throughout its 274 length it consistently handles among the highest traffic a volume of any route in the valley and is vital to the regional economy. But this nearly 100 year old route still has major sections that were built to older, lower standards and which currently exceed capacity during peak periods. Just within the next 10 years, congestion is expected to substantially worsen on many urban sections of this route. The California Department of Transportation Business Plan for Highway 99, which was completed in 2005, identified over \$6 billion in investment needed to bring this vital route up to six lane freeway standards and to address critical access and capacity needs. A major program of investment to improve this highway is a top priority for the entire Valley.

Air Quality

With ozone levels nearly 35 percent above the federal standard and particulate matter levels exceeding federal standards as well, the valley is among the most heavily impacted regions in the nation for air quality. Unlike many other nonattainment areas, however, the air quality problem in the San Joaquin Valley is not dominated by one large urban area. Instead, it comprises a number of moderately sized population centers, along the major north-south travel corridors of State Route 99 and Interstate 5.

The air quality problems in the San Joaquin Valley are partly due to the climate and geography, which create the optimal conditions for creating and trapping air pollution. The Valley is surrounded by the Sierra Nevada Mountains to the east, the Pacific Coast Range to

the west, and the Tehachapi Mountains to the south. It is characterized by hot, dry summers, with normal temperatures in the nineties, and heat waves periodically exceeding 100 degrees Fahrenheit. Winters in the Valley are cool and damp, with frequent periods of dense fog. In both summer and winter, the major airflow patterns tend to result in long mixing times for emitted pollutants. These stagnant weather patterns make the Valley vulnerable to forming ozone and fine particulate matter air pollution and impede the region's ability to disperse it.

Ozone is formed from two pollutants: nitrogen oxides (NOX) and reactive organic gases (ROG). In the Valley, mobile sources, including commercial trucks, passenger vehicles, tractors, and construction equipment account for nearly 80 percent of the NOX emissions. Of this, commercial trucks are the leading source, accounting for 45 percent of the total NOX emissions valley-wide. Passenger vehicles, the number two source, account for 9 percent of the total NOX emissions in the Valley.

OPTIONS FOR REAUTHORIZATION

Goods Movement

As a key goods movement corridor in California and with a regional economy that depends on the effective and reliable movement of products, the Valley is interested in the establishment of a specific program in the next reauthorization that spotlights this vital transportation need. This is truly a national issue and needs to be focused at the federal level. This includes policies recognizing the effects of international trade, incentives for public and private investment on key rail lines and intermodal connections and specific funding programs which can be targeted to critical goods movement corridors. The policy should articulate a national interest in freight movement including freight rail infrastructure. This new policy area should also provide incentives for joint development of short haul rail lines where it is simply not practical or possible for highway capacity alone to handle anticipated freight volumes in key corridors.

Truck Parking

The significant increase in trucks on the highway coupled with recent changes in federal safety laws for truck drivers has resulted in a serious shortage of places for big rigs to park. This problem is acutely felt in the San Joaquin Valley, where trucks parked along interchange ramps, in neighborhoods adjacent to industrial areas or overflowing commercial truck stops has made this a common problem. SAFETEA-LU contains a modest program to address truck parking; the next reauthorization needs to increase its policy focus and capital resources targeted to this area. This includes public/private, potential joint use solutions and an enhanced safety roadside rest program.

A Regional Investment Program for the San Joaquin Valley

As was noted, the Valley lags behind other regions of California in several key economic indicators. Economic development is a top priority throughout the Valley but the ability to grow the economy is directly related to the ability to provide adequate infrastructure to develop and sustain job creating activities. The Valley should be considered as a targeted region, where specific resources for transportation infrastructure are provided as a key public investment to promote and support economic development.

Programs Targeted at Congestion Relief

The population of the valley is projected to more than double by 2050. Our urban areas in this 250 mile region are projected to significantly expand while we are already challenged by current volumes on the existing transportation network. Targeting adequate federal investment and federal policies which emphasize infrastructure enhancements and effective system management should be front and center issues for the next reauthorization. This is both an economic activity and quality of life issue, and in the case of the Valley, a pivotal factor in achieving air quality standards.

Highway 99

No route is more important to the Valley, is more in the path of major urban growth, is more critical to regional commerce and is more underdeveloped as a vital transportation asset than California's Golden Highway. A federal program of investment is needed in the next reauthorization which will work in partnership with the substantial State and local investment currently underway to address current deficiencies and substantially enhance this backbone facility.

Blueprint Planning

The San Joaquin Valley, like other regions of California is engaged in a visioning process to guide how the Valley grows over the next 50 years. This blueprint approach can be a key to developing complementary transportation and land use decisions. This approach can also help to set the stage for more integrated development choices which support a balanced transportation system. The next reauthorization should consider incorporating blueprint planning strategies and techniques as a part of the transportation planning process.

Air Quality

Progress to attain air quality standards is of such vital concern to the Valley this section reiterates other options for the reauthorization bill which are also critical from an air quality perspective. This includes a national program specifically targeting congestion and system management, a program specifically targeted towards goods movement, which could include incentives for clean equipment, and which includes development of freight rail, including incentives for short haul rail, and targeted investment on Highway 99, the most significant multipurpose corridor in the Valley. This also includes the inclusion of Blueprint planning strategies, intended to more closely align land use and transportation decisions.

Federal Support for Regional AMTRAK Services

The Valley is home to the State sponsored AMTRAK *San Joaquins* service, one of the most successful regional AMTRAK routes in the Country. California has been a good partner in the development and operation of this service and it is now an attractive option for travel in the Valley. Stronger federal support and investment in regional AMTRAK services like the *San Joaquins* is needed, particularly where anticipated growth and congestion enhances the importance of such services to connect growing urban areas.

Continued Opportunities for Federal Program Efficiencies

The Valley supports continued opportunities to delegate and streamline processes and make fuller use of programmatic agreements to fund and deliver transportation improvements.



POLICY & TECHNICAL PAPER

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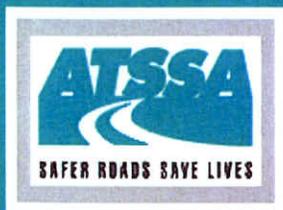
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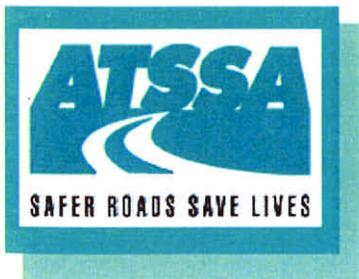
American Traffic Safety Services Association

Author: Peter Speer

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Low Cost Local Road Safety Solutions[®]





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ATSSA
15 Riverside Parkway, Suite 100
Fredericksburg, VA 22406

To order additional copies of *Low Cost Local Road Safety Solutions* at \$19.95
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version of this book is available in the "Members Only" section of ATSSA.com.

Copies are free to ATSSA and NACE members.

INTRODUCTION

For the past decade or more, the majority of motor vehicle fatalities in the United States have occurred on two-lane rural roads. In December 2005, the National Highway Traffic Safety Administration released a new report, *Contrasting Rural and Urban Fatal Crashes 1994 – 2003*. That report noted that from 1994 – 2003 there were 372,738 fatal crashes on U.S. roadways. Of those, some 218,539, or 58.6%, occurred on rural roads. During the same period, the rural fatality rate was 2.4 per 100 million vehicle miles traveled. The corresponding urban fatality rate is 1.0.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) provides federal funds to address safety issues on our nation’s most dangerous roadways. SAFETEA-LU provides \$90 million annually over four years as a set-aside under the Highway Safety Improvement Program (HSIP). While these funds are to be administered by state Departments of Transportation, Congress has directed that they be targeted at rural roads that have fatality rates that exceed statewide averages.

Although a positive start, SAFETEA-LU’s funding level for this program will not enable roadway safety practitioners to solve all of our nation’s local roadway safety problems. Therefore, it will be important for both state and local governments to stretch these funds to gain the maximum benefit or return on investment. The American Traffic Safety Services Association (ATSSA) and the National Association of County Engineers (NACE) formed a partnership to develop a tool to help local jurisdictions focus on *proven* low cost safety solutions. This publication, *Low Cost Local Road Safety Solutions*, is the result of that partnership. While we focused our efforts on solutions that could be applied in rural locations, many of the case study methodologies are entirely appropriate for urbanized areas.

The development of this publication was made possible through funding provided by ATSSA. The Texas Transportation Institute (TTI) was engaged to synthesize existing research and develop case studies about the various solutions presented here. NACE provided technical input and kept us on course to keep our focus on *real solutions for local roads*.

We hope that the examples that are provided are of sufficiently low cost that they might be considered and implemented by local jurisdictions even if federal funding under the HSIP is not immediately available.

ATSSA’s core purpose is *To Advance Roadway Safety*. We believe that if a single life can be saved through this project the effort will have been worthwhile.

ACKNOWLEDGEMENTS

This publication was made possible through an allocation of funding provided by the Board of Directors of the American Traffic Safety Services Association (ATSSA). The Texas Transportation Institute undertook a synthesis of existing technical research and the development of the case studies. ATSSA would specifically like to recognize principal investigator Melisa D. Finley, P.E., Assistant Research Engineer.

Identification, review and refinement of the individual case studies was guided by a Local Roads Program Advisory Group comprised of the following individuals:

Bob Furnas
President
Municipal Supply & Sign Co.
Naples, Florida

Anthony R. Giancola, P.E.
Executive Director
National Association of County Engineers
Washington, D.C.

James Kalchbrenner
Eastern Regional Sales Manager
Davidson Traffic Control Products
Filtrona Extrusion
West Nyack, New York

David McKee
Director, Technical Assistance Center
American Traffic Safety Services Association
Fredericksburg, Virginia

Neal Moon
Time Striping, Inc.
Van Buren, Arizona

Fred Ranck, P.E., P.T.O.E.
Safety & Geometric Engineer
Federal Highway Administration
Olympia Fields, Illinois

ATSSA thanks each of these individuals for their time, patience and tenacity in moving this project forward.

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Volume 1 No. 1

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Sign and pavement marking improvements result in a 42% reduction in crashes, yielding benefit-cost ratios of 159:1 to 299:1.

SIGN & PAVEMENT TREATMENTS



Sign and Pavement Marking Improvements Reduce Crashes

According to the National Highway Traffic Safety Administration, in 2004 rural roads accounted for approximately 57 percent of all fatal crashes. Contributing factors on secondary roads include sharp curves, no shoulders, no pavement markings, and inconsistent signing. Mendocino County in

the county roads (approximately 220 miles), identifying potential signing and marking deficiencies, recommending changes based on the current California Department of Transportation (Caltrans) signing and marking guidelines, and implementing the results. During recurring three-year cycles, all arterials,



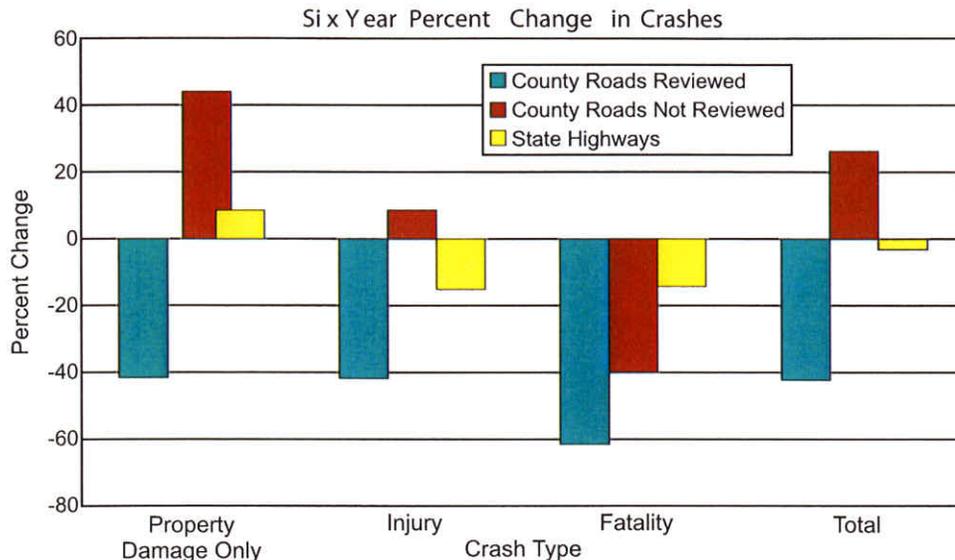
California recently showcased a low-cost program aimed at saving lives on secondary roads.¹

Mendocino County is located approximately 100 miles north of San Francisco. The Mendocino County Department of Transportation (MCDOT) is responsible for maintaining approximately 1000 centerline miles of secondary roads that serve 87,000 local residents.

In the 1990s, MCDOT developed a Road System Traffic Safety Review program to improve signing and markings on the arterial and collector roadways in their system.² Each year the program consists of completing a systematic review of one-third of

all collectors, and a number of selected local roadways are reviewed. These annual reviews are funded through the Mendocino Council of Governments (MCOG) with a combination of state and local monies.

Early efforts in Mendocino County concentrated on improving signing for curves and eliminating nonstandard signing in order to conform to current Caltrans standards. Funding from the Caltrans Hazard Elimination Safety (HES) Program was used to upgrade approximately one-quarter of the county's signs the first year. Since then, money to implement the recommendations of the annual reviews is allocated in the MCDOT budget.



When new signs were installed, high intensity retroreflective sheeting was used. Prior to this program, all signs were constructed of engineering grade retroreflective sheeting. Since 2000, some of the signs are being converted to microprismatic sheeting.

The effectiveness of the program was measured by comparing crash data for roadways improved as part of the safety program to two control groups: (1) county maintained roads not reviewed or influenced by reviews and (2) state highways within in the county. From 1992 to 1998 on the original 19 roads reviewed as part of the safety program, the number of crashes fell by 42 percent. Fatalities were down from 13 to 5 (61 percent), and injuries had decreased from 266 to 155 (42 percent). In contrast, the number of crashes on the non-reviewed county maintained roads increased by 27 percent. On the state highways the number of crashes fell by 3 percent.

Over the same six year period, the total program cost (reviews and implementation of recommendations) was \$79,260. Using average accident costs provided by Caltrans, the savings ranged from \$12.58 million to \$23.73 million,

yielding benefit-cost ratios of 159:1 to 299:1.

To highlight Mendocino County's program, the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP) sponsored a showcase in September 2004.¹ The 188 participants learned about the importance of highway safety, the collection of data to evaluate safety problems, the causes of crashes, and the importance of consistent signage. In addition, the participants gained a basic understanding of the *Manual on Uniform Traffic Control Devices* (MUTCD).³

Currently, the Florida LTAP is helping several Florida counties implement similar programs by assisting them with assessing crash data, identifying high crash rate sites, assisting with the implementation of corrective sign and pavement marking measures, and working with the agencies until a process has been developed for the agency to follow.⁴ For more information, contact the Florida LTAP at 352-392-2371.

Overall, evidence suggests that sign sheeting and pavement marking improvements are low cost safety solutions that reduce the number of crashes.

¹ Peaslee, G. Signs Show the Way to Cost-Effective Rural Safety. In *Public Roads*, Vol. 68, No. 4, January/February 2005.

<http://www.tfhrc.gov/pubrds/05jan/08.htm>.

² Ford, S.H. and E.C. Calvert. *Evaluation of a Low Cost Program of Road System Traffic Safety Reviews for County Highways*. Paper presented at the Transportation Research Board's 8th International Conference on Low-Volume Roads, June 2003.

³ *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.
<http://mutcd.fhwa.dot.gov>.

⁴ Peaslee, D.G. and J.D. Degner. *Florida Roadway Safety Circuit Rider Pilot Program*. Florida Local Technical Assistance Program, March 2005.



Volume 1 No. 2

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Crash studies show that post-mounted delineators and chevrons can reduce run-off-road crashes by up to 58% and 31%, respectively.

Post-Mounted Delineators and Chevrons Reduce Crashes and Speeds in Curves

According to the National Highway Traffic Safety Administration, in 2004 approximately 57 percent of all fatal crashes happened on rural roads, with approximately 90 percent occurring on two-lane roads. Typically 50 percent of

*Highway Research Program (NCHRP) Report 440,*⁵ researchers reported that other studies indicate that roadways with post-mounted delineators (in the presence or absence of edge lines) have lower crash rates than roadways



single vehicle crashes on rural two-lane roads occur on curves, with the other 50 percent occurring on tangent sections.

Post-mounted delineators and chevrons are two types of delineation treatments that are intended to warn drivers of an approaching curve and to provide guidance to drivers. These devices can provide drivers with a better appreciation of the sharpness of the curve before they enter the curve. In addition, once the driver is in the curve these devices provide continuous tracking information which helps the driver position their vehicle in the travel lane while traversing the curve.

Several studies have reported that post-mounted delineators reduce crash rates on relatively sharp curves at night.^{1,2,3,4} In *National Cooperative*

without post-mounted delineators. Researchers further stated that the cost of post-mounted delineators is justified for roadways with average daily traffic (ADT) exceeding 1000 vehicles per day (vpd).⁶

In a study by the Ohio Department of Highways, researchers found that post-mounted delineators on rural two-lane curves reduced run-off-road crashes by 15 percent.⁷ According to information contained in the Federal Highway Administration (FHWA) Low Cost Safety Improvements Workshop, post-mounted delineators reduce fatal crashes by 15 percent, nonfatal injury crashes by 6 percent, and run-off-road crashes by 25 to 58 percent.⁸

In Virginia, researchers conducted a study to determine the effectiveness

SIGNS



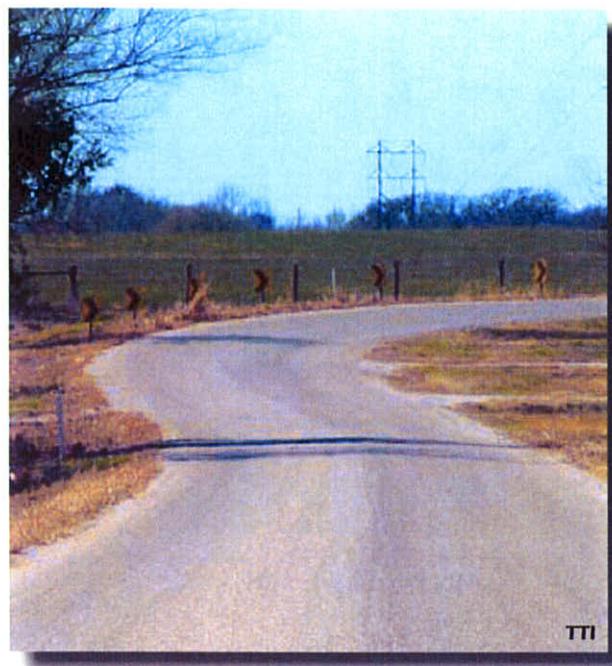
of three curve delineation treatments.⁹ Changes in speed and the lateral placement of vehicles within the travel lane were used as measures of effectiveness. The researchers found that drivers reacted most favorably to standard post-mounted delineators on curves < 7 degrees (radius of 820 ft) and to chevrons on sharp curves ≥ 7 degrees.

With respect to chevrons, a before-after study in Kansas found that chevrons reduced the total crash rate by 26 percent and the total fatal crash rate by 87 percent.¹⁰ Similarly, in Montana chevrons reduced the total crash rate by 25 percent, the run-off-road crash rate by 31 percent, and the nighttime run-off-road crash rate by 35 percent.¹⁰ According to information contained in the FHWA Low Cost Safety Improvements Workshop, chevrons can be expected to reduce total crashes by 33 to 49 percent.⁸

Recently, the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP) showcased the Mendocino County, California Road System Traffic Safety Review program.¹¹ Early efforts in Mendocino County concentrated on improving signing of curves and resulted in a reduction in crashes. For more information about the Mendocino County program, please reference case study number one of this publication.

Overall, evidence suggests that post-mounted delineators and chevrons are low cost safety improvements that reduce run-off-road crashes on two-lane roadways.

For more information on the installation and use of post-mounted delineators and chevrons please reference the *Manual on Uniform Traffic Control Devices (MUTCD)*.¹²



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- ² Longenecker, K.E. *Evaluation of Minor Improvements: Part 1 Delineation*. Idaho Department of Highways.
- ³ Tamburri, T.N., et al. *Evaluation of Minor Improvements Parts 3 and 4, Delineation and Guardrail*. California Transportation Agency, Sacramento, California, July 1967.
- ⁴ Taylor, J.I., H.W. McGee, E.L. Seguin, and R.S. Hostetter. *Roadway Delineation Systems*. NCHRP Report 130. Transportation Research Board, Washington, D.C., 1972.
- ⁵ Fitzpatrick, K., K. Balke, D.W. Harwood, and I.B. Anderson. *Accident Mitigation Guide for Congested Rural Two-Lane Highways*. NCHRP Report 440. Transportation Research Board, National Research Council, Washington, D.C., 2000.
- ⁶ Capelle, D.G. *An Overview of Roadway Delineation Research*. FHWA-RD-78-111. Federal Highway Administration, Washington, D.C., June 1978.
- ⁷ Foody, T.J. and W.C. Taylor. *Curve Delineation and Accidents*. Ohio Department of Highways, Bureau of Traffic, Columbus, Ohio, 1966.
- ⁸ Low Cost Safety Improvements Workshop. Federal Highway Administration, Washington, D.C., 2005.
- ⁹ Jennings, B.E. and M.J. Demetsky. *Evaluation of Curve Delineation Signs on Rural Highways*. VHTRC 84-R16. Virginia Highway and Transportation Research Council, Charlottesville, Virginia, December 1983.
- ¹⁰ Niessner, C.W. *Post Mounted Delineators*. FHWA-TS-83-208. Federal Highway Administration, Washington, D.C., July 1983.
- ¹¹ Peaslee, G. Signs Show the Way to Cost-Effective Rural Safety. In *Public Roads*, Vol. 68, No. 4, January/February 2005.
<http://www.tfhrcc.gov/pubrds/05jan/08.htm>.
- ¹² *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.
<http://mutcd.fhwa.dot.gov>.

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Volume 1 No. 3

The use of in-street pedestrian crossing signs increases driver yielding compliance at unsignalized pedestrian crossings by 5 to 20% resulting in driver yielding rates ranging from 67 to 98%.

SIGNS

ATSSA

SAFER ROADS SAVE LIVES

In-Street Pedestrian Crossing Signs Increase Driver Yielding Compliance

Warning signs and pavement markings used at pedestrian crossings can take many shapes and forms. Some of these traffic control devices are used to warn drivers to watch out for pedestrians. Even though drivers may receive the warning many of them consider yielding or stopping for pedestrians as a courtesy. However, in many states, it is the law.

In-street pedestrian crossing signs are regulatory signs placed in the street (on edge lines, centerlines, or in medians) to remind drivers of their legal obligation with respect to pedestrians at unsignalized pedestrian crossings.¹ These signs are easily implemented and may be removed for snow removal or other maintenance purposes. Typically, these signs are viewed as an appropriate treatment for lower speed roadways (≤ 30 mph) and cost \$200 to \$300 per sign (includes labor).²

Interest concerning in-street pedestrian crossing signs is growing, especially since these signs were added to the 2003 Edition of the *Manual on Uniform Traffic Control Devices* (MUTCD).¹ Cities in several states including Iowa, Minnesota, New Hampshire, New York State, Wisconsin, Washington State, and the District of Columbia have deployed in-street pedestrian crossing signs as a low-cost safety improvement.

Some of the first applications of in-

street pedestrian crossing signs were in New York State. In 1996, the New York State Department of Transportation developed a pedestrian safety cone that could be placed in the middle of a crosswalk.^{3,4} This device consisted of a traffic cone fitted with an orange retroreflective "jacket" bearing the sign STATE LAW TO PEDESTRIANS IN YOUR HALF OF ROAD.

In the late 1990s, the Highway Safety Research Center (HSRC) evaluated the effectiveness of the New York State device at six locations in New

York State and one location in Portland, Oregon.^{3,4} All of the sites had a speed limit ≤ 30 mph and the average daily traffic (ADT) ranged from 7200 to 15,500 vehicles per day (vpd). Six of the sites were two-lane roadways (one had a two-way left-turn lane) and one site was a four-lane roadway.

Combining data from all seven sites, in the before period drivers yielded to 70 percent of the pedestrians. After the installation of the pedestrian safety cone, drivers yielded to 81 percent of the pedestrians (a 16 percent increase).

In the summer of 2002, the Center for Transportation Research and Education at Iowa State University completed a small-scale assessment of in-street pedestrian crossing signs in Cedar Rapids, Iowa.⁵ The signs were installed on a four-lane major arterial with a continuous left-turn lane.



R1-6¹



R1-6a¹

The speed limit was 25 mph and the ADT was approximately 25,000 vpd. Prior to the use of the in-street pedestrian crossing signs, drivers in the eastbound, outside lane stopped only 70 percent of the time. After the installation, drivers stopped 84 percent of the time (a 20 percent increase). In the westbound, outside lane, the percent change was less dramatic, increasing from 64 percent to 67 percent (a 5 percent increase).

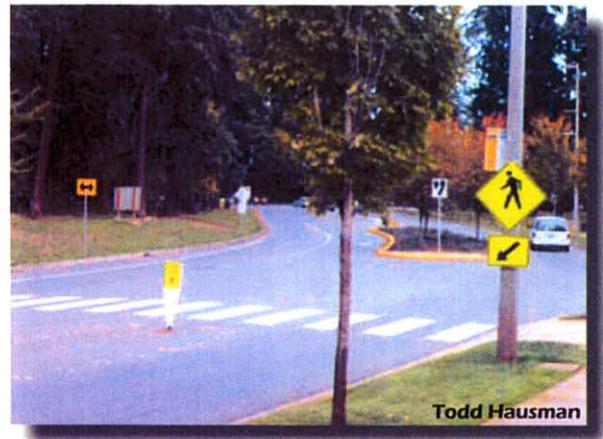
In December 2002, the City of Redmond, Washington installed 13 in-street pedestrian crossing signs on roadways with speed limits \leq 30 mph.⁶ These signs contained the words STOP FOR and the standard walking person pedestrian symbol. Before the signs were installed, the percent of drivers stopping ranged from 19 to 67 percent. After the signs were installed, the percent of drivers stopping ranged from 68 to 98 percent.

In a recent Transit Cooperative Research Program (TCRP)/National Cooperative Highway Research Program (NCRHP) study completed by the Texas Transportation Institute (TTI), researchers conducted field studies to provide insight into the actual behavior of drivers at locations with existing pedestrian crossing treatments.² At three of the sites researchers evaluated in-street pedestrian crossing signs. All three sites were on two-lane roadways with speed limits of 25 or 30 mph. The field studies indicated that in-street pedestrian crossing signs had relatively high driver yielding (ranged from 82 to 91 percent with an average of 87 percent)

compared to other high visibility signs and markings (ranged from 10 to 61 percent with an average of 32 percent).

Overall, evidence suggests that the application of in-street pedestrian crossing signs is a low cost safety improvement that increases driver yielding compliance at unsignalized pedestrian crossings.

In August 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) created a new, federally funded Safe Routes to School program (Section 1404). This bill provides specific funding for infrastructure related projects which includes pedestrian crossing improvements. For more information on the Safe Routes to School program, please visit the Federal Highway Administration (FHWA) Highway Safety Program website at <http://safety.fhwa.dot.gov/saferoutes/index.htm>.



Redmond, Washington

¹ *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004. <http://mutcd.fhwa.dot.gov>.

² Fitzpatrick, K., S. Turner, M. Brewer, P. Carlson, N. Lalani, B. Ullman, N. Trout, E.S. Park, D. Lord, and J. Whitacre. *Improving Pedestrian Safety at Unsignalized Crossings*. Draft Report Submitted to the Transit Cooperative Research Program/National Cooperative Highway Research Program, Transportation Research Board, National Research Council, Washington, D.C., January 2006.

³ Huang, H., C. Zegeer, R. Nassi, and B. Fairfax. *The Effects of Innovative Pedestrian Signs at Unsignalized Locations: A Tale of Three Treatments*. FHWA-RD-00-098. Federal Highway Administration, Washington, D.C., August 2000. <http://www.tfrc.gov/safety/pedbike/pubs/00-098.pdf>.

⁴ Huang, H., C. Zegeer, and R. Nassi. Effects of Innovative Pedestrian Signs at Unsignalized Locations: Three Treatments. In *Transportation Research Record 1705*, Transportation Research Board, National Research Council, Washington, D.C., 2000, pp. 43-52. <http://www.enhancements.org/trb%5C1705-008.pdf>.

⁵ Kannel, E., R.R. Souleyrette, and R. Tenges. *In-Street Yield to Pedestrian Sign Applications in Cedar Rapids, Iowa*. CTRE Project 02-115. Center for Transportation Research and Education, Iowa State University, Ames, Iowa, May 2003. <http://www.ctre.iastate.edu/reports/pedyield.pdf>.

⁶ Byszeski, S. *City of Redmond In Street Pedestrian Crossing Sign Test*. FHWA Experimentation #2-507(Ex) – In Street Pedestrian Crossing Signs Six Month Report. City of Redmond, Public Works/Transportation, Redmond, Washington, June 2003.

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Volume 1 No. 4

The use of a rear-facing flashing beacon on a school speed limit sign assembly increases driver compliance with the school zone speed limit by 9 to 35%.

Rear-Facing Flashing Beacons on School Speed Limit Signs Have a Positive Effect on Speeds

In school zones, it is important that drivers travel at safe speeds since vehicles are slowing down to enter and exit a school and typically a higher number of pedestrians are trying to cross the road. Despite these reasons, getting drivers to comply with school zone speed limits remains a challenge. Findings from research suggest that without police enforcement many drivers do not comply with school zone speed limits. However, under certain circumstances, such as an excessively long school zone or a school zone bisected by a stop-controlled or signalized intersection, noncompliance may occur because drivers forget they are in a school zone.

Flashing beacons are often used with school zone speed limit signs to inform drivers entering a school zone that a lower speed limit is in effect. However, as drivers travel through the school zone there is no active means of reminding drivers that they are still in the school zone and should be traveling at a reduced speed. Since the mid-1970s, the City of Naperville, Illinois has used rear-facing flashing beacons on the school speed limit sign assemblies to remind drivers to maintain a reduced speed.

Recently, the Texas Transportation Institute (TTI) evaluated the effectiveness of the rear-facing flashing

beacon at five sites.^{1,2} The first two sites were long school zones intersected by a signalized intersection. The third was a long school zone with no stop- or signal-controlled intersections. The fourth site was an average length school

zone with no stop- or signal-controlled intersections. The fifth site was an average length school zone intersected by a stop-controlled intersection. At each site researchers collected speed data before the rear-facing flashing beacon was installed and again shortly after the treatment was installed.

The speeds of the vehicles were measured as they traveled through the last several hundred feet of the school zone.

At each site the rear-facing flashing beacon was mounted on the existing school speed limit sign assembly in order to utilize the power source from the existing front-facing beacons. Thus, the only additional cost was that associated with the installation of the rear-facing flashing beacon (approximately \$200 plus labor for installation) and an End School Zone sign, if needed. The rear-facing flashing beacons were aimed towards traffic that was already in the school zone and had the same flash rate as the front-facing beacons (approximately 1 flash per second).



Entering School Zone

Leaving School Zone

SIGNS

Site	Length of School Zone (ft)	Speed Limit (mph)		Road Cross Section
		Normal	School Zone	
1	2,675	45	30	4 lanes + TWLTL
2	1,820	45	30	2 lanes + TWLTL
3	1,750	50	30	4 lanes + TWLTL
4	1,000	35	20	2 lanes + TWLTL
5	1,265	35	20	4 lanes + TWLTL

TWLTL - Two-Way Left Turn Lane

At all of the sites except Site 2, the percent of vehicles exceeding the school zone speed limit was reduced. At the long school zones (Site 1 and Site 3) the percent of vehicles exceeding the school zone speed limit before the installation of the rear-facing flashing beacon ranged from 70 to 91 percent. After the installation, the percent of vehicles exceeding the school zone speed limit ranged from 59 to 82 percent. So, at two of three long school zones the installation of a rear-facing beacon yielded a 9 to 20 percent reduction in the percent of vehicles exceeding the school zone speed limit.

At the average length school zones (Site 4 and Site 5) the percent of vehicles exceeding the school zone speed limit in the before period ranged from 34 to 55 percent. In the after period the percent of vehicles exceeding the school zone speed limit ranged from 28 to 46 percent; thus, at both of these locations the installation of a rear-facing flashing beacon resulted in a 15 to 35 percent reduction in the percent of vehicles exceeding the school zone speed limit.

Based on the positive results of these evaluations, the Texas Department of

Transportation (TxDOT) plans to develop guidelines for the use of rear-facing school speed limit beacons. In addition, TxDOT plans to add language concerning the use of rear-facing beacons in the forthcoming 2006 version of the *Texas Manual on Traffic Control Devices*.

Overall, evidence suggests that the application of a rear-facing flashing beacon on the school speed limit sign assembly is a low cost safety improvement that increases driver compliance with the school zone speed limit.

Agencies interested in implementing the rear-facing flashing beacon can do so in compliance with the *Manual on Uniform Traffic Control Devices (MUTCD)*³ (Section 4K.02) as long as it is used in conjunction with a warning or regulatory sign (e.g., an End School Zone sign). If agencies desire to use the rear-facing beacon without a warning or regulatory sign they need to receive approval from the Federal Highway Administration (FHWA) to experiment with the rear-facing flashing beacon. Section 1A.10 of the MUTCD outlines the necessary steps to apply for experimentation.

Percent of Vehicles Exceeding the School Zone Speed Limit										
Site	Approximate Distance from End of School Zone (ft)									
	500		400		300		200		100	
	Before	After	Before	After	Before	After	Before	After	Before	After
1	70	59	78	70	80	71	80	73	82	73
2	-	-	78	74	79	77	76	79	76	75
3	91	82	90	81	89	81	88	78	86	69
4	34	29	43	28	45	33	46	35	47	34
5	-	-	47	37	52	43	51	42	55	46

- Data not collected

¹ Gates, T.J., H.G. Hawkins, Jr., and R.T. Ewart. *Effectiveness of a Rear-Facing Flashing Beacon in School Speed Limit Sign Assemblies*. Paper presented at the Transportation Research Board 83rd Annual Meeting, January 2004.

² Rose, E.R., H.G. Hawkins, Jr., A.J. Holick, and R.P. Bligh. *Evaluation of Traffic Control Devices: First Year Activities*. Report 0-4701-1. Texas Transportation Institute, College Station, Texas, October 2004. <http://tti.tamu.edu/documents/0-4701-1.pdf>.

³ *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004. <http://mutcd.fhwa.dot.gov>.



Volume 1 No. 5

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Studies show that speed displays can significantly improve speed limit compliance by reducing vehicle speeds by approximately 10 mph.

Speed Displays Reduce Traffic Speeds and Increase Speed Limit Compliance

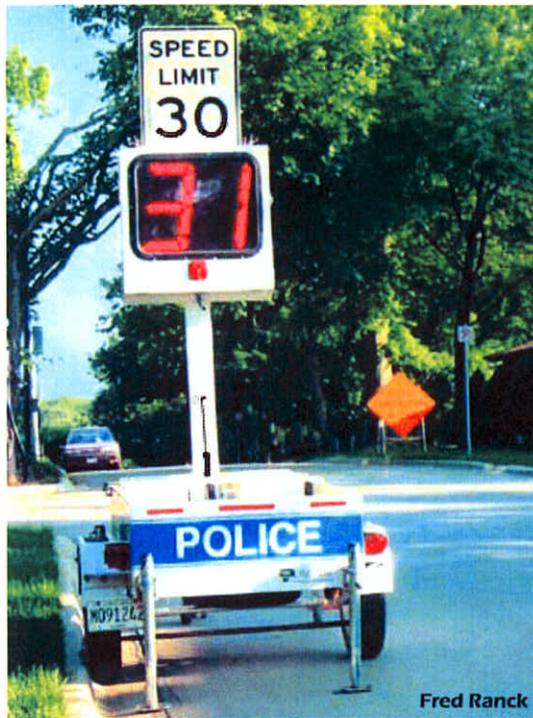
According to the National Highway Traffic Safety Administration, in 2003 approximately 86 percent of all speeding-related fatalities occurred on roads that were not interstate highways. Statistics also show that speeding was involved in 36 percent of the fatal crashes in work zones.

Speed displays are dynamic message signs that use radar to measure and record the speed of approaching vehicles. This measured speed is then displayed to passing drivers in an effort to decrease speeds. The two main types of speed displays are speed display trailers and mounted speed displays. Speed display trailers are portable and thus can be deployed at any roadside location that provides sufficient room. Mounted speed displays can be attached to speed limit signs, telephone poles, police vehicles, or metal stands. Speed display trailers are typically used on a temporary basis, while mounted speed displays are typically more permanent applications. An advantage of the speed display trailer is that a legal speed limit sign can easily be mounted on the trailer, whereas the mounted speed display must be near a current speed limit sign or have one mounted with

it. Speed display trailers typically cost \$5,500 to \$20,000, but can be rented for approximately \$50 a week. Mounted speed displays typically cost \$2,500 to \$7,000.

Speed displays are currently used by many cities and counties in school

zones. Speed display trailers placed in school zones in El Paso, Texas, resulted in a speed reduction of 8.5 mph.¹ Before speed display trailers were placed in school zones in Del Rio, Texas, 81 percent of drivers exceeded the speed limit.¹ After the placement of the speed display trailers, only 18 percent of drivers were traveling above the speed limit (a 78 percent reduction). The



Wheaton, Illinois

Fred Ranck

San Diego County Sheriff's Department also found a speed display trailer to be extremely effective.¹ Before placement, 77 percent of the drivers exceeded a 20 mph school zone speed limit. When a speed trailer was installed, only 20 percent of drivers were traveling above the speed limit (a 74 percent reduction). In Houston, Texas, 90 percent of drivers exceeded a 20 mph school zone speed limit before placement of a mounted speed display.¹ After placement, the proportion of drivers exceeding the

SIGNS



speed limit decreased to 15 percent (an 83 percent reduction).

The City of Phoenix found that a speed display in a school zone with a 15 mph speed limit substantially reduced the 85th percentile speed from approximately 48 mph to approximately 15 mph (a 33 mph reduction).¹ At a second site, the 85th percentile speed was reduced from 32 mph to 25 mph (a 7 mph reduction). A study in Santa Barbara, California found that speeds alongside the speed display trailer were reduced

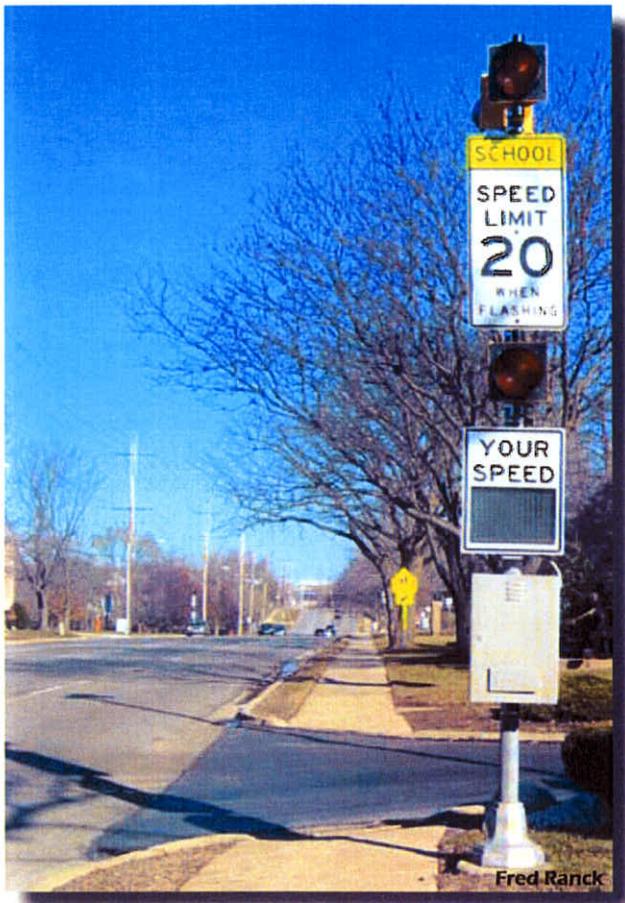
by 10 percent and by 7 percent downstream for a distance up to 0.5 mile.²

In a recent study by the Texas Transportation Institute (TTI), researchers evaluated the effectiveness of a mounted speed display at a school zone on a two-lane roadway in Forney, Texas.³ The normal speed limit was 55 mph and the school zone speed limit was 35 mph. The average speed at the beginning of the school speed zone dropped from 44.5 mph in the before period to 35.3 mph shortly after the speed display was installed (a 9.2 mph reduction). Four months later (speed display still active), the average speed was 35.7 mph, still 8.8 mph below the average speed in the before period.

The 85th percentile speed indicated similar trends – dropping from 50 mph in the before period to 40 mph shortly after the speed display was installed (a 10 mph reduction) and remaining around 42 mph four months later (an 8 mph reduction). The percent of drivers exceeding the school zone speed limit decreased dramatically from 95 percent in the before period to 34 percent shortly after the installation of the mounted speed display (a 64 percent reduction) and was still around 44 percent four months later (a 54 percent reduction).

In another recent study by TTI, researchers evaluated the effectiveness of a speed display trailer at two rural high speed work zones.⁴ The speed display trailer reduced speeds by 2 to 10 mph. In addition, the speed display reduced the percent of vehicles exceeding the posted speed limit.

Overall, evidence suggests that speed displays are a low cost safety improvement that reduces speeds and the proportion of drivers exceeding the speed limit.



Naperville, Illinois

¹ Fors, C. Controlling Community Speeds with Radar Displays. In *Police and Security News*, Vol. 18, No. 5, 2002. <http://www.policeandsecuritynews.com/septoct02/contollingSpeed.htm>.

² Bloch, S.A. *A Comparative Study of the Speed Reduction Effects of Photo-Radar and Speed Display Boards*. Paper presented at the Transportation Research Board 78th Annual Meeting, Washington, D.C., January 1998.

³ Rose, E.R. and G.L. Ullman. *Evaluation of Dynamic Speed Display Signs (DSDS)*. Report 0-4475-1. Texas Transportation Institute, College Station, Texas, September 2003. <http://tti.tamu.edu/documents/0-4475-1.pdf>.

⁴ Fontaine, M.D., P.J. Carlson, and H.G. Hawkins, Jr. *Evaluation of Traffic Control Devices for Rural High-Speed Maintenance Work Zones: Second Year Activities and Final Recommendations*. Report 0-1879-2. Texas Transportation Institute, College Station, Texas, October 2000. <http://tti.tamu.edu/documents/1879-2.pdf>.



Volume 1 No. 6

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Crash studies show that edge lines on two-lane roadways typically reduce crash frequency, especially in horizontal curves.

Edge Lines on Two-Lane Roadways Improve Safety

In the United States, two-lane roads account for almost 90 percent of the rural highway system.¹ According to the National Highway Traffic Safety Administration, in 2004 approximately half of all fatal crashes occurred on two-lane rural roads.

placed on paved rural arterials and collectors with a traveled way ≥ 20 ft wide and an ADT ≥ 3000 vpd. The use of edge lines on other paved streets and highways is open to engineering judgment.

In 1957, the Ohio Department of



The use of edge lines to delineate the path of a roadway is widely accepted as being beneficial to drivers. Thus, edge lines are a standard installation on freeways and other higher-class roadways. However, their use on two-lane rural roadways is less uniform.

The *Manual on Uniform Traffic Control Devices* (MUTCD)² provides warrants and guidance for the use of edge lines. It states that edge lines shall be placed on paved freeways, expressways, and rural arterials with a traveled way ≥ 20 ft wide and an average daily traffic (ADT) ≥ 6000 vehicles per day (vpd). The MUTCD also states that edge lines should be

Highways initiated a program to install edge lines on all two-lane rural highways that were at least 20 ft wide.³ A before-after crash study showed a 19 percent net reduction in crashes after the installation of the edge lines. In addition, edge lines resulted in a 37 percent net reduction in fatalities and injuries, a 63 percent net reduction in crashes at access points such as intersections and driveways, and a 35 percent net reduction in nighttime crashes.

Similarly, in a 1959 study by the Kansas Highway Commission the installation of edge lines resulted in a 78 percent net reduction in fatalities and a

PAVEMENT TREATMENTS



46 percent net decrease in the number of crashes at access points.⁴ The two-lane roadways in this study were 20 to 26 ft wide with a minimum ADT of 1,000 vpd.

Recently, researchers at the Center for Transportation Research at the University of Texas computed crash statistics from 4 years of Texas data in order to compare crash trends on two-lane roadways with and without edge lines.⁵ The two-lane roadways included in this analysis had 9, 10, and 11 ft lane widths and shoulder widths \leq 4 ft.

The crash ratios for roadways with and without edge lines were 1.50 and 1.63 crashes per million vehicle miles traveled [VMT], respectively. These results show that roadways with edge lines have an 8 percent lower mean crash ratio than similar roadways without edge lines. Stratifying the data by horizontal alignment reveals even larger differences in the mean crash ratios. For all curved segments without edge lines the mean crash ratio was 5.80 crashes per million VMT. For curved

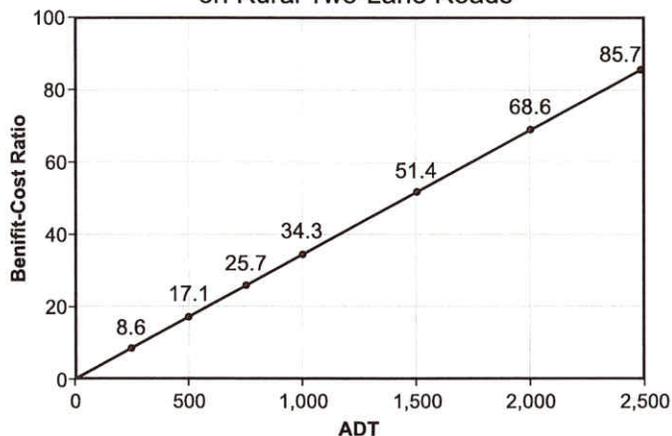
segments with edge lines the mean crash ratio was 4.30 crashes per million VMT (a 26 percent decrease). Thus, curved segments without edge lines had an average of 1.5 more crashes per million VMT than curved segments with edge lines.

In the 1990s, a study on the benefit-cost ratio of edge line installations, particularly on two-lane rural highways, was conducted.⁶ Using crash statistics and cost estimates from that time, it was determined that even on two-lane rural roads with an ADT of 500 vpd edge lines yield \$17 in safety benefits for every dollar invested. Researchers further concluded that edge lines would be justified on two-lane rural roadways if an average of one non-intersection crash occurs annually every 15.5 miles.

Overall, evidence suggests that the installation of edge lines is a low cost safety improvement that reduces crash frequency on two-lane roadways.

Horizontal Alignment	Mean Crash Ratio (Crashes per Million VMT)	
	Roadways With Edge Lines	Roadways Without Edge Lines
Not Stratified	1.50	1.63
Straight	1.70	1.81
Curved	4.30	5.80

Benefit-Cost Ratio by ADT for Edge Lines on Rural Two-Lane Roads⁶



¹ Table HM-35 Federal-Aid Highway Length – 2003 Miles by Traffic Lanes and Access Control. Highway Statistics 2003. Federal Highway Administration, Washington, D.C., 2003.

<http://www.fhwa.dot.gov/ohim/hs00/hm35.htm>.

² Manual on Uniform Traffic Control Devices for Streets and Highways. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.

<http://mutcd.fhwa.dot.gov>.

³ Musick, J.V. Effect of Pavement Edge Marking on Two-Lane Rural State Highways in Ohio. In *Highway Research Board Bulletin 266*, Highway Research Board, National Research Council, Washington, D.C., 1962, pp. 1-7.

⁴ Basile, A.J. Effect of Pavement Edge Markings on Traffic Accidents in Kansas. In *Highway Research Board Bulletin 308*, Highway Research Board, National Research Council, Washington, D.C., 1962, pp. 80-86.

⁵ Tsyganov, A., R.B. Machemehl, and N.M. Warrenchuk. *Safety Impact of Edge Lines on Rural Two-Lane Highways*. Center for Transportation Research, The University of Texas, Austin, Texas, September 2005.

http://www.utexas.edu/research/ctr/pdf_reports/0_5090_1.pdf.

⁶ Miller, T.R. Benefit-Cost Analysis of Lane Marking. In *Transportation Research Record 1334*, Transportation Research Board, National Research Council, Washington, D.C., 1992, pp. 38-45.



Volume 1 No. 7

LOW COST LOCAL ROAD SAFETY SOLUTIONS

The use of wider pavement markings results in crash reductions and improves visibility, lane positioning, and driver comfort.

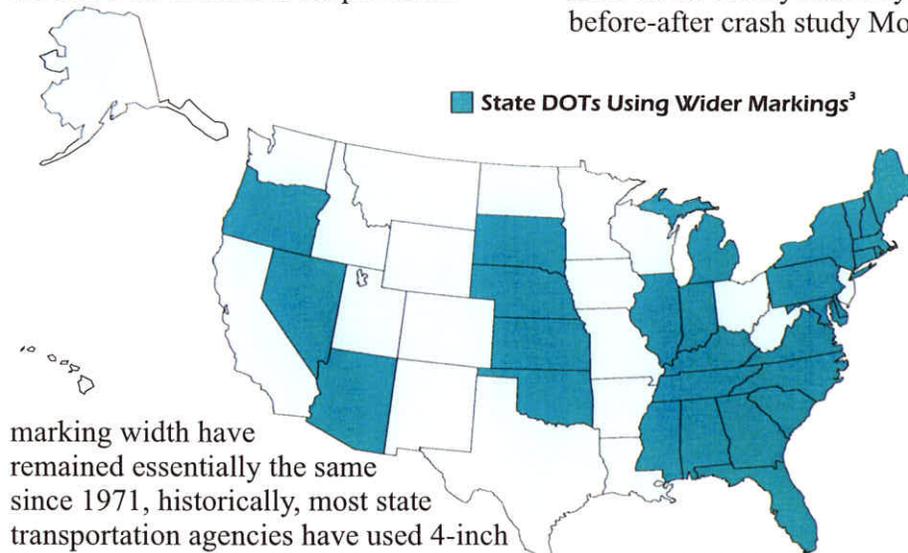
Wider Longitudinal Pavement Markings Improve Safety

According to the National Highway Traffic Safety Administration, in 1999 there were 8,091 (24 percent) single vehicle run-off-road crashes on two-lane roadways. One safety strategy recommended to address run-off-road crashes is the use of wider longitudinal pavement markings.¹

The *Manual on Uniform Traffic Control Devices* (MUTCD)² specifies the normal width of a longitudinal line to be 4 to 6 inches wide. Even though the MUTCD standards for pavement

Canada to determine the use and benefits of wider markings.³ Based on the survey responses, 29 of the 50 state departments of transportation (58 percent) were using wider markings. The most widely cited reason for using wider markings was improved marking visibility (57 percent of respondents).

One of the first applications of wider edge lines in the United States was in Morris County, New Jersey.⁴ In 1981, Morris County installed 8-inch edge lines on all county roadways. In a before-after crash study Morris County



marking width have remained essentially the same since 1971, historically, most state transportation agencies have used 4-inch lines as their standard. Wider markings (in some cases up to 12 inches) are used extensively in Europe and over the past two decades an increasing number of agencies have begun to use wider markings as tools to enhance roadway safety.³ Herein, the term “wider markings” refers to longitudinal pavement markings (centerline, lane line, or edge line) greater than 4 inches in width.

In 2001, researchers at the Texas Transportation Institute (TTI) administered a survey to transportation agencies in the United States and

compared 1980 fatality and injury crashes (when all county roads had 4-inch edge lines) to similar crashes in 1983 (when all county roads had 8-inch edge lines). In Morris County, the percent of fatality and injury crashes decreased by 10 percent compared to only a 2 percent decrease in crashes for other county roads in New Jersey (an 8 percent net change). In addition, single vehicle fatality and injury crashes in Morris County decreased by 33 percent compared to a 22 percent decrease in crashes for other New Jersey county roads (an 11 percent net change).

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A 1988 study by the New York State Department of Transportation indicated that sections of curving two-lane rural roads with new 8-inch edge lines resulted in higher crash reductions than similar sections with new 4-inch edge lines.¹ In particular, the study found greater safety effects for total crashes (a 10 percent decrease for wider edge lines versus a 5 percent increase for standard edge lines), for injury crashes (a 15 percent decrease versus a 10 percent decrease, respectively), and for fixed-object crashes (a 33 percent decrease versus a 17 percent decrease, respectively).

In a 1989 Federal Highway Administration (FHWA) study, researchers found that for rural roadways 24 ft wide, with less than 6 ft shoulders, and average daily traffic (ADT) volumes between 2,000 and 5,000 vehicle per day (vpd), those striped with 8-inch edge lines experienced a relative decrease in total crash rate, total crash frequency, and injury/fatal crash rate compared to those roadways striped with 4-inch edge lines.⁵ These findings were based on information provided by the Alabama Department of Transportation for nearly 300 miles of two-lane rural highways. Based on the research findings, the researchers recommended 8-inch edge lines on roadways with the following conditions: ADT between 2,000 and 5,000 vpd, pavement width equal to 24 ft with unpaved shoulders, and frequent rainfall.

Historically, benefit-cost analyses have served as an engineering benchmark by which to compare roadway countermeasures; unfortunately to date conclusive benefit-cost data are not obtainable. In

the 1980s, a FHWA study did determine that an annual reduction of only eight edge line-related crashes for every 1,000 miles striped with 8-inch edge lines would allow for the wider lines to be cost-effective; however, many transportation agencies are turning to indirect safety measures to justify the use of wider markings.^{3,5} These indirect measures include: driver opinion surveys, visibility measures (e.g., detection distance), and surrogate safety measures (e.g., vehicle position).

One of the most notable driver opinion surveys concerning wider markings was conducted in Florida.³ This survey showed that older drivers preferred wider markings. The decision to implement 6-inch markings statewide was due in part to the results of this survey. Two studies have found a significant increase in the average end detection distance between 4-inch and wider edge lines (6-inch and 8-inch) for younger drivers, as well as older drivers.^{6,7} A study in Massachusetts showed that 8-inch edge lines on curved highway segments results in fewer lane departures compared to 4-inch edge lines.⁵

Overall, evidence suggests that the installation of wider pavement markings is a low cost safety improvement that reduces crash frequency, improves end detection, improves lane positioning, benefits older drivers, and improves driver comfort.

¹ Neuman, T.R., R. Pfefer, K.L. Slack, K.K. Hardy, F. Council, H. McGee, L. Prothe, and K. Eccles. *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan Volume 6: A Guide for Addressing Run-Off-Road Collisions*. NCHRP Report 500. Transportation Research Board, Washington, D.C., 2003.

http://gulliver.trb.org/publications/nchrp/nchrp_rpt_500v6.pdf.

² *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.

<http://mutcd.fhwa.dot.gov>.

³ Gates, T. J. and H.G. Hawkins. *The Use of Wider Longitudinal Pavement Markings*. Report 0024-1. Texas Transportation Institute, College Station, Texas, March 2002.

<http://tti.tamu.edu/documents/0024-1.pdf>.

⁴ Wider Edgelines Cut Accident Rates. In *Better Roads*, April 1986, pp. 33-34.

⁵ Hughes, W.E., H.W. McGee, S. Hussain, and J. Keegel. *Field Evaluation of Edgeline Widths*. FHWA-89-111. Bellomo-McGee, Inc., Federal Highway Administration, Washington, D.C., 1989.

⁶ Zwahlen, H.T. and T. Schnell. Visibility of New Pavement Markings at Night Under Low-Beam Illumination. In *Transportation Research Record 1495*, Transportation Research Board, National Research Council, Washington, D.C., 1995.

⁷ Schnell, T. and P.J. Ohme. *Evaluation of Various Strategies to Increase Pavement Marking Visibility of Older Drivers*. Paper presented at the Transportation Research Board's 81st Annual Meeting, January 2002.

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Volume 1 No. 8

Crash studies show that RPMs reduce total crashes by 7 to 10% and reduce nighttime wet weather crashes by 24 to 33%.

Raised Pavement Markers Reduce Crashes on Two-Lane Roadways

According to the National Highway Traffic Safety Administration, in 2004 approximately 90 percent of all fatal crashes on rural roads occurred on two-lane roadways. In addition, about half of all single vehicle crashes on rural two-lane roads occur on curves, while the other half occurs in tangent sections.

be used. If snowfall is not a concern, raised non-snowplowable RPMs can be used. Raised snowplowable RPMs cost the most ranging from \$24 to \$38 each installed.² Recessed RPMs typically cost \$13 to \$25 each installed and raised non-snowplowable typically cost \$2 to \$9 each installed.²



Raised pavement markers (RPMs) can be used for additional delineation of the driving path and enhance the ability of the driver to track the roadway, particularly at night or during wet weather. RPMs can also provide tactile and auditory warning to drivers when vehicles traverse the markers.

In general, there are two main types of RPMs: non-retroreflective and retroreflective. Both types are used in conjunction with each other to show roadway alignment or to supplement or substitute for pavement markings.¹ Where snowfall is a concern, raised snowplowable or recessed RPMs can

In the late 1970s, the Georgia Department of Transportation installed RPMs (both raised and recessed) on the centerlines of 662 horizontal curves, all of which were in excess of 6 degrees of curvature.³ The nighttime crashes were estimated to have been reduced by 22 percent compared with daytime crashes at the same sites. In addition, single-vehicle crashes were estimated to have been reduced by 12 percent more than other nighttime crash types.

Around the same time in Ohio, RPM studies were conducted at 184 high crash rate locations (including horizontal curves, narrow bridges,

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stop approaches, and interchanges).⁴ Over 3,200 crashes at these locations were analyzed one year before and one year after installation. The results show a 9 percent reduction in crashes and a 15 percent decrease in injuries. RPMs were considered effective under all types of driving conditions, including nighttime conditions (a 5 percent reduction) and adverse weather conditions (a 6 percent reduction at the same time precipitation increased by 11 percent). Based on these results, the study concluded that for every dollar spent on RPMs there was a return of \$6.50 in savings due to a crash reduction.

In the late 1980s, RPMs were installed on approximately 230 miles of mainly two-lane roadways in New Jersey.⁴ Using data from two years before and one year after, there was a significant reduction in various types of nighttime crashes including total injury, head-on, and overturn crashes. The calculated benefit-cost ratios ranged from 15.49:1 to 25.51:1.

In the late 1990s, the New York State Department of Transportation conducted a safety assessment of RPMs as part of a review of the department's policy on RPM installation.^{5,6} The before-after study included 20 sites where RPMs had been installed selectively on unlit suburban and rural roadways with proportionately high numbers of nighttime crashes and nighttime wet weather crashes. The results show a 7 percent decrease in total crashes, a 26 percent decrease in nighttime crashes, and a 33 percent decrease in

nighttime wet weather crashes. In addition, there was a 23 percent reduction in all guidance related crashes (e.g., run-off-road, head-on, encroachment, and sideswipe) and a 39 percent reduction in nighttime guidance crashes.

Recently, National Cooperative Highway Research Program (NCHRP) Project 5-17 was completed to quantify the safety effects of RPMs and to develop guidelines for their use.⁷ This study gathered data in six states (Illinois, Missouri, New Jersey, New York, Pennsylvania, and Wisconsin) to evaluate the safety performance of snowplowable RPMs at non-intersection locations along two-lane roadways, four-lane expressways, and four-lane freeways. For two-lane roadways, the New Jersey data showed a 20 percent decrease in head-on crashes after the nonselective implementation of RPMs. In addition, the New York data showed a 10 percent decrease in total crashes, a 13 percent decrease in nighttime crashes, a 20 percent decrease in wet weather crashes, and a 24 percent decrease in wet weather nighttime crashes after the selective implementation of RPMs on two-lane roadways.

Overall, evidence suggests that the installation of RPMs is low cost safety improvement that reduces crashes, especially nighttime wet weather crashes, on two-lane roadways.

For more information on the use of RPMs, please reference the *Manual on Uniform Traffic Control Devices (MUTCD)*¹ and *NCHRP Report 518*.⁷

¹ *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.
<http://mutcd.fhwa.dot.gov>.

² Migletz, J. and J. Graham. *Long-Term Pavement Marking Practices*. NCHRP Synthesis 306. Transportation Research Board, Washington, D.C., 2002.
http://trb.org/news/blurbs_detail.asp?id=1119.

³ Wright, P.H., P.L. Zador, C.Y. Park, and R.S. Karpf. *Effect of Pavement Markers on Nighttime Crashes in Georgia*. Insurance Institute for Highway Safety, Washington, D.C., 1982.

⁴ Neuman, T.R., R. Pfefer, K.L. Slack, K.K. Hardy, F. Council, H. McGee, L. Prothe, and K. Eccles. *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan Volume 6: A Guide for Addressing Run-Off-Road Collisions*. NCHRP Report 500. Transportation Research Board, Washington, D.C., 2003.
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_500v6.pdf.

⁵ *Highway Safety Improvement Program-Annual Evaluation Report*. New York State Department of Transportation, Albany, New York, 1989.

⁶ *Raised Reflectorized Snowplowable Pavement Markers: A Report to the Governor*. New York State Department of Transportation, Albany, New York, 1997.

⁷ Bahar, G., C. Mollett, B. Persaud, C. Lyon, A. Smiley, T. Smahel, and H. McGee. *Safety Evaluation of Permanent Raised Pavement Markers*. NCHRP Report 518. Transportation Research Board, Washington, D.C., 2004.
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_518.pdf.



Volume 1 No. 9

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Shoulder and edge line rumble strips on two-lane roadways reduce run-off-road crashes by 25% and yield estimated benefit-cost ratios ranging from 2 to 221.

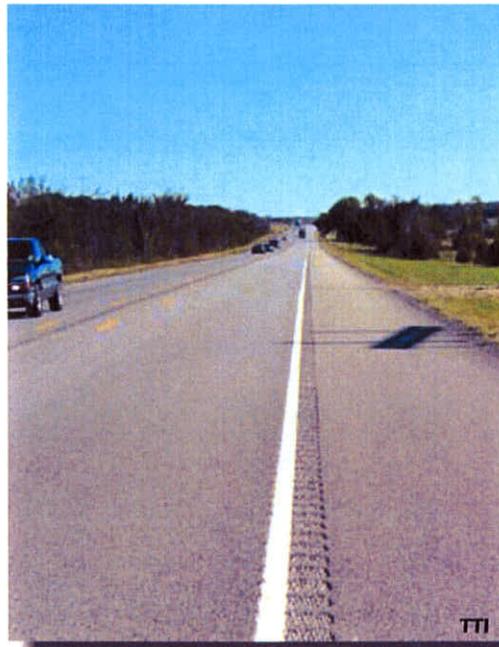
Shoulder and Edge Line Rumble Strips Reduce Run-Off-Road Crashes

According to the National Highway Traffic Safety Administration, in 1999 approximately 24 percent of all fatal crashes that occurred on two-lane roads were the result of a single-vehicle run-off-road crash. Of the single-vehicle run-off-road crashes on two-lane

freeway shoulders and some undivided roadways as a countermeasure for roadway departure crashes. Research on freeway shoulder rumble strips has shown significant reductions in run-off-road crashes (between 15 and 80 percent).^{1,2}

Based on the positive results from freeway applications, some transportation agencies have begun to install shoulder or edge line rumble strips on two-lane roadways. For example, the Mississippi Department of Transportation has installed edge line rumble strips on a two-lane roadway in Lamar County.³ In a before-after crash study, right side run-off-road crashes were reduced by 25 percent after the installation of the edge line rumble strips. In addition, a survey of 619 drivers found that 88 percent of those surveyed recommended that edge line rumble strips be implemented on all of Mississippi's rural highways.

In the fall of 2005, Kitsap County, Washington installed edge line rumble strips along approximately four miles of a two-lane roadway with heavy traffic and bicycle volumes.⁴ Prior to the installation of the edge line rumble strips, three crashes between vehicles and a bicyclist occurred resulting in two fatalities. The county hopes that the edge line rumble strips will reduce the number of vehicles that drift onto the shoulder where the bicyclists travel. Kitsap County plans to monitor the effects of the edge line rumble strips for one year after which they will consider the installation of edge line rumble strips at additional sites. To date, Kitsap County has received positive feedback from the community and bicyclists regarding the edge line rumble strips.



Edge Line Application

roads, 82 percent occurred on rural roads. Contributing factors to roadway departure crashes include: visibility in less than ideal conditions, driver fatigue and drowsiness, and drivers who are inattentive, careless, or distracted, and drift out of the travel lane and off the road.

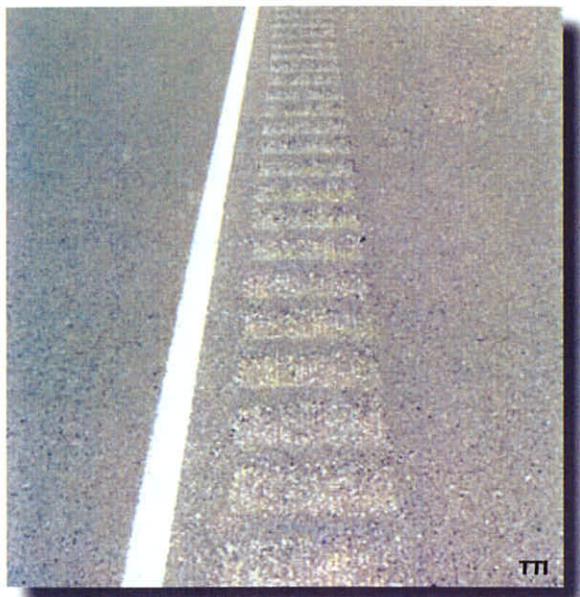
Rumble strips are raised or grooved patterns on the roadway that produce audible and tactile warnings when traversed by vehicle tires. Rumble strips placed on the shoulder or edge line are used to alert drivers that they are leaving the travel lane. Initially, shoulder rumble strips were placed on

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In a recent study by the Texas Transportation Institute (TTI) researchers computed benefit-cost ratios for edge line rumble strips based on data from Texas.⁵ Researchers assumed a 20 percent reduction in crashes as a result of the edge line rumble strips and a cost of \$0.25 per linear foot to install the edge line rumble strips, install pavement markings, and maintain traffic. The benefit-cost ratios computed varied from 2 to 221 depending upon the roadway volume and shoulder width.

The TTI study also looked at how edge line rumble strips affect the position of vehicles on



Shoulder Application

two-lane roadways. Researchers found that shoulder encroachment decreased by almost 50 percent after the installation of edge line rumble strips. Based on the findings, edge line rumble strips appear to have a positive impact on driver lane keeping.

Another potential benefit of edge line rumble strips is their ability to enhance the visibility of the edge line pavement markings in wet weather conditions. An on-going Texas Department of Transportation research project (0-5008) is currently evaluating the wet night visibility of various types of pavement marking materials, including the application of pavement markings over rumble strips (referred to as rumble stripes). For more information on rumble stripes, please reference case study number eleven of this publication.

Overall, evidence suggests that the installation of shoulder and edge line rumble strips is a low cost safety improvement that reduces run-off-road crashes on freeways, as well as on rural two-lane roadways.

For more information on rumble strips, please visit the Federal Highway Administration (FHWA) Highway Safety Program website at http://safety.fhwa.dot.gov/roadway_dept/rumble/ or the TTI Traffic Control Devices website at <http://tcd.tamu.edu/documents/rumble/rumble1.htm>.

Benefit-Cost Ratios for Four ADT Ranges and Seven Shoulder Width Ranges							
ADT	Shoulder Width (ft)						
	0.0-1.5	2.0-4.0	4.5.0-6.0	6.5-8.0	8.5-9.0	9.5-10.0	>10.0
≤ 1500	125	111	108	153	115	100	2
1500-2999	111	126	113	93	91	73	120
3000-4499	57	76	127	149	139	90	221
≥ 4500	96	199	102	161	144	200	60

ADT- Average Daily Traffic

¹ Federal Highway Administration Highway Safety Program Rumble Strip Website, Accessed January 2006.

http://safety.fhwa.dot.gov/roadway_dept/rumble/effectiveness.htm.

² Morena, D.A. Rumbling Toward Safety. In *Public Roads*, Vol. 67, No. 2, September/October 2003.

<http://www.tfrc.gov/pubrds/03sep/06.htm>.

³ Willis, J. and W. Dean. *Mississippi's Rumble Stripe Experience*. Presentation at the Transportation Research Board's 83rd Annual Meeting, January 2004.

<http://tcd.tamu.edu/documents/rumble/rumble1.htm>.

⁴ Information provided by Bill Zupancic of Kitsap County, Washington.

http://www.kitsapgov.com/pw/pilot_program.htm.

⁵ Carlson, P.J. and J.D. Miles. *Traffic Operational Impacts of Transverse, Centerline, and Edgeline Rumble Strips*. Report 0-4472-2. Texas Transportation Institute, College Station, Texas, September 2003.

<http://tti.tamu.edu/documents/0-4472-2.pdf>.



Volume 1 No. 10

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Crash studies show that centerline rumble strips typically reduce head-on and opposing-direction sideswipe crashes by 20 to 25% and yield benefit-cost ratios ranging from 0.99 to 24.88.

PAVEMENT TREATMENTS



Centerline Rumble Strips Reduce Head-On and Sideswipe Crashes

According to the National Highway Traffic Safety Administration, in 2004 approximately 57 percent of all fatal crashes happened on rural roads, with approximately 90 percent occurring on two-lane roads. Fourteen percent of crashes on rural, two-lane roads were a result of head-on or opposing-direction sideswipe crashes.

Rumble strips are raised or grooved patterns on the roadway that produce audible and tactile warnings when traversed by vehicle tires. Currently, rumble strips are used extensively on the shoulders of freeways and some undivided roadways as a countermeasure for roadway departure crashes. In recent years, many states have implemented centerline rumble strips on undivided roadways as a countermeasure to reduce head-on and opposing-direction sideswipe crashes.

One of the first installations of centerline rumble strips that was systematically evaluated was in Delaware along a 2.9 mile section of an undivided two-lane road.¹ Crash data from 3 years prior to and 6 years after installation showed a 90 percent

decrease in the average yearly head-on crashes and a complete reduction in fatal crashes (no fatalities during the six-year after period).

In 1996, the Colorado Department

of Transportation installed centerline rumble strips along a 17 mile section of an undivided two-lane road.² Crash data from similar 44-month periods before and after installation showed a 22 percent reduction in head-on crashes and a 25 percent reduction in opposing-direction sideswipe crashes.

In 2003, the Insurance Institute for Highway Safety completed a before-after crash study to assess the effectiveness of centerline rumble strips on rural undivided two-lane roads.³ Data from seven states were used: California, Colorado, Delaware, Maryland, Minnesota, Oregon,

and Washington. The study included 98 treatment sites along approximately 210 miles of roadway. Average daily traffic (ADT) volumes at the treatment sites ranged from 5,000 to 22,000 vehicles per day. The installation of centerline rumble strips reduced all crashes by 14 percent, and head-on and opposing-



Paul Carlson



Volume 1 No. 11

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Studies show that edge line rumble stripes can have retroreflectivity levels up to 20 times higher than an equivalent flat line in wet conditions after a year of service.

PAVEMENT TREATMENTS



Pavement Markings Over Rumble Strips (Rumble Stripes) Improve Pavement Marking Visibility

National statistics show that about half of all run-off-road crashes occur at night. As a measure to reduce that number, many transportation agencies are beginning to apply pavement markings to rumble strips to increase the visibility of the markings after

including the winter maintenance activities. The results indicate that dry and wet rumble stripe markings provide 6 and 20 times more retroreflectivity, respectively, than the standard flat edge line markings. These results demonstrate that rumble stripes have



Jim Willis

Lamar County, Mississippi

dark and in inclement conditions. A pavement marking applied to a rumble strip is referred to as a “rumble stripe.” Because the sloped edges of the strips are painted, the pavement marking is more visible at night and during wet conditions.

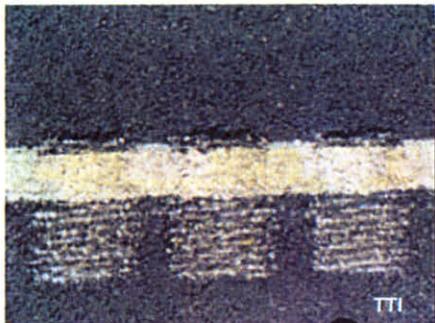
The Michigan Department of Transportation has evaluated rumble stripes by placing a pavement marking over pre-existing shoulder rumble strips, creating a double edge line system.¹ Retroreflectivity of both the standard flat line, and the shoulder rumble stripe, were measured after one year of service,

higher wet retroreflectivity than the standard flat lines, and that the rumble stripe may be protected from snow removal equipment as indicated by the higher dry retroreflectivity values. A pavement marking protected from snow removal equipment will increase the durability of the marking, extending its service life, and reducing yearly pavement marking costs.

The Mississippi Department of Transportation has also experimented with rumble stripes on edge lines at several sites. They concluded that in addition to the excellent audible

warning, rumble stripes provide increased retroreflectivity of pavement markings similar to that of profiled markings.²

An on-going Texas Department of Transportation research project (0-5008) is currently evaluating the wet night visibility of various types of pavement marking materials, including rumble stripes.³ The results of the first year of the project indicate

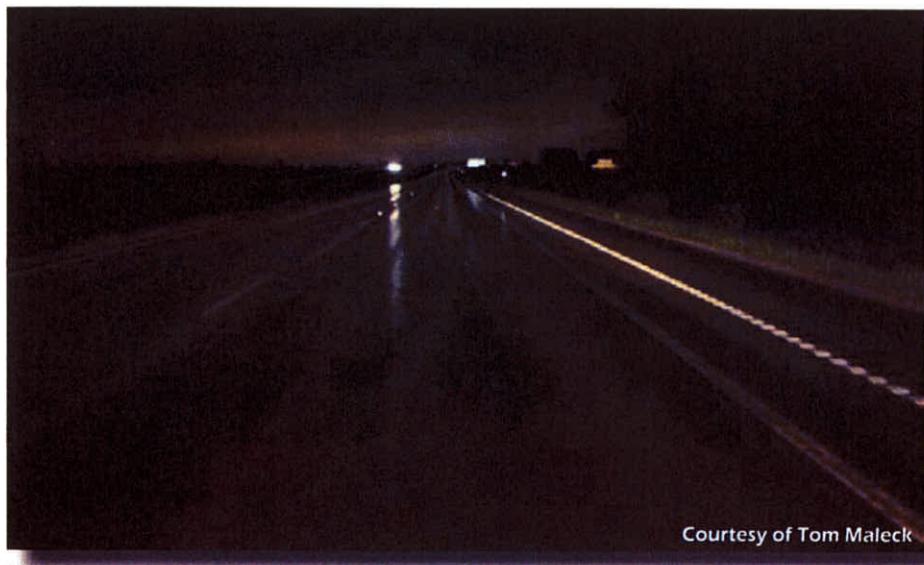


an overall advantage of a rumble stripe versus a standard flat line of the same marking material with the rumble stripe providing an additional 25 ft of visibility distance. The study indicated that the rumble stripe provides similar visibility to the standard flat line in low rainfall events, but better visibility in medium and heavy rainfall events. This is the result of the rumble stripe being more efficient than a flat marking at allowing water to run off of the marking. The project also looked at

the retroreflectivity of pavement markings, using the three current American Society for Testing and Materials (ASTM) measuring techniques. In a dry condition, the rumble stripe and standard flat line were similar in retroreflectivity. In a recovery condition (the time after its done raining but the road is still wet) the rumble stripe had a retroreflectivity value approximately twice as high as the standard flat line. In a continuous wetting condition (a simulated rainfall) the rumble stripe had a retroreflectivity value between two and four times higher than the standard flat line depending on the rainfall rate. It should be noted that for this project the lines were not weathered for a year like in the Michigan study.

Overall, evidence suggests that the installation of pavement markings over rumble strips, creating a rumble stripe, can increase the visibility of pavement markings in wet conditions.

For more information on rumble strips or rumble stripes please visit the Federal Highway Administration (FHWA) Highway Safety Program website at http://safety.fhwa.dot.gov/roadway_dept/index.htm or the TTI Traffic Control Devices website at <http://tcd.tamu.edu/documents/rumble/rumble1.htm>.



Michigan

¹ Filcek, M.J., V. Oulevski, J.G. Morena, D.C. Long, and T.L. Maleck. *Development of a Profiled Pavement Marking System: Investigation of the Dry/Wet-Night Retroreflectivity and Durability of Pavement Markings Placed in Milled Rumble Strips*. Paper presented at the Transportation Research Board 83rd Annual Meeting, January 2004.

² Willis, J. and W. Dean. *Mississippi's Rumble Stripe Experience*. Presentation at the Transportation Research Board 83rd Annual Meeting, January 2004. <http://tcd.tamu.edu/documents/rumble/rumble1.htm>.

³ Carlson, P.J., J.D. Miles, M.P. Pratt, and A.M. Pike. *Evaluation of Wet-Weather Pavement Markings: First Year Report*. Report 0-5008-1. Texas Transportation Institute, College Station, Texas, 2005. <http://tti.tamu.edu/documents/0-5008-1.pdf>.



Volume 1 No. 12

LOW COST LOCAL ROAD SAFETY SOLUTIONS

On-pavement horizontal signing at curves reduces average speeds by 3 to 10%, while directional lane markings reduce wrong-way movements by 93%.

PAVEMENT TREATMENTS

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On-Pavement Horizontal Signing: Information in the Driver's Line-of-Sight

Traffic control devices, such as signs and pavement markings, provide regulatory, warning, and guidance information to drivers. However, in some cases additional information is needed.



One way to supplement the information presented on other types of traffic control devices is through the use of horizontal signing. Horizontal signing consists of symbols or words on the pavement directly in the driver's line-of-sight that provides information to drivers.

During a 1998 transportation technology scanning tour of four European countries, members observed that horizontal signing practices in Europe provide drivers with a significantly greater amount of information than the pavement markings in the United States.¹ Horizontal signing is used extensively in Europe

where traffic engineers feel that the redundancy provided by horizontal signing is a very important element to attain and improve both efficiency and safety. Some examples of European horizontal signing are: highway route numbers (with arrows where necessary) at intersections and highway entrance/exit ramps, stop and yield markings, bus lane markings, and school markings.

The current version of the *Manual of Uniform Traffic Control Devices (MUTCD)*² does include provisions for horizontal regulatory, warning, and guide signing. Examples provided in the MUTCD include: STOP, arrow symbols, speeds (25 mph), stop/yield ahead, school crossing, pedestrian crossing, railroad crossing, and route guidance (US 40).

In a recent study by the Texas Transportation Institute (TTI), researchers applied the words CURVE 55 MPH on the pavement of a rural two-lane roadway approximately 400 ft after the standard curve warning sign but prior to the beginning of the curve to see if this horizontal signing encouraged drivers to slow down in the curve.³ After the installation of the horizontal signing, the average speed at the beginning of the curve decreased from 61 mph to 59 mph (a 3 percent reduction). On an individual basis, in the before period drivers slowed down approximately 8 mph, while in the after period drivers slowed down around 12 mph. The estimated cost of this application was \$500.⁴

At another curve on an urban four-lane divided highway, researchers applied a curve arrow followed by the words 50 MPH on the pavement. Prior to the installation of the horizontal

signing the average speed at the beginning of the horizontal curve was 66 mph, which was 11 mph over the posted speed limit of 55 mph. The posted speed limit violation rate at the beginning of the curve was 94 percent. After the installation of the horizontal signing, the average speed entering the curve decreased by 7 mph to 59 mph (a 10 percent reduction) and the posted speed limit violation rate was 78 percent (a 17 percent reduction). The estimated cost for this application was \$400.⁴

TTI researchers also investigated the application of lane direction pavement marking arrows at a location where traffic exits the highway onto a two-way, two-lane frontage road. A pair of through lane arrow pavement markings was placed approximately 120 ft downstream of the gore area of the exit ramp as a means of providing an additional cue for drivers to recognize the direction of traffic flow and thus reduce wrong-way movements. The estimated cost of this installation was \$300.⁴

The before-after data showed that the presence of the lane direction arrows had a beneficial effect on

the proportion of wrong-way movements. During the before period 385 wrong-way movements occurred. In the after period only 28 wrong-way movements occurred, a 93 percent reduction in wrong-way movements.

At three suburban sites in Northern Virginia, standard right-turn and through lane arrow pavement markings were applied several hundred feet in advance of mid-block driveways in an attempt to reduce rear-end collisions between non-turning vehicles and right-turning vehicles.⁵ The installation of the arrow symbols resulted in a reduction in conflicts at all three sites. Before the installation of the arrow symbols conflicts per 100 potential conflict situations ranged from 4.7 to 18.6. After the installation, conflicts per 100 potential conflict situations ranged from 2.4 to 9.2.

Overall, evidence suggests that the installation of horizontal signing is a low cost safety improvement that reduces (1) speeds in curves, (2) wrong-way movements where drivers may be confused about an appropriate lane selection, and (3) vehicle conflicts at mid-block driveways.



Steve Schrock

¹ Tignor, S.C., L.L. Brown, J.L. Butner, R. Cunard, S.C. Davis, H.G. Hawkins, E.L. Fischer, M.R. Kehrli, P.F. Rusch, and W.S. Wainwright. *Innovative Traffic Control Technology and Practices in Europe*. Report FHWA-PL-99-021. Federal Highway Administration, Washington, D.C., August 1999. <http://international.fhwa.dot.gov/Pdfs/Innovtce.pdf>.

² *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004. <http://mutcd.fhwa.dot.gov>.

³ Chrysler, S.T. and S.D. Schrock. *Field Evaluations and Driver Comprehension Studies of Horizontal Signing*. Report 0-4471-2. Texas Transportation Institute, College Station, Texas, February 2005. <http://tti.tamu.edu/documents/0-4471-2.pdf>.

⁴ Cost varies per quantity.

⁵ Retting, R.A., M.A. Greene, and J. Van Houten. Use of Pavement Markings To Reduce Rear-End Conflicts at Commercial Driveway Locations. In *Transportation Research Record 1605*, Transportation Research Board, National Research Council, Washington, D.C., 1997, pp.106-110.



Volume 1 No. 13

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Converging chevron pavement marking patterns reduce 85th percentile speeds by 11 to 24% and result in a 43% reduction in crashes.

Converging Chevron Pavement Marking Pattern Slows Down Traffic and Reduces Crashes

Speeding is one of the most prevalent factors contributing to traffic crashes. As drivers approach intersecting roadways, speeding extends the distance necessary to stop a vehicle so drivers have less time to react to vehicles entering the roadway. In addition, speeding reduces a driver's ability to safely traverse curves.

A converging chevron pavement marking pattern is one potential traffic control device that can be used to reduce speeds. The converging chevron pavement marking pattern consists of a series of white chevrons on the road surface with the spacing between chevrons decreasing as the driver travels over the pattern. This pattern creates the illusion that the vehicle is traveling faster than the vehicle's actual speed and that the road is narrowing.

In 1997, the City of Eagan, Minnesota applied a converging chevron pattern on a residential street (approximately 5,000 ADT) with a posted speed limit of 30 mph to reduce vehicle speeds.¹ The cost to implement was less than \$1,000.

Before the application of the converging chevron pattern, the 85th percentile speed in the area was 41 mph

and the highest speed recorded was 58 mph. One week after the installation of the converging chevron pattern the 85th percentile speed was reduced to 35 mph (a 15 percent reduction)

and the highest speed recorded was 45 mph. Two years later the 85th percentile speed was still less than during the before period (39 mph which was a 5 percent reduction). In 2001, the city resurfaced the roadway and repainted the converging chevron pattern. Immediately after this, the 85th percentile speed was 35 mph and the highest speed recorded was 40 mph.

Also in 1997, the City of Columbus, Ohio applied a converging chevron pattern on the approach to a double S-curve on a two-way, two-lane roadway.² The

posted speed limit was 35 mph and the advisory speed was 15 mph. Prior to installation of the markings the 85th percentile speed at the curve was 37 mph. Approximately 15 months later, the 85th percentile speed was reduced to 33 mph (an 11 percent reduction). The City of Columbus is currently



PAVEMENT TREATMENTS



considering the application of a converging chevron pattern at another S-curve in an effort to reduce speeds and roadway departures. This roadway has a posted speed limit of 45 mph and an advisory speed of 25 mph.

In May 1999, the Wisconsin Department of Transportation installed the converging chevron pattern on one of the Interstate 94 exit ramps at the Mitchell interchange in Milwaukee to reduce exit ramp speeds and large truck rollovers.³ The posted speed limit was 65 mph and the advisory speed for the ramp was 50 mph. The installation cost was \$40,000. The markings were reapplied in October 2001 at a cost of \$38,000.

Twenty months after the installation of the converging chevron pattern, the 85th percentile speed immediately downstream of the converging chevron pattern dropped from 70 mph to 53 mph (a

24 percent reduction). A before-after crash study showed that the number of crashes on the ramp was reduced from 14 to 8 (a 43 percent reduction) and the number of crashes involving large trucks decreased from 7 to 1 (an 86 percent reduction).

Overall, evidence suggests that the installation of the converging chevron pavement marking pattern is a low cost safety improvement that reduces speeds and the number of crashes.

Agencies interested in implementing the converging chevron pavement marking pattern need to receive approval from the Federal Highway Administration (FHWA) to experiment with the markings. Section 1A.10 of the *Manual on Uniform Traffic Control Devices* (MUTCD)⁴ outlines the necessary steps to apply for experimentation.



Milwaukee, Wisconsin

¹ Corkle, J., J.L. Giese, and M.M. Marti. *Investigating the Effectiveness of Traffic Calming Strategies on Driver Behavior, Traffic Flow and Speed*. MN/RC-2002-02. Minnesota Department of Transportation, St. Paul, Minnesota, October 2001.

<http://www.lrrb.gen.mn.us/PDF/200202.pdf>.

² Information provided by Mark Calvert of the City of Columbus, Ohio.

³ Drakopoulos, A. and G. Vergou. *Evaluation of the Converging Chevron Pavement Marking Pattern at one Wisconsin Location*. AAA Foundation for Traffic Safety, Washington, D.C., July 2003.

<http://www.aaafoundation.org/pdf/chevrons.pdf>.

⁴ *Manual on Uniform Traffic Control Devices for Streets and Highways*. Federal Highway Administration, Washington, D.C., 2003 Edition with Revision No. 1 Incorporated, November 2004.

<http://mutcd.fhwa.dot.gov>.



Volume 1 No. 14

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Longitudinal channelizers along the centerline of roadways approaching highway-railroad grade crossings reduce gate violations by 77%.

Longitudinal Channelizers Reduce Gate Violations at Highway-Railroad Grade Crossings

In 2004, 3,067 train/motor vehicle collisions occurred in the United States. Many highway-railroad grade crossings have active warning systems to warn drivers of approaching trains and keep drivers from entering the crossing.

Raleigh and Charlotte.^{1,2} One of the first improvements tested was the installation of longitudinal channelizers at a crossing in Charlotte. At this site, the longitudinal channelizers consisted of reflectorized tubes attached to



Courtesy of Peter Speer

Washington State

However, sometimes drivers choose to disobey the warning devices and drive around the gates. In an effort to discourage violations, some agencies are installing longitudinal channelizers along the centerline of roadways approaching the highway-railroad grade crossing.

Through the North Carolina Sealed Corridor Program, the North Carolina Department of Transportation (NCDOT) is improving the safety of highway-railroad grade crossings between

prefabricated, mountable islands. The delineators are flexible allowing them to return to their original position after they are impacted by vehicles. Over a period of 20 weeks prior to the installation of the longitudinal channelizers, an average of 43 violations per week occurred. After the installation of the longitudinal channelizers, the average violations per week was reduced to 10 (a 77 percent reduction).

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Currently, NCDOT has installed longitudinal channelizers at approximately 20 highway-railroad grade crossings. In most cases, the longitudinal channelizers extend approximately 70 to 100 ft from the crossing and cost on average \$10,000 for materials and installation per location.

The University of Florida also evaluated the effectiveness of longitudinal channelizers at three highway-railroad grade crossings in central Florida.³ Prior to the installation of the longitudinal channelizers, a total of 25 out of 2,194 vehicles drove around the gates, whereas only one out of 1,246 vehicles drove around the gate after the installation of the longitudinal channelizers.

On April 27, 2005, the Final Rule on Use of Locomotive Horns at Highway-Rail Grade Crossings was published in the *Federal Register*.⁴ This rule lists longitudinal channelizers as an approved supplemental safety measure (SSM) that may be installed at highway-railroad grade

crossings as an effective substitute for the locomotive horn. The recommended length of the longitudinal channelizers from the gate arm is 100 ft, with a minimum length of 60 ft where there is an intersecting roadway.

Each SSM has a corresponding effectiveness rating that reflects the percentage by which the SSM reduces the probability of a collision when compared to the same crossing with only flashing lights and gates. Longitudinal channelizers have an effectiveness rating of 0.75 which means the probability of a collision at a highway-railroad grade crossing is reduced by 75 percent as a result of installing longitudinal channelizers.

Overall, evidence suggests that the installation of longitudinal channelizers along the centerline of roadways approaching a highway-railroad grade crossing with an active warning system is a low cost safety improvement that is an effective countermeasure for gate violations.



Florida

¹ *Sealed Corridor Program*. North Carolina Department of Transportation, Rail Division, Raleigh, North Carolina. <http://www.bytrain.org/safety/sealed.html>.

² *North Carolina "Sealed Corridor" Phase I U.S. DOT Assessment Report*. North Carolina Department of Transportation, Office of Railroad Development, Raleigh, North Carolina, May 2002. <http://www.bytrain.org/safety/sealed/pdf/esvolpe.pdf>.

³ Ko, B., S.S. Washburn, K.G. Courage, and H.M. Dowell. *Evaluation of Flexible Traffic Separators at Highway-Railroad Grade Crossings*. Paper presented at the Transportation Research Board 84th Annual Meeting, January 2005.

⁴ Use of Locomotive Horns at Highway-Rail Grade Crossings. In *Federal Register*. 49 CFR Parts 222 and 229, Docket No. FRA-1999-6439, Notice No. 16. Department of Transportation, Federal Railroad Administration, Washington, D.C., April 27, 2005. <http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/pdf/05-8285.pdf>.



LOW COST LOCAL ROAD SAFETY SOLUTIONS

Roadside cable barrier reduces the severity of run-off-road crashes and costs about one-third less than W-beam guardrail.

Roadside Cable Barrier Reduces the Severity of Run-Off-Road Crashes

According to the National Highway Traffic Safety Administration, in 1999, 82 percent of the single-vehicle run-off-road crashes on two-lane roads occurred in rural areas. The most harmful events for single-vehicle nonintersection run-off-road crashes were overturning (42 percent) and impacting a tree (29 percent).

deflections; thus, larger clear areas are needed. The primary advantages of cable barrier include low initial cost (\$8/ft to \$15/ft to install), effective vehicle containment and redirection over a wide range of vehicle sizes and installation conditions, and low deceleration forces upon the vehicle occupants. Cable barrier is also beneficial in snow or sand



Courtesy of Steve Kessler

In an effort to reduce the number of serious injuries and fatalities that result from run-off-road crashes, many transportation agencies are installing guardrail to shield motorists from hazards located along the side of the roadway. Guardrail prevents vehicles from leaving the roadway and striking a hazard by containing and redirecting the vehicle. Based on the deflection characteristics on impact, roadside barriers are usually categorized as flexible, semi-rigid, or rigid.¹

Flexible systems, such as cable barrier, are the most forgiving since much of the impact energy is dissipated by the deflection of the barrier. However, this forgiving nature results in larger

areas because its open design allows snow and sand to pass through it. In addition, cable barrier minimizes visual impacts; thus, it is more aesthetically pleasing in rural environments.^{1,2,3}

The semi-rigid systems (e.g., box beam, strong post W-beam and thrie beam) and rigid systems (e.g., concrete and masonry) are low-deflection barriers, but they are more expensive (\$21/ft to \$35/ft to install) and less forgiving to the vehicle and its occupants.² In addition, snow, sand, and debris can be trapped by these systems.^{1,2}

Evidence from 32 evaluation studies that have quantified the effects of guardrail shows that guardrail reduces

ROADSIDE SAFETY



the severity of crashes.⁴ More specifically, guardrail reduces the chance of sustaining a fatal injury by approximately 45 percent and the chance of sustaining a personal injury by approximately 50 percent, given that a crash has occurred. This applies both to new installations and to replacements of old installations.

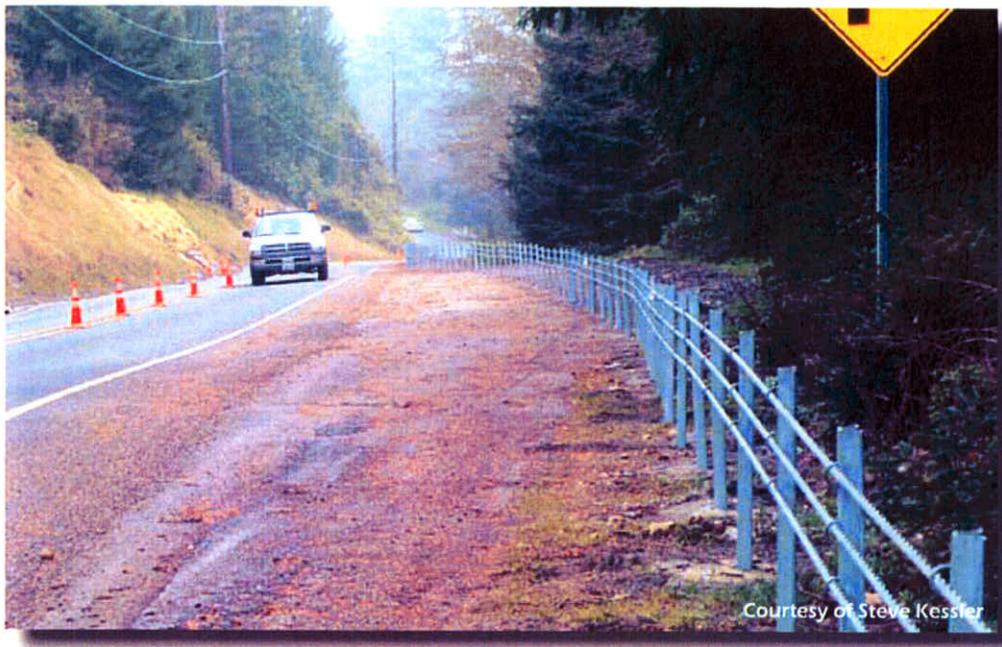
With respect to cable barrier, in 1979, researchers conducted a study in Iowa to determine the performance of cable barrier within the state using crash statistics. Two years of crash data showed that the average property damage and crash severity were lower for cable barrier than for all guardrail collisions in the state during the study period.⁵

In 2001, Pulaski County, Arkansas installed newly developed “high-tension” cable barrier in a curve where numerous crashes, including several fatalities due to roll-overs, had occurred.⁶ Prior to the installation of the cable barrier, no other

guardrail treatments had been used. Since that time, there have been no hits and no fatalities. Based on the success of this installation, the Arkansas Department of Transportation is starting to use “high-tension” cable barrier in the median to reduce the severity of cross-over crashes.

Currently, “high-tension” cable barrier is primarily used in medians; thus, in-service evaluations and benefit-cost data of roadside applications are not obtainable. However, in general cable barrier can be installed for about two-thirds the cost of W-beam guardrail. For more information on cable median barrier, please reference case study number sixteen of this publication.

Overall, evidence suggests that the installation of roadside cable barrier is a low cost safety improvement that reduces the severity of run-off-road crashes.



¹ *Roadside Design Guide*. 3rd Edition. American Association of State Highway and Transportation Officials, Washington, D.C., 2002.

² Development of an Improved Roadside Barrier System – Phase I. NCHRP Research Results Digest Number 273. Transportation Research Board, Washington, D.C., February 2003. http://trb.org/publications/nchrp/nchrp_rrd_273.pdf.

³ Outcalt, William. *Cable Guardrail*. Interim Report CDOT-DTD-R-2004-10. Colorado Department of Transportation, Denver, Colorado, June 2004. <http://www.dot.state.co.us/publications/PDFFiles/cableguardrail.pdf>.

⁴ Elvik, R. The Safety Value of Guardrails and Crash Cushions: A Meta-Analysis of Evidence from Evaluation Studies. In *Accident Analysis and Prevention*, Vol. 27, No. 4, 1995, pp. 523-549.

⁵ Ray, M.H., J. Weir, and J. Hopp. *In-Service Performance of Traffic Barriers*. NCHRP Report 490. Transportation Research Board, Washington, D.C., 2003. http://trb.org/publications/nchrp/nchrp_rpt_490.pdf.

⁶ Information provided by Larry Rummel of the Pulaski County Road and Bridge Department.



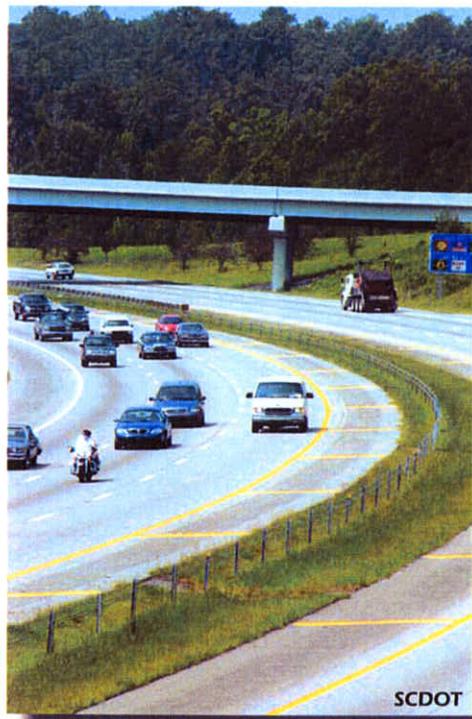
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LOW COST LOCAL ROAD SAFETY SOLUTIONS

Cable median barrier reduces the number of injuries and fatalities that result from median crossover crashes, yielding a societal benefit of \$420,000 per mile annually.

Cable Median Barrier Reduces Crossover Crashes

In an effort to reduce the number of serious injuries and fatalities that result from median crossover crashes, many state departments of transportation have installed cable median barrier to contain and redirect errant vehicles. Based on



fatal crashes. Subsequent to the cable median barrier installation, no fatal crashes occurred and the number of crossover crashes was reduced to 3.83 annually (a 76 percent reduction).

The cable median barrier installation cost approximately \$44,000 per mile. On average, each hit resulted in repairs to seven posts and cost \$733 for parts, labor, and equipment yielding a maintenance repair cost of \$2,570 per mile annually. The societal benefit of the cable median barrier was determined to be \$420,000 per mile annually.

Based on a safety analysis, WSDOT calculated benefit-cost ratios for

Cable Barrier Benefit-Cost Ratios	
Median Width	Benefit-Cost Ratio
Under 30 ft	2.7
30 to 40 ft	5.5
41 to 50 ft	4.7
51 to 60 ft	3.2
61 to 70 ft	0.6
71 to 80 ft	0.8
Over 80 ft	2.3

installing cable barrier in medians of varying width.

From 1999 to 2000 more than 70 people lost their lives in 57 separate interstate median crashes in South Carolina.^{2,3} To address this problem, the South Carolina Department of Transportation installed approximately 315 miles of cable median barrier on interstates with medians less than 60 ft wide. Over the next three years, 1,913 vehicles were stopped by the cable median barrier. Only 15 vehicles (less than one percent of those that penetrated the median) also penetrated the cable median barrier resulting in eight fatalities. On average repair costs were approximately \$1,000 per hit.

these experiences, local agencies are also starting to consider the use of cable median barrier.

In the 1990s, the Washington State Department of Transportation (WSDOT) installed approximately 25 miles of cable median barrier in three locations along Interstate 5.¹ Cable median barrier was chosen since it could be installed for about one-third the cost of concrete barrier and two-thirds the cost of W-beam guardrail.

Prior to the installation of the cable median barrier, 16 crossover crashes occurred annually resulting in 1.6

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In September 2001, the Oklahoma Department of Transportation installed cable median barrier on a 7-mile section of freeway which experienced 22 crossover crashes involving 10 fatalities from 1996 to 2001.^{4,5,6} As of May 2004, the cable median barrier had been hit 238 times resulting in only three injuries and no fatalities. On average, repairs consisted of replacing five posts and cost \$270 for parts, labor, and traffic control.

A second installation of cable median barrier along approximately 6 miles of another freeway was completed in September 2004.⁶ During the five years prior to the installation of the cable median barrier, six fatalities, 16 injuries, and nine property damage only crashes occurred. As of September 2005 the cable median barrier had been hit 21 times resulting in only one property damage only crash (i.e., no injuries or fatalities).

Recently, the Utah Department of Transportation (UDOT) also chose to use cable barrier instead of concrete barrier in medians since cable barrier could be installed for about one-third the cost of concrete barrier.⁷ By late 2003, UDOT had installed cable median barrier at six locations on two interstates. Prior to the installation of the cable median barrier, an average of five fatalities and 22 serious injuries occurred. Since the installation of the cable median barrier there have been no fatalities and only one serious injury has been reported. Out of the more than 120 vehicle

hits, only two vehicles crossed into on-coming traffic.

The Federal Highway Administration (FHWA) recommends the use of median barriers as a safety technology that prevents median crossover head-on crashes.^{2,8} The FHWA requires that all median barriers used on the National Highway System meet federal standards contained in the *National Cooperative Highway Research Program (NCHRP) Report 350*.⁹

Overall, evidence suggests that the installation of cable median barrier is a low cost safety improvement that reduces the number of injuries and fatalities that result from median crossover crashes.

¹ McClanahan, D., R.B. Albin, and J.C. Milton. *Washington State Cable Median Barrier In-Service Study*. Paper presented at the Transportation Research Board 83rd Annual Meeting, January 2004.

² Median Barriers. Federal Highway Administration website. Accessed December 2005. http://safety.fhwa.dot.gov/tools/median_barrier.htm.

³ Zeitz, R. Low-Cost Solutions Yield Big Savings. In *Public Roads*, Vol. 67, No. 3., November/December 2003. <http://www.tfhrc.gov/pubrds/03nov/11.htm>.

⁴ UDOT Using Innovative Cable Barrier. In *FastLane Newsletter*, Utah Department of Transportation, Spring 2004. <http://www.udot.utah.gov/index.php/m=c/tid=792/item=5304/d=full>.

⁵ Lee, R.B. *Oklahoma DOT Experience with Brifen Wire Rope Safety Fence on Lake Hefner Parkway in Oklahoma City*. Oklahoma Department of Transportation Internal Memorandum, June 24, 2004.

⁶ *Scanning Tour for High Tension Cable Median Barrier*. Draft report. Federal Highway Administration, Washington, D.C., December 2005.

⁷ Braceras, C. Utah Demonstrates That Cable Barriers Virtually Eliminate Cross-Over Crashes. In *Lifelines*, AASHTO-NCHRP Project 17-18, Vol. 2, No. 2, August 2005. <http://safety.transportation.org/doc/lifelines-5.pdf>.

⁸ Neuman, T.R., R. Pfefer, K.L. Slack, H. McGee, L. Prothe, K. Eccles, and F. Council. *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan Volume 4: A Guide for Addressing Head-On Collisions*. NCHRP Report 500. Transportation Research Board, Washington, D.C., 2003. http://gulliver.trb.org/publications/nchrp/nchrp_rpt_500v4.pdf.

⁹ Ross, H.E., Jr., D.L. Sicking, R.A. Zimmer, and J.D. Michie. *Recommended Procedures for the Safety Performance Evaluation of Highway Features*. NCHRP Report 350. Transportation Research Board, Washington, D.C., 1993.



Volume 1 No. 17

LOW COST LOCAL ROAD SAFETY SOLUTIONS

Crash studies help transportation engineers identify locations with safety problems, identify contributing factors, and assess potential countermeasures.

How Do I Conduct a Crash Study?

The majority of the highway system in the United States consists of two-lane rural roads. Typically, these roads carry relatively low traffic volumes; however, some of these roadways are becoming congested because of expanding urban areas, recreational travel, seasonal residencies, and special events.¹

is expensive, so as an alternative many agencies are considering low cost safety improvements which can solve many operational problems.

Crash statistics are commonly used by transportation engineers to identify locations with above-average crash occurrences or crash patterns that



According to the National Highway Traffic Safety Administration, in 2004 approximately 57 percent of all fatal crashes happened on rural roads. Approximately 90 percent of these fatalities occurred on two-lane roads. Problems on rural roads have been related to three basic causes: (1) inadequate road geometry (e.g., width, grades, alignment, sight distance) either at specific locations or over long sections, (2) lack of passing opportunities due to either limited sight distance or heavy oncoming traffic volume, and (3) traffic conflicts due to turns at access points (e.g., intersections, driveways).² Widening or realigning an existing two-lane road

are a significant portion of the total crashes. Crash studies are essentially comprised of six steps: (1) identify sites with potential safety problems, (2) characterize crash experience, (3) characterize field conditions, (4) identify contributing factors and appropriate countermeasures, (5) assess countermeasures and select most appropriate, and (6) implement countermeasures and evaluate effectiveness.^{1,3}

Identify Sites with Potential Safety Problems

The following methods can be used to identify sites with potential safety problems: crash data, traffic measures

SAFETY



(e.g., speed studies, volume/capacity studies), field observations, citizen input, enforcement input, and surrogate measures for crashes (e.g., number of conflicts, brake activation).^{1,3} Crash statistics are the most common of these methods; however, they can be computed in variety of ways. Users of crash data must understand the limitations of each approach.

For spot locations, the number of crashes is the simplest and most direct approach. Various minimum numbers of crashes are used to determine if a site is having a safety problem. For roadway sections with consistent characteristics, crash density can be used. Typically the minimum distance of the roadway section is 1 mile. Crash density is then the number of crashes per mile.¹

If there are considerable variations in traffic

volumes throughout the road system, crash analyses using the number of crashes can result in misleading conclusions. For example, two locations can have the same number of crashes but do not reflect the same degree of hazard potential if one carries twice as much traffic as the other. To account for exposure, crash rates are used. Crash rates are the number of crashes divided by the number of entering vehicles and the number of miles of roadway. The crash rate method is presented below. While this method is more complex, it generally provides better results.¹

Additional improvements to the crash statistics can be achieved using the number rate method and quality control methods. However, these methods are recommended for agencies with large complex systems and thus, are not discussed herein.¹

Crash Rate Method¹

1. Locate all crashes in accordance with accepted coding practices.
2. Identify number of crashes in each established section and at individual intersections and spots.
3. Calculate the actual crash rate for each established section during the study period.

$$\text{Rate/MVM} = \frac{(\text{number of crashes on section}) (10^6)}{(\text{ADT}) (\text{number of days}) (\text{section length})}$$

(ADT is the average daily traffic. MVM is million vehicle miles.)

4. Calculate the actual crash rate for each intersection or spot during the study period.

$$\text{Rate/MV} = \frac{(\text{number of crashes at intersection or spot}) (10^6)}{(\text{ADT at location}) (\text{number of days})}$$

(ADT at location represents the sum of all vehicles entering the intersection. MV is million vehicles.)

5. For the same period, calculate the systemwide average crash rates for sections, intersections, and spots-using the formulas above and the summation of total crashes, total vehicle miles, and total vehicles, respectively, for each category of location.

6. Select appropriate rate cutoff values as criteria for identifying high crash locations. A value about twice the systemwide rate is usually realistic and practical.

7. If actual rates exceed the minimum established criteria, the location is identified as a high crash location and placed on the list for investigation and analysis.

Selection of the cutoff value (step 6) is not as critical as it might appear. The principal purpose is to control the size of the list of locations to be investigated - a shorter list with high values, a longer list with low values. Experience will disclose the proper level for a particular agency.

Two additional crash evaluation methods that can be used are crash severity measures and crash indexes. Crash severity measures allow for more severe crashes (e.g., fatal and injury crashes) to be given more importance than less severe crashes (e.g., property-damage-only crashes). An overall crash index can be used to combine different methods into a single measure. Each measure can be weighted the same or differently. The combination minimizes the weaknesses of the individual measures.¹

Characterize Crash Experience

Once the sites with potential safety problems have been identified, the crash experience needs to be characterized. Activities that help to characterize the crash experience include: a list of the types of crashes, a review of crash report forms, preparation of collision diagrams, and field visits. The information gathered in this step helps identify contributing factors which can be used to identify appropriate countermeasures.¹

Characterize Field Conditions

Next, the physical condition of the site must be investigated. The geometries of the roadway are needed as a basis for all data collected about the roadway. On-site observation by an engineer is recommended. The timing of the visit should correspond to the safety problem; thus, the visit may need to take place during off-peak periods or at night. Photographs are a good tool for documenting geometric or operational problems for later review. Condition diagrams may also be developed. Condition diagrams are scale drawings of the location of interest that show geometric and traffic control details. Traffic volume counts and vehicle classification counts are also needed. In addition, supplementary traffic studies can be employed to further define the safety problem and help identify appropriate countermeasures.¹

Identify Contributing Factors and Appropriate Countermeasures

The next step is to determine potential countermeasures that could effectively correct or improve the situation. Countermeasures can be identified using the following sources:

detailed investigations of crashes, review of site plans, site visits, other transportation engineering studies, practices and previous experiences, and technical literature.¹ Many references are available that suggest countermeasures for certain situations including: the Institute of Transportation Engineers (ITE) *Traffic Engineering Handbook*;³ National Cooperative Highway Research Program (NCHRP) Report 440-*Accident Mitigation Guide for Congested Rural Two-Lane Highways*;¹ and the NCHRP 500 report series.⁴

Assess Countermeasures and Select Most Appropriate

When selecting the most appropriate countermeasure the following should be considered: (1) identify all practical countermeasures including doing nothing, (2) identify all practical combinations of countermeasures, (3) identify practical limitations and constraints, and (4) for each alternative identify the potential effect. Documentation of the data and process is needed.¹

The proposed countermeasures should be evaluated to determine which will provide the greatest return. Evaluations may be as simple as listing the advantages and disadvantages of each alternative. In contrast, a complete economic analysis using benefit-cost or cost effectiveness could be completed. Typically, evaluations involve the following six steps: (1) estimate net crash reduction, (2) assign values to crash reduction, (3) estimate secondary benefits, (4) estimate improvements costs, (5) analyze effectiveness at each location, and (6) assign program priorities. The final part of this step is to narrow down the range of possibilities to one or more measures.¹

Implement Countermeasures and Evaluate Effectiveness

The final step in the process is to implement the selected improvements and evaluate their effectiveness. The Federal Highway Administration (FHWA) developed a detailed procedure consisting of the following six tasks: (1) develop evaluation plan, (2) collect and reduce data, (3) compare measures of effectiveness, (4) perform statistical tests, (5) perform economic analysis, and (6) prepare

evaluation documentation.⁵ Several sources provide additional information on conducting evaluation studies.^{5,6,7,8,9}

The following four evaluation approaches are also recommended by the FHWA: before-and-after study with control sites, before-and-after study, comparative parallel study, and before, during, and after study. Of these techniques, the before-and-after study with control sites is considered to be the most desirable. This technique involves matching the improved sites with similar comparison sites that are not improved. By using a comparison site, the crash experience that would have been observed at the improved sites had the improvement not been made can be estimated.¹

The phenomenon known as regression to the mean affects the validity of a before-and-after study of a crash countermeasure. If a safety improvement is implemented at a site based on a high short-term crash experience, it is likely that even if no improvement was made the crash experience would decrease (regress to the mean). Thus, regression to the mean effects can be mistaken for the effects of crash countermeasures.¹ Newer Empirical Bayes techniques account for the effect of regression to the mean, but are more complicated.⁸

In conclusion, the majority of the highway system in the United States consists of two-lane rural roads. According to the National Highway Traffic Safety Administration, in 2004 approximately 90 percent of the fatalities that happened on rural roads occurred on two-lane roads. Crash studies can be used by transportation engineers to identify locations with safety problems, identify contributing factors, and assess potential countermeasures.

¹ Fitzpatrick, K., K. Balke, D.W. Harwood, and I.B. Anderson. *Accident Mitigation Guide for Congested Rural Two-Lane Highways*. NCHRP Report 440. Transportation Research Board, National Research Council, Washington, D.C., 2000.

² Harwood, D.W. and C.J. Hoban. *Low-Cost Methods for Improving Traffic Operations on Two-Lane Roads: Informational Guide*. FHWA-IP-87-2. Federal Highway Administration, Washington, D.C., January 1987.

³ Pline, J. *Traffic Engineering Handbook*. 5th Edition. Institute of Transportation Engineers, Washington, D.C., 1999.

⁴ NCHRP Report 500 Series, Volumes 1-16 (more forthcoming). Transportation Research Board, Washington, D.C., 2003-2005.

[http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-18\(3\)](http://www4.trb.org/trb/crp.nsf/All+Projects/NCHRP+17-18(3)) or
<http://safety.transportation.org/guides.aspx>.

⁵ *Highway Safety Evaluation – Procedural Guide*. FHWA-TS-81-219. Federal Highway Administration, Washington, D.C., November 1981.

⁶ Robertson, H.D., J.E. Hummer, and D.C. Nelson. *Manual of Transportation Engineering Studies*. Institute of Transportation Engineers, Washington, D.C., 1994.

⁷ Council, F.M., et al. *Accident Research Manual*. FHWA/RD-80/016. Federal Highway Administration, Washington, D.C., February 1980.

⁸ Hauer, E. *Observational Before-After Studies in Road Safety*. Pergamon/Elsevier Science, Inc., Tanytown, New York, 1997.

⁹ Latham, F.E. and J.W. Trombly. *Low Cost Traffic Engineering Improvements: A Primer*. FHWA-OP-03-078. Federal Highway Administration, Washington, D.C., April 2003.

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ADDITIONAL RESOURCES

Federal Highway Administration Office of Safety website.

<http://safety.fhwa.dot.gov/>.

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<http://safety.fhwa.dot.gov/media/twgreport.htm>.

Let's Work Together to Save Lives – Life-Saving Strategies for America's Highways. FHWA-SA-04-001. Federal Highway Administration, Washington, D.C.

<http://safety.fhwa.dot.gov/media/pdf/sa04001.pdf>.

Low Cost Safety Improvements Workshop. Federal Highway Administration. Contact Fred Ranck of the FHWA Resource Center in Olympia Fields, Illinois at 708-283-3545 or Fred.Ranck@fhwa.dot.gov.

Low Cost Traffic Engineering Improvements: A Primer. Latham, F.E. and J.W. Trombly. FHWA-OP-03-078. Federal Highway Administration, Washington, D.C., April 2003.

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Maintenance of Signs and Sign Supports for Local Roads and Streets – A Guide for Street and Highway Maintenance Personnel. Federal Highway Administration, Washington, D.C.

http://safety.fhwa.dot.gov/media/pdf/sign_support.pdf.

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15 Riverside Parkway, Suite 100
Fredericksburg, Virginia 22406

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POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

ATSSA's Roadway Safety Program

American Traffic Safety Services Association

Author: Peter Speer

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

ATSSA's Roadway Safety Program



“To Advance Roadway Safety”

“To Advance Roadway Safety”



First Printing: February 2002

American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, Virginia 22406

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The Need for Safer Roads

IN 2000, 41,821 PEOPLE LOST THEIR LIVES ON OUR ROADWAYS. ANOTHER 3.2 MILLION WERE INJURED IN CRASHES (2).

Over the last decade (1991-2000), roadway fatalities totaled 412,558 (1).

A murder takes place in the United States every 34 minutes. A highway death occurs ever 13 minutes (3).

In 2000, 1093 people lost their lives in work zones, representing a 26% increase from the 1999 total of 868. This figure has increased every year for the past 5 years, and is likely to increase further as we invest in our infrastructure, unless significant action is taken (4).

More law enforcement officials loose their lives in automobiles than are killed by guns (5).

Since 1775, approximately 620,000 Americans have lost their lives in wars. Since 1900, over 3,000,000 people have died on our roadways (6).

Using Bureau of Labor statistics, the economic cost of the *fatalities* of the last decade is estimated at \$404,306,840,000. This *does not include* the cost of temporary and permanent injuries (7).

AN AGGRAVATED ASSAULT OCCURS EVERY 35 SECONDS. A ROADWAY INJURY OCCURS EVERY 15 SECONDS (8).

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"There is abundant evidence to demonstrate that highway design is the important causative factor in the national traffic accident experience. Although some degree of human failure is necessarily present even in accidents where faulty design is the controlling cause, evidence indicates that in the great percentage of such instances proper design would discount human failure by guarding the motorist or pedestrian from exposure to hazard. The highway is static, the human element and the vehicle are animate; consequently of the three the highway is the most susceptible to control. It is illogical to insist upon a safe human element and safe vehicles on an unsafe highway."

*Harold F Hammond, Director
Traffic Division
The National Conservation Bureau, 1934*

Introduction

¹ AASHTO Strategic Highway Safety Plan - A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways. 1998. Page 1.

² Ibid.

³ The Transportation Equity Act for the 21st Century in Action. Money at Work.

American Association of State Highway and Transportation Officials and the American Public Transportation Association. October, 2001.

⁴ Ibid.

Every year for the past five years, nearly 42,000 motorists have lost their lives on America's roadways. In excess of 3,000,000 individuals are injured annually. If the average U.S. crash rate remains unchanged one child out of every 84 born today will die violently in a motor vehicle crash.¹ Furthermore, 6 out of every 10 children will be injured in a highway crash over a lifetime, many of them more than once.²

State faces \$3.3 million judgment in accident

Judge cites lack of guardrails

By Hugh Clark

DELR. Newark — In what is believed to be the largest award for a traffic accident case in the state's history, a federal judge has ordered the state to pay \$3.3 million to a 14-year-old boy whose car care off the Interstate Highway in Pennsylvania 12 years ago.

In making the decision in the lawsuit filed last Thursday, Circuit Judge Rife Silverstein said the state was negligent when it built the stretch of roadway without guardrails in the late 1980s. She said the state was "outraged" in liability for not installing the rails during paving in 1982.

Mount Union College student killed in crash



Single-car crash kills 3



In order to reduce the number of fatalities and injuries on our roadways, we must focus on three key components – the automobile, driver behavior, and the roadway itself. Much attention has already been given to making automobiles safer. They are subjected to crash testing to minimum levels. Every auto manufactured today includes “shoulder harness” type seat belts that are safer than the original seat-belt design. Many vehicles come equipped with driver and passenger air bags, and an increasing number also include side air bags. In recent years, more vehicles have come equipped with anti-lock disk brakes. Infant seats are safer, and considerable effort has been made to educate parents as to their proper placement and use.

In the area of driver behavior, The National Highway Traffic and Safety Admin-

istration (NHTSA) has done an outstanding job of public advocacy. In 2000, seat-belt use reached an all-time high of 73%, up from 50% in 1990.³ Due in no small part to congressional leadership regarding “.08” blood-alcohol-content and open container laws, alcohol-related traffic fatalities have declined from 57% of all traffic deaths in 1982 to 38% in 1999.⁴

Saving lives by focusing on the *roadway itself* has received much less attention. While the relatively small “Highway-Rail Grade Crossing” and “Hazard Elimination” initiatives have targeted specific roadway safety hazards, the statistical data support a much more significant investment in roadway safety.

Particular focus on engineering and maintaining roadways to meet the needs of older drivers is essential to achieve the goal of significantly reducing fatalities. These efforts should be undertaken *in addition* to the fine work underway in the areas of driver behavior and automobile safety.

Over the next two decades, the population of older drivers – those over 65 years of age – will increase dramatically (See Figure 1). This age group is highly “at risk” with injuries and fatalities far exceeding rates typical of the general population. Numerous studies confirm that older drivers are driving more and to a later age than ever before. It is projected that by the year 2020, nearly one in five motorists will fall into this age group. It is clear, from these demographic trends, that if we do not take action to create a safer roadway environment for older drivers, more people will die on our roadways.

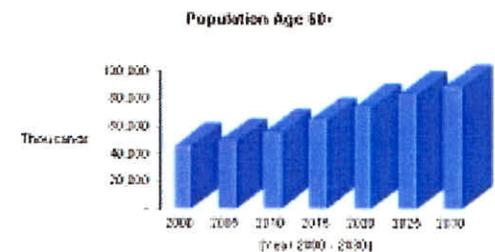


FIGURE 1

Recent data demonstrates a disturbing trend in regard to the impact of the roadway



environment on emergency response personnel. More police officers die on our roadways than are killed by criminal's bullets. Firefighters and rescue workers are often delayed by congestion, the lack of clear signage and directional guidance, and clearly marked emergency access lanes.



We have the tools to significantly reduce both injuries and fatalities on our roadways. Numerous research studies have demonstrated that "positive guidance" in the form of wider and brighter roadway markings and more visible directional signage save lives. Rumble strips keep motorists from running off the road, and modern guardrail saves lives on those occasions when the motorist does leave the roadway. Studies have shown that a well designed, installed and maintained work zone with highly reflective markings reduces travel delays and crashes. In addition, visible police presence in work zones causes motorists to drive more slowly and carefully, and results in fewer injuries and fatalities to both workers and motorists.

The reauthorization of the Transportation Equity Act for the 21st Century (TEA-21) provides us with the opportunity to put what we know into practice and save lives and reduce injuries on our roadways. *The Roadway Safety Program*, proposed at \$3 billion annually and funded by newly identified sources of revenue, can significantly reduce the carnage on our roadways.

While the human cost of motor vehicle crashes in pain, suffering and personal loss is incalculable, the economic cost has been estimated at \$150 billion annually.⁵ The public cost to the U.S. taxpayer is a stagger-

ing \$13.8 billion a year, equating to an added tax burden of \$144 for every U.S. household.⁶ The roadway safety improvements included in ATSSA's proposal all have a cost-benefit ratio of at least 3 to 1, according to FHWA statistics.⁷

The increased investment called for in the proposed *Roadway Safety Program* will also provide a direct stimulus to the U.S. economy. Each \$1 billion spent for highway construction generates 42,100 jobs annually, based on a recent U.S. Department of Transportation study.⁸ Using this DOT figure, the *Roadway Safety Program* alone would generate over 300,000 new jobs over the course of a six-year bill.



Additionally, the U.S. DOT study states that every dollar invested in the nation's highway system yields \$5.70 in economic benefits because of reduced delays, improved safety, and reduced vehicle maintenance costs.⁹ The *Roadway Safety Program's* new funding mechanism would therefore produce an estimated \$172 billion in economic benefits over the same six year period. These economic benefits are *in addition to* the primary objectives of saving lives and reducing crashes, and the distinct financial benefits that would result from achieving those goals.

It is our hope that the Congress and the Administration will give serious consideration to our recommendations. Thousands of American lives depend on it.

⁵ *The Economic Cost of Motor Vehicle Crashes*. National Highway Traffic Safety Administration (NHTSA). 1996. Page 7. Table -1.

⁶ *The Economic Cost of Motor Vehicle Crashes*. National Highway Traffic Safety Administration (NHTSA). 1996. Page 2.

⁷ *The 1996 Annual Report on Highway Safety Improvement Programs*. The Federal Highway Administration. April 1996. Table IV-7.

⁸ *Key Facts About the Critical Role Highways Play in Providing Economic and Homeland Security*. The Road Information Program. Data based on information from the Federal Highway Administration, the U.S. Department of Transportation, and the National Highway Traffic Safety Administration. November 2001.

⁹ *Ibid.*

Executive Summary

Each year in the U.S. nearly 42,000 people die and 3,000,000 are injured in motor vehicle crashes. These crashes result in an increased tax burden of \$144.00 for each U.S. household and a societal cost of \$580 for every person living in the U.S. Older drivers are at a much higher risk of dying in a motor vehicle crash than any age category but the youngest drivers. The retiring "baby boom" generation will result in 1 in 5 drivers aged 60 or older by 2020.

Efforts to modify driver behavior and improve the structural safety of motor vehicles is at an all time high. In 2000, seat-belt use reached a record of 73%. Alcohol-related traffic fatalities have declined from 57% in 1982 to 38% in 1999. Air bags and anti-lock brakes are becoming increasingly standard.

The Federal government has often served as a leader when it comes to improving the safety components of our nation's roadways. The 1966 and 1973 Highway Safety Acts were major catalysts towards upgrading guardrail, pavement markings and road signs. The creation of the Hazard Elimination Program (Section 152) and Highway-Rail Grade Crossing Program (Section 130) have targeted monies to reduce some of our nation's most dangerous road sections.

These roadway safety infrastructure initiatives provided states and localities the incentives they needed to upgrade their safety infrastructure and in turn saved the federal and state governments billions of dollars through the reduction of crashes, especially on two-lane rural roads.

21st century roadway safety devices are capable of providing similar returns on investment for the taxpayer. Rumble strips, brighter pavement markings, larger and brighter signs, upgraded guardrails and guardrail endtreatments and numerous other roadway safety devices with cost benefit ratios of not less than 3 to 1 are available today for U.S. roadways. However, without national leadership, the utilization of these devices will remain as sporadic as the use of "no passing zone" pavement markings were in the 1960's.

The ATSSA proposed initiative calls for a \$3 billion a year investment in our

nation's roadway safety infrastructure. Over the course of a six-year Federal Surface Transportation Program reauthorization bill, the program would add \$17.8 billion in new funding for roadway safety, and \$12.5 billion for all programs that currently benefit from the Highway Trust Fund.

According to U.S. DOT statistics this type of roadway investment would generate 300,000 new jobs and \$172.71 billion in economic benefits. An additional economic benefit is received in reducing motor vehicle crashes and the expenses the federal, state and local governments incur.

ATSSA's initiative seeks to make improvements by targeting high-risk demographics and locations through the greater use of low-cost roadway safety improvements. In addition ATSSA proposes improving the state of the practice in work zones and minimum specifications for roadway visibility.



If the average U.S. crash rate remains unchanged, one child of every 84 born today will **die violently** in a motor vehicle crash. Six out of every 10 children will be **injured** in a highway crash over a lifetime, many of them more than once.

Source: AAASHTO Strategic Highway Safety Plan.

ATSSA Roadway Safety Program Initiative

Safety Programs that Save Lives

Background

¹⁰ AASHTO *Strategic Highway Safety Plan - A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways*. 1998. Page 1.

¹¹ Ibid.

¹² *The Economic Cost of Motor Vehicle Crashes*. National Highway Traffic Safety Administration (NHTSA). 1996. Page 7. Table -1.

¹³ *The Economic Cost of Motor Vehicle Crashes*. National Highway Traffic Safety Administration (NHTSA). 1996. Page 2.

¹⁴ *The Economic Cost of Motor Vehicle Crashes*. National Highway Traffic Safety Administration (NHTSA). 1996. Page 1.

¹⁵ *The Federal Highway Administration 1998 Strategic Plan*. Strategic Goals and Objectives. Safety.

¹⁶ AASHTO *Strategic Highway Safety Plan - A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways*. 1998. Page 2.

¹⁷ *1999 Status of the Nations Highways, Bridges and Transit: Conditions & Performance (Executive Summary)*. The Federal Highway Administration. 1999. Page ES-9.

¹⁸ Federal Highway Administration (FHWA) 1998, 1999 & 2000 Statistics.

¹⁹ Ibid.

If the average U.S. crash rate remains unchanged, one child out of every 84 born today will die violently in a motor vehicle crash.¹⁰ Furthermore, 6 out of every 10 children will be injured in a highway crash over a lifetime, many of them more than once.¹¹

This past year nearly 42,000 people lost their lives on our nation's roadways. Another three million people were injured in motor vehicle crashes. While the human cost in pain, suffering and personal loss from these crashes is incalculable the economic impact to the U.S. is roughly \$150 billion.¹²

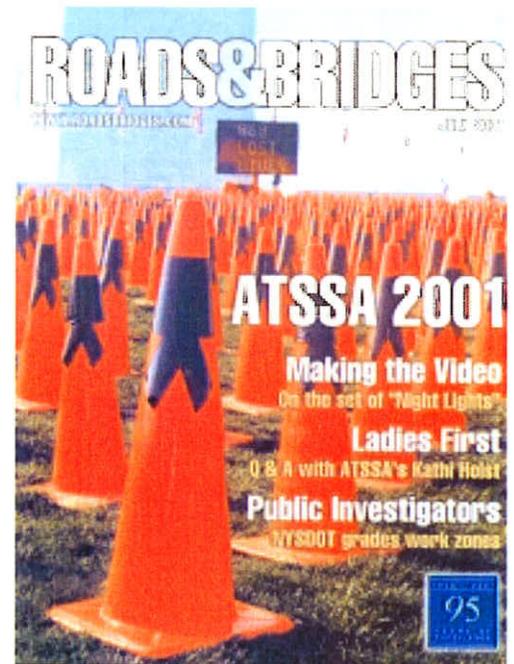
The financial impact from motor vehicle crashes is not confined to those directly involved. The cost to the U.S. taxpayer is a staggering \$13.8 billion a year equating to an added tax burden of \$144.00 for every U.S. household.¹³ In addition the societal costs related to motor vehicle crashes totals \$580 for every person living in the U.S., or 2.2% of Gross Domestic Product (GDP).¹⁴

In response to the personal, economic, and societal costs of 41,000-plus annual fatalities on U.S. roadways, the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) established aggressive goals to reduce fatalities. FHWA set a goal of reducing fatalities and injuries 20% by 2008.¹⁵ AASHTO set a goal to reduce fatalities by 5,000 to 7,000 by 2005.¹⁶ ATSSA's roadway safety proposals for the reauthorization of the federal surface transportation programs is designed to achieve these goals by providing a significantly increased investment in our roadway safety infrastructure.

More than 40% of all funds used to construct, repair and upgrade our nation's roadways are provided by the federal government.¹⁷ Every time they go to the gas pump motorists pay 18.4 cents per gallon into a fund that was specifically created to support transportation improvements and maintenance. In 2002 the total funding available to states from this federal program

is nearly \$32 billion - a record level.

The last congressional action on funding roadway improvements is called the Transportation Equity Act of the 21st Century (TEA-21), enacted in 1997. What has been TEA-21's impact on roadway safety? Each year since the passage of TEA-21 fatalities have risen, nearing 42,000 this past year.¹⁸ Work zone fatalities alone rose from 868 to 1,093 from 1999-2000.¹⁹



How can this be? We have safer cars, more people using seat belts and fewer people drinking and driving. We have a record level of transportation funding, yet people keep dying.

As ATSSA developed its policy on how to enhance TEA-21 to improve safety, it became clear that we as a nation need to develop a comprehensive policy that focuses sufficient resources to attack the problem. We took a hard look at where people are being injured and killed, and determined if there were improvements that could be made to the



infrastructure, or possibly the state of the practice, that could bring these numbers down. As a result, ATSSA's Roadway Safety Program focuses on creating a comprehensive roadway safety program.

Roadway Safety Program

²⁰ Shuster, Bud. E. Remarks made April 1, 1998 on the Floor of the House of Representatives. Page H1885.

²¹ GAO-01-836R *Federal Highway Funding*. July 2001. Page 2.

²² *Wisconsin Budget Act 16, SECTION 658t. 20.395 (3) (cx). 20.395 (3) (cx) State highway rehabilitation, federal*. 2001 Senate Bill 55. Page 175.

²³ FHWA Office of Safety Website - Run-Off Road Rumble Strips. <http://safety.fhwa.dot.gov/fourthlevel/rumble/costben.htm>.

²⁴ FHWA Office of Safety Website -Intersections http://safety.fhwa.dot.gov/fourthlevel/pro_res_intersections_chall.htm.

²⁵ Ibid.

²⁶ *Highway Design Handbook For Older Drivers and Pedestrians*. Federal Highway Administration. October 2001. Page 10.

²⁷ FHWA Office of Safety Website - Pedestrians Overview. http://safety.fhwa.dot.gov/fourthlevel/over_p.htm.

²⁸ Ibid.

²⁹ FHWA Office of Safety Website - Bicyclists Overview. http://safety.fhwa.dot.gov/fourthlevel/over_b.htm.

³⁰ FHWA Office of Safety Website - Older Drivers - Facts. http://safety.fhwa.dot.gov/fourthlevel/pro_res_olderdriver_facts.htm

³¹ FHWA Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians. October 2001. pg. 1.

The Need for Safer Roads

Roadway conditions contribute to nearly one-third of all motor vehicle fatalities.²⁰ Additionally, two-thirds of all fatalities occur on two-lane rural roads.²¹ Unfortunately, out of the \$32 billion TEA-21 program, only \$730 million yearly is directly targeted to making our roadways safer.

TEA-21 allows states to flex these dedicated safety dollars to other roadway programs. In addition, local political or budgetary tactics can actually reduce the amount spent on safety improvements. In Wisconsin, for example, a statewide interest group convinced the legislature to statutorily prohibit the use of federal roadway dollars on stand-alone safety projects such as better signage and pavement markings.²²

Federal, state and local transportation and census statistics indicate where crashes are occurring and project roadway safety trends. The following are areas that are targeted as part of ATSSA's safety initiative:

Run-off-Road Crashes: The Federal Highway Administration estimates that run-off-road crashes comprise about a third of all highway fatalities and cost our society about \$80 billion a year.²³



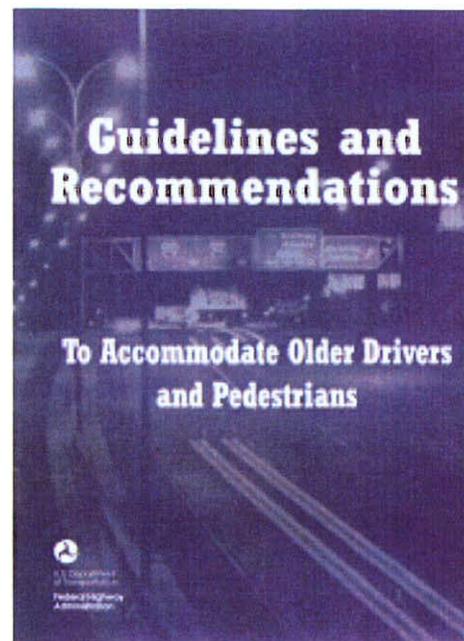
Countermeasures such as rumble strips can help prevent drivers from leaving the roadway, as can better signage and markings, especially on rural roads. Modern guardrail can help save motorists lives when they do leave the roadway.

Intersection Safety: Nearly 10,000 Americans lost their lives in intersection crashes in 1999.²⁴ Each year there are more than 2.8 million intersection crashes (over 45% of all reported crashes). Roughly 1.5

million Americans are injured in intersection-related crashes each year.²⁵ Older drivers are especially vulnerable at intersections as their line-of-sight is reduced and their reaction time is generally slower than that of younger drivers. FHWA's report on older drivers showed that two key improvements – better lighting and improved pavement markings – become more important to drivers as they age.²⁶

Pedestrians & Bicyclists: During the last decade, more than 63,000 pedestrians died and more than a million others were injured in pedestrian-vehicle crashes.²⁷ Another 8,000 bicyclists died and 700,000 were injured in motor vehicle-related crashes in the past decade.²⁸ Many of these bicycle fatalities involve children.²⁹

Older Drivers: In 1998 there were 7,269 people 65 years and older who died in motor vehicle crashes.³⁰ People 65 years and older represented 13 percent of the population in 1998 and 18 percent of motor vehicle deaths. By 2020 it is projected that one in five drivers will be age 65 and over.³¹



Statistically, this age group is the most likely to die in an automobile crash with the exception of those under the age of 25. There are a number of recommendations on how to

make the roads safer for older drivers in FHWA's excellent report, "Highway Design Handbook For Older Drivers and Pedestrians."

Speeding: Traveling too fast for conditions or in excess of the posted speed limits is related to close to 1/3 of all fatal crashes and costs America approximately \$27.7 billion dollars in economic costs each year. An FHWA report on a European safety scanning tour demonstrated that wider markings in the Netherlands resulted in the



Source: FHWA

reduction of vehicle speeds by 10km/h and accidents by 35%³². The same study reported that experiments with variable speed limits resulted in a 25% to 50% reduction in accidents.³³

We propose that considerable effort be spent on "speed management systems" that will slow drivers down close to the posted speed limit. This alone could result in saving a significant number of lives annually.

Work Zones: Work zone fatalities and injuries have steadily risen since the enactment of TEA-21. Fatalities rose from 868 in 1999 to 1,093 in 2000.³⁴ As shown in Figure 2, they have risen four of the last five years.

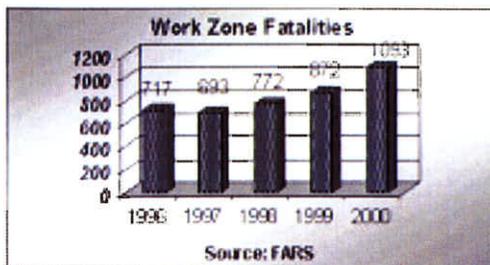


Figure 2. Work Zone Fatalities 1996-2000)

In addition to the human cost of work zone crashes, the operation of our roadways is negatively impacted causing increased motor vehicle "greenhouse gas" emissions and increases the cost of moving truck freight and commuting times for workers. Better signage, markings, and the presence of uniformed police officers are among the tools that can reduce fatalities and injuries in work zones.

Emergency Management Systems: The terrorist attacks on the Pentagon across the Potomac from Washington, DC and New York City's Twin Towers provided us with a stark reminder of the original purpose of our nation's interstate highway system - National and Civil Defense. Both New York City and Washington, DC had a difficult time moving first responders in to deal with the tragedy and moving the public out of harms way.

The recently adopted FHWA Manual on Uniform Traffic Control Devices has an entire section on emergency management. However, the cost to cities and states in developing and implementing an emergency management plan will be significant.



³² FHWA Study Tour for Speed Management and Enforcement Technology. Federal Highway Administration. December 1995. Page 7.

³³ FHWA Study Tour for Speed Management and Enforcement Technology. Federal Highway Administration. December 1995. Page 6.

³⁴ FHWA Office of Safety - Work Zone Safety Facts, 2000.

Recommendation: Create a New Roadway Safety Program (RSP)

³⁵ *The Use of Wider Longitudinal Pavement Markings*. Texas Transportation Institute Study. December 2001. Page 5.

³⁶ *Benefit-Cost Analysis of Lane Marking*. Ted Miller, Ph.D. The Urban Institute. Paper No. 920297. Transportation Research Board 71st Annual Meeting. January 1992. Page 1.

³⁷ Federal Highway Administration office of Safety website <http://safety.fhwa.dot.gov/fourthlevel/rumble/costben.htm>

A major component of ATSSA's reauthorization proposal is the creation of a new core *Roadway Safety Program (RSP)* that would provide \$3 billion a year for the installation of low-cost, high-benefit roadway safety improvements. Under the RSP funds would be available to make improvements that target the following high-risk areas:

- Run-off the road crashes;
- Intersections;
- Pedestrians/Bicycle;
- Older drivers;
- Speed management;
- Work zones;
- Safety management systems;
- Emergency management;
- Roadway safety research.

Run-Off-Road Mitigation: RSP funds would be available for states to install rumble strips, better *wet-night* pavement markings and improve signing. In addition, ATSSA calls for enacting a change that would require all pavement marking edge lines on federal-aid roads be not less than six inches in width. Currently 29 of the 50 states are using some forms of wider lines to assist motorist visibility.³⁵ The cost-benefit ratio of pavement markings³⁶ and rumble strips respectively has been documented as high as 60 to 1.³⁷

Intersections: As part of the RSP, funds would be available to install intersection safety countermeasures that enhance signing, markings, retiming of signals, and automated enforcement. ATSSA calls for RSP funds to also be spent to conduct studies designed at reviewing the effectiveness of automated enforcement technologies in reducing injuries and fatalities.

Pedestrians/Bicycle: Whether it is a school zone, a busy intersection in a downtown business section, or a bicyclist in a local neighborhood, numerous technologies are available to make pedestrian and bicycle transportation safer. RSP funds would be available to implement countermeasures such as auditory crosswalks and better signage and pavement markings.

Older Drivers: Older drivers have many special needs on the roadways. Signs and pavement markings need to be bigger and brighter to account for degrading eyesight.

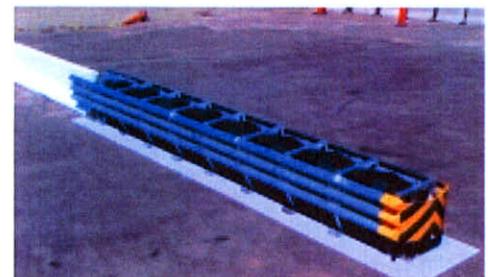


State of the art guardrail and impact attenuators should be installed to create a more forgiving environment when motorists leave the roadway.

There are numerous structural changes that can be made to the roadway to expand the capacity of older drivers to drive safely. RSP funds are made available to states to implement countermeasures that create a more forgiving roadway for older drivers. ATSSA supports requiring that all installers of guardrail be trained to ensure that these vital roadway safety devices are installed correctly. In addition, our proposal calls for investing \$3-\$5 million a year in educating older drivers regarding how to safely navigate the roadways.

Additional RSP Eligible Older Driver Enhancement Activities:

Safety countermeasures described in the FHWA publication: [Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians \(FHWA-RD-01-051\)](#) (e.g. larger and brighter signs); Section 120(c) safety countermeasures; guide sign lighting retrieval systems; NCHRP 350 compliant guardrail, guardrail endtreatments, median barriers, bridge railings, barrier terminals, concrete barrier endtreatments, breakaway utility poles, crash cushions, impact attenuators, and permanent and temporary traffic control devices.





Speed Management: RSP funds could be used by states to evaluate variable speed limit technology, currently in use in Europe, for use on U.S. roadways.

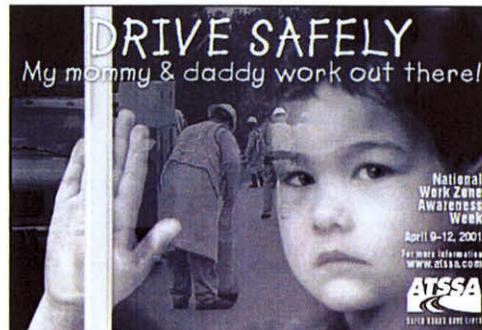
Work Zone Safety: ATSSA's work zone safety policy recommendations are designed to ensure that those who design, install and adjust traffic control work zones have the best training and expertise on how to do so safely and with minimum impact to the motoring public. We recommend requiring minimum levels of safety training for roadway workers and work zone device installers. In addition, we support increasing the size of work zone pavement markings to a minimum width of six inches and ensuring that traffic control devices consist of high performance reflective materials. In high-risk work zones, positive separation would be required and federal funds would be made available to ensure that police assistance is available during high-risk work zone operations.



In addition to policy changes that enhance the quality of roadway work zones we recommend that additional funding be made available for education and outreach programs to industry and the motoring public. We recommend that the RSP provide \$500,000 a year to fund each of the following initiatives:

- The ATSSA-FHWA-AASHTO sponsored National Work Zone Awareness Week.
- The ARTBA/TTI National Work Zone Information Clearinghouse.
- The development of an FHWA conference on Work Zone Safety with the release of an FHWA Work Zone Safety and Mobility Report.

Safety Management Systems: RSP funds could be used by states to develop statewide safety management systems to ensure that roadway safety devices are installed and replaced in an efficient and timely manner.



Emergency Management: Under our proposal RSP funds are available to assist states in developing and implementing an emergency management system. The signage, changeable message signs and devices that are necessary for implementing such a program would be eligible for federal funding.

Roadway Safety Research - ATSSA proposes that RSP funds be used to double the roadway safety data analysis and evaluation programs (\$25 million). It is vital that additional emphasis be placed on understanding the current conditions that cause roadway injuries and fatalities and the benefits of roadway safety systems.

Funding the Roadway Safety Program

³⁸ Key Facts About the Critical Role Highways Play In Providing Economic and Homeland Security. The Road Information Program. Data based on information from the Federal Highway Administration, The U.S. Department of Transportation, and the National Highway Traffic Safety Administration. November 2001.

³⁹ Ibid.

Funding the Roadway Safety Program

ATSSA proposes that this new *Roadway Safety Program* be funded at \$3 billion a year by utilizing the following new funding resources:

- Restore interest revenue to the Highway Trust Fund (\$1.5 billion yr.)
- Transfer General Fund Ethanol Tax (2.5 cents) (\$400 million yr.)
- Index federal motor fuels user fee to the CPI (\$900 million yr.) **Figure 3.**

tion study.³⁸ Using this DOT figure, the *Roadway Safety Program* alone would generate 300,000 new jobs over the course of a six-year bill. Additionally, the U.S. DOT study states that every dollar invested in the nation's highway system yields \$5.70 in economic benefits because of reduced delays, improved safety, and reduced vehicle maintenance costs.³⁹

The *Roadway Safety Program's* new funding mechanisms would therefore produce an estimated \$172.71 billion in eco-

Revenue Sources	Year 1*	Year 2	Year 3	Year 4	Year 5	Year 6
Restore interest revenue to HTF	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5
Transfer General Fund Ethanol Tax (2.5 cents)	\$.4	\$.4	\$.4	\$.4	\$.4	\$.4
Indexing federal motor fuels user fee to the CPI	\$.9	\$1.8	\$2.7	\$3.6	\$4.5	\$5.4
Total Funds Available	\$2.8	\$3.7	\$4.6	\$5.5	\$6.4	\$7.3

Fig. 3 - Funding the Roadway Safety Program (Billions of dollars) Source: ARTBA*
 * Year one numbers utilized from *A Blueprint for Year 2001 Reauthorization of the Federal Surface Transportation Programs*. ARTBA. Additional years funding levels extrapolated by ATSSA staff.

ATSSA proposes using this new revenue in a manner that supports the funding under the RSP and, as indicated in **Figure 4**, generate additional revenue for the Highway Trust Fund (HTF) for all transportation projects starting in year two. Over the course of a six year reauthorization bill the HTF would receive an additional \$12.5 billion while at the same time investing \$17.8 billion to improve our nation's roadway safety infrastructure.

economic benefits over six years. These economic benefits are *in addition to* the primary objectives of saving lives and reducing crashes, and the distinct financial benefits that would result from achieving those goals.

Distribution	Year 1*	Year 2	Year 3	Year 4	Year 5	Year 6
Roadway Safety Program	\$2.8	\$3.0	\$3.0	\$3.0	\$3.0	\$3.0
Highway Trust Fund	\$0.0	\$0.7	\$1.6	\$2.5	\$3.4	\$4.3
Total Funds Available	\$2.8	\$3.7	\$4.6	\$5.5	\$6.4	\$7.3

Fig. 4 - Program Funding Distribution (Billions of dollars) Source: ARTBA*
 * Year one numbers utilized from *A Blueprint for Year 2001 Reauthorization of the Federal Surface Transportation Programs*. ARTBA. Additional years funding levels extrapolated by ATSSA staff.

The increased investment called for in the ATSSA roadway safety proposal provides direct stimulus to the U.S. economy. Each \$1 billion spent for highway construction generates 42,100 jobs annually, based on a recent U.S. Department of Transporta-



Brightness and Visibility of Signage and Markings

The Need for Greater Visibility

In 1993 Congress required the Federal Highway Administration to develop and implement minimum levels of retro-reflectivity (brightness measurement) for pavement markings and signs. Driving at night or in adverse weather conditions increases the risk of roadway crashes.



According to various studies, drivers are approximately three times as likely to be involved in an accident during rainy or wet pavement conditions⁴⁴ and nearly five times as likely to be involved in a nighttime versus daytime crash.⁴⁵

Nighttime visibility is a problem for all drivers, but most especially older drivers. A healthy 20-year old with 20/20 vision will have, in effect, 20/40 vision at night.⁴⁶ However an older driver's visual acuity corrected to 20/20 with glasses drops to 20/70 or 20/80 in the dark.⁴⁷ A driver aged 60 needs approximately three times as much light on an object to see it as clearly as they did age 20.⁴⁸

A further examination of statistical data demonstrates that older drivers are nearly four times as likely to be involved in a fatal crash when compared with drivers of all ages.⁴⁹ Accidents involving older drivers

most frequently involve failure to heed signs, yield the right of way, or turn properly.⁵⁰

Recommendation: Implement Minimum Levels of Retroreflectivity

ATSSA proposes that a minimum retroreflectivity standard for pavement markings and signs be established to ensure the necessary amount of light reflected back to the driver is sufficient to allow an older driver to navigate the roadway safely. ATSSA supports the timely publication of a final rule to establish minimum levels of retroreflectivity for signs and pavement markings as an essential component in reducing the number of fatalities on our nation's highways.

Under the ATSSA proposed *Roadway Safety Program* states and local governments could utilize RSP funds to bring their road systems in compliance with the newly established minimum levels of retroreflectivity.

⁴⁴ *Development of Human Factors Guidelines for Advanced Traveler Information Systems (ATIS) and Commercial Vehicle Operations (CVO): An Examination of Driver Performance Under Reduced Visibility Conditions When Using an In-Vehicle Signing and Information System (ISIS)*. FHWA-RD-99-130. December 1999. Page 6.

⁴⁵ *Ibid.*

⁴⁶ *Ibid.* Page 7.

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

Obsolete and Dangerous Roadway Hardware

⁵¹ FHWA Memorandum, E. Dean Carlson. Subject. Action: Traffic Barrier. September 29, 1994. Safety Policy and Guidance.

⁵² FHWA Memorandum, Donald E. Steinke. Subject. Action. Identifying Acceptable Highway Safety Features. July 25, 1997.

The Need for Safer Hardware

Congress recognized the need for improving roadway safety hardware as part of the 1991 Intermodal Surface Transportation and Efficiency Act (ISTEA). ISTEA mandated that the FHWA institute measures to enhance the crashworthy performance of roadside safety features. As early as 1994 the FHWA called for the replacement of old and obsolete roadway safety hardware such as blunt end guardrail terminals.⁵¹



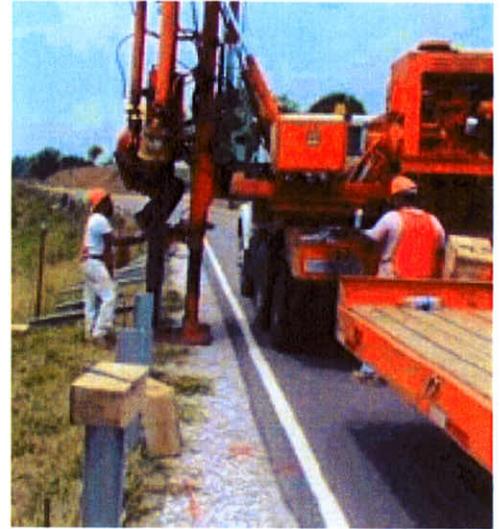
In 1997 the FHWA released a guidance memorandum that strongly encouraged states to upgrade roadside safety hardware with devices that comply with National Cooperative Highway Research Program (NCHRP) Report 350 (NCHRP 350).⁵²

Recommendation: Fund the Upgrade of Roadside Safety Hardware to NCHRP Report 350 Standards

ATSSA supports the timely publication of a final rule to establish a schedule for the upgrading of all roadside safety hardware in compliance with National Cooperative Highway Research Program (NCHRP) Report



350 guidelines. ATSSA proposes that the new *Roadway Safety Program* funding be provided to assist states in upgrading their road systems in compliance with NCHRP 350.



Conclusion

Approximately 3,500 people die every month on our nation's roadways. The increased tax burden from these crashes for taxpayers is nearly \$14 billion with societal costs well over \$150 billion. ATSSA's proposal to invest \$3 billion a year to enhance the nation's roadway safety infrastructure is a sound investment that will pay for itself in reduced crashes.

In addition, the funding mechanisms put in place to fund the *Roadway Safety Program* would provide much needed additional revenue to enhance the capacity of our nation's transportation system. We look forward to taking these proposals to Congress and the American people to get their support for improving our roadway safety system and making "Safer Roads - Save Lives" a reality.

Citations - “The Need for Safer Roads”

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American Traffic Safety Services Association
15 Riverside Parkway, Suite 100
Fredericksburg, Virginia 22406

Visit our Web site at
www.atssa.com



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

California Strategic Growth Plan

California Department of Transportation

Author: Will Kempton

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Author: Will Kempton, Director
California Department of Transportation
1120 N Street, MS 49
Sacramento, CA 95814
(916) 654-6130

California Strategic Growth Plan

Executive Summary:

As part of Governor Arnold Schwarzenegger's California's Strategic Growth Plan (SGP), a massive infrastructure improvement program has been initiated that will serve to fortify the State's transportation system. California transportation officials received a jump-start in financing the SGP with voter approval in November 2006 for the issuance of nearly \$20 billion in general obligation bonds dedicated specifically to transportation. The SGP deploys demand-management strategies, constructs dedicated truck lanes, high occupancy toll lanes, and builds new capacity. It requires innovation in transportation planning, construction and management, sustained coordination between regional transportation agencies and the State, and dedicated funding. The federal program can support and encourage this type of comprehensive approach to transportation infrastructure through changes that will accomplish the following:

- Ensure Highway Trust Fund Stability and growth.
- Develop a national freight policy and coordinated, intermodal goods movement program.
- Continue and extend the existing National Environmental Policy Act delegation program and increase its scope to include plan and project air quality conformity determinations.
- Provide states with more latitude in selecting projects for toll projects and public private partnerships.
- Ensure that federal project oversight is proportional to the share of federal funding in a project.
- Modify planning and programming financial constraint and conformity requirements to allow for more flexibility in programming projects.
- Encourage "blue print" planning approaches and performance based, corridor level system management.

Background Information

Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a \$222 billion infrastructure improvement program to improve the state's transportation system, provide additional education facilities, increase available housing and waterways, and provide for flood control and winter storage.

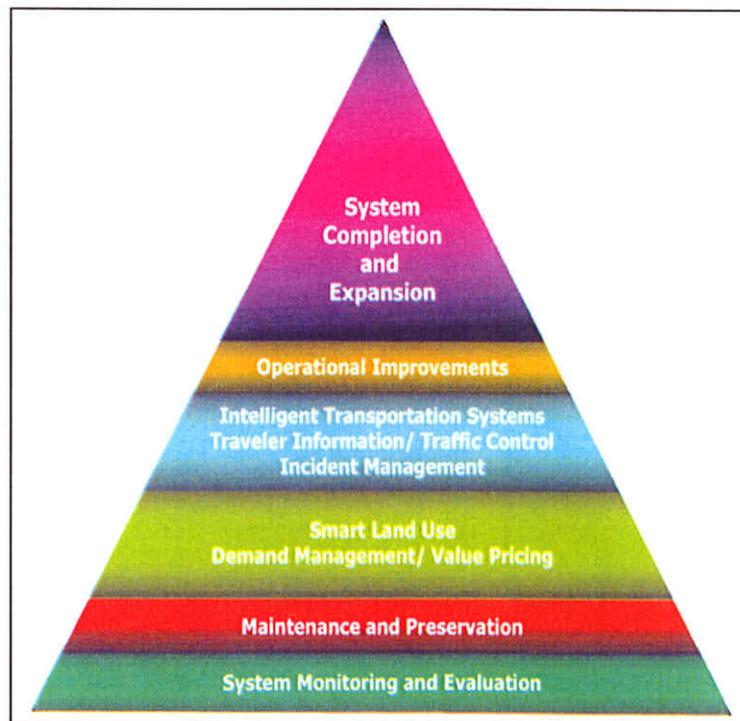
The SGP includes a historic and comprehensive transportation investment package designed to decrease congestion, improve travel times, and increase safety, while accommodating future growth in the population and the economy.

This SGP deploys demand-management strategies, constructs dedicated truck lanes and high occupancy toll lanes, and builds new capacity. It will enable more traffic to move through existing roadways, rehabilitate thousands of lane miles of roads, add new lanes, and increase public transportation ridership. This requires innovations in transportation planning, construction and management, sustained coordination between regional transportation agencies, the State, and dedicated funding.

The SGP calls for investing \$107 billion in transportation infrastructure during the next decade. Funding includes \$47 billion in existing transportation funding sources such as the gas tax, Proposition 42, and federal funds. A total of \$40.1 billion in new funding is proposed from other fund sources and leveraging existing funds to attract increased federal, private, and local funding. The remaining \$19.9 billion is sourced from the transportation bonds approved by California's voters in November, 2006.

The SGP is a complete system approach based on a key premise that investments in mobility throughout the system yield significant improvements in congestion relief. The pyramid in Figure 1 below outlines the strategies to be used to achieve the outcome of reduced congestion. The base of the pyramid is as important as the apex. System monitoring and preservation are the basic foundation upon which other strategies are built. System expansion and completion will provide the desired mobility benefits to the extent that investments in and implementation of the strategies it establish a solid platform.

Figure 1: Strategic Growth Plan Strategies



The SGP is performance based and outcome driven. It targets a significant decrease in traffic congestion below today's levels. This will occur even while accommodating growth in population and the economy over the decade. Over the next ten years, daily congestion (measured by daily hours of delay) is projected to increase 35 percent from 558,143 hours in 2005 to 753,000 hours in 2016 based on current trends. With the SGP, congestion levels are estimated to be 454,000 hours daily in 2016, a reduction of more than 100,000 hours or 18.7 percent below today's levels. Capacity or "throughput" will increase by 15 percent. In addition to congestion relief, the \$107 billion investment also results in:

- 550 new HOV lane miles.
- 750 new highway lane miles.
- 9,000 lane miles rehabilitated.
- 600 new commuter lines.
- 310,000 more transit riders.
- 11 more intercity rail round trips.
- 150 percent increase in intercity rail ridership.
- 8,500 miles of separated bike and pedestrian paths.

The previously mentioned bond measure provides more than \$19.9 billion for investment as follows:

- \$4.5 billion to relieve congestion by expanding capacity, enhancing operations, and improving travel times in high congestion corridors.
- \$4.0 billion will be spent for capital improvements and fleet expansion to enhance public transit, intercity and commuter rail, and waterborne transit. Projects include new capital projects, safety and modernization improvements, capital service enhancements, rehabilitation, and bus rapid transit improvements.
- \$3.1 billion for infrastructure improvements to seaports, land ports of entry and airports; to relieve traffic congestion along major trade corridors; and to improve freight rail facilities to enhance the movement of goods from port to marketplace. Included in this amount is \$1.0 billion for air quality improvements that will achieve emission reductions from activities related to port operations and freight movement. \$100 million of the total will be available for port, harbor, and ferry terminal security improvements.
- \$2.0 billion to augment the existing State Transportation Improvement Program (STIP).
- \$2.0 billion for local streets and roads, congestion relief, and traffic safety.
- \$1.0 billion for the State-Local Partnership account.
- \$1.0 billion for improvements in the State Route 99 Corridor.
- \$1.0 billion for transit system safety, security, and disaster response.
- \$750 million to augment the State Highway Operation Protection Program.
- \$250 million for highway-railroad crossing safety.
- \$200 million for school bus retrofit for air quality.

- \$125 million for local bridge seismic retrofit.

Alternatives and/or Recommendations:

- *Ensure Highway Trust Fund Stability and growth.*

The Office of Management and Budget and the General Accountability Office forecast that at current rates of expenditures and revenues, the Highway Trust Fund (HTF) Account will go bankrupt sometime in late 2009. Both offices predict that the Mass Transit Account will follow suit within two years after that date.

A declining HTF balance will only exacerbate the discussion on limits to program size in the next authorization cycle. The discussion on program size initially delayed the reauthorization of TEA-21 by a year. It is possible that the discussion for the next program cycle could focus on remedying the overextension of the HTF at the expense of program expansion. If this were to happen, the outcome could end the historic ten to twenty percent program increases that have occurred since the Surface Transportation Uniform Relocation and Assistance Act of 1987.

It is imperative that a solution or set of solutions to ensuring the solvency of the HTF be found. Program efficiencies will help to reduce or more effectively use the resources of the HTF, but they alone do not solve the problem. Congress will need to take a serious look at the revenue side to correct this problem. The American Association of State, Highway and Transportation Officials has developed recommendations to accomplish this and these recommendations are included as a separate technical paper in this volume.

- *Continue and extend the existing National Environmental Policy Act delegation program and increase its scope to include plan and project air quality conformity determinations.*

California was selected as a pilot State for delegation of National Environmental Policy Act project approval responsibilities and has approved state legislation to waive sovereign immunity so that it can accept the designation to the pilot program. The Department expects that delegation will result in a time-savings (and an associated time value of money savings) by reducing the time required for environmental clearance.

However, delegation does not grant to the state full federal environmental lead authority. Through an oversight by Congress, FHWA still has project level air quality conformity approval and, as intended, it continues to have a role in the planning level conformity process. Although California will be resolving the project level air quality conformity issue through an administrative delegation, this oversight should be corrected in law. And since the role of FHWA in planning level air quality conformity is limited, and duplicates the role of EPA, that too should be considered for delegation; this would allow direct negotiation between MPOs and Caltrans with EPA, reducing the number of parties in the negotiations and possibly reducing the time for TIP and RTP amendments that

require conformity determinations. This would, in some situations, expedite project delivery while retaining environmental protections.

Additionally, there will not be sufficient time to gauge the value of the NEPA pilot delegation program. It is now almost two years into SAFETEA-LU and, due to the delay in needed Federal regulations, no State has formally applied for delegation with US DOT. It is becoming more likely that the time limit on the program will expire before any pilot State has the opportunity to fully complete even one major EIS from Notice of Initiation through Record of Decision. The State will require an extension of this program to ensure adequate time to evaluate it.

- *Provide states with more latitude in selecting projects for toll projects and public private partnerships.*

Private sector capital is a largely untapped source of funding for projects. SAFETEA-LU toll programs allow states to partner with the private sector for a limited number of projects. This limited program application leaves those states that are in the process of structuring their public-private partnership programs with little option for participation. Expanding program eligibility to all federally funded highways creates more opportunities for public private partnerships and will increase its attractiveness as a congestion management tool.

- *Develop a national freight policy and coordinated, intermodal goods movement program.*

SAFETEA-LU made some inroads in support of goods movement by increasing project eligibility for certain programs, such as creating the dedicated Coordinated Border Infrastructure Program (\$106 million for California), and through earmarked programs such as the High Priority Projects program. Even though the measure increased project eligibility for some programs, there was not a significant increase in formula funding. The result has been to create a larger pool of eligible projects over which to spread funds. The fundamental issue of a dedicated source of funding for goods movement projects was not addressed.

Overall, the State received approximately \$592 million in funding that was spread over 69 goods movement project earmarks. Of this amount, \$366 million was directed to three specific projects, The Alameda Corridor East (\$211 million), Inland Empire Goods Movement Gateway/Norton Air Force Base (\$55 million) and the Gerald Desmond Bridge (\$100 million). This is not enough funding to address the massive goods movement and congestion issues caused by California's position as the nation's main port of entry for the Pacific Rim.

The estimated cost for completion of the Alameda Corridor East is \$4.6 billion. There are several mega-projects in other states that are similar in scope and cost. These projects are vital not only to the economies of their resident states, but also to the rest of the

nation. Currently, there is no national mechanism to address these needs. It is almost impossible for a state to be timely in meeting growing national trade needs through the programs and processes under SAFETEA-LU. The nation needs a clear federal policy that supports its trade corridors and provides a reliable source of funding to ensure its continued economic competitiveness in the global marketplace

- *Ensure that federal project oversight is proportional to the share of federal funding in a project.*

Over the next ten years, California will invest over \$107 billion in transportation infrastructure as part of the Strategic Growth Plan. Of this amount, \$33 billion or 32% percent will come from federal sources. Because the State and its local partners have stepped up to the plate through the \$19.9 billion bond program, the \$3 billion annually raised by the eighteen self-help counties, and other state and local resources, the federal percentage of overall project funding for projects in California, has been declining. In 2005, the federal share of transportation funding represented nearly 40 percent. By 2015, it is projected that it will decline to 34 percent.

This potential decline in revenues comes at a time when, at least locally, FHWA is increasing its program management and oversight responsibilities on projects to eliminating fraud and waste in use of federal funds. There is no doubt that the federal government has a responsibility to ensure that funds are used appropriately. However, the maximum enforcement approach has not produced any significant findings in California and has increased our indirect costs for project development. In essence, it is an inefficient use of federal funding.

The federal role should be commensurate to its contribution to the program. In the past, US DOT has wisely taken an approach of shared stewardship through agreements, and used a risk management program in assessing where it should exercise its review. This approach is less burdensome, more cost effective, and should be formalized.

- *Modify planning and programming financial constraints and conformity requirements to allow for more flexibility in programming projects.*

At this point in time, FHWA and FTA are still in the process of developing State and Metropolitan Planning Regulations to meet SAFTEA LU requirements. It is becoming apparent that existing regulations, especially in regards to financial constraints are inhibiting the State's ability to plan for, and program projects. The process requires almost all amendments to Regional Transportation Plans (RTPS) and Programs to undergo financial constraint tests that slow project implementation. Under existing conditions, if a region needs to either add a project to the FTIP or amend its funding, it will first need to amend its plan which involves a new finding of financial constraint and conformity for the entire document. This extensive process can cause the region to miss key local and state programming windows because of the additional time needed to

reexamine the issues. The key will be to find a balance between RTP and RTIP financial projections and changing conditions to allow expeditious amendments. Some of the change will need to occur in the Federal Clean Air Act because of the close association between fiscal constraint and conformity.

- *Encourage "Blue Print" Processes and performance based, corridor system management.*

Blue Print processes allow regions to analyze the impacts of land use and infrastructure decisions in real time. The process allows regions to analyze impacts of land use and infrastructure decision either region-wide or in micro-scale in real time. Decision makers can see the results of proposed changes immediately, which make it an extremely useful tool in guiding land use and transportation infrastructure investments. It also leads to the development of clear performance criteria for transportation system management. When coupled with a corridor level management approach, it leads to the definition of strategies that operators of the system can cooperatively use to obtain the highest levels of capacity usage from highways, local streets and roads, and transit systems. The results from efficient system management provide the information needed to guide future investment within the corridor. Future federal programs should provide funds to regions to develop the tools for real time planning, and support coordinated system management programs.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Intercity Rail

California Department of Transportation

Author: William Bronte

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Author: California Department of Transportation
William Bronte, Chief, Division of Rail
P.O. Box 942873
Sacramento, CA 94273-0001
(916) 654-4384
bill_bronte@dot.ca.gov

Intercity Rail

Executive Summary:

In a span of 30 years, California has improved its intercity rail system to service levels equivalent to the Amtrak Northeast Corridor between Boston and Washington D.C. and the State is home to the second, third and fifth busiest corridors in the Amtrak system. This success can be directly attributed to the State's investment of nearly \$1.8 billion in intercity rail since 1976, and its commitment to continue investing in the system. The capital and service improvements to California's intercity rail system have significantly reduced vehicle miles traveled on the State's highways using a mode that is more energy efficient than either automobile or airline travel, and has improved freight rail goods movement, which is beneficial to the national economy.

As the Congress and the Administration move to redefine the nature and structure of a national intercity passenger rail system, it should look to the California model as a way to develop an efficient and effective program. The State's key recommendations for restructuring of the program are as follows:

- Create a multi-year Federal capital matching program to encourage states to invest in intercity passenger rail by providing an 80 percent Federal/20 percent State matching program. The program should be dedicated, stable and of a sufficient amount to encourage State investment.
- Allow prior State investments made within a defined number of years to be counted as part of the State's 20 percent match to future capital funds.
- Enhance goods movement opportunities and leverage state programs by establishment of a federal program of investment in joint use (freight and passenger) rail corridors.

Background Information

California has had a vigorous intercity passenger rail program in place since 1976 when it first agreed to provide financial support of an additional round trip of Amtrak's "San Diegan", which operated between San Diego and Los Angeles. Since that small step 30 years ago, California's intercity passenger rail program has come to be viewed as the national leader.

Today, California's extensive intercity rail and feeder bus network ties together communities in all corners of the State. More than 5 million passengers rode California's intercity passenger rail services during the last Federal fiscal year making the State second only to New York in terms of total Amtrak ridership. California is home to the second, third and fifth busiest corridors in the Amtrak system:

- The Pacific Surfliner Corridor (formerly San Diegan), connecting San Diego with Los Angeles to Santa Barbara and San Luis Obispo carries 2.7 million passengers annually.
- The Capitol Corridor, connecting Auburn through Sacramento to San Jose carries 1.3 million passengers annually. With its most recent frequency increase, 16 round trips now operate between Sacramento and Oakland, nearly the same level of service provided on Amtrak's Northeast Corridor between Boston and Washington D.C.
- The San Joaquin Corridor, connecting the Bay Area/Sacramento with Bakersfield (and bus connections to Los Angeles) carries 800,000 annually.

Together, these three routes generate more than half a billion passenger miles annually—500,000,000 miles of travel that did not occur on the State's highways. In addition to helping alleviate highway congestion, intercity passenger rail provides environmental and energy benefits. The President has called on Americans to reduce their fuel consumption by 20 percent and Governor Arnold Schwarzenegger has initiated efforts to reduce the emission of gases that contribute to global warming. According to scientists at the Oakridge National Laboratory, intercity passenger rail uses 18 percent less energy on a per passenger mile basis than airlines, and 17 percent less than automobiles.

The State's success has been due to the support of its Executive and Legislative branches of government and the decision of California's voters to invest in intercity passenger rail. Since 1976, nearly \$1.8 billion dollars has been invested to build the system. As part of Governor Schwarzenegger's Strategic Growth Plan and the recently approved Transportation Bond Measure, California is poised to invest another \$400 million in its intercity rail program.

Although these funds primarily benefit passenger rail, many of these investments also benefit the Class I railroads and both the State and the nation's economy. By improving the efficiency and increasing the capacity of their infrastructure, it enhances the ability of the railroads to move goods to market.

Alternatives and/or Recommendations:

Although California has made significant investments in its intercity passenger rail system, it and other states with intercity passenger rail programs cannot continue to do it alone. Reducing national dependence on foreign energy supplies, improving the country's mobility and strengthening the vitality of the State's and nation's economy will require a continued, robust,

federal partnership and investment. The following are California's recommendations for achieving these goals:

- Create a multi-year Federal capital matching program to encourage states to invest in intercity passenger rail by providing an 80 percent Federal/20 percent State matching program. The program should be dedicated, stable and of a sufficient amount to encourage State investment.
- Allow prior State investments made within a defined number of years to be counted as part of the State's 20 percent match to future capital funds.
- Enhance goods movement opportunities and leverage state programs by establishment of a federal program of investment in joint use (freight and passenger) rail corridors.



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COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Restoring Lost System Capacity

California Department of Transportation

Author: John Wolf

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Author: Assistant Division Chief, System Management Planning, Division of Traffic Operations, John Wolf
California Department of Transportation
1120 N Street, Sacramento, California 95814
(916) 654-2627
john.wolf@dot.ca.gov

Restoring Lost System Productivity

Executive Summary

This paper was recently presented to the U.S. Government Accountability Office (GAO) in response to queries to State Department's of Transportation on the causes of inefficiency of roadway networks and remedies. It is provided here in its original form with the detailed questions and the Department of Transportation's responses. The responses emphasize the criticality of system and corridor management based upon performance measurement across all jurisdictions and modes. This approach will restore lost productivity to the State's transportation system, improve freeway throughput, travel time reliability and ensure economic growth.

The Department's Transportation Management System (TMS) Master Plan and Traffic Operations Strategies on which this document are based are available on the Department's internet site under the Division of Traffic Operations. The concepts in these reports are also the foundation for the transportation portion of the State's Strategic Growth Plan.

Background Information

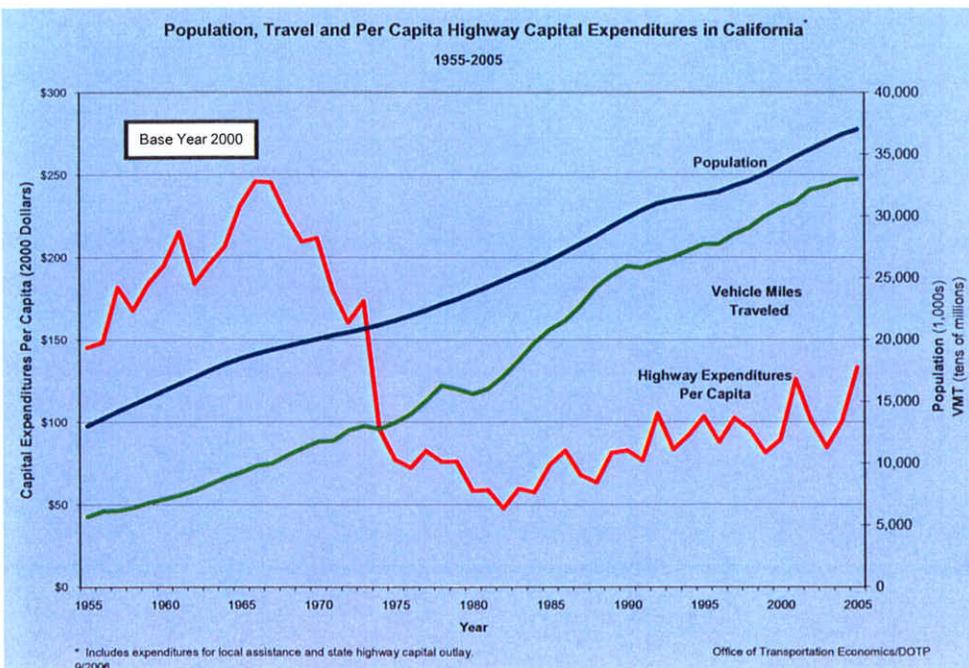
- Please describe the state's road network, traffic patterns, traffic trends, areas of growth, etc. (in context of road network inefficiencies)

Inefficiency might have multiple meanings or subjective interpretations. Some might argue that motorized vehicle use of roads is inefficient because of some broad assessment of value and worth. We have begun to look at utilization and productivity of our freeway system in urban areas where, clearly when we need them the most they don't realize the capacities they were designed to carry (2,000+ per lane per hour). This same concept can be applied at the person carrying level as well. This answer, for the most part, is limited to our jurisdiction, i.e. the State Highway System which is approximately 9 % of roadway in the state. The chart below gives you a picture of the historical pattern of traffic volume. As for other patterns or trends we see a combination of urban and rural, inter and intraregional travel, and a distinct inland movement as we congest and populate the coastal areas.

California's State Highway System is comprised of 15,213 center line miles and more than 50,560 lane miles. Annual vehicle miles of travel (VMT) were over 183 billion in 2005. Interstates comprise less than 20 percent of the system center line miles however carry almost half of all VMT and are the major freight (5 axle truck) corridors as well as commute corridors. Most of the State's Freeway and Expressway (F&E) System envisioned in the late 1950's to

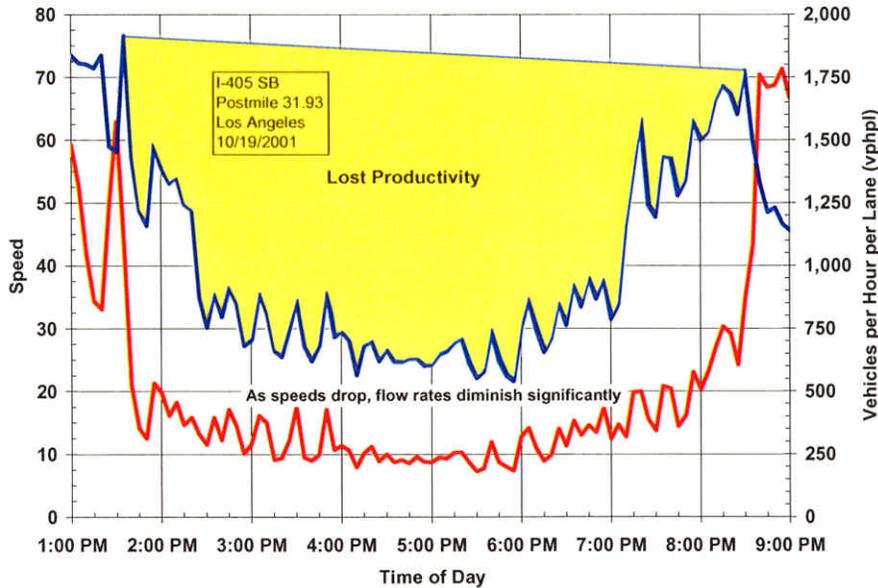
serve future growth was not completed as a system to higher standards (typically freeways). The Interstate portion was the only portion of the F&E comprehensively completed. Over 50 percent of the State's highways remain conventional two lane routes. Major routes such as State Route 99 traversing the State's central valley have major expressway and conventional gaps. City streets and county roads account for 137,104 center line miles and 293,664 lane miles. In 2005 VMT was almost 142.9 billion.

It isn't surprising that traffic on the state's roadway network is increasing as the state's population grows. Travel on the state highway system increased by 27 percent from 1994 to 2005. On the local network travel increased 12 percent. With California's position on the Pacific Rim and location of major international water ports, traffic into and out of the ports has significantly increased with trade expansion. Five axle truck average daily vehicle miles of travel has increased about 32 percent in the same time frame. When you factor in the limited investment in highway expansion, it isn't surprising that urban freeway daily vehicle hours of delay (DVHD) (commonly referred to as recurrent) has increased almost 70 percent from 1994 to 2004 with over 500 thousand hours DVHD in 2004. (California measures recurrent congestion as a condition lasting 15 minutes or longer where travel demand exceeds freeway design capacity and vehicular speeds are 35 miles per hour or less during peak commute periods on a typical incident-free weekday.)



- Which areas would you identify as being an inefficient use of the road network? Why?

Not knowing precisely what the GAO considers “inefficient”, we will use our concept of productivity to give a picture of what we consider the poor utilization of existing infrastructure on the State Highway freeway system.



Urban freeway corridors are not used as efficiently as they can be. The chart above attests to this. This inefficiency applies to a lesser extent to major parallel local arterials as well. Management of these systems needs to be coordinated and must be comprehensive. The California Department of Transportation estimates that almost one-half of the urban freeway system provides a level of productivity that is 25 to 35 percent below planned capacity levels during peak congested periods.

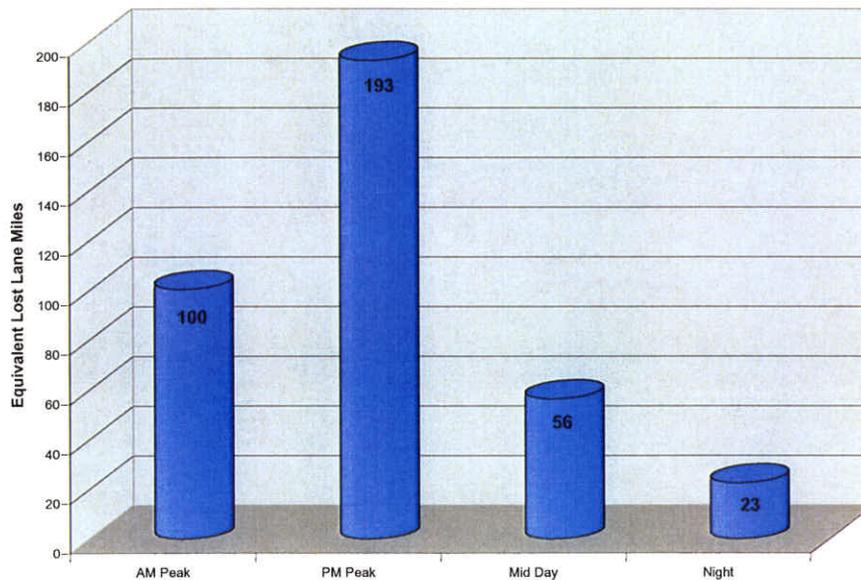
Inefficiencies are manifest in other ways, e.g. what we might call corridor imbalance, i.e. a corridor wherein over-demand for a freeway causes this lost capacity when you have underutilization of a rail or bus service within the corridor. The same could be said for local arterials not at capacity while the freeway in the same corridor is.

- What are the major factors that contribute to the inefficient use of the road network of these areas?

The productivity potential of the freeway system isn't being captured because the system is not yet aggressively managed through actions such as comprehensive ramp metering. The potential capacity of the larger system, that includes high capacity major local arterials, can be captured by actions such as increased coordination of ramp metering with other road signals, and signal synchronization.

- What is the effect of this inefficiency?

While the chart above shows the magnitude of lost capacity due to “inefficiencies”, a less technical way to explain the impact is what we call “lost lane miles”, i.e. when you need your built capacity the most we, in effect, un-build or loose those lane miles – pretty ironic given the traditional solution of building or adding lanes to address transportation demand problems. Here’s an example from SCAG’s Regional Transportation Plan.

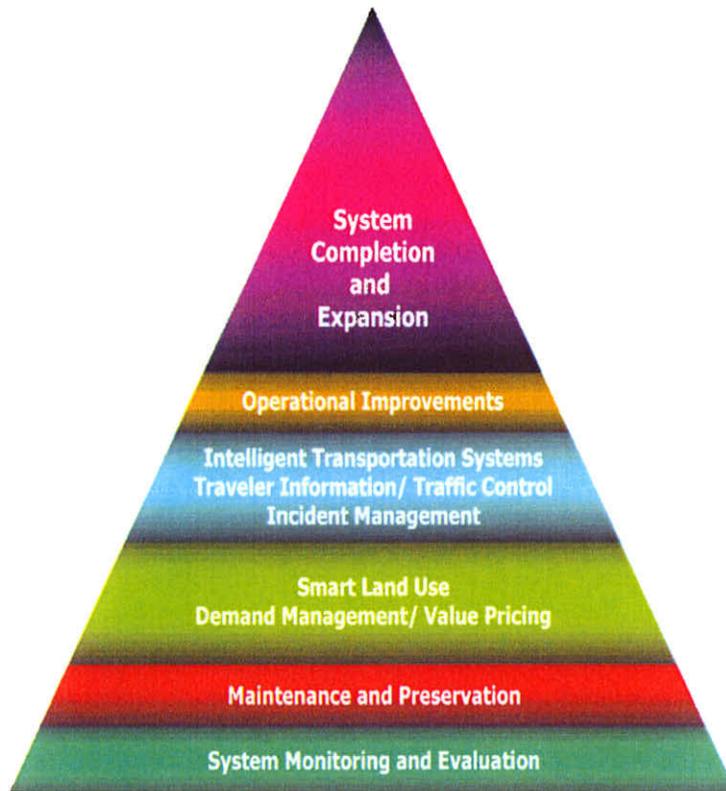


This effect is only compounded if we continue to expand the system to address congestion without first re-capturing the lost capacity and maintaining mobility thereafter.

- What approaches have been used to mitigate the inefficiencies of the road network that does not include increasing road capacity (economic, operational, etc.)?

While we have been deploying HOV and Ramp Metering for some time, we have barely begun to apply comprehensive system management based on performance measurement across all jurisdictions and modes. System management can significantly improve productivity of the freeway network, improve travel times and reliability for all travelers. The Department’s Transportation Management System (TMS) Master Plan identifies three principal elements for a managed system that will restore capacity. These are traffic control, (such as ramp meters), incident management, and traveler information. These elements must be built on a strong foundation of detection in order to measure freeway performance. Aggressive deployment of TMS could increase productivity by 20 percent, reduce projected congestion by 20 percent, and improve travel time reliability by 10 percent. These operational strategies are at the heart of system management as depicted in the Governor’s Strategic Growth Plan graphic on the following page.

Governor's Strategic Growth Plan--*GoCalifornia* Strategies for Mobility



A similar graphic was part of the Department's Transportation Management System Master Plan, which presented the strategy and business case for deploying TMS strategies described above on urban freeways in coordination with major local arterial operations. The TMS Master Plan describes a system management framework for mitigating inefficiencies of the road network. The framework itself is comprised of six elements and is constructed like a pyramid, with a broad base, and smaller apex. The base (the foundation of system management) is system monitoring and evaluation. The next element is maintenance and preservation. Following this element is demand management. Next comes the TMS element comprised of traveler information, traffic control, and incident management. (TMS are the business processes and associated tools, field elements, and communication systems that help maximize the productivity of the transportation system.). The last two elements are operational improvements and system expansion. Operational improvements are a key element however must be coordinated with TMS improvements. System expansion is necessary on some urban freeway corridors through improvements such as high occupancy vehicle lanes and direct connector ramps and interchanges. The Department's approach to identifying non-expansion and expansion projects and their benefits on urban freeways is described in a report titled "Traffic Operations Strategies" (TOPS). The report describes levels of intelligent infrastructure improvements and other operational improvements that would be considered before expansion. (TMS Master Plan and TOPS available on Division of Traffic website)

- Which of these initiatives are federally funded?

The HOV network was funded using federal funding. The TMS Master Plan effort and TOPS were primarily funded through state dollars. There have been some federal State Planning and Research (SPR) dollars in subsequent studies and demonstration corridor plans. SPR dollars are being used to fund an effort by the Administration to reduce congestion through demand management using an approach referred to as Blueprint planning. In this initiative the largest metropolitan planning organizations are provided funding to do enhanced comprehensive land use and transportation planning that will result in better decision making to reduce congestion through a variety of strategies. Actual improvements to the freeway network in all categories are typically funded through federal transportation dollars with state match.

- What other types of funding are available for these approaches?

State funding has been used for ramp metering deployment, operation and maintenance. Local sales tax funds are also available

Recently the voters of the State passed a \$19.9 billion bond package for transportation improvements in multiple categories (state highways, local arterial signal synchronization, transit, rail) that will comprehensively reduce congestion and improve mobility. Several counties in California also have what we refer to as “local measures”. The voters have chosen to increase the sales tax in their county for transportation purposes. A significant amount of these funds go towards improvements on urban freeway corridors.

- How is Caltrans involved in the transportation planning and decision-making for different regions? Who are the major decision-makers? How are different approaches and projects prioritized? What tools or data are used to make these decisions on funding projects? Is asset management used to guide the planning process?

The Department is involved with the State’s 18 metropolitan planning organizations (MPOs) as part of the 3 C process in federal law (23 USC Section 134 and 135). This is the process for developing plans and programs. The 3 C’s are continuing, cooperative and comprehensive. The Department is on the technical and policy advisory committees of all MPO’s and in most cases on the MPO board as an ex-officio member. For the non-MPO areas the Department likewise is on technical and policy committees for the regional transportation planning agencies. The Department is a participant in all transportation and related studies led by the MPOs and non-MPO regions. The Department brings an “owner/operator” view to the table for the state highway system as well as the larger statewide transportation system viewpoint.

The major decision makers in California are the MPOs and also County Transportation Commissions in southern California. California is unique in that the MPO for the six county southern California area (the Southern California Association of Governments) prepares and adopts the Metropolitan Transportation Plan (MTP) however five of these counties have unique powers under State law that allows each county commission to prepare its own regional transportation improvement program and other critical financial programming documents

independently. The county transportation commissions in addition to the 18 MPOs are the key decision makers. The California Transportation Commission appointed by the Governor is responsible for final decisions on project funding for major transportation funding programs such as the State Transportation Improvement Program and several categories of the bond programs. The state legislature ultimately has major decision making powers.

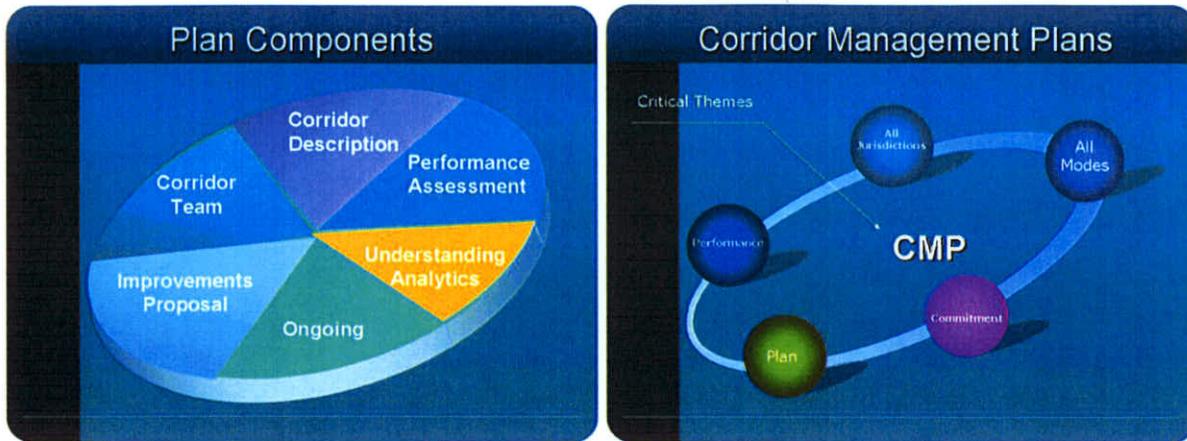
In California, 75 percent of all funds going into the State Transportation Improvement Program are under the direction of the regional transportation planning agencies and county transportation commissions. Final approval is with the California Transportation Commission. California has a bottoms up approach to decision making. The Department's role is to be at the planning table with the regions and recommend and advise on plans and programs in a cooperative manner based on sound analysis of projected outcomes. An example of this approach is the development of the TMS Master Plan. The Department convened a committee representing the larger MPOs to discuss the results of technical studies supporting plan development and future courses of action. Much of the TMS effort is finding its way into plans and programs by the MPOs.

Approaches and projects are prioritized by the MPOs and non-MPO regions. Larger MPOs and the county transportation commissions typically prioritize approaches and projects based on benefits of an approach or project to restoring productivity in the corridor. The Department is working with these agencies to assess current freeway performance through detection (performance measurement), analyze causes of congestion, identify a range of potential strategies, actions and improvements to restore productivity, perform micro-simulation modeling to test alternative scenarios for highest results, select the scenarios of highest performance, and prepare plans to guide corridor management and operations.

Data used for project decision making typically include current and estimated future travel demand and delay hours. Tools are typically micro-simulation models such as paramics. For project prioritization typically the estimated reduction in DVHD in the corridor or through the project area that the project will achieve is the highest determinant. Asset management is increasingly in the equation however it isn't currently a strong factor. It will however become one in the future. The Department has a strong commitment to life cycle benefit cost analysis that will complement a stronger asset management strategy.

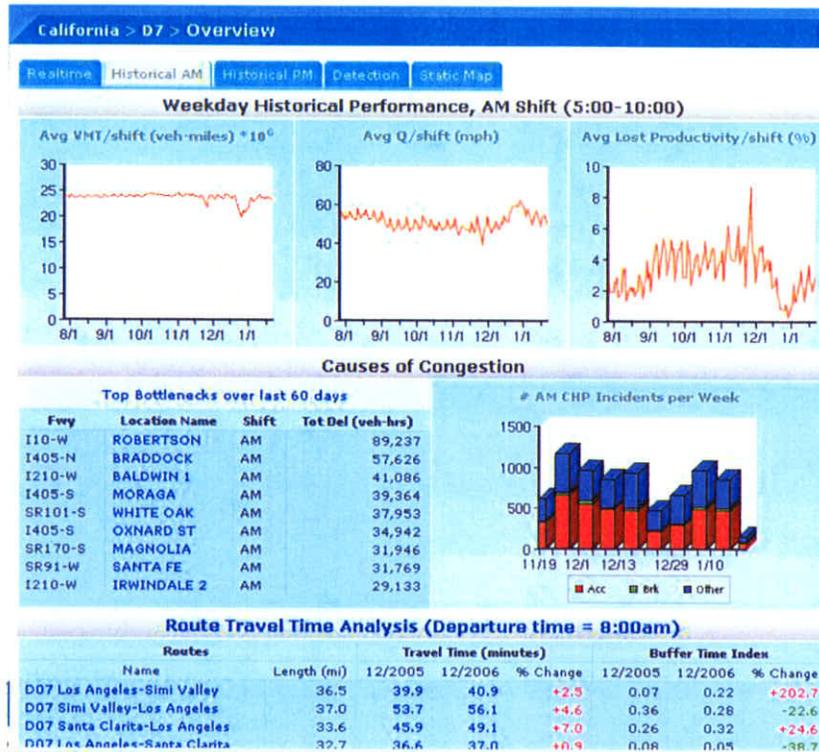
- How involved is Caltrans with the implementation phase of these approaches? What divisions at Caltrans work specifically on road efficiency issues? What types of guidance do you provide local agencies? What types of data does Caltrans collect on these projects?

Issues of road efficiency are a joint responsibility of the Division of Traffic Operations and Transportation Planning, but require input from all functions and stakeholders – in other words, full system management. The Divisions of Transportation System Information is also involved and has recently taken a look at asset management.



Guidance will be developed in the near future for implementing system and corridor management based on performance measurement across jurisdictions and modes. Guidance will be based on the concepts in the TMS Master Plan. Currently conceptual guidance only has been provided. The Department is working now with regional and local agencies on securing process commitments to the concept of system management through execution of charters or memorandums of understanding and development of work plans for conducting performance assessment and other steps towards a final corridor management plan.

Data for urban freeways is collected now by daily vehicle hours of delay, annual average daily traffic, and by numbers of incidents. Incidents (such as accidents or debris in freeway) slow traffic flow and create congestion. For corridors with detection (typically embedded loops in pavement) information flows on a real-time basis into a system called PeMS (performance measurement system). These are the most highly congested urban corridors. PeMS allows both Department and regional agencies the ability to see how the system is performing and identify periods of congestion. With that information staff can then disaggregate the data further to identify causes. Detection is being expanded rapidly to support system and corridor management based on performance measurement. The Department may do actual “on the ground” counts in corridor segments or ramp termini depending on the existence of detection or other detailed information needed. On a statewide basis including rural areas the Department has a traffic census program to collect and estimate average annual daily traffic and truck volumes. Below is an example of a PeMS screen on the following page.



- After implementation of these approaches, have there been any evaluations conducted? If yes, what were the results? How were the results measured?

The first comprehensive approach to understanding the causes of inefficiency and what is needed to restore productivity to urban corridors is in its final stage of development for the I-880 corridor in Alameda County in the Bay Area. This is a prototype approach that will be applied statewide for all urban freeway corridors. The final corridor management plan will identify a recommended best set of strategies, actions, and improvements to both restore productivity to the corridor and sustain it through system management and performance measurement. The final micro-simulation modeling to test the impacts of various improvement alternatives is not yet complete. Preliminary pre-modeling efforts however have been encouraging and the efforts well received by the congestion management agency and regional partners. Ultimately the results of the effort will be monitored and measured through PeMS.

- If no formal evaluation was conducted, what benefits do you believe resulted from the implementation of these approaches? What are the limitations of these approaches?

California can not yet point to an example of a corridor for which productivity has been restored based on a system management approach and performance measurement. The TMS Master Plan assumes a 7 to 19 year window to achieve DVHD reductions based on system management. The Administration's recent initiative referred to as the Strategic Growth Plan, expedites this

schedule to a 10 year window. We are confident in the outcomes of a system management approach based on research and studies done in the past few years by the Department, in consultation with experts on system productivity in the private sector and at our universities. There will ultimately be demonstrable benefits. The TMS Master Plan is being implemented more aggressively with infusion of transportation bond dollars. Concepts of system management based on performance measurement are embedded into the bond programs overall and specifically into the Corridor Mobility Improvement Account. Improvements funded from this \$4.5 billion fund on the state highway system will be evaluated based on their contributions to reducing DVHD and improving corridor performance. The guidelines for the program encourage preparation of a corridor management plan similar to the I-880 example to sustain mobility benefits from these investments.

The Department has not identified any limitations to the approach of correcting transportation inefficiencies through applying principles and practices of system management. The TMS Master Plan released in 2004 identifies a short-term horizon of three to five years with the goal to prepare for and support aggressive TMS implementation. (This includes addressing opportunities for improvement, ensuring a minimum level of deployment, leveraging past investments fully, and preparing for more aggressive deployment.) The goal for the longer-term horizon of seven to nineteen years is to restore lost capacity (increase productivity), reduce projected freeway congestion, and improve travel time reliability. Critical actions in this horizon are to continue to aggressively deploy TMS with a foundation of detection, and report continuously on system performance.

- What have been the challenges in implementing these approaches? What strategies have been used, by either the federal government or state governments, to overcome the challenges for implementing these approaches?

Challenges are primarily in areas of education and understanding of locally elected officials, transportation agency staff, and the general public on the benefits of system management to both system operation and to them personally in less delay and more reliable travel times. Typically, for example, when ramp metering is proposed in a corridor there is resistance due to a perception that metering will cause additional delays to the traveler and cause back-up of traffic onto local arterials. Newer technologies allow for intelligent metering that adjusts for back-ups and manages both the freeway ingress and the arterials for highest efficiency.

The second challenge is planning for corridor management at the corridor and not project level. California has over 470 cities and 58 counties. Each wants its own project and plan. Roadway networks must be managed across jurisdictions and modes. This is why the Department is working towards charters and memorandums of understanding for corridor management between the MPOs, local jurisdictions and modal agencies based on logical termini or end points.

The federal government has been supporting the movement toward system management and performance measurement through several initiatives including the integrated corridor management program. Federal Highway Administration has a fairly aggressive approach to supporting corridor management through its traffic operations programs. This includes value pricing discretionary programs. SAFETEA-LU includes provisions requiring MPOs and the State Department's of Transportation to include system performance measurement in its plans and

programs and to include operational management strategies for improved system performance. Also in the reauthorization is a requirement for real-time system management information as part of the State and MPO approach for ensuring travel time reliability. Requirements for congestion management systems (CMS) are in federal law for MPOs with urbanized areas of 200 thousand population. The federal government provides training and support for CMS requirements.

The State has supported the shift towards system management through funding both the TOPS and TMS Master Plan efforts. The legislature also enacted legislation that made mandatory the collection, analysis and publication of recurrent DVHD data on a yearly basis. Collection and analysis of congestion data is the critical first step to measuring system performance.

- What other long term approaches are being considered for the state in the next 20 years? What are the most promising advances in transportation strategies and technologies are being developed now for future use?

The most promising advance in transportation strategies is to take an aggressive and comprehensive approach to applying TMS to the state's urban freeway corridors. In addition urban fringe areas should be targeted in advance to install detection and embed concepts of system management and performance measurement with regional and local agencies. Corridor management plans for currently congested corridors and for urban fringe corridors need to be prepared based on rigorous performance assessment and be used to guide corridor operations and management.

California works closely with its research institutes at the University of California and other institutes to coordinate research and development of technologies to improve freeway performance and manage transportation systems. Currently, research in wireless technologies for collecting freeway performance data are showing promise, improved ramp metering algorithms are under development, and rapid improvements to PeMS capabilities to collect and analyze a variety of performance data are being made.

Caltrans conducted a major demonstration known as automated highways several years ago. We are also working closely with USDOT to move forward with Vehicle Information Infrastructure (VII) effort. Such efforts will eventually result in a highly automated system and enable much higher productivity and improved safety than currently possible. Prior to a fully automated system, we envision phases of improved management e.g. dynamic lane assignments.

Alternatives and/or Recommendations

The federal government should to continue to emphasize the importance of system and corridor management based on performance measurement on urban freeway corridors (including major parallel local arterials and across modes) and provide increased funding within all existing programs so that system management elements are not a lower priority for funding when completing growing rehabilitation and system expansion needs. While SAFETEA-LU increased both State and MPO requirements to include operations and system management elements in the State and Metropolitan Transportation Plans, the implementation of these plans could fall short of the goal of a managed system across all jurisdictions and modes, just at the time it is needed.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Highway Trust Fund and Transportation Issues

**American Association of State Highway and Transportation Officials
(AASHTO)**

Author: John Horsley

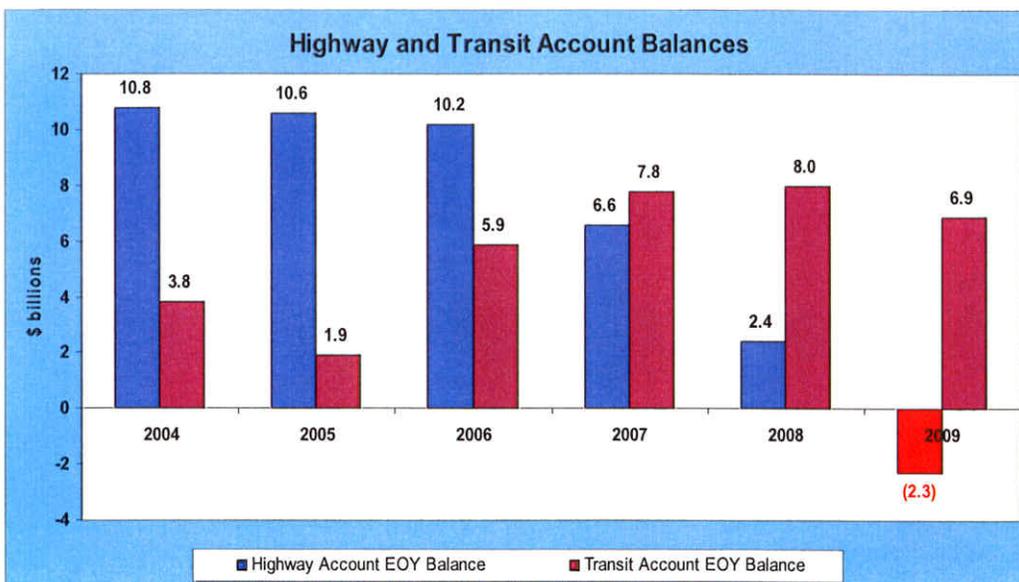
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Author: John Horsley, Executive Director
Association of State Highway and Transportation Officials
444 North Capitol Street NW, Suite 249
Washington, DC 20001
(202) 624-5800
jhorsley@ashto.org

HIGHWAY TRUST FUND AND TRANSPORTATION ISSUES

Immediate funding issues

Looking at the key issues in the immediate future for highway and transit finance the nation is faced with needs that exceed its available resources at all levels of government. Compounding that problem is the current state of the accounts that make-up the Highway Trust Fund (HTF). Figure one shows the current projected revenue to the HTF. The situation is grave with the Highway Account expected to show a deficit in fiscal 2009 of some \$2.3 billion and the Transit Account to be in deficit by 2012. In both cases, the result would be steep reductions in programs with highway investment dropping as much as \$9 billion below SAFETEA: LU program levels.



To avert a funding crisis in 2009 and beyond, the Commission should urge Congress to provide revenues sufficient to preserve funding of the highway and transit programs at the levels authorized by SAFETEA: LU.

Looking to the future

Beyond addressing the immediate crisis, Congress should provide the revenues necessary by 2015 to restore the purchasing power of the highway and transit programs. There are three alternative scenarios that The American Association of State Highway and Transportation Officials (AASHTO) proposes for the Commission to consider. The first two scenarios phase in the restoration of purchasing power (in terms of 1993 levels) over multiple authorization cycles. Under the scenario that fully restores purchasing power by 2015, highway assistance would increase to \$73 billion and transit to \$17.3 billion annually.

The time has come to increase investment in our Surface Transportation System to the levels needed. This will require marshalling the political will necessary at the federal, state and local levels to generate the additional revenues required to make the necessary increases in investment possible.

AASHTO recommends that Surface Transportation investment should be increased at all levels of government in order to keep the U.S. competitive in the global economy and meet America's 21st century transportation needs. To accomplish that goal all levels of government must continue to fund their historical shares of investment.

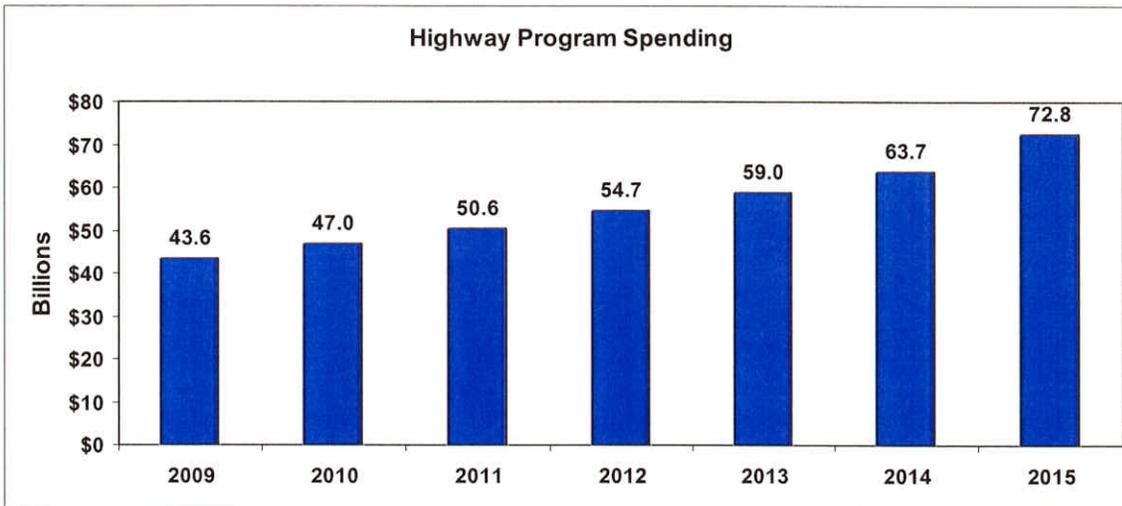
To illustrate, if the federal highway program increases its funding to \$73 billion by 2015 to restore the program's purchasing power, and state and local governments sustain their historical share of the program at 55% of highway capital investment, state and local spending level would have to increase to \$89 billion by 2015. While these increases look huge, history shows that they are similar to what federal, state and local governments have been able to achieve in the recent past.

In 1981, highway capital investment was \$19.7 billion, \$11.5 billion federal and \$8.2 billion state and local. By 2005, it had increased to \$75 billion, up 280%, \$33 billion federal, up 187%, and \$42 billion, state and local, up 412%. If state and local investment increases at the same annual rate for the ten years between 2005 and 2015, as it did for the 24 years between 1981 and 2005, it will increase to \$89 billion. To restore the system's purchasing power overall, the federal government will also have to fund its share of the increase needed.

Increased Costs of Construction are a key factor requiring increased investment.

In the period from 1993 to 2004, highway construction costs increased at approximately the rate of the consumer price index -- around 2.5% annually. But from 2004 through 2006, there was a spike in the prices of petroleum, steel, concrete, asphalt, and construction equipment, which increased construction costs, overall, between 30% and 45%, depending on the regional market. AASHTO estimates that between 1993, the year in which federal fuel taxes were last adjusted, and 2015, construction costs will have increased by over 70%. As previously cited, to restore the

purchasing power of the program, federal funding will have to be increased from \$43 billion in 2009 to \$73 billion by 2015. To do so will require the equivalent of increasing the federal gas tax by 10 cents. The chart that follows shows the proposed pattern of increased highway investment.



Likewise the nation will need to increase federal transit assistance from \$10.3 billion in 2009 to \$17.3 billion by 2015 to meet critical transit needs and to help meet air quality requirements.

In its 2004 Conditions and Performance Report, U.S. DOT estimated the highway “cost to improve” investment level to be \$118.9 billion each year for the next twenty years. Using the Consumer Price Index to adjust this figure over time from “constant dollars” to “year of expenditure dollars,” shows that \$137.5 billion is the level of annual capital investment for 2007 that would result in positive net benefits to the American public in terms of the condition and performance of the highway system. Adjusting each year for the CPI, that figure would increase to \$167 billion by 2015, and to \$214 billion by 2025.

Intercity Passenger Rail

Nearly all intercity passenger rail service is currently provided by Amtrak, which serves 23 million passengers annually, generating annual ticket revenues of about \$1.1 billion. Services are provided over a network of approximately 23,000 miles of rail over which about 270 trains operate per day, serving 500 communities in 47 states. Over the past ten years Federal assistance for Amtrak has averaged about \$1 billion annually.

Congestion on highway and aviation systems has caused many states to look for ways to augment service. A number have invested in intercity passenger rail service. Many of these investments have yielded striking successes in the past decade and the experience has demonstrated that passenger rail can be a viable alternative. Investment in the Chicago-Milwaukee-Minneapolis corridor, as part of the Midwest Regional Rail Initiative may increase

annual ridership from 321,000 in 1996 to 3.2 million in the future. Planned investment in California's three state-supported corridors will support ridership of 11.6 million in the future, compared with 2.6 million in 1996. For the Northeast Corridor, planned investments will maintain and expand the current annual ridership of 14 million.

Despite important changes under new Amtrak leadership, uncertainty continues to surround its future. Critical rail infrastructure repairs and improvements remain unaddressed. Recent efforts to recalculate Northeast Corridor access fees for commuter lines have deflected those involved from the broader, long-term task. The uncertainty of annual federal support for Amtrak and the access fee controversy have called into question the Federal commitment to the investment necessary to bring the Northeast Corridor up to a state of good repair.

In order to address these issues AASHTO supports providing the funding needed for Amtrak to continue operation of current services and not interrupt vital commuter services until a long-term national program for intercity passenger rail service is established.

As part of that process, AASHTO recommends establishing a sound passenger rail partnership between the States and the Federal government and then move forward with plans to expand service. States will continue to support existing rail service, as well as taking the lead in planning and developing new, expanded and enhanced regional passenger rail corridor services. However, there must be a federal-state funding partnership similar to existing highway, transit and aviation programs.

To assess investment needs in this field in 2002 AASHTO produced a report entitled *Intercity Passenger Rail Transportation*. In the report AASHTO estimated the investment needs for 21 intercity passenger rail corridors, including those owned by Amtrak, to be \$60 billion over the next 20 years. That would translate into an annual investment of \$3 billion.

Freight Rail

AASHTO's 2003 Freight Rail Bottom Line Report estimated that the level of investment in rail infrastructure required for freight rail to maintain its current market share and handle its "fair share" of growth was approximately \$195 billion over 20 years. It anticipated that the railroads should be able to provide around 75 percent of the funding required, estimated at \$142 billion, but the remainder (up to \$53 billion, or \$2.65 billion annually) would have to come from public sources, in the form of direct assistance, low-interest loans, tax credits and other forms of public-sector participation.

Compared to a scenario in which no public support was provided, the base case scenario, in which \$2.75 billion in annual public support was provided, would avoid seeing 450 million tons of freight shift from rail to trucks, avoid 15 billion in additional truck VMT, save shippers \$162 billion, and save \$10 billion in highway costs over a 20-year period.

Surface Transportation Policy and Revenue Study Commission
Los Angeles, California Hearing
February 21 & 22, 2007

Additional revenues should be provided from outside the Highway Trust Fund for freight and intercity passenger rail using a variety of tools such as investment tax credits and as appropriate customs fees.

Author: California Department of Transportation
William Bronte, Chief, Division of Rail
P.O. Box 942873
Sacramento, CA 94273-0001
(916) 654-4384
bill_bronte@dot.ca.gov

Intercity Rail

Executive Summary:

In a span of 30 years, California has improved its intercity rail system to service levels equivalent to the Amtrak Northeast Corridor between Boston and Washington D.C. and the State is home to the second, third and fifth busiest corridors in the Amtrak system. This success can be directly attributed to the State's investment of nearly \$1.8 billion in intercity rail since 1976, and its commitment to continue investing in the system. The capital and service improvements to California's intercity rail system have significantly reduced vehicle miles traveled on the State's highways using a mode that is more energy efficient than either automobile or airline travel, and has improved freight rail goods movement, which is beneficial to the national economy.

As the Congress and the Administration move to redefine the nature and structure of a national intercity passenger rail system, it should look to the California model as a way to develop an efficient and effective program. The State's key recommendations for restructuring of the program are as follows:

- Create a multi-year Federal capital matching program to encourage states to invest in intercity passenger rail by providing an 80 percent Federal/20 percent State matching program. The program should be dedicated, stable and of a sufficient amount to encourage State investment.
- Allow prior State investments made within a defined number of years to be counted as part of the State's 20 percent match to future capital funds.
- Enhance goods movement opportunities and leverage state programs by establishment of a federal program of investment in joint use (freight and passenger) rail corridors.

Background Information

California has had a vigorous intercity passenger rail program in place since 1976 when it first agreed to provide financial support of an additional round trip of Amtrak's "San Diegan", which operated between San Diego and Los Angeles. Since that small step 30 years ago, California's intercity passenger rail program has come to be viewed as the national leader.

Today, California's extensive intercity rail and feeder bus network ties together communities in all corners of the State. More than 5 million passengers rode California's intercity passenger rail services during the last Federal fiscal year making the State second only to New York in terms of total Amtrak ridership. California is home to the second, third and fifth busiest corridors in the Amtrak system:

- The Pacific Surfliner Corridor (formerly San Diegan), connecting San Diego with Los Angeles to Santa Barbara and San Luis Obispo carries 2.7 million passengers annually.
- The Capitol Corridor, connecting Auburn through Sacramento to San Jose carries 1.3 million passengers annually. With its most recent frequency increase, 16 round trips now operate between Sacramento and Oakland, nearly the same level of service provided on Amtrak's Northeast Corridor between Boston and Washington D.C.
- The San Joaquin Corridor, connecting the Bay Area/Sacramento with Bakersfield (and bus connections to Los Angeles) carries 800,000 annually.

Together, these three routes generate more than half a billion passenger miles annually—500,000,000 miles of travel that did not occur on the State's highways. In addition to helping alleviate highway congestion, intercity passenger rail provides environmental and energy benefits. The President has called on Americans to reduce their fuel consumption by 20 percent and Governor Arnold Schwarzenegger has initiated efforts to reduce the emission of gases that contribute to global warming. According to scientists at the Oakridge National Laboratory, intercity passenger rail uses 18 percent less energy on a per passenger mile basis than airlines, and 17 percent less than automobiles.

The State's success has been due to the support of its Executive and Legislative branches of government and the decision of California's voters to invest in intercity passenger rail. Since 1976, nearly \$1.8 billion dollars has been invested to build the system. As part of Governor Schwarzenegger's Strategic Growth Plan and the recently approved Transportation Bond Measure, California is poised to invest another \$400 million in its intercity rail program.

Although these funds primarily benefit passenger rail, many of these investments also benefit the Class I railroads and both the State and the nation's economy. By improving the efficiency and increasing the capacity of their infrastructure, it enhances the ability of the railroads to move goods to market.

Alternatives and/or Recommendations:

Although California has made significant investments in its intercity passenger rail system, it and other states with intercity passenger rail programs cannot continue to do it alone. Reducing national dependence on foreign energy supplies, improving the country's mobility and strengthening the vitality of the State's and nation's economy will require a continued, robust,

federal partnership and investment. The following are California's recommendations for achieving these goals:

- Create a multi-year Federal capital matching program to encourage states to invest in intercity passenger rail by providing an 80 percent Federal/20 percent State matching program. The program should be dedicated, stable and of a sufficient amount to encourage State investment.
- Allow prior State investments made within a defined number of years to be counted as part of the State's 20 percent match to future capital funds.
- Enhance goods movement opportunities and leverage state programs by establishment of a federal program of investment in joint use (freight and passenger) rail corridors.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***A Plan to Fly California (Without Ever Leaving the Ground): Highlights
of the California Environmental Impact Report/Environmental Impact
Study***

California High-Speed Rail Authority

Author: Mehdi Morshed

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

A plan to
Fly California

*...without ever
leaving the ground.*

Highlights of the

**Final Program Environmental Impact
Report/Environmental Impact
Statement (EIR/EIS) for the *proposed*
California High-Speed Train System**

A STUDY BY THE CALIFORNIA HIGH-SPEED RAIL
AUTHORITY AND THE FEDERAL RAILROAD ADMINISTRATION



How will you travel from Southern California to the Bay Area in 2020?

High-speed trains could be in your future

San Francisco
SFO
Oakland
Oakland Airport
Redwood City/

Californians will face a massive challenge by the year 2020:

Up to 98 million more intercity* trips – and 11 million more people will mean a greater demand on the state’s infrastructure, resulting in more traffic congestion, reduced safety, more air pollution, longer travel times, less reliability and less predictability in intercity travel.

The California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) have undertaken an environmental study to assess a proposed high-speed train system and other options for meeting future intercity travel demands. Alternatives for intercity travel were evaluated, generally from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego.

The alternatives for serving existing and future intercity trips...

- **No Project** – reliance on the state’s existing transportation systems
- **Modal Development** – improvements to existing highway and air travel networks
- **High-Speed Trains** – a new statewide train system, over 700 miles in length, capable of travel at speeds up to 220 mph

Based on the Final Program EIR/EIS, high-speed trains

- Would be two-to-three times less costly than expanding highways and airports to serve similar travel demands
- Would improve intercity transportation reliability
- Are projected to carry as many as 68 million passengers annually by 2020 – with the capacity to carry about twice that many passengers
- Would be the most energy efficient of the alternatives
- Would have quick travel times
- Would provide low passenger costs per mile
- Would be safer and more reliable than highway and air travel

High-speed trains could

- Offer a new choice in intercity travel
- Connect to existing airports and transit terminals along high-speed train corridors
- Ease the growing demand on existing highways and airports through 2020 and beyond

* "Intercity" means region-to-region trips, not including daily commute trips

Palo Alto
San Jose
Union City
Fremont
Stockton
Modesto
Sacramento
Merced
Fresno
Bakersfield
Palmdale
Sylmar
Burbank
Los Angeles
Norwalk
Anaheim
Irvine
East San Gabriel Valley
Ontario Airport
Riverside
Temecula
Escondido
University City
San Diego

No Project Alternative

The state's existing transportation systems with planned improvements

No Project Alternative

This alternative consists of the state's intercity transportation system (highway, air and conventional rail) as it existed in 1999-2000, and as it would be in 2020 with the addition of transportation projects currently programmed for implementation (already in funded programs/financially constrained plans), including:

- State Transportation Improvement Program
- Regional Transportation Plans for highways and public transit
- Airport improvement plans
- Intercity passenger rail plans

Study Results

Would not meet intercity travel needs projected for 2020 as population continues to grow

- Highway capacity would be insufficient to accommodate projected intercity travel growth in the regions that would be served by the proposed high-speed train system
- Many of the state's airports already are at or near capacity and could become severely congested under this alternative
- Highway congestion and airport delays would continue to increase, hindering the economy and eroding California's quality of life

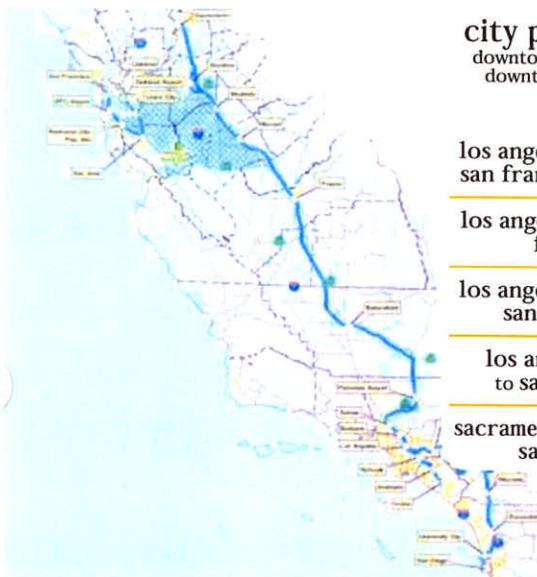
Would contribute to environmental degradation

- There would be negative impacts on traffic: increased congestion, decreased mobility and reduced reliability and safety
- Degradation of air quality and increased energy demand

Total "door-to-door" travel time from Los Angeles to San Francisco

- Highway travel time would increase by one hour in 2020
- Air travel time would increase by 30 minutes in 2020
- Existing conventional rail travel time 10:05 (requires two bus transfers)

estimated total travel times "door-to-door" between cities by auto, air and high-speed train in 2020



city pairs downtown to downtown	auto no project alternative	air no project alternative		high-speed train alternative optimal express times	
	total	line haul*	total	line haul*	total
los angeles to san francisco	7:57	1:20	3:32	2:35	3:30
los angeles to fresno	4:30	1:05	3:02	1:22	2:33
los angeles to san diego	2:49	0:48	3:00	1:13	2:16
los angeles to san jose	6:50	1:00	3:14	2:06	3:02
sacramento to san jose	2:40	no service	no service	0:50	1:53

*actual time in plane or train

two

Modal Alternative

Additional improvements to existing highway and air travel systems

This alternative consists of potentially feasible improvements to existing highways and airports sufficient to serve at least 68 million person trips annually. While these improvements are not proposed or recommended, they represent theoretically feasible options and include:

- 2,970 additional lane-miles on intercity highways statewide, which would include at least two and sometimes four additional highway lanes along selected intercity highways
- Over 90 new gates and five new runways statewide – equivalent to two new Ontario International Airports
- No increased transportation choices or improved connectivity
- Little or no sustainable capacity beyond the 68 million trips

Study Results

Would help to meet the need for intercity travel into the future, but with significant disadvantages

- Would be less safe and less reliable than the proposed high-speed train alternative
- Congestion would still increase on highways and at airports compared to existing conditions as well as congestion and travel delays on streets and highways leading to and from airports
- Highway and air transportation improvements would result in reduced travel times and congestion as compared to the No Project Alternative
- As compared to the No Project Alternative, employment would be expected to increase by 250,000 and urbanized area by 65,000 acres between 2002 and 2035
- Would cost over \$82 billion (2003 dollars) – more than two times more expensive than the high-speed train alternative

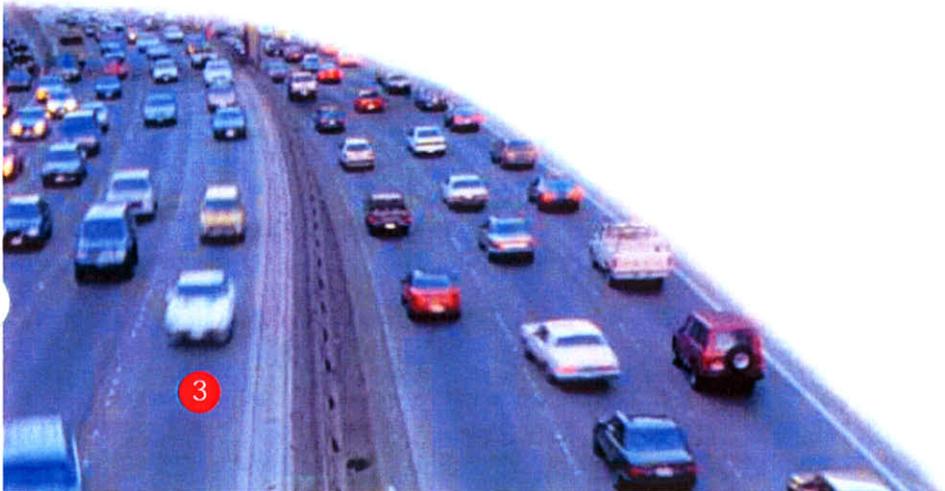
Would have the potential for significant negative environmental impacts

- Increased energy use and dependence on petroleum
- Increased emissions of air pollutants
- Impacts on property and land uses
- Increased suburban sprawl
- Impacts to wetlands and biological resources
- Effects on cultural resources, such as historic sites
- Impacts on water quality
- Impacts on park lands



Total “door-to-door” travel time from Los Angeles to San Francisco

- Highway travel time would increase from the existing 6:57 in 2000 to 7:16 in 2020
- Air travel time would increase from the existing 3:02 in 2000 to 3:27 in 2020



High-Speed Train Alternative

A new statewide transportation network capable of traveling at 220 mph connecting California's major metropolitan areas

This alternative consists of a new high-speed train system over 700 miles long that would deliver predictable, consistent and competitive intercity travel.

- State-of-the-art electrically powered high-speed steel-wheel-on-steel-rail technology with automatic train control
- Up to 68 million passengers a year by 2020
- Exclusive tracks for most of the system, fully grade-separated, either in an open trench or tunnel, at-grade, or on an elevated guideway, depending on terrain and physical constraints
- Most alignments within or adjacent to existing rail or highway right-of-way
- New and upgraded stations, with connections to major airports

Study Results



Would help to meet the need for intercity travel into the future

- Safer, more reliable than highway or air travel
- A new mode of transportation that would increase connectivity and accessibility to existing transit systems and airports
- Quick, predictable, consistent travel times that would be sustainable over time
- Improved travel options in parts of the state with limited bus, rail and air transportation service
- Employment opportunities expected to increase by 450,000 over the No Project Alternative; however, urbanization decreases by 2,600 acres compared to the No Project Alternative between 2002 and 2035
- Congestion would still increase on highways and at airports as compared to existing conditions
- Reduction of total travel times for all transportation modes as a result of traffic diversion to high-speed trains
- Cost to construct the entire system – over \$33 billion (2003 dollars)
- Passenger cost lower than auto or air travel for the same intercity markets
- Diverting trips to high-speed trains would reduce congestion on highways and for air travel

Would have the potential for significant negative environmental impacts

- Impacts on property and land uses
- Impacts to wetlands and biological resources
- Impacts to cultural resources, such as historic sites
- Noise and vibration impacts
- Impacts to farmlands
- Impacts to park land and water quality

Would provide environmental benefits compared with the No Project and Modal Alternatives

- Decreased energy consumption
- Reduced air pollutant emissions and improved air quality
- Would use less land than would be needed to expand existing highways and airports
- Would provide opportunities to plan for transit-oriented growth to meet future demands
- Fewer environmental impacts overall on sensitive habitats and water resources (floodplains, streams and wetlands) than the Modal Alternative
- For longer distance intercity travel, high-speed trains would provide “door-to-door” travel times comparable to air transportation and less than one-half as long as highway travel times
- For intermediate intercity markets such as Fresno to Los Angeles, high-speed trains would provide considerably quicker “door-to-door” travel times than either air or highway transportation options
- Would provide additional capacity for future generations

Total “door-to-door” travel time from Los Angeles to San Francisco

- Highway travel time would increase from the existing 6:57 in 2000 to 7:36 in 2020
- Air travel time would increase from the existing 3:02 in 2000 to 3:26 in 2020
- High-speed train travel time would be 3:30 in 2020

EIR/EIS Prepares Way For Meeting California's Transportation Needs

220-mph train system would link major California cities

The California High-Speed Rail Authority (the Authority) has proposed high-speed train service for intercity travel in California between the major metropolitan centers of the San Francisco Bay Area and Sacramento in the north, through the Central Valley, to Los Angeles and San Diego in the south. The proposed high-speed train system is projected to carry as many as 68 million passengers annually by the year 2020.

The Authority adopted a Final Business Plan in June 2000, for an economically viable high-speed train system capable of speeds in excess of 200 miles per hour on a mostly dedicated, fully grade-separated track with state-of-the-art safety, signaling and automated train control systems.

To comply with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), a Final Program EIR/EIS has been prepared. The Authority is both the project sponsor and the lead agency for purposes of the state CEQA requirements. The Federal Railroad Administration (FRA) is the federal lead agency for compliance under NEPA.

Preparation of the Final Program EIR/EIS by the Authority and the FRA has involved more than six months of public review of the Draft Program EIR/EIS, plus seven public hearings. The Authority and the FRA responded to thousands of comments, made appropriate changes and incorporated additional analysis in preparation of this Final Program EIR/EIS.

The Final Program EIR/EIS document includes:

- A full description of the alternatives
- Evaluation of potential environmental impacts for each alternative
- Identification of general mitigation strategies for the proposed high-speed train alternative
- Discussion of preferred high-speed train alignments and station locations

The Final Program EIR/EIS identifies high-speed trains as the preferred alternative that could shape California's intercity transportation future:

- A completely new and separate intercity transportation alternative to augment existing air, highway and conventional rail travel
- Quick travel times
- Better for the environment than only expanding highways and airports
- Proven, 22-year safety record in Europe and Japan
- Capable of carrying 68 million passengers a year by 2020
- Low passenger travel cost per mile



California's New High-Speed Train

Bringing California closer together

The Final Program EIR/EIS identifies preferred alignments and station locations

Preferred Alignments and Station locations include:

Northern Mountain Crossing

A broad corridor containing a number of feasible route options has been identified for further study. This broad corridor is generally bounded by (and includes) the Pacheco Pass (SR-152) corridor to the south, the Altamont Pass (I-580) corridor to the north, the BNSF corridor to the east, and the Caltrain to the west. Alignment options through Henry Coe State Park and station options at Los Banos would not be pursued. Further study will be conducted to identify a preferred route within the identified corridor.

Southern Mountain Crossing

Through the Tehachapi Mountain Range between Los Angeles and Bakersfield via a crossing through Palmdale and the Antelope Valley.

Bay Area

Service to the Bay Area along the Peninsula to San Francisco and the East Bay to Oakland.

Central Valley

Service along or near the Highway 99 corridor (primarily BNSF alignment) from Bakersfield to Sacramento and the Bay Area.

Service to San Diego (Inland)

Through the Inland Empire via the I-215/I-15 corridor to downtown San Diego.

Service to Orange County

Direct service from Los Angeles to Orange County via the LOSSAN rail corridor.

Shared Use and Intermodal Connections

Service to the urban centers on shared tracks with other passenger rail services at moderate speeds in heavily urbanized areas (i.e., San Jose to San Francisco and Los Angeles to Orange County).

Stations in close proximity to San Francisco Intl Airport, Oakland Metropolitan Intl Airport, Burbank-Glendale-Pasadena Airport, Ontario Intl Airport, Palmdale Airport, Los Angeles Intl Airport, San Jose Intl Airport and San Diego Intl Airport.

Station connections at major transit hubs in California's metropolitan areas. Each station site would have higher-density, mixed-used, pedestrian-oriented development around station.



Next Steps in the Environmental Process for the Proposed High-Speed Train System

- The Authority certifies that the Final Program EIR/EIS complies with the California Environmental Quality Act, and the Federal Railroad Administration (FRA) issues a Record of Decision for compliance with National Environmental Protection Act.
- The Authority and FRA prepare a program level environmental review for the “Bay Area–Central Valley” segment to select a preferred alignment and station locations.
- The Authority determines whether to advance individual segments of the high-speed train system to project-specific environmental review.
- The Bay Area Metropolitan Transportation Commission’s statewide ridership/revenue study is completed and used to update the high-speed train system’s business plan.
- The Authority begins working with local governments, transportation agencies and private parties on right-of-way preservation and protective advance acquisition consistent with state and federal requirements.

Check out the California High-Speed Rail Authority’s Web site
for the Draft and Final Program EIR/EIS and related technical reports.
www.cahighspeedrail.ca.gov

List of cities where libraries will have document available:

Anaheim	Gilroy	Norwalk	Riverside	San Jose
Bakersfield	Irvine	Oakland	Sacramento	Santa Clarita
Burbank	Los Angeles	Oceanside	San Clemente	Stockton
Escondido	Merced	Ontario	San Diego	Sylmar
Fremont	Modesto	Palmdale	San Francisco	Temecula
Fresno	Mountain View	Palo Alto	San Gabriel	Tulare

The Final Program EIR/EIS is available for viewing in libraries
and can be obtained on CD by contacting the
California High-Speed Rail Authority
at (916) 324-1541



CALIFORNIA HIGH-SPEED RAIL AUTHORITY



U.S. Department
of Transportation
**Federal Railroad
Administration**



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***Bond Funding First Step of Many Needed to Rebuild the State's
Transportation Network***

California Chamber of Commerce

Author: David G. Ackerman

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Bond Funding First Step of Many Needed to Rebuild State's Transportation Network

By approving the largest transportation bond in the state's history in November 2006, California voters made one thing perfectly clear — they are not happy with traffic congestion and the condition of California's roads and highways.

An effective infrastructure network, including a transportation system that efficiently moves people, goods and services, is essential to California's economic prosperity and quality of life. Even with the approval of the transportation bond, California's business climate and lifestyle are endangered by decades of underinvestment and poor planning for roadways, schools, housing, levees and other infrastructure. California voters clearly understood these challenges with the overwhelming approval of \$37 billion in infrastructure bonds and strong protections for the use of \$1.4 billion in annual gasoline sales tax revenues.

Almost \$20 billion of the bonds approved will be allocated to a variety of transportation infrastructure projects including highways, local

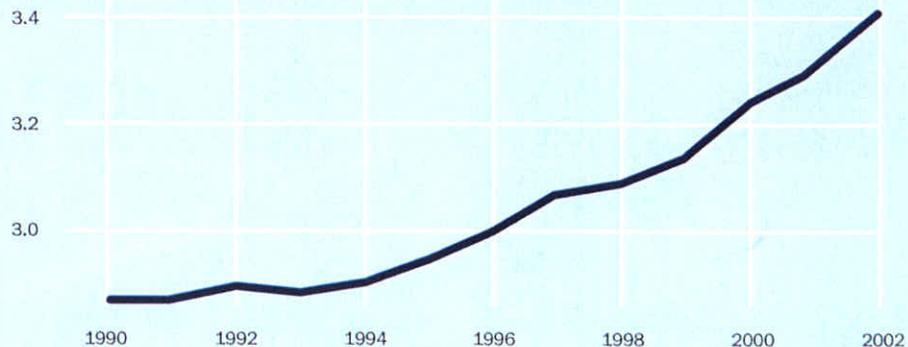
streets and roads, "goods movement" projects and regional transportation projects.

A key feature in the transportation bond package is use of the existing project selection and revenue allocation that removes projects from the "pork barrel" selection process that is so tempting as part of the political process. The California Transportation Commission (CTC) already is hard at work drafting the guidelines that local agencies will use to select projects for funding. The local decision-making process is very important so the voters see the direct result and benefit from their support for the bond measures.

Although a \$20 billion investment in transportation infrastructure is long overdue, it is important to understand that one bond issue does not solve all of California's transportation challenges. California slipped into the "infrastructure crisis" through 30 years of underinvestment and the passage of a single bond issue will not in itself correct all the deficiencies that exist today.

Annual Vehicle Travel Per State Highway Lane Has Increased

Vehicle-Miles per Lane-Mile



Source: Legislative Analyst's Office, *Analysis of the 2004-05 Budget Bill* (February 18, 2004).

As the state's population increased over the last three decades, real per capita infrastructure spending decreased from about \$170 in the 1970s to an average of \$30 in the 1990s. The state added only 1 percent to its road lane miles since 1990, even though the population increased by 18 percent and vehicle miles traveled increased by 21 percent. If the transportation bond had not been approved, the CTC might have been forced to stop making new construction allocations to projects from the state's major transportation funding programs.

Future Funding Challenges

California needs adequate, dependable and dedicated funding for transportation to build and maintain a transportation network that is the foundation of the state's economy and lifestyle. The approval of the transportation bond is a definite "course correction," but a long-term, stable funding plan is still necessary.

The state's 18-cent-per gallon motor vehicle fuel excise tax on gasoline and diesel fuel provides about \$3.5 billion per year in revenue. Federal gasoline and diesel fuel taxes provide about the same amount to the state. The motor vehicle fuel excise tax is an early example of a "pay-as-you-go," simple and direct user fee where drivers paid money directly proportional to the

amount they drove their vehicles.

That relationship has changed with the introduction of alternative fuel vehicles. For example, hybrid vehicle owners pay less fuel tax per vehicle mile traveled than drivers of standard gasoline-powered vehicles even if they both impose the same burden on roads.

Federal and state fuel excise tax rates have not increased since the mid-1990s. The purchasing power of the fuel excise tax continues to decline steadily due to inflation and the increasing fuel efficiency of motor vehicles (less fuel consumed per mile driven, therefore less tax paid). In future decades, increasingly efficient gasoline and diesel vehicles, gasoline-electric hybrids and alternative fuel vehicles also will diminish the value of the fuel tax.

Direct User Fees

"Direct user fees" refer to levying a charge on road users related to use of a particular road, usually based on the distance traveled, but sometimes also on a specific time, place and/or level of congestion. Lawmakers have recently started to examine newer types of direct user fees to supplement, and possibly replace, the motor vehicle fuel excise tax in the future. Examples of other types of direct user fees include:

- Tolls. Fees based on the distance driven on a specific road, or for use of a

bridge, sometimes varying according to the time of day or congestion. Modern toll projects include electronic payment options.

- Vehicle Miles Traveled (VMT) fees. Fees charged on each vehicle for every mile traveled, measured through odometer readings or in-vehicle reporting technology.

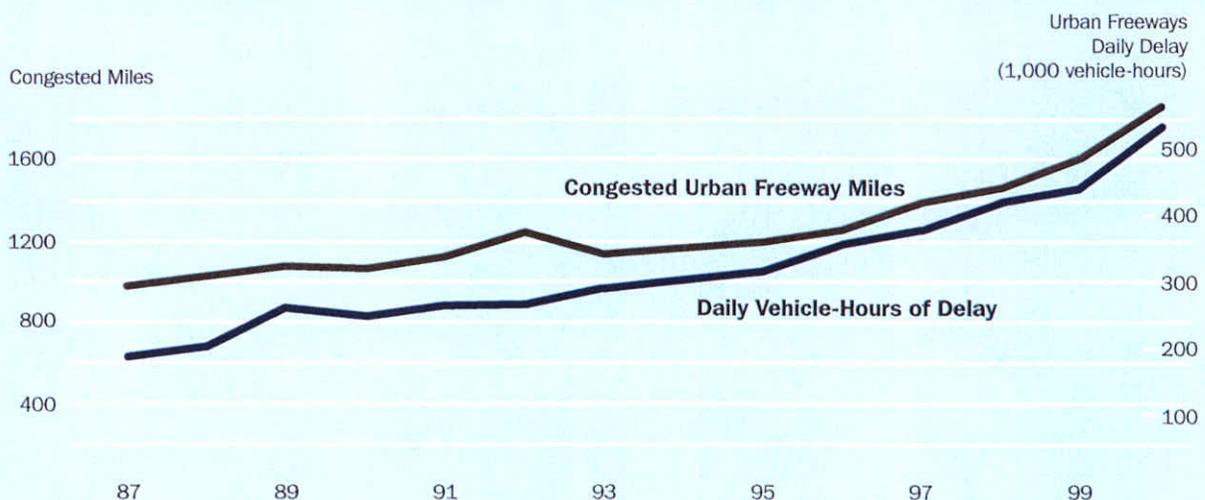
- Value pricing. "Premium" lanes for which a fee is charged to obtain a faster or more reliable trip compared to an adjacent or nearby non-priced lane. A common example of value pricing is the High Occupancy Toll (HOT) lane, where carpools have free or reduced-payment access and single occupant vehicles can pay to use the lane.

- Congestion pricing. Variable fees charged for use of some or all roads, varying in price based on time of day, route used and distance traveled. Congestion pricing requires complex technology to record time, distance and place of travel and obtain payment.

Local Transportation Sales Taxes

Declining value of revenues from state and federal resources, coupled with rising construction costs, have resulted in the increasing use of local sales taxes to support transportation. Voters in six counties approved new or extensions of local transportation sales taxes last November.

Urban Highway Congestion Is Accelerating



Source: Legislative Analyst's Office, *Analysis of the 2004-05 Budget Bill* (February 18, 2004).

Now 21 counties with more than 90 percent of the state's population have enacted sales taxes dedicated to transportation. County sales taxes now produce more than 15 percent of all funds used statewide for transportation, providing a critical resource to fund transportation projects and programs and to meet matching requirements for obtaining state and federal funds.

Infusion of Private Capital

Private investment in public infrastructure is growing worldwide. It offers an important means of financing projects in an era when public resources are limited and the state faces multi-billion dollar unfunded infrastructure needs. The California Chamber of Commerce supported legislation last year that will encourage new public-private partnerships to construct transportation projects.

Congestion Relief

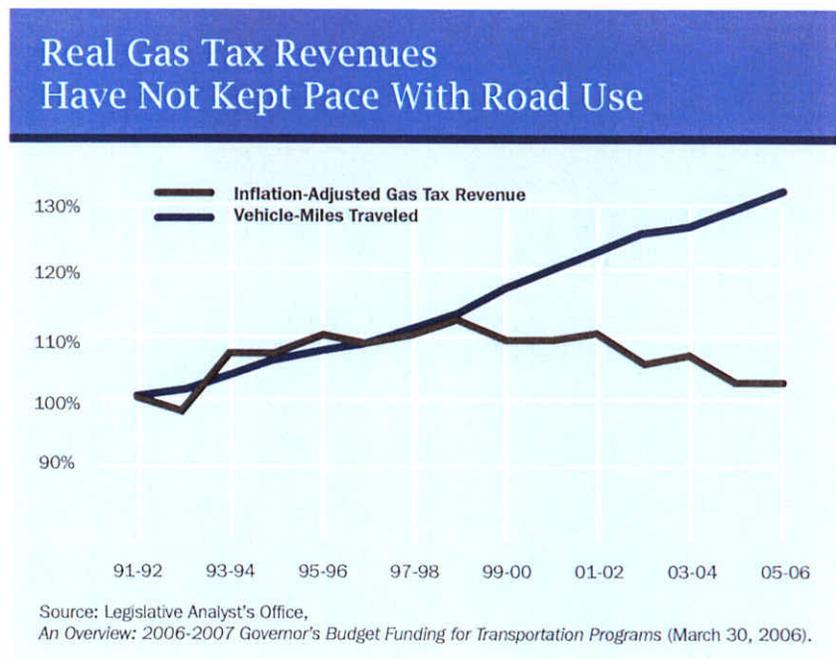
California's largest cities, on average, experience the worst congestion in the nation, with drivers incurring substantial annual costs due to wasted time and fuel. Residents of Los Angeles, Orange County, the Inland Empire and San Francisco incur more than \$1,000 per year in additional costs due to congestion, according to the March 2005 *American Society of Civil Engineers California Infrastructure Report Card*. Driving on substandard roads costs California motorists an average \$554 in additional repair and maintenance annually, or \$12.6 billion statewide, the *Report Card* also indicates. Passage of the transportation bond will allow the state and local agencies to increase road capacity and repair and maintain existing roads, using the latest technologies and innovations to make the most of its investments.

California's drivers regularly drive over dangerous roads at a high price. Poor road conditions contribute to 30 percent of highway fatalities involving collisions with fixed objects such as trees, guardrails, poles, railway crossings and similar objects. More than 70 percent of the state's major roads are rated in poor or mediocre condition, and the majority of users are unhappy with the quality of California's roads, the *Report Card* says.

The state needs to protect its multibillion-dollar infrastructure assets with increased funding for road rehabilitation and maintenance.

Goods Movement

Investments in transportation infrastruc-



ture that reduce the cost of moving freight are crucial to California and the nation. California is a critical hub in the global economy, and its global trade is a major and growing financial engine for the state, responsible for one in every seven jobs. The state estimates that more than 37 percent of the value of all U.S. and foreign trade passes through California's ports. Further, more than 2 million jobs nationwide are tied to the California ports. With nearly 37 million residents and the sixth largest economy in the world, the state estimates cargo volumes will double in 15 years. Approval of the transportation bond will allow California to specifically focus on "goods movement" projects for the first time in history.

Truck Movement and Rail Capacity

Congestion, poor road conditions, and extended peak travel hours all are major mobility challenges faced by the trucking industry. Congestion limits truck access to ports and intermodal facilities, increasing costs and delaying shipments. Poor road conditions reduce access to shipping facilities for larger trucks, whose size and weight also contribute to roadway deterioration. Longer peak travel hours have made it increasingly difficult for truck drivers to schedule their trips to avoid congestion.

Rail is a competitive mode of freight transport in part because it does not have

to compete with uncertain congestion factors that trucks face on urban roadways. Rail projects also can benefit truckers, alleviating highway congestion by allowing more long haul shipments by rail.

Sea Ports

California has a competitive advantage over other ports in the United States, especially for the rapidly growing Asian trade. Los Angeles, Long Beach and Oakland are among the four largest ports in the country, based on container volume. The combined container traffic through the Los Angeles and Long Beach ports alone makes it the fifth largest operation in the world. Smaller ports, such as Port Hueneme, have developed rapidly growing specialty cargo-handling capability, such as motor vehicles.

Although California's international trade activity at the ports is projected to keep growing, the ports already have begun to lose some competitive advantage due to congestion, delays caused by cargo volume and strikes or labor shortages. External factors, such as labor and landside transportation, continue to affect port capacity as much as the internal infrastructure issues.

Airport Facilities

The state also faces a major challenge in the expansion and improvement of airport facilities. California's airports are outdated and quickly reaching capacity limits

due to the combined growth in passenger and cargo traffic. The Federal Aviation Administration recently ranked San Francisco International Airport second worst in the nation in terms of total delays.

To keep California competitive in the global market, the state must improve its aviation system to accommodate significant growth in passenger and cargo movement, ensure mobility around the airports and provide access for an increasing level of corporate aviation.

Delivering the Projects

Major transportation infrastructure projects require between seven and 23 years to complete due to a planning and development process that requires multiple approvals from federal, state, regional and local levels of government, in addition to numerous community stakeholders. Some federal and state requirements, such as environmental reviews, often result in duplicative efforts and approvals. Special procurement requirements create unnecessary expenses for projects and slow down delivery.

Excessive bureaucracy and lack of consensus between interest groups regarding the planning and development process increase the time to deliver new projects, greatly increase costs and erode public confidence in the ability of public agencies to address infrastructure needs. California must expedite project approval processes while ensuring critical environmental protections are in place.

California voters approved Proposition 35 in 2000, allowing the state to contract with private companies for architectural and engineering services for all public works projects. Passage of the transportation bond will require the California Department of Transportation (Caltrans) to make use of all available resources to

design the approved projects, including contracting for private engineering services to supplement state-employed engineers. *Public Sector Accountability, Efficiency, Results*

California does not regularly assess what the transportation system needs in terms of improvements, maintenance and funding. The "SR 8" study mandated by the Legislature and conducted in 1999 determined an unfunded backlog of more than \$100 billion, but has not been updated. A needs assessment should be conducted on a regular basis, preferably not less often than every five years.

Historically, Caltrans has not had defined performance outcomes to assure that its efforts and expenditures meet expectations nor has it been held accountable for those outcomes. Several recent efforts, including the California Performance Review and the Business, Transportation and Housing Agency Performance Improvement Initiative, have developed proposed transportation system performance outcomes, including:

- accessibility;
- economic development;
- environmental quality;
- equity;
- mobility;
- productivity;
- reliability;
- return on investment;
- safety; and
- system preservation.

The private sector uses similar performance analysis and benchmarking, as do an increasing number of public agencies. Caltrans and other transportation agencies must assure that their efforts and practices result in the best possible project delivery, operations, efficiency and stewardship of public funds.

Approval of Propositions 1A and 1B

in November 2006 set California on a new course for its transportation future. The government agencies entrusted with allocating and spending those revenues face a challenge to keep the faith with the voters. If voters see the funds spent wisely and efficiently, they will be willing to approve the next steps needed to continue improving California's transportation systems.



Staff Contact
David G. Ackerman
Special Consultant
for Transportation

dackerman@theapexgroup.net
c/o DGA Associates
980 9th Street, #1580
Sacramento, CA 95814
(916) 444-9601
www.calchamber.com
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**FEBRUARY 21 & 22, 2007
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Preferred Alignments and Stations - Statewide

California High-Speed Rail Authority

Author: Mehdi Morshed

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



Preferred Alignments and Stations - Statewide



Optimal Express Travel Times

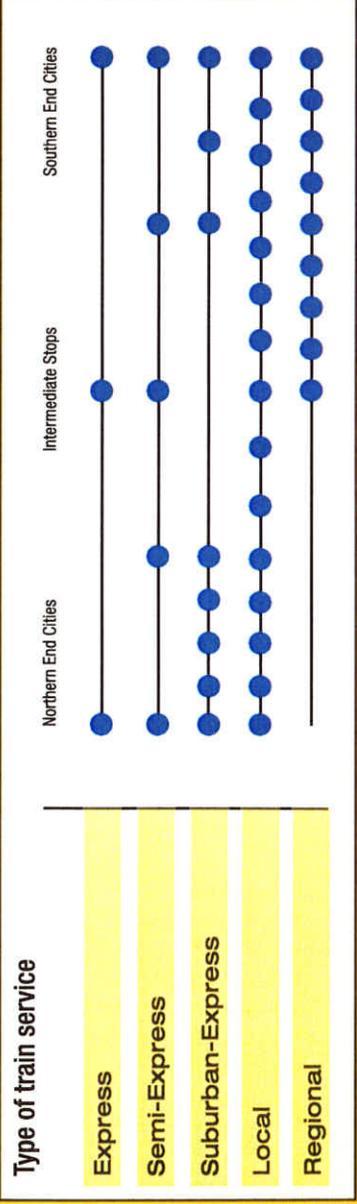
Preferred Alternative (Station to Station)

Travel Time (hrs:Min)	Los Angeles	San Francisco	San Jose	San Diego	Sacramento	Stockton	Tracy	Modesto	Merced	Fresno	Bakersfield	Palmdale Airport	Burbank	Ontario Airport	Riverside	Escondido	Anaheim	Irvine	SFO Airport	Union City	Oakland
Los Angeles	N/A	2:33-2:36	2:06-2:16	1:14	2:12	1:59	1:59	1:49	1:39	1:23	0:52	0:26	0:08	0:23	0:31	0:35	0:27	0:37	2:28	2:21	2:33
San Francisco	2:33-2:36	N/A	0:30	3:49-3:52	0:60-1:44	0:44-1:32	0:33	0:45-1:22	0:56-1:11	1:16-1:19	1:45-1:48	2:14-2:17	2:20-2:31	2:56-2:59	3:04-3:07	3:28-3:31	2:52-2:55	3:01-3:04	0:10	0:23	N/A
San Jose	2:06-2:16	0:30	N/A	3:25-3:35	0:47-1:16	0:30-1:03	0:21	0:32-0:52	0:40-0:43	0:49-0:59	1:20-1:30	1:48-1:58	2:03-2:13	2:30-2:40	2:38-2:48	3:02-3:12	2:25-2:35	2:34-2:44	0:21	0:12	0:23
San Diego	1:14	3:49-3:52	3:25-3:35	N/A	3:27	3:15	3:15	3:05	2:54	2:38	2:08	1:41	1:22	0:55	0:46	0:22	N/A	N/A	3:45	3:36	3:48
Sacramento	2:12	0:60-1:44	0:47-1:16	3:27	N/A	0:20	0:28	0:27	0:38	0:54	1:24	1:55	2:07	2:33	2:42	3:06	2:41	2:51	0:52-1:39	1:31	1:43
Stockton	1:59	0:44-1:32	0:30-1:03	3:15	0:20	N/A	0:08	0:12	0:25	0:41	1:10	1:38	1:54	2:21	2:28	2:53	2:24	2:34	0:36-1:23	1:14	1:26
Tracy	1:59	0:33	0:21	3:15	0:28	0:08	N/A	0:10	0:25	0:41	1:10	1:38	1:54	2:21	2:28	2:53	2:24	2:34	0:23	0:12	0:24
Modesto	1:49	0:45-1:22	0:32-0:52	3:05	0:27	0:12	0:10	N/A	0:15	0:31	1:01	1:29	1:45	2:11	2:19	2:44	2:14	2:24	1:13	1:03	1:15
Merced	1:39	0:56-1:11	0:40-0:43	2:54	0:38	0:25	0:25	0:15	N/A	0:20	0:50	1:18	1:34	2:00	2:08	2:33	2:04	2:14	1:02	0:51	1:03
Fresno	1:23	1:16-1:19	0:49-0:59	2:38	0:54	0:41	0:41	0:31	0:20	N/A	0:35	1:03	1:18	1:45	1:53	2:17	1:46	1:57	1:10	1:00	1:12
Bakersfield	0:52	1:45-1:48	1:30-1:30	2:08	1:24	1:10	1:10	1:01	0:50	0:35	N/A	0:31	0:49	1:16	1:23	1:48	1:19	1:29	1:39	1:31	1:43
Palmdale Airport	0:26	2:14-2:17	1:48-1:58	1:41	1:55	1:38	1:38	1:29	1:18	1:03	0:31	N/A	0:22	0:49	0:56	1:21	0:51	1:01	2:08	1:59	2:11
Burbank	0:08	2:28-2:31	2:03-2:13	1:22	2:07	1:54	1:54	1:45	1:34	1:18	0:49	0:22	N/A	0:30	0:37	1:02	0:33	0:43	2:22	2:14	2:26
Ontario Airport	0:23	2:56-2:59	2:30-2:40	0:55	2:33	2:21	2:21	2:11	2:00	1:45	1:16	0:49	0:30	N/A	0:11	0:36	N/A	N/A	2:50	2:41	2:53
Riverside	0:31	3:04-3:07	2:38-2:48	0:46	2:42	2:28	2:28	2:19	2:08	1:53	1:23	0:56	0:37	0:11	N/A	0:26	N/A	N/A	2:38	2:49	3:01
Escondido	0:55	3:28-3:31	3:02-3:12	0:22	3:06	2:53	2:53	2:44	2:33	2:17	1:48	1:21	1:02	0:36	0:26	N/A	N/A	N/A	3:22	3:13	3:25
Anaheim	0:27	2:52-2:55	2:25-2:35	N/A	2:41	2:24	2:24	2:14	2:04	1:46	1:19	0:51	0:33	N/A	N/A	N/A	N/A	0:11	2:54	2:44	2:56
Irvine	0:37	3:01-3:04	2:34-2:44	N/A	2:51	2:34	2:34	2:24	2:14	1:57	1:29	1:01	0:43	N/A	N/A	N/A	0:11	N/A	3:04	2:54	3:06
SFO Airport	2:28	0:10	0:21	3:45	0:52-1:39	0:36-1:23	0:23	1:13	1:02	1:10	1:39	2:08	2:22	2:50	2:58	3:22	2:54	3:04	N/A	N/A	N/A
Union City	2:21	0:23	0:12	3:38	1:31	1:14	0:12	1:03	0:51	1:00	1:31	1:59	2:14	2:41	2:49	3:13	2:44	2:54	N/A	N/A	0:12
Oakland	2:33	N/A	0:23	3:48	1:43	1:26	0:24	1:15	1:03	1:12	1:43	2:11	2:26	2:53	3:01	3:25	2:56	3:06	N/A	0:12	N/A

NOTE: ALL TIMES PRELIMINARY AND SUBJECT TO CHANGE PENDING FURTHER DEFINITIONS OF ALIGNMENTS IN THE BAY AREA TO CENTRAL VALLEY STUDY.

(Sample of stations)

Year 2020 Potential Train Stopping Patterns





POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Benefits of the California High-Speed Train System

California High-Speed Rail Authority

Author: Mehdi Morshed

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CALIFORNIA HIGH-SPEED RAIL AUTHORITY

BENEFITS OF THE CALIFORNIA HIGH-SPEED TRAIN (HST) SYSTEM¹

Benefits to the Transportation System:

- Carrying up to 68 million passengers annually by 2020, with the capacity to carry twice as many passengers and high-value, lightweight freight.
- Meeting the need for a safe and reliable mode of travel that would link the major metropolitan areas of the state and deliver predictable, consistent travel times sustainable over time.
- Will not require an operating subsidy.
- Serving tourist and leisure travel, business travel, and long-distance commuters over a variety of long-, intermediate- and relatively short-distance trips (such as Los Angeles to Anaheim, Palmdale, Riverside, San Diego, Fresno, Sacramento, and the Bay Area).
- Sharing rail alignments throughout much of the system will improve joint facilities benefiting safety and operations of existing freight, commuter and conventional passenger rail services.
- Providing quick, competitive travel times between California's major intercity markets.
- Providing door-to-door travel times for longer distance intercity markets that would be comparable to air transportation and less than one-half as long as automobile travel times.
- Providing considerably quicker travel times for intermediate intercity trips than either air or automobile transportation, and bringing frequent HST service to many parts of the state that are not well served by air transportation.
- Providing lower passenger costs than for travel by automobile or air for the same intercity markets.
- Providing a new intercity, interregional and regional passenger mode—the high-speed train—which would improve mobility and connectivity and accessibility to other existing transit modes and airports compared to the other alternatives.

¹ For more information see "California Environmental Quality Act Findings of Fact and Statement of Overriding Considerations" (pages 70-78) and the "Staff Report for the Final Program EIR/EIS" posted under the "Final EIR/EIS". Also see the Authority's Implementation Plan, "A Blueprint for Building California's High-Speed Train".

- Improving the travel options available in the Central Valley and other areas of the state with limited bus, rail and air service for intercity trips.
- Providing system redundancy in cases of extreme events, such as adverse weather or petroleum shortages.
- Providing a predominantly separate transportation system that would be less susceptible to many factors influencing reliability, such as capacity constraints, congestion, and incidents that disrupt service.
- Providing superior on-time reliability.
- Providing a lower accident and fatality rate than automobile travel. Will avoid up to 10,000 auto accidents yearly with their attendant deaths, injuries and property damage when compared to exclusive reliance on highways.
- Offering greater opportunities to expand service and capacity with minimal expansion of infrastructure.
- Adding capacity to the state's transportation infrastructure and reducing traffic on certain intercity highways and around airports to the extent that intercity trips are diverted to the HST system.
- Eliminating delays at existing at-grade crossings where the HST system would provide grade separation.
- Using train technology proven to be the safest most reliable form of transportation known through extensive regular revenue service in Europe and Asia.
- Expanding airports and highways to meet the intercity travel demands of 2020 would cost two to three times more than building the HST system.
- California's highways and airports are highly congested and conditions are projected to further deteriorate from projected growth – even if we widen highways and expand airports.

Benefits to the Environment:

- HST will have less impact on the natural and built environment than expanding airports and highways: less potential impact on wetlands and water resources, biology and farmlands; less noise impact and even reductions in areas where the HST project grade-separates existing roads over adjacent rail lines.
- Projected to save five million barrels of oil per year, even with future improvements in auto fuel efficiency. Comparing the energy required to carry a passenger one kilometer, the HST needs only one-third that of an airplane and one-fifth of a commuter automobile trip.

- Avoiding and/or minimizing the potential impacts to cultural, park, recreational and wildlife refuges to the greatest extent possible.
- Decreasing air pollutants statewide and in all air basins analyzed by reducing pollution generated by automobile combustion engines.
- Electrically powered HST reduces pollutant and greenhouse emissions and reliance on fossil fuels. The total predicted emissions savings of the California HST system is up to 10.4 billion pounds of CO₂ per year by 2020 and would grow with higher ridership.
- Maximizing use of existing transportation corridors and railroad rights-of-way in order to minimize the impacts on California's treasured landscape.

Land Use Planning Benefits:

- All HST stations will be multi-modal transportation hubs that will stimulate denser infill development and will be linked directly to local and regional transit, airports, and highways.
- In contrast to highway improvements that encourage sprawl, HST is consistent with the State's adopted smart growth principles² and is highly compatible with local and regional plans that support rail systems and transit-oriented development.
- Saving an estimated 67,000 acres from urban/suburban development, including 24,000 acres of farmland, by encouraging compact transit-oriented development.
- Increasing public benefits beyond the benefits of access to the HST system itself, including relief from traffic congestion, improved air quality, promotion of infill development and preservation of natural resources, increased stock of affordable housing, promotion of job opportunities, reduction in energy consumption, and improved cost-effectiveness of public infrastructure.
- Being a catalyst for wider adoption of smart growth principles in communities near HST stations.

Economic and Social Benefits:

- Creating more economic growth for California – over 450,000 more permanent jobs expected by 2035.
- Benefit-cost analysis has shown that direct benefits would be more than twice the costs of the HST system.

² As expressed in the Wiggins Bill (AB857, 2003), and in government code 65041.1

- Economic growth would come from construction and operation of the system, travel time reductions, travel quality advantages, reduced delays to air and auto travelers, reduced air pollution, reduced accidents and fatalities, and location advantages related to proximity to the HST system.
- Reducing airport delays (by diverting some airline passengers to high-speed trains), thereby reducing aircraft operating costs.
- Generating about 300,000 job-years of employment from HST construction.
- Improving travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service.
- Providing lower passenger costs than travel by automobile or air transportation
- Inducing travel; that is, some people who would not otherwise make trips will now do so because of the availability of high-speed rail.
- Enhancing and strengthening urban centers. In combination with appropriate local land use policies, the increased accessibility afforded by the high-speed service could encourage more intensive development and may lead to higher property values around stations.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***Port Rail Access Improvements: Beneficial Enhancements To Serve
California and the Nation***

Port of Oakland

**Authors:
Steve Gregory,
Eve Grossman-Bukowski,
Jess Garrett**

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

**Surface Transportation Policy and Revenue Study Commission
Los Angeles, California Hearing
February 21 & 22, 2007**

Author:

Steve Gregory, Senior Port Strategic Planner
In collaboration with Eve Grossman-Bukowski and Jesse Garrett
Port of Oakland
530 Water Street
Oakland, California 94607
510-627-1363
sgregory@portoakland.com

Title:

**Port Rail Access Improvements: Beneficial
Enhancements to Serve California and the Nation**

Executive Summary:

Government, at all levels, needs to recognize the importance of goods movement to the economic well-being of our country. In particular, this attention needs to focus on the major corridors stretching inland from our ports of entry, through which trade goods enter the country and exports are sent abroad. The global trade sector has been growing dramatically over the last several years, fueled largely by economic development in China. Projections call for continued strong growth.

To keep pace with this growth in trade, America's West Coast ports, through which the lion's share of containerized traffic passes and their transportation partners, primarily the Class I rail carriers and the trucking industry, need to increase their capabilities to move this traffic between ships and inland origin/destination points. Investment in our ports and trade corridors needs to be made on a systemwide basis, realizing that the entire trade infrastructure is only as strong as its weakest link. This means not directing all of our resources into just a few of the largest elements.

As imports continue to grow, particularly from the Pacific Rim, it is critical that America fully utilize its ports and trade corridors to keep and to increase jobs and economic activity in the trade sector. Our ports and trade corridors are equally, if not more important to America's export industries, such as agriculture that depend upon this trade infrastructure to move its products across the seas.

California's Central Valley is a prime agricultural supplier to the world. Growers there rely upon the Port of Oakland to move their products onto the ships that will take them to distant markets and upon the rail network to move their goods to consumers throughout

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the country. This requires port and access infrastructure that can be relied upon, both at current and at future levels of traffic.

Truck and rail are the primary modes of moving this traffic. As concerns about worsening congestion on our roadways and deteriorating air quality grow, shifting more goods movement to rail makes sense, both economically and in terms of quality of life.

This modal shift presents the federal government with an opportunity to take the lead in promoting and funding the transport of foreign trade goods, as well as containerized domestic traffic by rail. Projects at ports and along corridors also present opportunities for collaboration among public and private sector partners who have the means to move them forward to completion. If government fails to seize this opportunity to advance goods movement projects and to form mutually-beneficial partnerships, then others outside of the country, notably in Canada and Mexico, will step forward and reap the jobs and economic benefits that are the products of this activity.

In order to give rail transport of goods the government support that it merits, public sector officials must first recognize that rail transport serves the public good to the same extent as over-the-road movement of goods does and that public funds for rail improvement would not go straight into the pockets of private enterprise.

Another reason for federal surface transportation policy to focus on rail capacity expansion is that we have built out our interstate highway system as much as we can and have little or no choice left.

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Background Information:

I. Improving Landside Access to Ports

It is well documented that ocean-borne trade is a significant portion of our national economy and that strong growth is projected in this sector over the next fifteen to twenty years.

Critical components of this trade infrastructure network are our seaports and the national trade corridors that connect them with the rest of the country. Three of the four busiest (TEU volumes) container ports in the United States are in California and five of the six busiest are on the West Coast. Combined, these West Coast ports process 22.2 million TEU annually and either receive or send 44.5% of them via rail.

To meet the growth demands of world trade, these ports must continue to increase their container-handling capacity. However, they face serious constraints to growth, not the least of which is an inability to move containers to and from the ports overland at a rate commensurate with ships loading and unloading them. This is due to inadequate surface transportation infrastructure connecting to the ports, both highway/roadway and rail.

Failure to redress these deficiencies will result in delays and will drive up costs to shippers who move their goods through these congested ports and corridors. This, in turn, results in shippers choosing to move their goods through other ports such as those to the north in Canada (Prince Rupert Sound and Vancouver) or to the south in Mexico (Lazaro Cardenas, Manzanillo or Punta Colonet) or through a widened Panama Canal, providing expedited access to U.S. Gulf and East Coast ports.

Such diversions of cargo would result in a loss of jobs and revenue to the U.S. West Coast ports and to the largely urban regions they serve, which are home to over 25 million Americans.

Focusing more specifically on California, our three large container ports (Los Angeles, Long Beach and Oakland) handle over 43% of the nation's total container traffic. The two Southern California ports have recently had two episodes of container gridlock at and around their facilities. These were the 2002 West Coast port lockout and a Southern California surface transportation meltdown that occurred in 2004. During these periods of congestion and delay, excess traffic was not rerouted to the Port of Oakland, largely because the rail infrastructure serving Oakland was not deemed adequate to move the additional volume of containers inland in a timely or cost-effective manner. The results were that ships anchored off the Southern California ports for days, they diverted to more distant ports or in several cases simply turned around without offloading cargoes, in order to maintain their trans-Pacific schedules.

This economic and logistics disorderliness in Southern California emphasizes the need to address port access improvements with a systems approach, both regionally (in this case,

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on the West Coast) and within California. A repeat of these events could be ameliorated through investment in the rail infrastructure serving Oakland, which would give rail carriers sufficient freight-hauling capacity to provide a level of service acceptable to shippers, thereby drawing a greater share of Pacific Rim trade to Oakland as a first port of call. This ability to handle increased container traffic would also allow Oakland to serve as an effective domestic relief valve should the Southern California ports experience yet another episode of gridlock.

The Port of Oakland offers shippers a direct route, the Central Corridor, to Chicago. Making the proposed rail improvements to the western end of the Central Corridor and to the Port's intermodal rail facilities can triple the current intermodal capacity of container trade moving along this corridor and greatly increase the velocity of both freight and passenger movement. These results can be achieved for a relatively small investment and in a reasonably short time frame.

However, having made the above claim, it is important to keep in mind that the entire length of the corridor and its endpoints are a system. Improvements must be examined systemwide. Bottlenecks occurring beyond project area boundaries can negate the capacity and velocity improvements within a given project area. Currently, Union Pacific Railroad is focusing on the eastern end of the Central Corridor, as well as the portion in Wyoming, over which a large portion of its coal traffic moves. There are also segments of the corridor crossing the western states that will need attention if they are not to become constraints.

The program of access improvements put forward by the Port of Oakland, described following, consists of a complementary set of roadway/highway and rail improvements, with the latter emphasized over the short term, given the more immediate need for rail infrastructure upgrading. This Access Improvement Program is needed for these reasons:

- To provide the surface infrastructure that is capable of moving the Port's customers' container traffic to and from the Port smoothly, reliably and quickly.
- To provide Port customers with an efficient and un-congested gateway to U.S.-Asia trade.
- To continue to provide jobs in the Bay Area, as well as throughout California and to generate beneficial economic impacts in the region and state through the Port's activities.
- To help relieve congestion on the region's roadways and to reduce vehicular air emissions, both in the Bay Area and in the Central Valley.

The Access Improvement Program is a strategic improvement design that will be achieved over a number of years. It has a short-term element, comprised of priority projects for which the Port will seek funding in the immediate future. The primary source of this short-term funding is the state infrastructure bond; SB 1266 (Perata): The

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Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, also known as Proposition 1B.

The Port of Oakland is also the international gateway of choice for a number of California export shippers, especially the agriculture industry in the Central Valley, so expanding intrastate infrastructure capacity to move containers, whether by road or rail between Oakland and the Central Valley is critical. Shifting to short-haul rail for these movements should be a key component in the State's effort to reduce roadway/highway congestion and to improve air quality. Such a modal shift is of particular interest in the Central Valley where the air quality fails to meet government standards with increasing frequency. The Port has been involved in the effort to develop short-haul rail in this market. The primary effort is the CIRIS project, described below.

II. The Need for Increased Government Support of Rail Transport

There is a need to give rail projects equal consideration for public funding with roadway/highway projects. We need to recognize that both rail transport and roadway/highway transport represent a partnership of the private and public sectors that move goods from points of origin to market for the benefit of all. Rail is movement by privately-owned firms operating on privately-owned right-of-ways, carrying goods for the public benefit. Privately-owned trucks carry goods for the public benefit over publicly-owned roads and highways. Rail companies maintain their own right-of-ways; government maintains roads and highways. Rail companies have had to pay to replace polluting locomotives; simultaneously, government is increasingly paying to replace older, more polluting trucks. Both rail and highway/roadway modes are shared not only by freight, but by passengers as well. When combined, trends in both rail and roadway/highway capacity constraints paint a worrisome picture for the state of the U.S. freight system. Our nation has completed the build out of our highway networks to full capacity over the past 50 years and it is now imperative to focus our attention on improving the efficiency and capacity of our country's rail network to accommodate the projected growth trends in international trade.

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Recommendations:

Ports and Trade Corridors

- Recognition by the Federal Government of the importance to our economic well-being of goods movement, particularly along national trade corridors and through our ports functioning as international trade gateways.
- Recognition also that our ports and trade corridors are all part of a larger interdependent network that merits investment throughout and not just at a few mega-nodes.
- Provision of a federal funding mechanism for trade corridors and gateways.

Highway/Roadway and Rail Infrastructure Funding

- Recognition of the public benefit role played by railroads in moving the nation's goods.
- Making rail projects eligible for investment of public funds.
- Consideration of allowing investment of public funds to cover the operation of short-haul rail systems that contribute to reducing roadway congestion and air emissions.

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On-Port Projects

There are two major rail access projects located at the Port of Oakland. These are high priority, since increasing intermodal container capacity at the Port cannot be realized without making these improvements. Accordingly, the Port will seek funding from Proposition 1B for them. The Port intends to sponsor these two projects, and as sponsor, will assume the responsibility for delivering the required funding match.

7th Street Grade Crossing and Roadway Improvement

Project Description

This project will increase the Port's capacity for moving both rail and truck cargo into and out of the Port area. New rail bridges are necessary to enhance connection of the Port's two existing intermodal rail terminals to the mainline and with the planned new Outer Harbor Intermodal Terminal and to provide an integrated, grade-separated rail system serving the Port. The current rail bridges and roadway under-crossings were constructed in phases between 1930 and 1964 and cannot meet the rail infrastructure requirements for future Port growth. Replacing the existing rail bridges will also provide for the widening of 7th Street, a major arterial that connects the Port with I-880 and the relocation of a major intersection at the heart of the Port to accommodate the construction of the new rail facility. Current studies indicate that 7th Street will reach its carrying capacity of about 3 million TEUs by 2010. 7th Street also provides the main access for the public to the Port's 40-acre Middle Harbor Shoreline Park.

Cost Estimate and Anticipated Bond Funding

Total cost is \$289 million, of which \$125 million will be requested from Proposition 1B.

Construct Outer Harbor Intermodal Terminal (OHIT)

Project Description

This project will construct an expanded intermodal rail terminal at the Port on the former Oakland Army Base. The OHIT Project will include constructing container loading and unloading tracks, parking areas for containers and connections to the railroad mainline. This new facility will increase the rail terminal capacity at Oakland from approximately 640,000 lifts (containers) per year to 1.7 million lifts (1.2 million TEU to 3.1 million TEU). Additionally, this project is intended to be developed into a state-of-the-art clean-air technology showcase, featuring electrification and automation of yard operations based on European models. This would greatly reduce the use of diesel yard equipment and trucks at the facility.

Cost Estimate and Anticipated Bond Funding

Overall cost is \$450 million, of which \$325 million would construct the yard, build approach and storage tracks and relocate utilities. The electrified crane system and hardware and software to run it will cost \$125 million. Approximately \$225 million will

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be requested from Proposition 1B funds (\$162.5M from TCIF and \$62.5M from Air Emissions Reduction fund).

Off-Port Projects Supported by the Port of Oakland

The following four projects are critical components to the Port's rail access program, but due to their off-Port location on Union Pacific Railroad right-of-way, sponsorship may have to consist of a partnership among direct stakeholders. Nevertheless, the Port intends to continue to promote these projects, without which, anticipated growth of the Port will not be possible.

Upgrade Union Pacific Mainline Between Oakland and Martinez

Project Description

The UPRR mainline entering Oakland from the North is the major rail access to the nation's fourth largest container port. BNSF has operating rights over this line, which serves as its principal access into the Port. This line also serves as access for passenger train operations, which have priority over freight trains, thereby contributing further to the current delay problems. Currently, both BNSF and UPRR have a limited capacity to move trains into and out of the area. Trackage available for storing trains prior to departure or after arrival is extremely limited. Construction of these improvements will create the capacity to move more trains with fewer delays into and out of Oakland.

Of specific interest to the Port are improvements to the Martinez Subdivision that will allow increased freight capacity and greater operating efficiencies for both the UPRR and the BNSF. Such improvements include the expansion from two to four mainline tracks between the Port and Richmond; the addition of a third mainline track between Richmond and Point Pinole; track reconfigurations at the Emeryville station; and siding, crossover and signal improvements along the subdivision. Additional capacity enhancements to the subdivision are being discussed by the Port and UPRR and might be incorporated at a later time.

Cost Estimate and Anticipated Bond Funding

Project costs, for the improvements affecting the ability to move freight to and from the Port total \$78 million. Approximately 50% would come from Proposition 1B. The match would presumably come from the sponsor, other users of the line or government.

Improvements to the Central Corridor Line: Donner Summit

Project Description

This project was anticipated as part of the Southern Pacific/UPRR merger plan approved by the Federal Surface Transportation Board. It will improve clearances by removing or modifying snow sheds and tunnels on the former S.P. line serving Northern California

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over Donner Summit to allow the movement of double-stack container trains. This project will also complete the double tracking over Donner Summit.

Currently, both international and domestic container traffic is routed over the Feather River route. Opening of the former Southern Pacific line to this traffic will allow trains to be 38% longer and will significantly reduce transit times for goods moving between Northern California, the Midwest, and the East Coast by providing new capacity, system-wide, on a route used by both BNSF and UPRR.

Cost Estimate and Anticipated Bond Funding

Total cost is estimated at \$90 million.

Tehachapi Trade Corridor Rail Improvement

Project Description

This project double tracks a critical statewide rail link between Kern Junction and Mojave (Kern County, California) that connects Northern California with the rest of the U.S. and accesses Southern California from the Central Valley. While not in Northern California, this is a critical transportation link for the northern 2/3 of the state. Construction consists of double tracking a fifteen mile segment, eliminating three tunnels, extending sidings and improving the train signal system. Initial throughput increases due to these improvements is projected to be 650,000 TEU per year.

Cost Estimate and Anticipated Bond Funding

Total cost is \$82 million, of which half has been offered by BNSF. The other half (\$41 million) will be sought from Proposition 1B.

California Interregional Rail Intermodal System (CIRIS)

Project Description

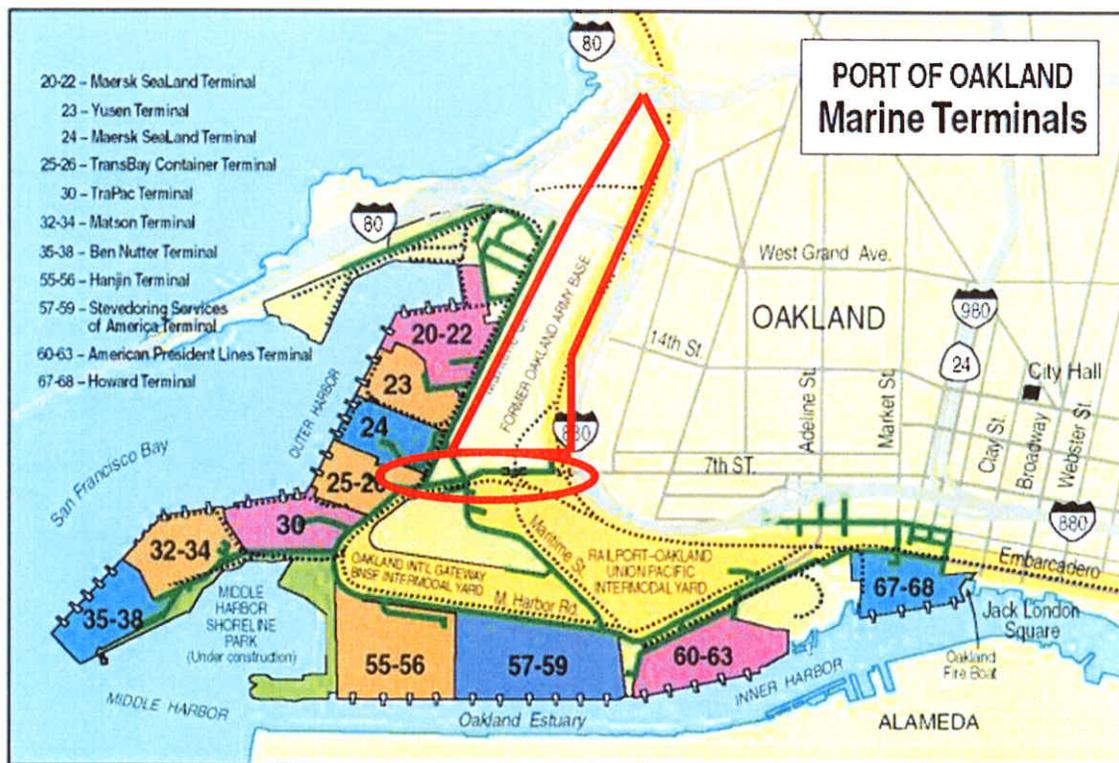
This project entails operating a rail shuttle system between the Port of Oakland and inland points in California's Central Valley, as an alternative to moving containers by truck over the highway. This program will primarily serve high-volume freight corridors and will require the development and/or improvement of rail intermodal facilities at the locations to be served, improvements to the existing rail system to create capacity and most likely operating subsidies in the initial phases.

Cost Estimate and Anticipated Bond Funding

Initial cost of developing one or two intermodal loading facilities and possibly providing rolling stock is \$20 million. An additional \$7 million has been requested for track realignment work. \$13.5 million dollars will be sought from Proposition 1B.

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Regarding the need to subsidize operation of a short-haul rail system, we should keep in mind that investing in a rail service to carry containers between points within California is less expensive over time than acquiring new highway right-of-way and building new highway lane miles, where such a choice actually exists. For example, Caltrans applies a very broad \$2.9 million cost estimate per lane mile of highway construction in the Bay Area. At that rate, the cost of building one lane in each direction between Oakland and Stockton would support the operation of CIRIS for many years.



**Figure 1: Port of Oakland On-Port Access Projects
 7th Street Grade Separation (bottom) and
 Outer Harbor Intermodal Terminal (top)**

New OHIT Terminal, Facing North



Figure 2: Proposed Layout of Outer Harbor Intermodal Terminal

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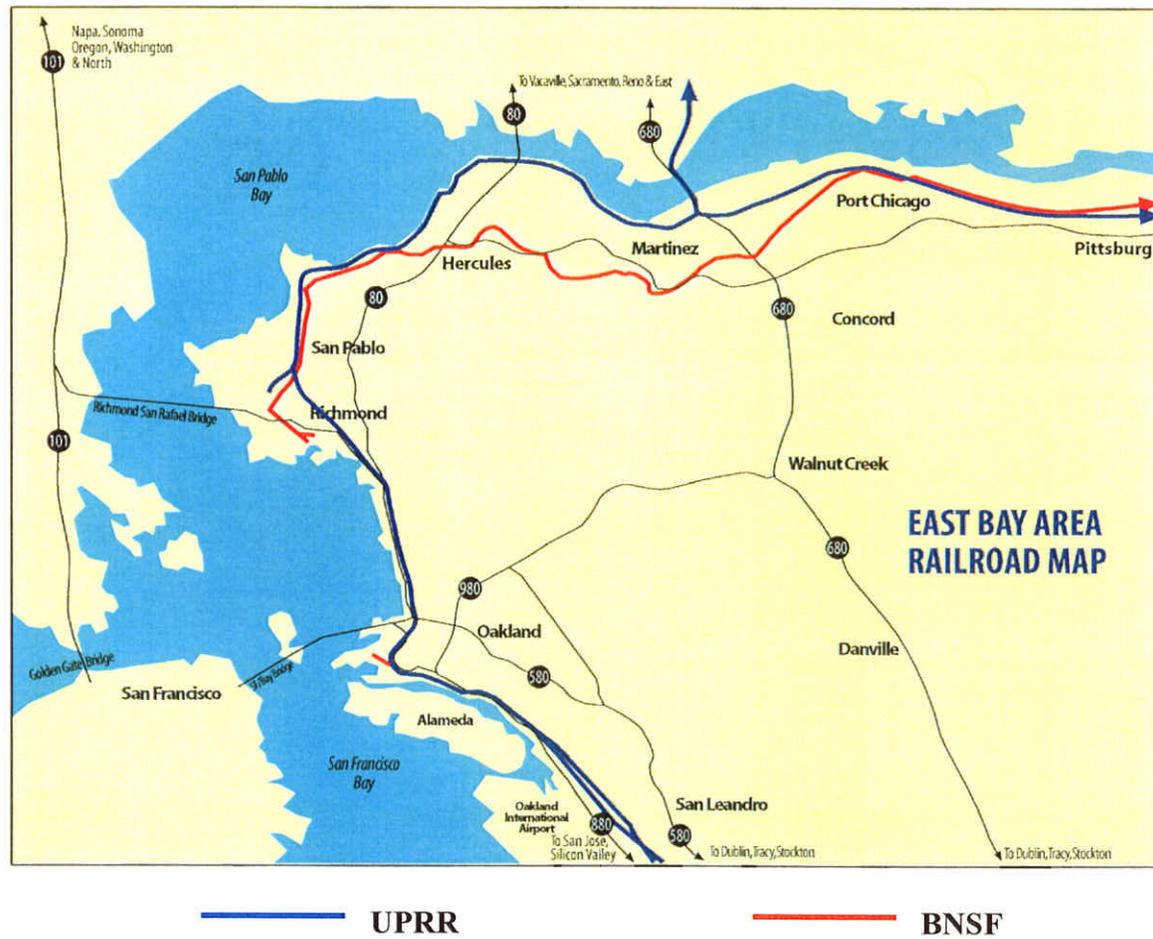
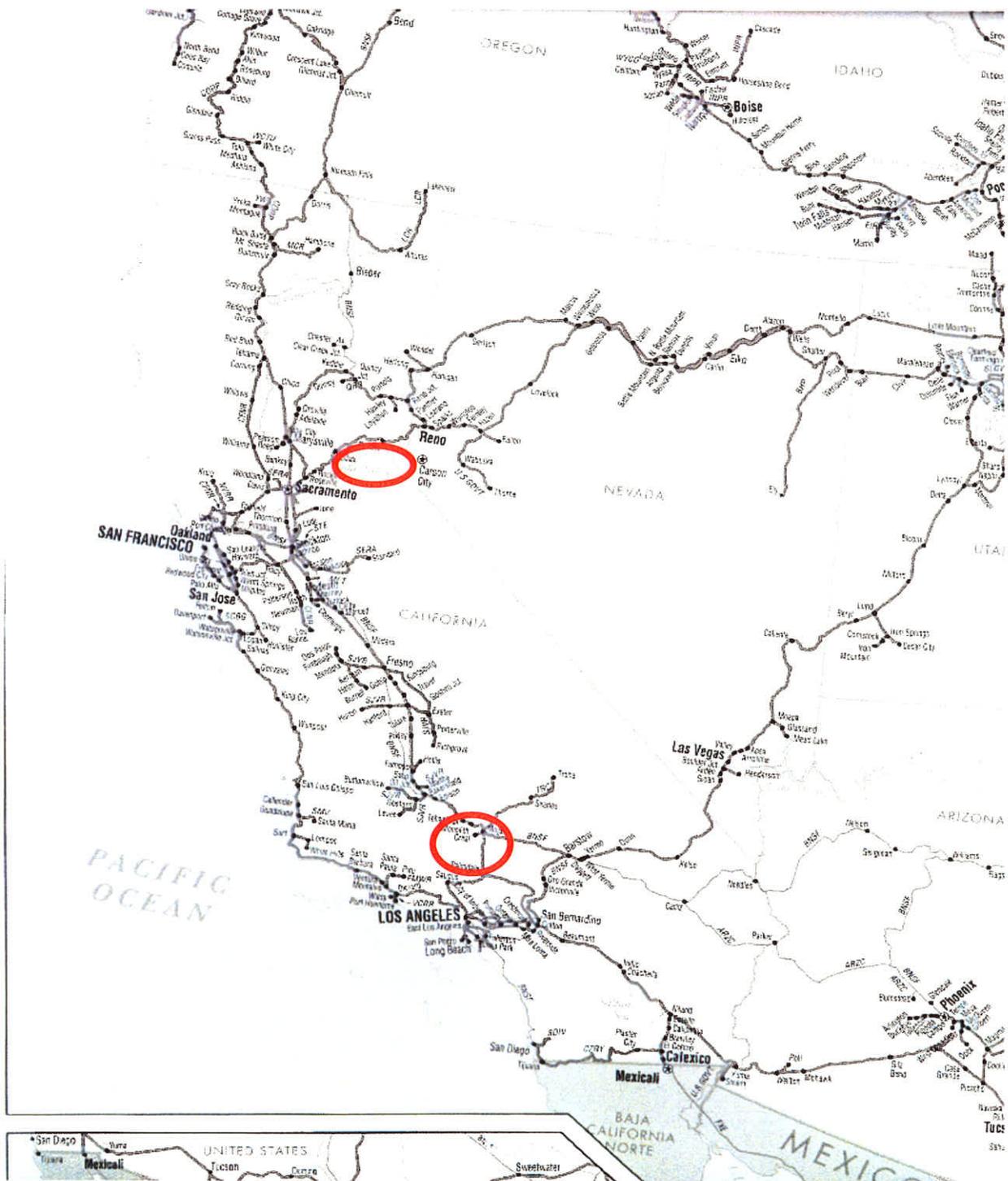


Figure 3: Port of Oakland: Martinez Subdivision Improvements
Area of improvements is along UPRR line between Oakland and Martinez.

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**Figure 4: California Gateway Rail Access Projects:
Central Corridor: Donner Summit (Top)
Tehachapi Trade Corridor (Bottom)**



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Freight Trust Fund

Coalition for America's Gateways and Trade Corridors

Author: Leslie Blakey

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

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Authors: Policy Committee
Coalition for America's Gateways and Trade Corridors
1150 18th Street, NW
Suite 1030
Washington, DC 20036
202-828-9100
Lblakey@blakey-agnew.com

Paper Title:

Freight Trust Fund

Committee Chairman, Mortimer Downey
PB Consult

Phil Bangert
Patton Boggs

Stephanie Bowman
Port of Tacoma

Nancy Butler
DMJM Harris

Ray Chambers
National Railroad Construction & Maintenance Association

Larry Ehl
Washington State DOT

Norm Emerson
Port of Los Angeles

Eve Grossman- Bukowski
Port of Oakland

Fran Inman
Majestic Realty Company

Leslie Blakey
Coalition for America's Gateways and Trade Corridors

Tim Lovain
Denny Miller Associates

James McCarville
Port of Pittsburgh

Annie Nam
Southern California Association of Governments

Sharon Neely
ACE Project

Jeff Squires
Parsons

Chris Vineis
Capital Partnerships, LLC

John Zumerchik
Mi-Jack Products, Inc.

About the Coalition

The Coalition for America's Gateways and Trade Corridors (CAGTC) is a diverse coalition of more than 40 organizations dedicated to increasing federal investment in America's intermodal freight infrastructure. In contrast to single mode interests, CAGTC's main mission is to promote a seamless goods movement transportation system across all modes to enhance capacity and economic growth. For more information on the Coalition for America's Gateways and Trade Corridors, please visit www.tradecorridors.org.

Executive Summary:

Experience with federal transportation policy has shown that progress in meeting transportation needs is greatest when federal-aid programs are linked to dedicated funding sources with stable sources of revenue. Good examples of this are the highway programs in the 1950s and 60s and mass transit in the 1980s and 90s.

The need for dedicated and predictable freight infrastructure funding has been documented by the U.S. Department of Transportation, the U.S. Chamber Foundation and other studies. Yet, the equally important task of identifying funding and allocation strategies has largely gone unaddressed.

At the same time, competition for available funds during the next-TEA will be even more intense. When freight programs and projects compete with all other transportation programs – maintenance, safety, and personal mobility – they often lose to those other equally important national priorities.

Without a dedicated federal freight fund, it is certain that freight programs will again receive less funding than necessary to maintain, and much less improve, the current condition and performance of goods movement infrastructure. Preceding the passage of SAFETEA-LU, the Coalition for America's Gateways and Trade Corridors documented that freight and goods movement infrastructure projects need a bare minimum of \$2 billion (2005 dollars) annually in federal funding.

The Coalition for America's Gateways and Trade Corridors has agreed upon the following tenets with respect to establishment of a dedicated federal Freight Trust Fund:

- The cost of goods and goods movement should support and internalize some portion of the cost of expanding related needed infrastructure, such that growth in demand for moving goods supports corresponding expansion of infrastructure.
- All potential funding mechanisms and funding sources should be considered and based on benefit to users – i.e. those who receive the most benefit, pay the most.
- Funding should be predictable, dedicated and sustained.
- Funds should be available to support projects, across all modes, of various size and scope, but with special priority for projects of national significance.
- Funds should be available to support multi-jurisdictional and multi-state projects.
- Fund distribution should be based on objective, merit-based criteria, with higher-cost projects subject to more stringent evaluation than lower-cost efforts.
- Funding should be linked with projects in a manner similar to Full Funding Grant Agreements that ensure once a project is approved, funds will flow through to completion.
- Fund availability should be "Pay as you go" and not result in deficit spending.

Background Information

Mr. Jeffrey Shane, Deputy Secretary for the U.S. Department of Transportation, noted, "By and large, the movement of freight has been a stepchild, it's not unfair to say, in the overall discussion of transportation policy." According to the U.S. Chamber Foundation, transportation funding for the coming ten year period (2005 to 2015) will be **\$1 trillion short** of documented needs. In particular, freight and goods movement infrastructure are perilously under-funded when compared to current conditions and growth projections. All modes of transport are affected and, without a focused and concerted national plan that includes dedicated funding, the effects will burden businesses, consumers and the environment for years to come.

The need for dedicated freight infrastructure funding has been documented by the U.S. Department of Transportation. Although there was a five-fold funding increase for freight in SAFETEA-LU – representing more than \$4 billion – a substantial additional funding commitment is needed to meet 2020 freight capacity needs.

Sustainable goods movement lies at the center of our quality of life, not only for the availability of consumer products, but because of transportation's impact on land use, energy consumption and environmental quality. Improvements to freight infrastructure can result in less congestion with better air quality and less time and fuel wasted.

Twenty-five million businesses in the United States all depend to some degree on the products delivered by our freight transportation system, as does every American household. Our high standard of living, steady employment, low consumer prices and overall economic prosperity are a direct result of an efficient, dependable and cost-effective supply chain.

To illustrate the importance goods movement has on our economy, it is helpful to look at the conclusions of a 2006 Congressional Budget Office report on the economic impact of a potential shutdown of the ports of Los Angeles and Long Beach. The report determined that such an event would cost our economy between \$65 and \$150 million per day. Jobs lost to a long-term closing of the ports would exceed one million.

While we all hope such catastrophic events will never occur, the trend of congestion is leading us to the same impact on the economy.

For example, according to the U.S. DOT's Congestion Initiative, one national retailer keeps \$2.5 billion in merchandise on-hand, but adds 10 days of "buffer stock" to its inventory to accommodate rail delays. The additional stock costs the company \$2.7 million annually. Similarly, an Atlanta area distributor finds it difficult for one of their trucks to make more than 12 daily deliveries: in 1984, that truck could have made as many as 20 daily deliveries. Furthermore, according to a 2005 study by Global Insight, the trucking industry is currently short at least 20,000 drivers, a figure that is expected to rise to 111,000 by 2014, due in part to declining working conditions.

The success of U.S. national trade policy has created a strong goods movement transportation demand. The commercial access to foreign markets and sources of supply for benefit of the U.S. consumer has greatly intensified over the last two centuries. Technological advancements and

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trade agreements have raised productivity, driving economic growth and giving a powerful impetus to foreign trade. Initially, innovations like the advent of railroads in the 19th century aided in the easy, low-cost transfer of goods and lessened the barriers distance imposed on trade. Now, however, the inefficiencies of these transportation networks could lead to a breakdown in trade. In fact, the transportation system chokepoints and bottlenecks in our major gateways and trade corridors, which are also bogged down in congestion and air pollution burdens, represent a trade barrier as threatening as tariffs.

To keep up with maintenance and necessary improvements to the freight system, America should be spending \$83 billion more each year than currently projected. According to FHWA's recent Notice of Proposed Rulemaking (NPRM) on the Projects of Regional and National Significance (PNRS) program, "Despite the significant increase for surface transportation funding in the Transportation Equity Act of the 21st Century, current levels of investment are insufficient to fund" projects of regional and national significance.

Projects of regional and national significance are crucial, high-cost transportation infrastructure that produces a high-return for our economic and mobility needs. The NPRM states, these facilities "have national and regional benefits, including improving economic productivity by facilitating international trade, relieving congestion, and improving transportation safety by facilitating passenger and freight movement."

Movement of goods to market is essential to the economy and the ripple effects from a breakdown in our goods movement system is felt in every corner of the country. A stronger federal role through solid policy initiatives, new legislative opportunities with real dollars, public-private partnerships for freight planning, finance, operations and security, and an overall strengthened national understanding of the benefits of freight and goods movement in the nation is urgently needed.

Public support for transportation programs is strong across the country. Americans voted in favor of transportation initiatives in the November 2004 elections by overwhelming margins: Of nearly 55 transportation funding measures on the ballot in 21 states, the voters approved 76 percent, resulting in more than \$28 billion in new state and local transportation spending.

In looking at the history of U.S. transportation policy, dedicated funding sources for specific program areas – i.e. freight, transit, safety, rail, etc – tied to growth in demand, represent the best solution to assure a safe and efficient goods transportation system by 2020. Like its predecessors, the current federal surface transportation authorization legislation (called the Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users or SAFETEA-LU) requires freight projects to compete for funding against all other transportation priorities.

While the new legislation authorizes approximately \$68 billion more in funding than previous legislation, it is still deficient when measured by our country's burgeoning needs and in comparison to our trading partners' transportation investments. This shortfall is partly because federal motor fuel taxes, which are not indexed to inflation, have lost about one-third of their purchasing power since 1993. Also with more fuel efficient vehicles and many other changes since the federal-aid highway program began, projections indicate the Highway Account of the Highway Trust Fund (HTF) will be in deficit by 2010, just one year after SAFETEA-LU expires.

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Forecasts of insufficient funding levels are not new. In fact, as far back as a 1982 CBO study, it was noted that "highway user taxes will not keep up with inflation, much less begin to address the problems of deferred maintenance and Interstate completion."

Further complicating this picture is the call from the "donor" states (those who send more money to the HTF than they receive back) to return dollar-for-dollar their motor fuel taxes. If the federal government were to simply return all the money each state pays in, then there would be no money or justification for a federal program.

Ironically, the so-called devolution movement is gathering strength at an inopportune time. As the world becomes increasingly global, freight is moving far greater distances, both domestically and internationally. On the domestic front, 300 million of the 660 million truck trips in the United States in 2005 were for distances greater than 300 miles.

Further complicating the situation is the fact that the Panama Canal is operating at capacity, and the percentage of Post-Panamax container ships is on rise, contributing to the projected 350 percent container traffic through our ports over the next fifteen years. Keeping in mind that most transportation infrastructure projects take a minimum of ten years to build, we are quickly facing a goods movement reality where transportation demand outstrips supply.

As the debates surrounding the passage of SAFETEA-LU made clear, in an environment of highly competitive transportation needs and interests, freight-related projects often fail to receive priority. All too often, freight projects just don't make the cut when competing with "people projects."

Alternatives and/or Recommendations:

The Mass Transit Account (MTA) and the programs it supports underscore the benefits and successes of having a separate, "firewalled" account. With its dedicated and guaranteed Full Funding Grant Agreements in place, local transit systems, regional planning agencies and state departments of transportation have been able to make long range transportation decisions and function much more effectively. In turn, transit service and ridership have expanded nationwide.

The Interstate System itself was the outcome of similar program and funding decisions. The creation of the Highway Trust Fund in 1956 established a separate account which, supported by payments from road users, facilitated the realization of the largest public works project to date: The Interstate System.

As freight continues to be more global, the significant needs created can be best addressed through the establishment of a federal Freight Trust Fund (FTF), or firewalled freight account in the existing federal Highway Trust Fund.

Objective, merit-based criteria should govern the distribution of FTF resources with priority given to projects offering the greatest national benefit, with higher-cost and complex projects subject to more stringent evaluation than smaller, lower cost efforts. An example of such criteria can be found in the proposed Projects of National and Regional Significance (PNRS) Evaluation and Rating where proposed projects will be judged against their ability:

- (i) To generate national and/or regional economic benefits, including creating jobs, expanding business opportunities, and impacting the gross domestic product;
- (ii) To reduce congestion, including impacts in the State, region, and Nation;
- (iii) To improve transportation safety, including reducing transportation accidents, injuries, and fatalities;
- (iv) To otherwise enhance the national transportation system; and
- (v) To garner support for non-Federal financial commitments and provide evidence of stable and dependable financing sources to construct, maintain, and operate the infrastructure facility.

Further evaluation criteria should include the extent to which the project encourages non-federal contributions to the project, uses new technologies, including intelligent transportation systems that enhance the efficiency of the project, reduces energy consumption and improves regional air quality.

There should be a federal policy regarding partnership for freight and goods movement funding through a dedicated federal Freight Trust Fund. CAGTC supports the following principals with respect to establishment of a dedicated federal Freight Trust Fund (FTF):

- The cost of goods and goods movement should support and internalize some portion of the cost of expanding related needed infrastructure, such that growth in demand for moving goods supports corresponding expansion of infrastructure.
- All potential funding mechanisms and funding sources should be considered and based on benefit.
- Funding should be predictable, dedicated and sustained.
- Funds should be available to support projects, of various size and scope, but with special priority for projects of national significance.
- Funds should be available to support multi-jurisdictional and multi-state projects.

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- Fund distribution should be based on objective, merit-based criteria, with higher-cost projects subject to more stringent evaluation than lower-cost efforts.
- Funding should be linked with projects in a manner similar to Full Funding Grant Agreements that ensure once a project is approved, funds will flow through to completion.
- Fund availability should be “Pay as you go” and not result in deficit spending.

In addition, CAGTC urges:

- Congress to move forward with hearings to document public support for a FTF;
- The 1909 National Transportation Policy and Revenue Study Commission established by SAFETEA-LU to place dedicated freight funding as a top priority;
- U.S. Department of Transportation to initiate a national freight benefits study; and,
- Government Accountability Office (GAO) to assess the potential for a portion of the future growth in customs fees to be assigned to the FTF.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Goods Movement

California Department of Transportation

Author: Richard Nordahl

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

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Author: California Department of Transportation
Richard Nordahl, Chief, Office of Goods Movement
P.O. Box 942873
Sacramento, CA 94273-0001
(916) 654-4384
Richard_nordahl@dot.ca.gov

GOODS MOVEMENT

Executive Summary

California is the nation's main gateway to Pacific Rim international trade. It is seeing significant freight growth, highlighted by a forecast of a 210 percent increase in container volumes projected to come through the State's ports between 2005 and 2030. Our transportation and environmental needs are huge, including an initially estimated \$47.3 billion for goods movement projects, and \$6-10 billion for environmental investments. While SAFETEA-LU did provide some significant funding promises (including \$592 million in goods movement earmarks for California), we believe that a reliable, sufficient source of funding needs to be provided for transportation/trade infrastructure and environmental mitigation. This money must be provided to ensure our nation's continued economic competitiveness in the global marketplace, and appropriate mobility, jobs, safety and quality of life for our citizens.

Briefly, our key recommendations include:

- Strengthen Federal action and support for expanded national goods movement planning and policy.
- Establish a separate freight investment program/fund.
- Create a national user fee that would not penalize any one region to support the above program.
- Grant public entities the flexibility to invest federal funds where the greatest public benefit can be achieved, regardless of mode or ownership.
- Adopt the California principle of simultaneous and continuous improvement of transportation/trade infrastructure and community and environmental quality/public health as federal policy and directive.
- Increase Federal investment in freight transport research and technology demonstration projects, particularly in areas of alternative transportation modes, engines and fuels.

Background Information

A. The Challenge

The United States (and California) face a freight/goods movement challenge, which must be addressed if we are to meet the needs of our economy as a participant in the global economy, and if we are to provide our citizens mobility, jobs, and a quality environment.

California is the nation's main gateway to Pacific Rim international trade. The nation reaps significant benefits from this trade flowing through California. However, our infrastructure and our environment suffer from significant impacts from the movement of this trade, including the impacts of congestion, pollution and an impaired quality of life. California is also a major producer and consumer of agricultural, commercial, industrial and other goods and materials. These domestic trade flows are also a key functional component to the national economy, but with similar significant local impacts.

The growth in California freight movement can be illustrated in several ways. From a domestic perspective, over the 5-year period 1999 to 2004, total 5-axle truck vehicle miles of travel (VMT) grew from 7.88 billion in 1999 to 8.98 billion in 2004, a 14 percent increase. Rail tonnage grew from 143 million tons in 1999, to 171 million tons in 2004, an over 20 percent increase. Despite the changes in Mexico's economy, North America Free Trade Agreement (NAFTA)-related California/Mexico trade continues to increase. In 1999, Mexico surpassed Japan to become California's top export trade market. Total trade activity through the California Ports of Entry (POEs) exceeded \$33 billion in 2004, an increase of 160 percent since 1995.

But it is through our seaports that we have seen the most significant growth. The volume of containerized cargos coming through the Ports of Los Angeles, Long Beach and Oakland has increased 67 percent, 1999 through 2005, from 9.9 million Twenty Foot Equivalent Units (TEUs), to 16.5 million TEUs. This latter volume represented more than 43 percent of all US continental containerized cargos. In its final draft, *Growth of California Ports: Opportunities and Challenges*, the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) projects these volumes will increase to 22.4 million in 2010, 40.2 million in 2020, and 51.2 million TEUs by 2030 (a 210 percent increase over 2006 levels). In part, this volume reflects a change in our national economy. While international trade comprised 13 percent of the Gross Domestic Product in 1990 and 26 percent in 2000, it is projected to increase to 35 percent in 2020, tripling in just 30 years.

This growth is resulting in a sizeable unmet transportation, environmental, and economic need. In the development of our California Business, Transportation and Housing Agency/California Environmental Protection Agency *Goods Movement Action Plan* (GMAP), released in January 2007, we identified a goods movement/trade infrastructure need of \$47.3 billion in major (\$10 million plus cost) projects. Looking at it from a different perspective, the CALMITSAC report estimates just port-related infrastructure needs at \$20.3 billion. The California Air Resources Board, in its *Emission Reduction Plan for Ports and Goods Movement in California*, estimates that current emissions from goods

movement activities, primarily due to diesel emissions, contribute to approximately 2,400 premature deaths, 2,000 hospital admissions due to heart ailments, 5,100 hospital admissions due to acute lung ailments, and 62,000 cases of asthma and other serious respiratory ailments annually. Environmental/community mitigation costs are estimated at \$6-10 billion. Finally, in an analysis for the California/Mexico border area, traffic congestion and delays from inadequate infrastructure capacity cost California nearly \$3.2 billion in lost output and a loss of more than 35,000 jobs in 2005. This growth challenges the nation to respond appropriately and aggressively. If we do not, our economy will be handicapped by increasing congestion and delay, lost productivity, higher costs and increased environmental and energy impacts.

B. The Federal Policy, Program and Financial Response

The Federal government has been responding from policy, program and funding perspectives. It has released a draft "Department of Transportation Framework for a National Freight Policy," which lays out an overall vision, and seven broad objectives. Significantly, by their admission, it is not a Federal freight policy. From our perspective, while a national policy orientation is extremely important, the federal government must take responsibility for the positions that it advocates, and most importantly, lay out an action plan of direct Federal policy, program and funding involvement. The Federal Highway Administration's (FHWA) Office of Freight Management and Operations has made great strides in providing information regarding the nation's freight system, and actions that can be undertaken. The U.S. Department of Transportation at a minimum must enable the office to grow further beyond its FHWA "silo" and more aggressively pursue in content and action a more truly multimodal approach, including more attention to maritime/inland waterway issues, rail system development, operations, air cargo services and future growth.

SAFETEA-LU made some inroads in support of goods movement by increasing project eligibility for some programs, such as creating the dedicated Coordinated Border Infrastructure Program (\$106 million for California), through earmarked programs such as the High Priority Projects program. Even though it increased project eligibility for some of the programs to allow some intermodal projects, there was not a significant increase in formula funding. Thus, regions wound up with a larger pool of eligible projects over which to spread funds. The fundamental issue of a dedicated source of funding for intermodal projects was not addressed.

Overall, the State received approximately \$592 million in funding that was spread over 69 goods movement project earmarks. Of this amount, \$366 million was directed to three specific projects, The Alameda Corridor East (\$211 million), Inland Empire Goods Movement Gateway/Norton Air Force Base (\$55 million) and the Gerald Desmond Bridge (\$100 million). This is not enough funding to address the massive goods movement and congestion issues caused by California's position as the nation's main port of entry for the Pacific Rim.

The estimated cost for completion of the Alameda Corridor East is \$4.6 billion. There are several mega-projects in other states that are similar in scope and cost. These projects are

vital not only to the economies of their resident states, but also to the rest of the nation. Currently, there is no national mechanism to address these needs. It is almost impossible for a state to be timely in meeting growing national trade needs through the programs and processes under SAFETEA-LU. The nation needs a clear federal policy that supports its trade corridors and provides a reliable source of funding to ensure its continued economic competitiveness in the global marketplace.

Alternatives and/or Recommendations

The Department of Transportation has been addressing these issues in light of the increasing severity of the State's (and nation's) goods movement challenges. Our recommendations below are based on the GMAP (noted above), our comments on the U.S. Department of Transportation (USDOT) draft National Freight Policy Framework, and ongoing policy work by the American Association of State Highway and Transportation Officials (AASHTO):

- There must be much stronger Federal action and support for expanded national goods movement planning and policy (e.g., in the USDOT development of the National Freight Policy Framework). One of the key overall objectives should be the identification, in cooperation with the states, of the most critical current and required future components of the nation's freight transportation system.
- There must be a Federal commitment, from a policy and funding perspective, to making major investments in maintaining and upgrading the nation's freight transportation infrastructure. The federal government should be responsible for "national" investment requirements related to trade agreements, security, ports, border crossings, and major national freight transportation gateways. Ideally, a separate Freight Investment Program/Fund should be established, with its allocation bearing some relationship to where the revenues are originally generated.
- To support the above program, a national user fee, that would not penalize any one region, should be established that as a minimum, results in international trade paying more of its fair share of the cost of required transportation/trade infrastructure and environmental mitigation. In addition, harbor maintenance and inland waterway tax revenues should be fully expended for their intended purposes.
- There should be modifications to federal tax structure to encourage by tax credits or other means, greater private sector investments in freight infrastructure.
- There should be increased long-term support of regional efforts for voluntary user fee arrangements for infrastructure improvements (e.g., application of container fees, with the revenues "fire walled" and committed to specific project improvements).
- The Transportation Infrastructure Finance and Innovations Act (TIFIA) should be modified to permit federal grants and/or loans for pre-construction project development work.

- Administrative requirements which in effect restrict the ability to use of Congestion Mitigation and Air Quality (CMAQ) funds for projects involving the private sector (e.g., with railroad companies) should be reviewed and streamlined. In the use of federal funds, public entities should have the flexibility to invest where the greatest public benefit can be achieved, regardless of mode or ownership.
- There should be much greater federal emphasis on addressing the environmental, energy, community and social equity impacts of freight facilities and transport, especially in the area of diesel emissions reduction. **The California principle of simultaneous and continuous improvement of transportation/trade infrastructure and community and environmental quality/public health should be adopted as federal policy and directive.**
- The United States Environmental Protection Agency should aggressively pursue the development and implementation of Tier III railroad locomotive emission standards.
- There should be greater investments in freight transport research and technology demonstration projects, particularly in areas of alternative transportation modes, engines and fuels. As part of this effort, work should be undertaken to research, demonstrate and implement methods to reduce the level of greenhouse gas contributions from freight transport.
- There should be greater, systematic, freight data collection, especially with regard to truck transportation and commodity movement statistics, with particular emphasis on freight transportation system performance measures and metrics. This information should be provided in useable form to the states to facilitate statewide planning and programming, while protecting private company competitive information.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
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Goods Movement Action Plan Executive Summary

California Business, Transportation and Housing Agency

Author: Multiple Authors

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



GOODS MOVEMENT ACTION PLAN

Prepared by

**Business, Transportation and Housing Agency
and
California Environmental Protection Agency**

January 2007

PREFACE

Much work has been done at local and regional levels to address important goods movement issues. Notable long-term efforts include work conducted by the Southern California Association of Governments¹ and the Metropolitan Transportation Commission.² As the State develops its goods movement initiatives, the integrity of local and regional processes must be maintained while adding elements that benefit from a statewide approach.

Beginning in June 2004, the Schwarzenegger Administration began a concerted effort to assemble goods movement stakeholders to learn about the challenges and opportunities facing the future of goods movement within the State. The input generated by these meetings resulted in the formation of the Goods Movement Cabinet Work Group in December 2004, co-chaired by Secretary Sunne Wright McPeak of the Business, Transportation and Housing Agency (BTH) and Secretary Alan Lloyd of the California Environmental Protection Agency (Cal/EPA). Their efforts led to the publication of the Administration Goods Movement Policy, “Goods Movement in California,” in January 2005.

Secretaries McPeak and Lloyd then convened a series of “listening sessions” in Los Angeles on January 27, 2005 and March 24, 2005 and in Oakland on February 11, 2005, to hear from the full range of stakeholders engaged or impacted by goods movement activities. Collectively, these sessions attracted 325 participants who offered specific ideas and recommendations to resolve issues associated with the growth of the goods movement industry and the mitigation of its impacts.

The development of the Goods Movement Action Plan has been a two-phase process. The “Phase I: Foundations” report, released on September 2, 2005, characterizes the “why” and the “what” of the State’s involvement in goods movement in the following four segments: (1) the goods movement industry and its growth potential; (2) the four “port-to-border” transportation corridors that constitute the State’s goods movement backbone and the associated inventory of infrastructure projects that are being planned or that are underway; (3) the environmental and community impacts—as well as a preliminary description of mitigation approaches and issues; and (4) key aspects of public safety and security issues.

The Phase I report includes a compiled inventory of existing and proposed goods movement infrastructure projects. The listing includes previously identified projects in various Regional Transportation Plans (RTPs) and Regional Transportation Improvement Programs (RTIPs) prepared by Metropolitan Planning Organizations (MPOs), Regional Transportation Planning Agencies (RTPAs), and County Transportation Commissions (CTCs). In addition, the listings include a wide range of outlined projects underway or under consideration by the ports, railroads, and other third parties. Prior to this compilation, no comprehensive statewide inventory has been available.

¹ Southern California Association of Governments, Southern California Strategy for Goods Movement: A Plan for Action, February 2005.

² Metropolitan Transportation Commission, Regional Goods Movement Study for the San Francisco Bay Area, December 2004.

This Phase II Goods Movement Action Plan is a statewide action plan for goods movement capacity expansion, goods movement-related public health and environmental impact mitigation and community impact mitigation, and goods movement-related security and public safety enhancements. It presents the “how,” “when,” and “who” required to integrate these efforts. Specifically, it presents a framework for decision making regarding candidate actions and potential “solution sets” to achieve simultaneous and continuous improvement for each of the subject areas.

The Phase II effort to develop this Plan was a stakeholder-based process with input from the public in an open and transparent public setting. In October 2005, BTH and Cal/EPA assembled an Integrating Work Group comprised of regulators and industry, community, and environmental leaders to provide input to the Cabinet Work Group regarding a framework for decision making regarding candidate actions.

The following six subject-specific work groups supported the Integrating Work Group:

- Infrastructure Work Group
- Public Health and Environmental Impact Mitigation Work Group
- Community Impact Mitigation and Workforce Development Work Group
- Homeland Security and Public Safety Work Group
- Innovative Finance and Alternative Funding Work Group
- Technology Work Group

Each of the supporting work groups discussed the technical and public policy issues within their domain. The Integrating Work Group resolved conflicts among the supporting groups to the extent possible and provided critical input to assist BTH and Cal/EPA in producing a series of comprehensive, consistent, and practical recommendations for action.

In addition to the Work Group meetings, BTH, Cal/EPA and ARB held six community meetings in Phase II for the development of this Plan. The locations and dates for these evening community meetings were:

- Wilmington – February 6, 2006
- Commerce – February 22, 2006
- Oakland – February 27, 2006
- Fresno – March 15, 2006
- Barrio Logan (San Diego) – July 11, 2006
- Riverside – July 13, 2006

Based in part on the air pollution findings in the “Phase I: Foundations” report, the Air Resources Board (ARB) staff began development of the Emission reduction Plan for Ports and Goods Movement in California in the fall of 2005. The ARB Board approved the Emission Reduction Plan in April of 2006, and the Emission Reduction Plan is a key element of this Goods Movement Action Plan.

ACKNOWLEDGMENTS

BTH Secretary Sunne Wright McPeak and Cal/EPA Secretary Linda Adams³ led the Cabinet Work Group responsible for the preparation of the Goods Movement Action Plan.

BTH Undersecretary Barry Sedlik, Cal/EPA Assistant Secretary for Policy Cindy Tuck and ARB Executive Officer Catherine Witherspoon provided overall project management for the Phase II effort. The Action Plan has been supported by staff from BTH, Cal/EPA, and other state offices as summarized below.

Contributors from BTH include: Curt Augustine, Yolanda Benson, Jim Bourgart, Ouida Braithwaite, Karin Fish, Stan Hazelroth, Ed Heidig, Jason Hone, Jorge Jackson, Augustin Jimenez, Dawn Larson, Cheryl Murphy, Jeff Newman, Alicia Patterson, Ash Roughani, Benjamin Sarem, Gwen Strivers, Michael Tritz, and Joan Wilson. Other contributors include: Director Will Kempton, Gabriel del Castillo, Ken De Crescenzo, Steve De Vorkin, Michele Fell, Patty, Fong, Ed Griffith, Todd LaCasse, Dan McKell, Tom Messer, Richard Nordahl, Dave Richardson, Brian Smith, Joan Sollenberger, Rick Wilhelm, and John Williamson from the Department of Transportation; George Stepanenko and Mark Uyeda from the Department of Corporations; Commissioner Mike Brown, Joe Farrow, Kevin Green, Leon Hines Jr., Louise Pankey, and Darlene Pederson from the California Highway Patrol; and Jackie Stutz from the Department of Financial Institutions.

Contributors from Cal/EPA include: Dan Skopec, Andrea Lewis, Patty Zwarts and Jeanine Townsend. Contributors from ARB staff include Mike Scheible, Lynn Terry, Linda Murchison, Cynthia Marvin, Kurt Karperos, Sylvia Oey and Kellie Williams. Contributors from State Water Resources Control Board staff include: Executive Director Celeste Cantu and Tom Howard. Contributors from the Department of Toxic Substances Control include Director Maureen Gorsen, Dorothy Rice and Rick Brausch. Contributors from the Department of Pesticide Regulation include: Director Mary-Ann Warmerdam and Paul Gosselin.

Other contributors include: Director Matthew Bettenhausen, Jessica Cummings, Patrick Koeneker and Gary Winuk from the Office of Homeland Security; John Barna from the California Transportation Commission; Eric Swedlund and David Pagan from the Governor's Washington, D.C. office; and Jeffrey Williamson from the Center for International Trade Development.

³ Former Cal/EPA Secretary Alan Lloyd led the Cal/EPA effort of the Cabinet Work Group prior to his retirement in February 2006.



California Environmental Protection Agency
Alan C. Lloyd, Ph.D.
Agency Secretary



Business, Transportation & Housing Agency
Sunne Wright McPeak
Agency Secretary

January 27, 2005

GOODS MOVEMENT IN CALIFORNIA

Improving the movement of goods in California is among the highest priorities for Governor Schwarzenegger. The State's economy and quality of life depend upon the efficient, safe delivery of goods to and from our ports and borders. At the same time, the environmental impacts from goods movement activities must be reduced to ensure protection of public health.

The goods movement and logistics industry is an increasingly important sector of good jobs for Californians. It is vital to grow the industry by improving the essential infrastructure needed to move goods from California's ports throughout California and to the rest of the country with a focus on the entire "coast to border" system of facilities, including seaports, airports, railways, dedicated truck lanes, logistics centers, and border crossings. This system of facilities is critical to the national goods movement network and must be the focus of a partnership with the federal government. Improving the goods movement infrastructure also is pivotal to relieving congestion on freeways and increasing mobility for everyone in California. Further, it is vital that local, state, and federal authorities cooperate to ensure port, rail and road safety and security.

It is the policy of this Administration to improve and expand California's goods movement industry and infrastructure, in a manner which will:

- Generate jobs.
- Increase mobility and relieve traffic congestion.
- Improve air quality and protect public health.
- Enhance public and port safety.
- Improve California's quality of life.

The Schwarzenegger Administration has established a Cabinet Work Group to lead the implementation of this policy for goods movement and ports by working collaboratively with the logistics industry, local and regional governments, neighboring communities, business, labor, environmental groups and other interested stakeholders to achieve shared goals.

I. EXECUTIVE SUMMARY

The Goods Movement Action Plan (the Plan) is an initiative of the Schwarzenegger Administration to improve and expand California's goods movement industry and infrastructure in a manner which will:

- Generate jobs.
- Increase mobility and relieve traffic congestion.
- Improve air quality and protect public health.
- Enhance public and port safety.
- Improve California's quality of life.

The development of the Goods Movement Action Plan has been a two-phase process. The "Phase I: Foundations" Report, released on September 2, 2005, characterizes the "why" and the "what" of the State's involvement in goods movement in the following four segments: (1) the goods movement industry and its growth potential; (2) the four "port-to-border" transportation corridors that constitute the State's goods movement backbone and the associated inventory of infrastructure needs (see Figure I-1); (3) environmental and community impacts—as well as a preliminary description of mitigation approaches and issues; and (4) key aspects of public safety and security issues.

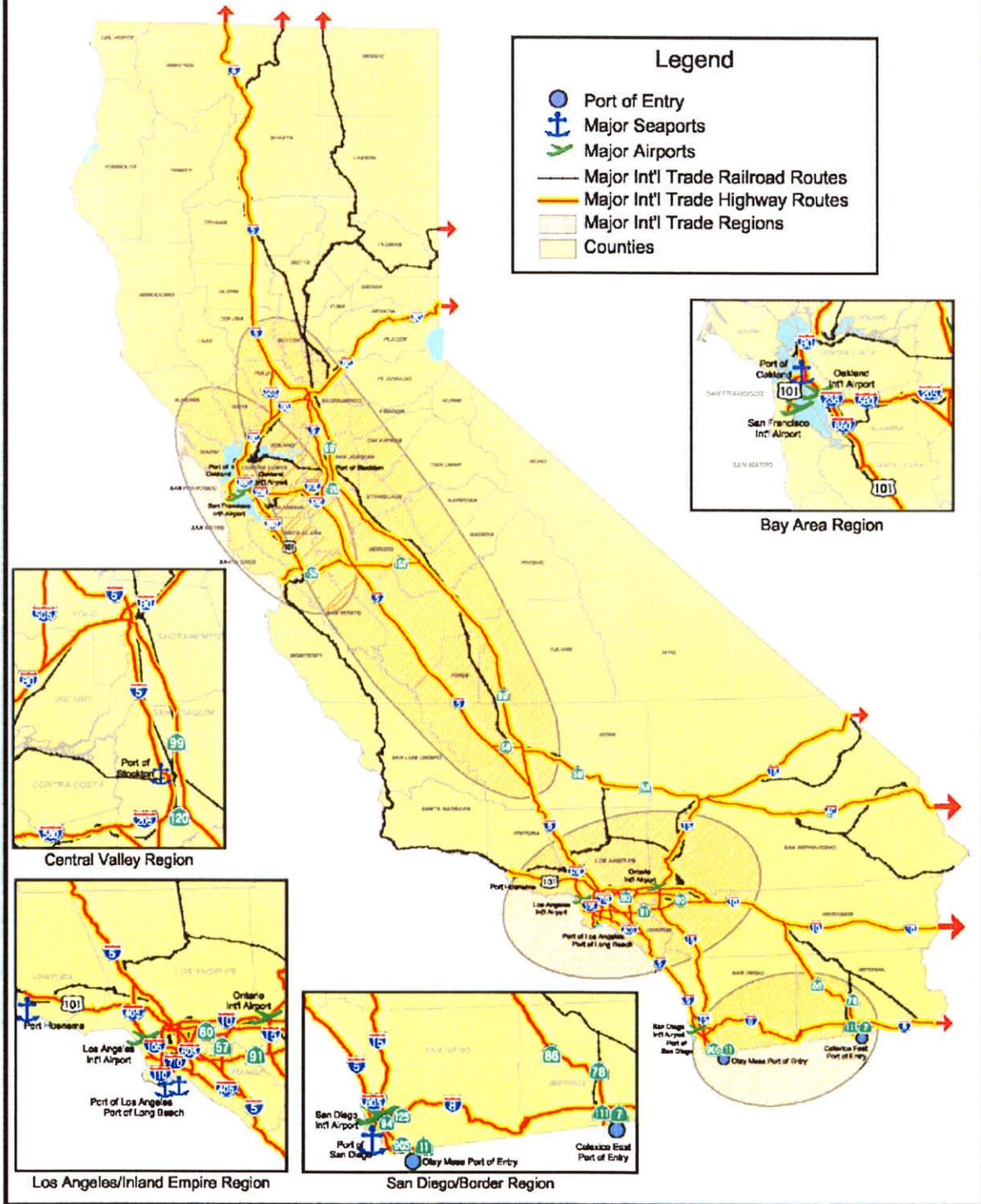
The Phase I report includes a compiled inventory of existing and proposed goods movement infrastructure projects. The listing includes previously identified projects in various Regional Transportation Plans (RTPs) and Regional Transportation Improvement Programs (RTIPs) prepared by Metropolitan Planning Organizations (MPOs), Regional Transportation Planning Agencies (RTPAs), and County Transportation Commissions (CTCs). In addition, the listings include a wide range of outlined projects underway or under consideration by the ports, railroads, and other third parties. Prior to this compilation, no comprehensive statewide inventory has been available.

This Plan is the work product of the Phase II effort that has been underway since September 2005. It includes a set of preliminary candidate actions for operational improvements, infrastructure additions, public health and environmental impact mitigation actions, community impact mitigation and workforce development actions, and security and public safety improvement efforts. It presents the "how," "when," and "who" required to integrate these efforts. It presents a framework for decision-making regarding candidate actions and potential solution sets to achieve simultaneous and continuous improvement as discussed in this Plan.

The Phase II effort focuses on action, getting to the particulars of how to make needed improvements and address serious environmental and community concerns about goods movement operations. The staggering growth of the goods movement industry as a consequence of changing global business trends provides California with great opportunities and great challenges. If needed infrastructure investments are made, growth of the industry can be a

Figure I-1

Priority Regions and Corridors in California



source of high wage jobs to California's growing population. If infrastructure investments are stalled or not made, job growth may be more limited and aging infrastructure will likely be unable to serve the future needs of Californians. Similarly, if needed investments are made to address serious environmental and community concerns associated with goods movement, public health and quality of life can be improved. If investments are not made to address the serious environmental and community concerns associated with goods movement sources and increases in goods movement sources, already high levels of air pollution, along with the associated health effects and other environmental and community impacts, will continue to increase and harm public health and quality of life.

The complexity of the industry, the urgency of the needs for environmental and community impact mitigation, and the vulnerabilities of vital infrastructure to the threat of terrorism require that decisions be made now about California's next two to three decades. While the combinations and permutations of outcomes are almost endless, it is the Administration's responsibility to develop the best information possible and take prudent action even though uncertainties remain. Public health and the economics of goods movement are too important to the people of California to not take action.

Specifically, a statewide perspective enables:

- Assessment of projects as part of a statewide goods movement system.
- Comparison of port, rail, and highway projects in a common framework.
- Identification of critical public health and environmental mitigation and community impact mitigation actions.
- Prioritization of projects and actions to address the most important needs first.
- Concentration of effort to secure required funding in an orderly fashion.
- Evaluation of performance to determine if State, regional, and community benefits are achieved.

This Goods Movement Action Plan presents a "framework for action." Building the framework on a performance measurement platform provides a means to evaluate, select, and fund candidate projects and actions relative to desired outcomes. The framework is built on a foundation of internally consistent principles aligned with Administration policy. Consistent with defined principles, a series of evaluation criteria are established to judge the merits of prospective projects or actions. Criteria are defined for infrastructure and operational improvements, environmental impact mitigation, community impact mitigation and workforce development, and public safety and security. Performance metrics are established where appropriate to quantify and assess outputs and outcomes relative to expectations. Finally, sets of benchmarks are developed, where appropriate, to judge how performance relates to "best-in-class" for comparable projects or actions executed elsewhere. In order to give context to the preliminary candidate actions, their selection and implementation timeframe, one must keep in mind the five thematic considerations of the 22 guiding principles:

- Consider the four port-to-border corridors as one integrated system.
- Undertake simultaneous and continuous improvement in infrastructure and mitigation.

- Pursue excellence through technology, efficiency, and workforce development.
- Develop partnerships to advance goals.
- Promote trust, provide for meaningful public participation, and ensure environmental justice consistent with state law.

Table I-1 presents a summary of preliminary candidate actions and projects developed by the Business, Transportation and Housing Agency (BTH) and the California Environmental Protection Agency (Cal/EPA). The table contains a range of items that include desired practices, studies or evaluations, regulatory measures, and physical projects. This inventory identifies statewide preliminary candidate actions in four categories:

- Infrastructure Projects and Operations
- Public Health and Environmental Impact Mitigation
- Community Impact Mitigation and Workforce Development
- Homeland Security and Public Safety

The table organizes the preliminary candidate actions as noted above and applies a timeframe to designate immediate, short-term, intermediate-term, and long-term actions within each area of focus. The timeframe can be interpreted⁴ in the following terms:

- Immediate (immediate implementation; generally operational improvements)
- Short-term (0-3 years)
- Intermediate-term (4-10 years)
- Long-term (10+ years)

Actions are assigned to the timeframe based on considerations of complexity and scope. By scanning vertically through the columns of the table, one can identify actions within the same timeframe and across all four categories. Conversely, moving horizontally across the table will reveal actions in the same area of goods movement over the four timeframes. In the consideration of Infrastructure and Operations and Public Health and Environmental Impact Mitigations, there are further delineations within the table that group mode-specific actions.

Collectively, the Action Plan identifies approximately 200 actions and projects recommended for further investigation, review or implementation. In aggregate, preliminary findings indicate that the collective capital costs total approximately \$15 billion. The total cost for goods movement-related emission reduction strategies, as compiled by the California Air Resources Board (ARB) in the Emission Reduction Plan for Ports and Goods Movement in California (April 2006), is estimated to be between \$6 billion and \$10 billion.

With the passage of the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, \$3.1 billion will be available to help address the wide range of infrastructure, air quality, and homeland security aspects of California's goods movement system. Those funds include \$2 billion for infrastructure, \$1 billion for emission reduction projects, and \$100 million

⁴ The preliminary candidate infrastructure projects in Appendix C are delineated by a slightly different time frame as follows: Short 1-5 years; Intermediate 6-10 years; and Long 11-20 years.

to enhance homeland security. Chapter VII of the Plan includes BTH's and Cal/EPA's recommendations to the California Transportation Commission (CTC) regarding allocation of the infrastructure funding and recommendations to ARB regarding allocation of the air quality funding. The newly formed California Maritime Transportation Security Council will recommend allocation of the available public safety funds.

To aid the California Transportation Commission with prospective areas to direct transportation infrastructure resources, the Action Plan presents a series of "solution sets" of high priority projects that can produce corridor-wide improvements and lay a foundation for future project and action implementation. Table I-2 presents those solution sets. Chapter V includes a detailed discussion and important caveats regarding the solution sets.

Finally, the Plan is based on the fundamental principle that infrastructure project actions, public health and environmental mitigation actions, and community impact mitigation actions must be approached on a simultaneous and continuous basis. The Plan describes at Chapter VI how this principle will be implemented and verified.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

Infrastructure and Operations	Immediate Actions <u>Operational Improvements</u>	Short-Term Actions (0-3 years) <u>Infrastructure Projects</u>	Intermediate-Term Actions (4-10 years) <u>Infrastructure Projects</u>	Long-Term Actions (more than 10 yrs) <u>Infrastructure Projects</u>
<p>Ships</p> <ul style="list-style-type: none"> ➤ Spread out vessel sailings and arrivals in the trans-Pacific trade. ➤ Evaluate short- sea shipping – including environmental impacts. ➤ Increase “destination loading” on ships from the Far East. ➤ Finalize ARB ship auxiliary engine rule (OAL review). <p>Ports</p> <ul style="list-style-type: none"> ➤ Operate PierPass port extended gate hours program. ➤ Implement PierPass drayage truck fleet emission reduction program. ➤ Expand labor force at the ports. ➤ Improve labor work rule flexibility to enable increased daily truck turns. ➤ Implement virtual container yards. ➤ Implement incentives to limit container dwell time. ➤ Finalize ARB intermodal cargo equipment rule (OAL). <p>Rail</p> <ul style="list-style-type: none"> ➤ Evaluate shuttle train pilot project performance. ➤ Utilize more rail for long haul. <p>Trucks</p> <ul style="list-style-type: none"> ➤ Develop regional or national chassis pools. ➤ Implement port-wide terminal appointment systems for truckers. <p>Other</p> <ul style="list-style-type: none"> ➤ Employ better trade and transportation forecasting. ➤ Improve communications of fluctuating demand forecasts for labor and equipment among carriers, railroads, and terminal operators. ➤ Develop comprehensive goods movement data collection methodologies, modeling, and data evaluation. ➤ Enact public-private partnership legislation. ➤ Enact design-build and design sequencing legislation. 	<p><u>Infrastructure Projects</u></p> <ul style="list-style-type: none"> ➤ State Route 47, Alameda Corridor Expressway (includes Schuyler Heim Bridge replacement). ➤ I-710 Early Action Project: Port Terminus Improvements. ➤ Port of Long Beach Gerald Desmond Bridge Replacement. ➤ Alameda Corridor East Grade Separations.* ➤ BNSF/UP, Los Angeles Basin Rail Capacity Improvements.* ➤ BNSF/UP Colton Crossing Rail Grade Separation.* ➤ Port of Oakland 7th Street/Union Pacific Grade Separation Reconstruction. ➤ Port of Oakland Outer Harbor Intermodal Terminal. ➤ Union Pacific Railroad Martinez Subdivision, Oakland to Martinez, Capacity Improvement Project. ➤ I-880 23rd and 29th Avenue Interchanges, Operational improvements. ➤ Altamont Pass Rail Corridor/Central Valley Rail Freight Shuttle Demonstration Project. ➤ State Route 905 Six-Lane Freeway (Mexico border/Otay Mesa port of entry to Interstate 805). ➤ Port of San Diego National City Marine Terminal Operational Improvements. ➤ BNSF Tehachapi Pass Double Track, Tunnels Modification. ➤ UP Central Corridor Double Track, Tunnels Modification. 	<p><u>Infrastructure Projects</u></p> <ul style="list-style-type: none"> ➤ Alameda Corridor East Grade Separations.* ➤ BNSF “Southern California International Gateway” Near Dock Intermodal Facility. ➤ Union Pacific Near Dock Intermodal Container Transfer Facility. ➤ BNSF/UP Los Angeles Basin Rail Capacity Improvements.* ➤ Interstate 5 Truck Lanes, SR 14 to Calgrove Blvd. ➤ BNSF/UP Colton Crossing Rail Grade Separation. ➤ I-80 Cordelia Truck Scales. ➤ State Route 4 Extension to the Port of Stockton. ➤ I-580 Westbound Truck Climbing Lanes. ➤ I-580 Eastbound Truck Climbing Lanes. ➤ Otay Mesa East Border Crossing (new). ➤ State Route 11, State Route 905 to Otay Mesa East Border Crossing. 	<p><u>Infrastructure Projects</u></p> <ul style="list-style-type: none"> ➤ Alameda Corridor East Grade Separations ➤ BNSF/UP Los Angeles Basin Rail Capacity Improvements.* ➤ Angeles Basin Rail Capacity Improvements.* 	

Infrastructure and Operations

* These infrastructure projects appear in more than one time frame due to the complexity and/or scope of the specific project(s).

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
Ships	<ul style="list-style-type: none"> ➤ Support for ratification of MARPOL Annex 6 for international shipping. ➤ Implement vessel speed reduction MOU in Southern California. ➤ Finalize ARB ship auxiliary engine rule (i.e., Office of Administrative Law (OAL) review). 	<ul style="list-style-type: none"> ➤ Utilize lower sulfur fuel (0.5% by 2007) for marine auxiliary engines. ➤ Dedicate cleanest vessels to California service (ongoing). ➤ Increase use of cleaner fuels in ships through voluntary or regulatory mechanisms (ongoing). ➤ Increase use of shore power or alternatives for ships through voluntary or regulatory mechanisms (ongoing). ➤ Expand vessel speed reduction program. 	<ul style="list-style-type: none"> ➤ Utilize lower sulfur fuel (0.1% by 2010) for ship auxiliary engines. ➤ Obtain Sulfur Emission Control Area (SECA) designation or alternative. ➤ Retrofit existing main engines on ships during major maintenance (ongoing). ➤ Install emission controls on ship main/auxiliary engines of frequent flyers (ongoing). ➤ Continue ongoing strategies. 	<ul style="list-style-type: none"> ➤ Continue ongoing strategies.
Locomotives	<ul style="list-style-type: none"> ➤ Utilize CA low sulfur diesel for captive instate locomotives. ➤ Implement 1998 Railroad MOU for South Coast Air Basin. ➤ Implement 2005 Statewide MOU for Rail Yard Risk Reduction. ➤ Conduct ARB training on locomotive idling restrictions. 	<ul style="list-style-type: none"> ➤ Upgrade engines in switcher locomotives by 2010. ➤ Retrofit existing locomotive engines with diesel PM controls. ➤ Use cleaner fuels in locomotives, particularly for captive fleets and/or new facilities. 	<ul style="list-style-type: none"> ➤ Implement Tier 3 US standards for line haul locomotives (new engine and rebuild standards). ➤ Implement US low sulfur fuel for interstate locomotives. ➤ Concentrate Tier 3 locomotives in California (ongoing). 	<ul style="list-style-type: none"> ➤ Continue ongoing strategies.
Trucks	<ul style="list-style-type: none"> ➤ Utilize CA low sulfur diesel for trucks. ➤ Conduct smoke inspections for trucks in communities. ➤ Enforce 5 minute idling limit for trucks. ➤ Accelerate software upgrade for trucks. ➤ Implement incentives for cleaner trucks. 	<ul style="list-style-type: none"> ➤ Adopt and implement ARB rule to modernize (replace and/or retrofit) private truck fleets (ongoing). ➤ Modernize (replace and/or retrofit) port trucks (ongoing). ➤ Implement CA/US 2007 truck emission standards. ➤ Adopt and implement ARB rule to require international trucks to meet US emission standards. ➤ Enforce CA rule for transport refrigeration units on trucks, trains, ships. ➤ Enhance enforcement of truck idling limits. 	<ul style="list-style-type: none"> ➤ Restrict entry of trucks new to port service unless equipped with diesel PM controls. ➤ Continue ongoing strategies. 	<ul style="list-style-type: none"> ➤ Continue ongoing strategies.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
Public Health and Environmental Mitigation – Air Quality, Continued	<ul style="list-style-type: none"> ➤ Utilize CA low sulfur diesel for equipment. ➤ Finalize ARB intermodal cargo equipment rule (i.e., OAL review). ➤ Implement State incentives for cleaner fuels at Ports of Los Angeles and Long Beach. 	<ul style="list-style-type: none"> ➤ Implement ARB rule for cleaner cargo handling equipment through replacement, retrofit, or alternative fuels (ongoing). ➤ Adopt and implement ARB fork lift rule for gas-fired equipment (ongoing). ➤ Require green equipment for goods movement related construction and maintenance. 	<ul style="list-style-type: none"> ➤ Implement CA/US Tier 4 equipment emission standards. ➤ Upgrade cargo handling equipment to 85% diesel PM control or better. ➤ Continue ongoing strategies. 	<ul style="list-style-type: none"> ➤ Increase penetration of zero emission or near zero emission cargo handling equipment. ➤ Continue ongoing strategies.
	Cargo Handling Equipment			
	<ul style="list-style-type: none"> ➤ Implement incentives for cleaner harbor craft. 	<ul style="list-style-type: none"> ➤ Adopt tighter USEPA or ARB emission standards for harbor craft. ➤ Utilize CA low sulfur diesel for harbor craft. ➤ Clean up harbor craft through replacement, retrofit, or alternative fuels (ongoing). ➤ Use shore power for harbor craft at dock. 	<ul style="list-style-type: none"> ➤ Implement new USEPA or ARB engine standards for harbor craft. ➤ Implement incentives to accelerate introduction of new harbor craft engines. ➤ Continue ongoing strategies. 	<ul style="list-style-type: none"> ➤ Continue ongoing strategies.
	Commercial Harbor Craft			

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
Public Health and Environmental Mitigation – Water Quality	<ul style="list-style-type: none"> ➤ Apply thoroughly and enforce existing water quality requirements (e.g., permits, certifications, etc.) on projects, and treat complaints, tips and violations (noncompliance with requirements) as a high priority – particularly at port operations areas, truck traffic idling areas, and upland disposal areas of any dredged materials. ➤ Identify waste load allocations (pollutant level targets, in terms of mass discharge allowed) for port-area water bodies currently listed as impaired [pursuant to Clean Water Act section 303(d)]. ➤ Review current ballast water exchange practices and identify opportunities to further mitigate exotic species introduction. ➤ Initiate studies to better understand relationship between airborne emissions in port areas and water quality and beneficial use impacts. ➤ Initiate studies to identify community impacts from project-related activities with regards to water quality and beneficial use of the waters (with special attention to potential environmental justice impacts and subsistence consumption and recreational uses). ➤ Identify sources of marine debris discharges in port areas and begin to eliminate them. ➤ Implement better land planning practices that employ the key principles of Low Impact Development (LID). For example: use site hydrology as the organizing principle for all others. <ul style="list-style-type: none"> ○ Match the initial abstraction and mimic natural water balance. ○ Employ a uniform, strategic distribution of small-scale controls. ○ Decentralize controls and disconnect impervious surfaces. ○ Minimize land disturbance and connected, impervious cover. ○ Incorporate natural site elements into design. 	<ul style="list-style-type: none"> ➤ Establish redundant systems to eliminate or reduce discharges of marine debris and other pollutants causing impairments. ➤ Establish performance measures to measure effectiveness of mitigation activities and overall mission to protect enhance and restore beneficial uses of waters in project areas. ➤ Continue to thoroughly apply and enforce existing water quality requirements (e.g., permits, certifications, etc.) on projects, and treat complaints, tips and violations (noncompliance with requirements) as a high priority – particularly at port operations areas, truck traffic idling areas, and upland disposal areas of any dredged materials. ➤ Apply waste load allocations (pollutant level targets, in terms of mass discharge allowed) for port-area water bodies approved and in force. ➤ Continue to identify waste load allocations (pollutant level targets, in terms of mass discharge allowed) for port-area water bodies currently listed as impaired [pursuant to Clean Water Act section 303(d)]. ➤ Implement better ballast water exchange practices and identify opportunities to reduce and further mitigate exotic species introduction. ➤ Implement recommendations from studies to reduce water quality and beneficial use impacts from airborne emissions in port areas. ➤ Implement recommendations from studies to enhance and restore water quality and beneficial use of the waters (with special attention to potential environmental justice impacts and subsistence consumption and recreational uses) in communities surrounding projects. ➤ Continue to implement better land planning practices that employ the key principles of Low Impact Development (LID). 	<ul style="list-style-type: none"> ➤ Monitor performance of systems employed and practices implemented in previous terms and revise plans or practices as needed. ➤ Ongoing implementation of short-term actions. 	<ul style="list-style-type: none"> ➤ Ongoing implementation of intermediate actions.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
Public Health and Environmental Mitigation - Hazardous Waste Management	<ul style="list-style-type: none"> ➤ Develop a statewide Hazardous Waste and Contaminated Media Management Plan for goods movement-related infrastructure projects to ensure the integrated, safe management of hazardous wastes and substances encountered during project design and construction. ➤ Account for the costs of any required management of contaminated soils, mitigation of other hazardous substances contamination, and oversight of compliance with related regulatory requirements in the planning and execution of infrastructure projects. ➤ Design infrastructure projects with an effort to minimize exposure to hazardous substances and to manage hazardous substances to minimize public health and environmental impacts of any removal, transportation, treatment, and onsite management. ➤ Ensure that hazardous substances mitigation approaches (such as on-site management, deed restrictions, etc.) will remain protective of public health and the environment for the life of the infrastructure project and that operations and maintenance plans that provide for ongoing monitoring and inspection of any remedial systems or site controls are in place where appropriate. 	<ul style="list-style-type: none"> ➤ Develop project specific Hazardous Waste and Contaminated Media Management Plans to ensure the integrated, safe management of hazardous wastes and substances encountered during project design and construction. 	<ul style="list-style-type: none"> ➤ Ongoing implementation of immediate and short-term actions. 	<ul style="list-style-type: none"> ➤ Ongoing implementation of immediate and short-term actions.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
Community Impact Mitigation and Workforce Development	<p>Note: The actions listed in the Public Health and Environmental Mitigation section will provide significant health benefits to communities adjacent to ports, rail yards, intermodal facilities, and highways. Additional general actions include:</p> <p>Strategies</p> <ul style="list-style-type: none"> ➤ Enforce anti-idling rules. ➤ Reroute trucks. ➤ Conduct mitigation and pollution prevention. ➤ Develop community benefit agreements when desired by the community. ➤ Conduct targeted community assessments including monitoring as appropriate. ➤ Track emission reductions and estimated cancer risk reduction in communities. ➤ Preserve existing parks, open space, and natural areas. ➤ Coordinate with local city redevelopment departments to identify priority enhancement areas in adjacent communities. ➤ Develop and implement community enhancement projects. ➤ Emphasize landscaping and aesthetic improvements using local native plants. ➤ Increase enforcement of traffic and vehicle safety laws and regulations. ➤ Increase public and trucker education on safety and neighborhood issues. <p>Public Participation</p> <ul style="list-style-type: none"> ➤ Expand public outreach. ➤ Consult community members regarding infrastructure plans throughout the planning process. ➤ Establish Community Advisory Committee for the EIR/EIS stage of an infrastructure project (for projects that have not already gone through the environmental review process). 	<ul style="list-style-type: none"> ➤ Ongoing implementation of immediate actions. ➤ Use green equipment for construction of infrastructure projects (as available). ➤ Establish construction staging areas in locations to minimize impact on local circulation. ➤ Establish a community forum to address community concerns during construction. ➤ When considering operational changes to extend hours (including during construction), evaluate noise and light impacts on adjacent communities. ➤ Mitigate noise impacts in adjacent communities. ➤ Mitigate light impacts in adjacent communities. 	<ul style="list-style-type: none"> ➤ Ongoing implementation of immediate and short-term actions. 	<ul style="list-style-type: none"> ➤ Ongoing implementation of immediate, short-term, intermediate-term and long-term actions.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
<p align="center">Continued Community Impact Mitigation and Workforce Development,</p>	<p>Public Participation, Continued</p> <ul style="list-style-type: none"> ➤ Hold public meetings when members of the affected community can attend (e.g., in the evening). ➤ Include language translation where appropriate. ➤ Draw on knowledge and experience from the community. <p>Land Use Planning</p> <ul style="list-style-type: none"> ➤ Integrate port and city planning/promote use of buffer zones between ports and surrounding communities. <p>Workforce Development</p> <ul style="list-style-type: none"> ➤ Partner with the California Community Colleges Economic and Workforce Preparation Division, the California State University System and other institutions of higher learning, K-12, and employers to respond to the demand for qualified workers and continuous workforce improvement. 	<ul style="list-style-type: none"> ➤ Provide goods movement job training within affected communities. ➤ Develop industry driven and industry recognized certificate programs (and curriculum) in the areas of transportation, logistics support, warehousing and storage, supply chain management and safety and security. ➤ Provide logistics (goods movement) training to incumbent workers to enhance productivity and create higher skilled higher wage jobs in this sector. ➤ Placement of workers into logistics industry by creating awareness of job opportunities and preparing job seekers with employable traits as required by industry. 	<ul style="list-style-type: none"> ➤ Provide goods movement job training within affected communities. ➤ Continuously develop and offer for credit and not-for-credit logistics and goods movement curriculum. ➤ Replicate model across California. 	<ul style="list-style-type: none"> ➤ Provide goods movement job training within affected communities. ➤ Create an educational continuum by articulating curriculum from K-12 through graduate school to provide incumbent workers, employers, and job seekers with continuous educational opportunities.

**Table I-1
PRELIMINARY CANDIDATE ACTIONS – SUMMARY FOR FOUR CORRIDORS**

	Immediate Actions	Short-Term Actions (0-3 years)	Intermediate-Term Actions (4-10 years)	Long-Term Actions (more than 10 yrs)
<p align="center">Public Safety and Security</p> <ul style="list-style-type: none"> ➤ Operational Improvements, Evaluations and Studies ➤ Align CHP Foreign Export and Recovery (FEAR) efforts with Federal Homeland Security. ➤ Establish a multi-jurisdictional Port Security Task Force ➤ Evaluate cross-sectoral vulnerability of ports (power, water, etc). ➤ Evaluate all truck and rail routes out of port districts and air basins to determine long term velocity, security, and environmental opportunities. ➤ Develop a Federal, State, and Local funding strategy. ➤ Evaluate the "Agile Port" concept for public safety/homeland security advantages. ➤ Use the NAFTA model to understand the public safety and security issues. ➤ Evaluate lane departure technology to identify driver fatigue and safety scoring of operators. ➤ Continue support and implementation of safety improvement programs. ➤ Increase enforcement of traffic and vehicle safety laws and regulations. ➤ Increase public and trucker education on safety and neighborhood issues. ➤ Urge US Coast Guard District Eleven Command to adopt the Automated Secure Vessel Tracking System (ASVTS) developed by the Maritime Information Services of North America (MISNA). ➤ Evaluate new freight transportation technologies (maglev, SAFE shuttle, etc.) for Homeland Security and public safety applications. ➤ Evaluate <i>Green Freight Corridor</i> road and rail infrastructure with integrated sensor network for Homeland Security and public safety applications. 	<ul style="list-style-type: none"> ➤ Construct commercial vehicle enforcement facilities around the LA/LB and Oakland ports to enhance highway safety and security. ➤ Establish a pilot test program using hazardous materials movement of containers and a short haul rail system that "flushes out" the containers in the ports and rail yards. ➤ Develop a pilot project for creating a physical communication grid in the corridor. ➤ Use intelligence and automated info to identify and target high-risk containers. ➤ Pre-screen high-risk containers at point of departure. ➤ Use new detection technology to quickly prescreen. ➤ Develop joint inspection stations in the port districts and at the border crossing. ➤ Develop community web portal to provide real or near real time information on goods movement and freight mobility conditions across road and rail network within the region. ➤ Clear U.S. Customs at inland destinations. 	<ul style="list-style-type: none"> ➤ Retrofit freight vehicles with probes and smart sensors to measure speed, weather, pollution, lane departure, cargo location, customs data, container RFID information, and vehicle/frame condition inspection dates. ➤ Use smarter, tamper-evident containers with RFID e-seals. ➤ Develop a container loading and unloading program (similar to CTPAT) that addresses homeland security issues like peaking for local California businesses. 	<ul style="list-style-type: none"> ➤ Develop a Green Freight Corridor (similar to Customs Green Lane) program and system. ➤ Install sensors and environmental monitoring equipment along corridor to communicate between operators, vehicles, containers and the command center. ➤ Establish three integrating centers for all data and system managements at the ports, Mexican border, and the Inland Empire using the Metrolink model. ➤ Provide data feeds from corridor system to County Emergency center, the Command and Control Center at Camp Pendleton, the CHP command centers, and NORTHCOM. 	

**TABLE I-2
GOODS MOVEMENT ACTION PLAN
TRADE CORRIDOR IMPROVEMENT FUND PROGRAM
BOND FUNDING RECOMMENDATIONS⁵**

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<u>Los Angeles/Inland Empire Corridor</u>					
<u>Truck Emission Reduction and Congestion Mitigation⁶</u>					
• PierPass Extended Gate Hours Program					Provides for extended gate hours, reduced congestion and emissions Reduces emissions
• PierPass Emission Reduction Program					Reduces unnecessary truck trips to and from ports Enables more efficient use of equipment and reduces unnecessary truck trips
• Virtual Container Yard					Provides means to improve efficiencies and enable truck owner- operators to increase number of daily turns
• Common Chassis Pool					
• Work rule flexibility ⁷					

⁵ The project mitigation cost and project total cost columns are included to illustrate that the total cost of the project includes the cost of required mitigation, and that total cost should be funded as the cost of the project.

⁶ These programs are intended to be industry-funded.

⁷ This is currently under International Longshore and Warehouse Union (ILWU) consideration.

**TABLE I-2
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TRADE CORRIDOR IMPROVEMENT FUND PROGRAM
BOND FUNDING RECOMMENDATIONS⁵**

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
Truck Port Access Improvements					
<ul style="list-style-type: none"> State Route 47, Alameda Corridor Expressway (including Schuyler Heim Bridge replacement) 	111,000	557,000			Improves access to Terminal Island terminals and near-dock facilities
<ul style="list-style-type: none"> I-710 Early Action Project: Port Terminus Improvements 	60,000	300,000			Improves safety and access by upgrading State Route 1 (Pacific Coast Highway) and Anaheim Street interchanges and expands green space
<ul style="list-style-type: none"> Port of Long Beach, Gerald Desmond Bridge Replacement 	160,000	800,000			Improves access to Terminal Island; removes bottleneck to both ship and truck movements

TABLE I-2
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TRADE CORRIDOR IMPROVEMENT FUND PROGRAM
BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
Rail Mode Increase					
<ul style="list-style-type: none"> Port of Los Angeles/Burlington Northern Santa Fe, "Southern California International Gateway" Near Dock Facility (See Chapter V Text.) 	40,000	200,000			Reduces truck trips on Interstate 710; relieves rail terminal capacity constraint
<ul style="list-style-type: none"> Ports of Los Angeles and Long Beach/Union Pacific, Near Dock Intermodal Container Transfer Facility Completion (See Chapter V Text.) 	20,000	100,000			Reduces truck trips on Interstate 710; relieves rail terminal capacity constraint
<ul style="list-style-type: none"> Alameda Corridor East Grade Separations <ul style="list-style-type: none"> Los Angeles County Orange County Riverside County San Bernardino County 	313,000 112,000 158,000 <u>108,000</u> 691,000	1,565,000 562,000 788,000 <u>541,000</u> 3,456,000			Addresses community division safety issues; reduces vehicle emissions

TABLE I-2
GOODS MOVEMENT ACTION PLAN
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BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<u>System Throughput/Velocity Improvements</u>					
<ul style="list-style-type: none"> • Burlington Northern Santa Fe/Union Pacific, Los Angeles Basin Rail Capacity Improvements (main line capacity, shuttle train demonstration project improvements) • Los Angeles County • Orange County • Riverside County • San Bernardino County 	67,000 29,000 114,000 <u>212,000</u> 422,000	333,000 145,000 572,000 1,061,000 <u>2,111,000</u>			Addresses current and projected 2010 system capacity constraints; enhances Metrolink/ Amtrak services; facilitates rail freight shuttle service demonstration
<ul style="list-style-type: none"> • Burlington Northern Santa Fe/Union Pacific, Colton Crossing Grade Separation 	56,000	280,000			Removes major railroad bottleneck; improves safety, reliability; enhances Metrolink/Amtrak services
<ul style="list-style-type: none"> • State Route 14 to Calgrove Blvd., Interstate 5 Truck Lanes 	12,000	60,000			Removes bottleneck; improves both truck and passenger vehicle velocity

TABLE I-2
GOODS MOVEMENT ACTION PLAN
TRADE CORRIDOR IMPROVEMENT FUND PROGRAM
BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<i>Bay Area Corridor</i>					
<i>Port Access Improvements</i>					
<ul style="list-style-type: none"> Port of Oakland, 7th Street/Union Pacific Grade Separation Reconstruction 	50,000	250,000			Removes access bottleneck; improves throughput, reliability and safety
<i>Rail Mode Increase</i>					
<ul style="list-style-type: none"> Port of Oakland, Outer Harbor Intermodal Terminal 	65,000	325,000			Enhances capacity; improves performance of port intermodal operations, reduces truck trips
<i>System Throughput/Velocity Improvements</i>					
<ul style="list-style-type: none"> Union Pacific Railroad Martinez Subdivision, Oakland to Martinez, Capacity Improvement Project 	16,000	78,000			Improves access; relieves Capital Corridor, San Joaquin and rail freight train operational conflicts
<ul style="list-style-type: none"> Interstate 880, 23rd and 29th Avenue Interchanges, Operational Improvements 	18,000	91,000			Improves reliability and safety; enhances access to seaport and airport

TABLE I-2
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BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<ul style="list-style-type: none"> Cordelia Truck Scales 	22,000	110,000			Improves safety; would be coordinated with I-80/I-680/SR 12 interchange improvement projects.
<u>Central Valley Corridor</u>					
<u>Port Access Improvements</u>					
<ul style="list-style-type: none"> State Route 4 (Crosstown Freeway) Extension to Port of Stockton 	20,000	100,000			Improves throughput and access
<u>Bay Area/Central Valley Access Improvements</u>					
<ul style="list-style-type: none"> Altamont Pass Rail Corridor/Central Valley Rail Freight Shuttle Demonstration Project 	5,000	27,000			Addresses track alignment issues; facilitates shuttle and Altamont Commuter Express services
<ul style="list-style-type: none"> I-580 Westbound Trucking Climbing Lanes 	20,000	100,000			Improves velocity and safety
<ul style="list-style-type: none"> I-580 Eastbound Truck Climbing Lanes 	20,000	100,000			Improves velocity and safety

TABLE I-2
GOODS MOVEMENT ACTION PLAN
TRADE CORRIDOR IMPROVEMENT FUND PROGRAM
BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<u>San Diego/Border Corridor</u>					
<u>International Border</u>					
<ul style="list-style-type: none"> State Route 905 Six-Lane Freeway 	59,000	494,000			Improves access to border; facilitates international trade (50% of unfunded balance)
<ul style="list-style-type: none"> Otay Mesa East Border Crossing (new) 	41,000	260,000			Improves access to border; facilitates international trade (partial funding)
<ul style="list-style-type: none"> State Route 11, State Route 905 to Otay Mesa East Border Crossing 	47,000	234,000			Provides access to new border crossing
<u>Port Access Improvements</u>					
<ul style="list-style-type: none"> Port of San Diego-National City Marine Terminal Operational Improvements 	11,000	57,000			Improves access

TABLE I-2
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BOND FUNDING RECOMMENDATIONS⁵

Corridor/Region Solution Set Route or Lead Agency and Project Title	Bond Funding	Project Construction Cost (in thousands)	Project Mitigation Cost	Project Total Cost	System Benefit
<u>State Gateways and Central Coast</u> <u>System Throughput/Velocity Improvements</u>					
• Burlington Northern Santa Fe, Tehachapi Pass Double-Track, Tunnel Modification	16,000	82,000			Relieves bottleneck; provides for improved rail service to Port of Oakland, Central Valley
• Union Pacific, "Central Corridor" Double Track, Tunnels Modification	18,000	90,000			Improves east-west operations and reliability; provides opportunity for extension of Capitol Corridor services to Reno.
<u>TOTAL</u>	\$2,000,000	\$10,262,000			



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

White Paper

Gateway Cities Council of Governments

Author: Richard R. Powers

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

WHITE PAPER

Submitted by
Richard R. Powers, Executive Director

GATEWAY CITIES COUNCIL OF GOVERNMENTS
16401 Paramount Blvd.
Paramount, CA 90723
(562-663-6850)
Email: richardpowers@earthlink.net

The Gateway Cities Council of Governments (GCCOG) is a Joint Powers Authority whose members are the 27 cities and communities of Southeast Los Angeles County, California with a total population of approximately 2.2 million. The GCCOG boundaries include the Port of Long Beach (and the Port of Los Angeles as an adjacent neighbor). The cargo volumes from the two ports combined makes them the fifth largest port in the world. Last year approximately 15.5 million containers moved through the ports. At the current growth rate this container volume is expected to double within 10 to 12 years. The majority of the container volume from the ports move through our cities, additionally 6 million more residents are expected to be added to the growing population of Southern California in the next 20 years.

Currently the freeways in Southeast Los Angeles County carry approximately **20,000 to 25,000 heavy duty trucks** daily. Based on studies done by the GCCOG this volume is expected to grow to **50,000 to 70,000 heavy duty trucks** on our local freeways within 20 years if no other changes in container movements are developed. Each truck is equivalent to approximately 3 to 4 cars. The current volume of heavy duty trucks is currently congesting our local freeways and major arterial streets creating significant safety problems. Today, the I-710 freeway which serves the ports has more truck related accidents than any other freeway in the country, averaging 3 to 5 a day. The I-710 provides primary north/south regional freeway access for the majority of the residents living in the Gateway Cities subregion in addition to the large volume of goods movement.

What has the GCCOG and our transportation partners done to address these pressing transportation problems? We have taken on the task of defining, assessing, and designing potential infrastructure solutions to our transportation issues. Specifically, we have used a community based consensus approach to build consensus-based solutions. This strategy has proven to work as the communities articulate problems and develop solutions with the technical assistance of planning and engineering professionals.

The I-5 Freeway project is a prime example of a consensus based solution. During the course of project development, consensus was obtained from the adjacent communities along the I-5 freeway to double the size of the freeway. Community input was instrumental in identifying land acquisition and other community impacts. Construction is expected to begin next year on the first project segment. The same approach has been used to develop consensus with the communities along the I-710 freeway from the San Pedro Bay ports to the SR-60 freeway (approximately 18 miles). The solution developed to improve that freeway involves expanding to 10 general purpose lanes and 4 separated truck lanes. This alternative was approved by all the corridor communities with the provision that air quality improvement and health risks must be addressed simultaneously with project development. Furthermore a commitment to the community has been made that air quality be improved before any expansion of

the mainline freeway occurs. The community has given its support to proceed with other corridor improvements including interchanges and arterial streets that improve safety and access.

Additionally, a third group of Gateway Cities, that border the SR-91, I-605 and I-405 freeway corridors have funded and endorsed studies to address congestion, safety and air quality impacts with these freeways and are recommending further studies to develop improvements. In all cases, the development of transportation improvement solutions are proceeding as consensus based efforts with the local communities by their active participation in all phases of transportation planning activities. This level community participation process is unique, unprecedented and successful.

Goods movement remains a major problem for our communities but is simultaneously an economic benefit as well. Divestiture of freight related activities and businesses are not a community goal. Coexisting in an environmentally responsible way is a goal. The air must be cleaner.

With respect to Goods Movement, the agencies involved are proceeding with plans to thoroughly examine Alternative Goods Movement Technologies to reduce the large number of heavy duty trucks that congest our freeways and create safety problems and accidents. We have high hopes that these new technologies will prove to be a major conveyance of containers in the future. We also encourage the maximum use of rail to move as many containers as possible.

The San Pedro Bay Ports and the goods that flow through them are a matter of national interest and are reflected in the national economy. Federal involvement, in funding is essential and we support the concepts of creative public/private partnerships.

The Gateway Cities Clean Air Program is one of the largest fleet modernization projects in the country. To date over 500 older, highly polluting diesel trucks have been removed from Southern California freeways. We applaud the joint actions of the Ports of Long Beach and Los Angeles as major supporters of our program, and we look forward to dramatic near term expansion of the program to replace or retrofit the entire 16,000 highly polluting older diesel trucks currently in use.

There are numerous air quality plans in the region where financial support from EPA and the federal government are remiss in not supplying necessary funding and tougher regulatory environments.

To summarize, our transportation solutions are founded in practical and technically pragmatic approaches developed by working with our local communities. Many of the programs suggested by USDOT and others for

transportation improvements need to be more flexible to assist us in implementing community based solutions. The Gateway Cities welcome the opportunity to work with USDOT, FHWA, EPA and other federal agencies toward developing the types of solutions that would achieve positive transportation results and air quality improvements as quickly as possible with maximum local acceptance and input.



POLICY & TECHNICAL PAPER

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Surface Transportation Authorization Projects

The Associated General Contractors of America

Author: James D. Waltz

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA SURFACE TRANSPORTATION REAUTHORIZATION PRINCIPLES

Closing the Transportation Gap: A Future Vision

The vision for a National road way network that drove the construction of the Interstate Highway System has benefited the nation significantly. The Interstate Highway System is the foundation on which the United States became the world economic power that it is. In addition this system, and the National Highway System which feeds into it, greatly enhanced the quality of life of every citizen.

A transportation system that moves people and goods safely, reliably and efficiently is vital to the economic future of this country and our continued individual quality of life. However, as the Nation passes the 50th Anniversary of the enactment of legislation that put in place the framework for and mechanism that funded construction of the Interstate Highway System we see a system that, if not broken, is in dire need of improvement. In addition, the projected growth in demand on the system puts into question our ability to maintain economic competitiveness and quality of life. The United States cannot rely on a 20th Century transportation system to meet the demands, challenges and global competition of the 21st Century.

There is a significant gap between the transportation problems and future demands on the system and the existing vision and resources that are being brought to the table to address these shortcomings. The Associated General Contractors of America calls on the Congress and the Administration to take the bold steps necessary to address our transportation challenges and keep us strong economically.

A Transportation System Showing Signs of Failure:

Road and Bridge Conditions Poor

Time sitting in traffic increasing

Congestion

Projected Growth:

Congestion Increasing

Population Growing

Number of Vehicles on the Road Increasing

Freight Movement is Increasing

InterNational Trade Growing

Existing Freight Facilities are Congested

Congestion at Freight Facilities

Federal Role:

The Federal role must be to continue to provide a safe and efficient National road network focused on interNational trade, economic development, defense, National security, safety and motorist mobility. Freight movement, particularly as it impacts interNational trade and economic strength, must be a top priority of the Federal program. In addition, because of its impact on freight movement, interstate commerce and productivity congestion reduction must also be a Federal priority. Finally, the safety of the users of the surface transportation system must also remain a Federal priority.

The future of the surface transportation system must be a fully integrated system, which allows for the efficient and economic movement of freight. Despite the completion of the Interstate Highway System, the Federal government must continue to play a strong role in transportation policy. The Federal government should look at all possible means to close the \$107 billion gap between the resources being provided and the minimum investment necessary to maintain this National asset.

AGC Recommendations:

Freight Movement

The movement of goods from manufacturers to consumers must be a National priority. Transportation costs will be a significant factor in the competitiveness of US produced products in the world. Also the ease of foreign produced products to make their way into the US and from entry point to final distribution will also impact their cost to the final user. The inability to quickly move imported products from ports to final distribution locations will force foreign producers to choose other ports of entry into the US. This has significant implications for security and competitiveness. For these reasons AGC recommends:

- There continues to be the need for a strong Federal role in transportation policy and funding. States should continue to be key partners in carrying out the Federal aid highway program. However, proposals to reduce the Federal role and transfer responsibility to individual states are detrimental to the National good. AGC opposes any effort to devolve the Federal program to one operated primarily by individual states.
- State programs are a significant supplement and enhancement to the Federal program. States must be enticed to provide more resources for transportation improvement. AGC recommends that an incentive program be created to encourage states to establish a transportation trust fund supported by a dedicated funding source with firewalls, similar to the Federal Highway Trust Fund, to ensure that these transportation funds are invested in transportation improvements. States with already existing trust funds should be rewarded.

- The National Corridor Infrastructure Improvement Program and the Projects of National and Regional Significance Program, created in SAFETEA-LU, should be enhanced and become the primary focus of the Federal Highway Administration (FHWA). FHWA should create a National map that identifies key freight movement corridors and focus discretionary funding on improving them.
- New highway capacity should be developed by adding new routes on new alignments, adding lane miles on existing corridors, correcting bottlenecks, upgrading interchanges, and creating exclusive truck lanes.
- Port and railroad intermodal connections should be eligible for funding from the Highway Trust Fund but only if additional revenue sources directly related to these projects are enacted. Fees such as container fees, point of entry fees, intermodal transfer fees and other similar user fees should be created. Port authorities, railroads and truckers should be included in discussions concerning these revenue increases and investment options.
- Direct HTF investment in intermodal projects should be limited directly to transportation facilities. Warehouses and other transfer facilities should not be eligible for HTF dollars.
- To have a system operating at its highest level congestion and bottlenecks should be reduced substantially. Reducing the congestion level by 25 percent through the end of the next reauthorization period should be a performance goal.

Mobility

The Federal government cannot walk away from the system it created and built; rather, it must see it mature and adapt to changing demographic and economic conditions and mobility needs. This includes maintenance and reconstruction of existing roadway, construction of new capacity, acquisition of right-of-way, improvement of intermodal connectors, and development of multi-modal complements to highway infrastructure.

Financing

The transportation challenges facing the United States are significant and must be addressed. Increased investment is necessary and all options should be considered. A study prepared for the National Chamber Foundation by Cambridge Systematics points out that:

To improve our transportation system to a level that benefits the nation's economic productivity, all levels of government must invest \$288 billion in 2006, \$368 billion in 2015, and \$516 billion in 2030. Current revenue streams will fall far short of these levels—the cumulative shortfall through 2015 is \$1.1 trillion.

Highway Trust Fund: The Highway Trust Fund, through revenue provided by user fees, has historically provided approximately 45 percent of the annual investment in the US road and bridge system. This mechanism was successful in providing the funds necessary to build the Interstate Highway System and in expanding and maintaining it in

recent years as well as other transportation projects. The level of investment provided by the HTF should be increased to address mounting needs. The immediate problem facing the HTF is that, for a variety of reasons, the balance is projected to be gone before the expiration of SAFETEA-LU. In addition, inflation has caused the buying power of the Federal motor fuels tax to be reduced by nearly one-half since this user fee was last increased in 1993. Dramatic increases in construction material prices over the past five years, at levels higher than the Consumer Price Index, have added to the HTF woes.

The HTF has been a model for efficient public investment that enjoys significant public support. Eventually the method for charging the user fee may need to be changed but for the foreseeable future the existing system should be maintained and enhanced. An increase in revenue is necessary just to keep up with inflation but also to address the ever growing transportation infrastructure needs.

Motor Fuels Tax: The Federal gas tax is currently 18.4 cents per gallon. Reflecting the political difficulty of raising taxes, it has been raised only five times since it was first imposed in 1956. Significant increases in the cost of fuel, more efficient vehicles and alternatively fueled vehicles are all impacting the level of revenue that can be expected to come from the motor fuels tax.

Congress must act to shore up the existing funding method until a better system can realistically be put in place. In the long term Congress should consider changing the user fee collection model to a Vehicle Miles (VMT) Tax. A VMT would be charged to all vehicles using transportation infrastructure that is eligible for Federal funds. Mileage could be electronically recorded and collected at the gas pump when vehicles are fueled or through a monthly invoice.

AGC recommends consideration of the following:

- Retroactively raising the motor fuels tax directly to address past inflation since the fee was last increased and annually indexing the motor fuels tax to inflation.
- An alternative to consider is eliminating all motor fuels taxes and replace them with a Federal sales tax on fuel and vehicle sales. A percentage is applied to the cost of each.
- Congress should institute an annual Federal vehicle fee on hybrid and non-petroleum-powered vehicles. Hybrid and other alternatively fueled vehicles pay less per mile for the use of the road system than do traditionally fueled vehicles.
- Either moving to an indexed fuel tax system or a percentage sales tax could increase instability in the annual amount of revenue coming to the HTF. To avoid this Congress should establish a Federal user rate commission to annually determine the Federal motor fuels tax rate and non-petroleum/hybrid vehicle rate. The Commission's decision would be final unless overturned by a "Super" majority of the Congress.

Tolling/ Public Private Partnerships (PPPs): Together, tolls and private capital contribute about 4.5 percent annually to the total revenue pool currently available for U.S. highway program investments. Much of this revenue is used for debt service. While there is potential to expand the application of tolling in the U.S. and to attract even more private capital to highway investments, objective research suggests these methods alone cannot realistically be anticipated to raise the amount of revenue

necessary to substantially close the existing highway capital investment gap. As such, while they should be promoted and encouraged, they should not be overemphasized as solutions to meeting future funding needs.

States should be granted the option to use tolls on all Interstate and NHS routes. An adjustment in a state's annual Federal apportionment should reflect the value the state receives from tolling on facilities built largely with Federal revenue.

Create additional incentives for states to partner with the private sector to improve and operate Interstate and NHS routes. It is also imperative that revenues realized by public entities through the sale of concessions be reinvested only in transportation infrastructure programs.

Bonding: Create a new bonding vehicle to allow the Federal government to borrow funds for an immediate boost in Federal infrastructure investment.

Customs Fees: A portion of US Customs revenue could be dedicated to paying bond interest or dedicated to intermodal or trade corridor routes.

Other Issues

Earmarks: The number of Congressional earmarks for specific projects has increased dramatically over the past three reauthorizations. Projects can be useful in getting political support from individual members of Congress in getting the legislation enacted. Projects, however, can harm the program in giving the program a bad reputation in the media and, therefore, with the public. Earmarks can hurt a state's program because these projects may or may not be included on the state's priority list and can divert funds away from other state priorities.

- AGC recommends the creation of a methodology for use in selecting projects to receive earmarked funds mechanism be established for grading projects for earmark.



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**FEBRUARY 21 & 22, 2007
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***Three Promising Transportation Revenue Options: Tolls, Environmental
Vehicle Registration Fees, and Gas Taxes***

Mineta Transportation Institute

**Authors:
Dr. Asha Weinstein
Dr. Jennifer Dill**

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

THREE PROMISING TRANSPORTATION REVENUE OPTIONS: TOLLS, ENVIRONMENTAL VEHICLE REGISTRATION FEES, AND GAS TAXES

(from a related study by the Mineta Transportation Institute – MTI)

Dr. Asha Weinstein
Mineta Transportation Institute
San José State University
One Washington Square
San Jose, CA 95192-0185
408-924-5853; asha.weinstein@sjsu.edu

Dr. Jennifer Dill
Nohad A. Toulan School of Urban Studies and Planning
Portland State University
PO Box 751
Portland, OR 97207-0751
503-725-5173; jdill@pdx.edu

1. Executive Summary

Significant investments will be required to maintain, operate, upgrade, and expand the nation’s transportation infrastructure if the United States is to retain its economic position in the global economy while accommodating the substantial projected increases in future population. State-level policy makers find themselves faced with flagging revenues combined with public demands for better quality roads and more transit—and also strong anti-tax sentiment from both voters and legislators. This situation leaves policy makers to wonder whether to continue with traditional revenue sources for the time being, or to begin the transition to alternatives.

This white paper provides guidance to policy makers struggling with these choices by reporting the highlights of a larger study conducted by the Mineta Transportation Institute, *Transportation Financing Opportunities for the State of California* (Weinstein, Dill, Goldman, et al, 2006). That study identified a large set of potential revenue and finance measures for analysis, and then applied five evaluation criteria to each option to narrow these to a set of more promising options for further review. The criteria were: revenue generation, ease of implementation, transportation system performance, equity, and political feasibility. For the more promising alternatives, a full assessment of the most viable revenue and finance options was developed to identify the most optimum approaches for California or other states to pursue.

Among the results, three revenue options stand out as holding promise to boost future transportation revenues: building new tolled highway facilities, raising vehicle registration fees using a concept we call “environmental” vehicle registration fees, and continuing to advocate for higher gas taxes. These three revenue measures all fared well when evaluated holistically across the full set of five evaluation criteria. This white paper presents the highlights of the analysis of

those three options, focusing on their revenue potential, political feasibility, and transportation system performance implications.

2. Background Information

Fuel taxes have long been the preferred transportation revenue option at the state and federal levels, because they are considered a user fee, but across the U.S. growth in population and vehicle miles traveled (VMT) is outpacing growth in gas tax revenues (Puentes and Prince, 2005; Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance, 2006). This discrepancy has occurred as the buying power of per-gallon fuel taxes has fallen over time, due to inflation and improved fuel economy. The growing popularity of hybrid vehicles and expected growth in vehicles that run on fuels other than gasoline or diesel cast further doubt on the long-term viability of traditional fuel taxes (Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance, 2006).

State-level policy makers find themselves trying to reconcile these flagging revenues with public demands for better quality roads and more transit—and also strong anti-tax sentiment from both voters and the legislatures. This white paper provides guidance to policy makers wrestling with these issues by reporting the highlights of a larger study conducted by the Mineta Transportation Institute, *Transportation Financing Opportunities for the State of California* (Weinstein, Dill, Goldman, et al, 2006). That study identified a large set of potential revenue and finance measures for analysis, and then applied five evaluation criteria to each option to narrow these to a set of more promising options for further review. The criteria were revenue generation, ease of implementation, transportation system performance, equity, and political feasibility. For the more promising alternatives, a full assessment of the most viable revenue and finance options was developed to identify the most promising approaches for California or other states to pursue. Options assessed were higher taxes (gas taxes, vehicle registration fees, vehicle license fees, and state sales taxes), new tolled facilities (highway lanes, HOT lanes, fully-tolled highways, or truck-only lanes), and financing tools (public-private partnership [PPP] and general obligation bonds).

Among the results, three revenue options stand out as holding promise to boost future transportation revenues: building new tolled highway facilities, raising vehicle registration fees using a concept we call “environmental” vehicle registration fees, and continuing to advocate for higher gas taxes. These three revenue measures all fared well when evaluated holistically across the full set of five evaluation criteria. This report presents the highlights of the analysis of those three options, focusing on their revenue potential, political feasibility, and transportation system performance implications of the three options. Before looking at the three options in depth, however, we present background information on the study methods and an overview of the revenue potential and political feasibility of a larger set of revenue options, to place in context the findings on tolls, environmental vehicle registration fees, and higher gas taxes.

2.1. Overview of Findings about the Revenue and Finance Measures Assessed

Three of the criteria used to analyze the full set of revenue and finance measures were how much revenue they might generate, how politically popular they might be, and what impacts they could have on improving (or worsening) the performance of the transportation system. This section looks briefly at each of those three criteria.

2.1.1. Revenue generation

The first criterion, revenue generation, assesses whether the revenue option will generate sufficient revenue to have a meaningful impact on statewide needs. In addition to assessing the specific value of near-term revenues generated, it is also important to look at the potential for the revenue option to provide stable and predictable revenues over the long term. Effective transportation planning and capital asset management requires knowing five, ten, and even twenty years into the future what resources will be available to maintain existing infrastructure and services, as well as to fund major capital projects constructed over many years.

We predicted estimated revenues in California in 2020 from eight different tax or fee options: three different options for raising the state gas tax, replacing the state gas tax with a fee of 1 cent per mile traveled, doubling the current personal vehicle registration fee from \$31 a year to \$62 a year, adding a quarter-percent state sales tax for transportation, or raising the vehicle license fee (VLF) from the current rate of 0.65% to 1.00%. (Statewide toll revenues are too difficult to predict, so were not included.) As shown in Table 1, three measures have the greatest long-term potential to generate revenue: increasing the vehicle license fee from 0.65% to 1.0% of vehicle value, a new statewide 1/4¢ sales tax, and indexing the fuel tax rate to inflation (see Table 3). These sources will retain their revenue production over time because they do not lose value due to inflation. Both of the tax options highlighted in this report—raising the state gas tax and raising vehicle registration—will likely raise at least half a billion dollars a year by 2020.

Table 1 Comparison of Revenue Potential in 2020 of New or Increased Statewide Taxes and Fees

Tax or Fee Change	Estimated Revenues in 2020		
	Millions of 2005 Dollars	As Percent of State Fuel Tax Revenues at 2006 Rate	Annual Revenue Growth Rate in 2020
<i>State Fuel Tax at 2006 Rate</i>	\$2,093 – 2,627	–	-2.2 to -3.5%
Add 1¢/gallon fuel tax each year for 10 years	\$1,163 – 1,459	56%	-2.2 to -3.5%
Additional 6¢/gallon fuel tax	\$698 – 876	33%	-2.2 to -3.5%
Index existing fuel tax for inflation	\$1,442 – 1,009	38 – 69%	5.9 to 6.6%
Replace 18¢/gallon fuel tax with 1¢/mile mileage fee	\$401 – 503	19%	7.2 to 8.6%
Additional \$31/year personal vehicle	\$462 – 580	22%	-1.2 to -2.6%

registration fee (flat rate increase or variable “environmental” fee system)			
Additional 1/4% state sales tax	\$1,465 – 1,567	60 – 70%	0.75 to 1.1%
Additional 0.35% vehicle license fee	\$1,841 – 1,968	75 – 88%	2.8 to 3.2%

Source: Weinstein, Dill, Goldman, et al 2006, Appendix C. *Note:* Range of revenue options based upon low and high growth scenarios with varying population growth and inflation assumptions.

2.1.2. Transportation system performance

Transportation system performance is an extremely important—yet often overlooked—criterion. All taxes and fees influence economic behavior, so to the extent that they affect individuals’ and businesses’ decisions and behavior within the transportation system, they can influence the overall efficiency and performance of the system. For example, fuel taxes raise the price of gasoline, providing some incentive for people to purchase more fuel-efficient vehicles or drive less, thus potentially reducing fossil fuel consumption and greenhouse gas emissions. If some roads are tolled and others are not, drivers may shift to the nontolled routes, increasing congestion on the free roads and decreasing it on the tolled ones. Because the behavioral shifts triggered by transportation revenue mechanisms can have substantial effects on traffic flow and the environment, it is critical to try to predict these shifts and their consequences.

Analysis of how many different revenue options fared under the transportation system performance criterion revealed that tolled facilities offer opportunities to improve transportation system performance by making it possible to implement variable pricing as a traffic management technique. Variably priced tolls can permanently eliminate recurring congestion on a facility. Even without variable pricing, flat tolls will somewhat reduce traffic on those lanes, compared to what would occur if the lanes were free. At the same time, new toll roads have the potential to increase overall levels of traffic and thus increase congestion elsewhere on the network. Removing truck traffic from mixed-flow lanes on highways through truck-only toll lanes could generate several important improvements in system performance that would benefit the trucking industry and other highway travelers alike. Using PPPs to implement tolled facilities could have both positive and negative impacts on the performance of the system, depending upon how the agreements are written.

Most of the different tax and fee revenue options examined in this report would not directly affect the performance of the transportation system, at least noticeably. One exception is mileage fees. Mileage fees that vary by time of day, level of congestion, or axle weight have been shown to be particularly effective in reducing traffic delays, air pollution, and roadway damage, respectively. Weight-distance fees for trucks can help rationalize the movement of freight by embedding the costs of pavement damage in the cost of moving goods. Finally, higher gas taxes and environmental vehicle registration fees for more polluting or less efficient vehicles could encourage drivers to purchase more efficient and cleaner cars, although the financial incentive would be small unless the fees were raised significantly.

2.1.3. Political feasibility

Even a revenue option that performs well under technical criteria such as revenue generation and transportation system performance is unlikely to be implemented if the public and elected officials strongly oppose it. Many factors influence political feasibility. For example, revenue options that have been used in the past have greater likelihood of gaining support—both voters and elected officials tend to be more supportive of modifying existing measures than adopting entirely new ones. In addition, politically feasible measures tend to have at least a few strong champions, and relatively diffuse (or poorly organized) opponents. Finally, California's history shows that transportation revenue measures usually succeed only if they have support from both the northern and southern regions of the state.

Political feasibility was assessed by interviewing seventeen key stakeholders involved in transportation finance, as well as conducting two telephone surveys of California residents. The Survey and Policy Research Institute at San José State University conducted the two public opinion polls of California residents to assess their preferences regarding different revenue and finance options. The first, a survey of over 2,700 residents, focused on people's views about the need to raise transportation revenues and their preferences for different options to raise transportation revenues through new or augmented statewide taxes and fees. The second poll asked over 800 residents their views on raising revenues by charging user fees on specific facilities such as tolled highways, and on incorporating public-private partnerships into these plans.

The survey found that most revenue options are generally not popular politically (see Table 2). However, several types of toll roads came in with support over 45% (truck-only toll lanes, High-occupancy/toll or HOT lanes, and fully tolled new roads). Among the tax and fee options, which were less popular, two measures showed promise of potentially gaining majority support: increasing registration fees and varying them by fuel economy or emissions (45% supported and 51% opposed), and increasing the fuel tax by 10¢ over ten years (40% of respondents supported, 54% opposed). Given the recent success of a 9.5¢ per-gallon fuel tax increase in Washington, these options are worth exploring in California and elsewhere. Increasing the vehicle license fee (VLF) was supported by 42% of likely voters (with 53% opposed), but the high-profile debates over the future of this tax during the 2003 gubernatorial recall election make it a less politically attractive option in the near term than other taxes or fees.

Table 2 Overall Support for Each Revenue Option

Revenue option	Description of option from questionnaire	% of Respondents Supporting the Option
Truck-only toll (TOT) lanes	There were proposals in some congested regions to build new toll lanes for trucks right next to existing freeways. Trucks would be required to use these toll lanes instead of the regular freeway. (Survey 2)	64%
High-Occupancy/Toll (HOT) lanes	Open underused carpool lanes to solo drivers who were willing to pay a toll (Survey 1)	55
Toll roads	One option for building new highway projects without increasing taxes is to borrow money to build the road, charge tolls for driving on the new highway, and use the money collected to pay back the loans and maintain the highway. (Survey 2)	47
Environmental vehicle registration fees	Increase the vehicle registration fee to an AVERAGE of \$62 per year for all vehicle owners, but vary the fee according to how much pollution the vehicle emits and how much gas mileage it gets. Vehicles that emit more pollution or get lower gas mileage would pay HIGHER fees and those that emit less pollution or get better gas mileage would pay LOWER fees. (Survey 1)	44
Express toll lanes	Building new freeway lanes alongside existing highways and charging a toll to drivers who use those NEW lanes. (Survey 2)	44
Gas tax	Increase the 18-cents-a-gallon state gas tax by one cent per year for ten years. (Survey 1)	40
Sales tax	Adopt a half-cent increase in the statewide sales tax. (Survey 1)	40
Vehicle license fee	Raise the vehicle LICENSE fee to 1%. The vehicle license fee is currently 0.65% (point six-five percent) of your vehicle's value, so the new fee would be 1%, with the additional revenue dedicated to transportation purposes. (Survey 1)	40
Tolls on new highway lanes	One way to pay for new highway lanes is to charge tolls for using them. (Survey 1)	40
Registration fees	Increase the vehicle REGISTRATION fee to \$62 per year per vehicle, from its current level of \$31.	32
General obligation bonds	One proposal is for the state to pay for new freeways and transit programs with general obligation bonds. These don't require a tax increase. But paying off the bonds from the state's general fund over 30 years would use money that otherwise might be spent for other state programs and services.	30
Indexed gas tax	Index the gas tax to inflation. Under this proposal, the gas tax could increase slightly each year based upon inflation. For example, in 2004, inflation in California was about 3%, so the tax would have gone up by about a half cent per gallon. (Survey 1)	27
Mileage fee	Eliminate the 18-cents-a-gallon gas tax altogether and replace it with a so-called "mileage fee" based on the number of miles a vehicle is driven. Each driver would pay a fee of one cent per mile for every mile driven within the state. For example, every 100 miles driven would incur a mileage fee of \$1. Each vehicle would be equipped with an electronic means to keep track of miles driven and the fee would be paid at the pump when drivers buy gas. (Survey 1)	22
n	Survey 1: 2705; Survey 2: 815	

Source: Weinstein, Dill, Goldman, et al, 2006.

2.2. Analysis of Tolling, Environmental Registration Fees, and Raising the Gas Tax

2.2.1. Tolling

In the late 1800s, privately built toll roads were common in California. In all, 159 private toll facilities were built in the early years of the state, mostly in the mining regions of the Sierra Nevada (Klein and Yin, 1994). But since the early twentieth century, California has relied primarily on taxes and fees charged to all drivers, or to the population at large, to fund its transportation system. Over the last decade, however, new toll roads have been built in San Diego and Orange counties.

Toll facilities have the potential to generate revenues to cover some or all of the costs of major new infrastructure projects, and to cover the costs of operating and maintaining them over time. It is possible that in a few cases the roads might even generate excess revenues that could then be used to finance improvements to nearby facilities, public transit, or other local needs. However, it is unlikely that tolls could become a predictable source of revenue at the statewide level in the near or medium term, and they are therefore unlikely to generate a core revenue stream that could provide a meaningful supplement to declining fuel tax revenues. Most likely, only a small number of new toll facilities will generate enough revenue to fully repay their capital costs.

Nevertheless, individual toll roads in select locations have the potential to generate billions of dollars over their lifetimes. California's existing tolled bridges and highways currently raise over \$550 million per year (Weinstein, Dill, Goldman, et al, 2006). The survey conducted for this report showed that converting underused carpool lanes to HOT lanes had clear majority support, with 56% of voters saying that they would support such a proposal. When the results were broken down by different demographic categories, every population group showed a support level of at least 50% (see Table 3). In addition to public support, HOT lanes have fairly strong stakeholder support.

Table 3 Support by Likely Voters for Allowing Solo Drivers to Use HOV Lanes for a Fee

Question: Another idea is to open underused carpool lanes to solo drivers who are willing to pay a toll, and to use the money collected to improve transportation. Do you support or oppose that idea?

Respondent Category	For (%)	Against (%)	Don't know (%)
Statewide	56	41	3
North/South			
North	54	42	4
South	57	40	3
Region			
Bay Area	53	42	5
Los Angeles	57	40	3
Other Southern California	60	37	3
Central Valley	54	45	2
Central Coast	50	45	5
Rural	56	39	6
Gender			
Men	54	44	3
Women	58	38	4
Race			
White	55	42	3
Latino	60	38	3
Asian	50	44	6
Black	61	38	1
Age			
18-34 years	64	34	2
35-54 years	58	39	2
55+ years	50	45	5
Education			
Less than college graduate	58	39	4
College graduate	54	43	3
Income			
Less than \$50,000	55	41	4
\$50,000-100,000	61	37	3
Over \$100,000	53	45	2
Transit Use			
Used transit in last month	57	40	4
Has not used transit	55	41	3
Weekly Driving			
Drives less than 100 miles per week	56	40	4
Drives 100 or more miles per week	56	41	2
How much of a problem is the quality of the transportation system for you?			
Big or somewhat	57	40	3
Not much or no problem	55	42	3
Spending priority			
Focus on highways	57	40	3
Focus on transit	55	41	4
Both	56	40	4

Source: Weinstein, Dill, Goldman, et al, 2006. Note: **Bold** indicates that the differences between groups within each category (e.g. age or region) are significant at $p < 0.05$.

Fully tolled roads have less clear political support among both the public and stakeholders. Less than half (44%) of the likely voters surveyed supported building new, fully tolled roads. However, support for tolled facilities may be different when people are asked about a particular project in a corridor they often travel. Truck-only toll (TOT) lanes were popular with likely voters (62%), but face opposition from the trucking industry.

Support for express lanes lies in the middle. Like HOT lanes, express lanes offer drivers choice, and thus draw less opposition from people who believe that toll roads are unfair. The first survey found that only 40% of likely voters supported the express lane concept. The second survey found 47% support. Support may have been higher in the second survey because the question was asked in the context of a series of questions about toll lanes, and this may have increased respondents' interest in the topic.

Support for tolled facilities was generally higher in Los Angeles and the rest of Southern California, where such lanes already exist. This may indicate that experience with tolled facilities increases support. Therefore, agencies wishing to implement new options such as tolling should choose and implement initial projects carefully. Another conclusion policy makers may draw from these results is that even if tolling projects are not initially popular with the public, once implemented the public may accept them without much protest, assuming the project is implemented without unexpected difficulties.

Support for pricing options was not clearly related to income or ethnicity, as might be expected based upon the debates over equity that arise when tolling options are considered. Lower income respondents were about equally likely to support tolls roads, express toll lanes, and HOT lanes. While these survey results don't refute the argument that tolls are regressive, they do demonstrate that lower-income people may nevertheless value the benefits that the facility provides. Alternatively, they may like the certainty that they won't be paying through sales or fuel taxes for a facility they do not plan to use. The results call out for a more sophisticated analysis and debate of equity implications of pricing strategies. Support for tolling was generally higher among younger adults and women.

2.2.2. "Environmental" Vehicle Registration Fees

One alternative examined was to raise annual vehicle registration fees by varying amounts, based upon vehicle characteristics such as weight, fuel economy, or emissions. Varying the fee by weight, with heavier vehicles paying more, reflects the increased damage heavier vehicles cause to roads. Heavy commercial trucks already pay higher fees, but all passenger vehicles pay the same registration fee, even some that weigh in excess of three tons. Varying the fee based upon fuel economy or emissions provides support for statewide objectives to reduce fuel use, greenhouse gases, and air pollutants.

This study examined a fee structure that could be designed to generate the same amount of total revenue as a flat \$31 increase for all vehicles (a doubling of the current amount). In such a case, the largest, least fuel efficient, or most polluting vehicles would be paying more than \$62 per year and the smallest, most fuel efficient, and least polluting vehicles would pay less than \$62 per year. The overall revenue potential for this option is modest, though very stable and predictable. Adding an average of \$31 per vehicle fee for transportation would generate from

\$460 to \$580 million annually in 2020 (constant 2005 dollars). This is a sizeable amount—an addition equivalent to at least 20% of current annual state fuel tax revenues.

Linking the increase in fees to environmental objectives increased public support significantly. Of the likely voters surveyed, only one-third (34%) indicated that they would support a proposal to increase the vehicle registration fee to a flat \$62 per year. However, respondents were much more enthusiastic about fees that varied according to vehicle performance. When respondents were asked if they would support a proposal that raised the fee to an average of \$62, but varied the fee according to emissions and gas mileage, support increased significantly, from 34% to 45% of voters, an 11% increase. Of the tax or fee revenue options presented individually on the survey, this garnered the highest level of support.

The survey also asked “generally speaking, should the fees that people pay to register their vehicle take into account the gasoline mileage those vehicles achieve?” or “...the amount of pollution those vehicles emit?” There was a much higher level of support for linking fees to emissions. Nearly two-thirds (64%) of voters thought that fees should take into account air pollution emissions, while less than half (49%) thought fees should take fuel efficiency into account. The question that specifically asked about support for an increase to \$62 included linking the fee to pollution or gas mileage. If the question had only included emissions, support may have been higher than 45%.

Linking the fee to mileage or emissions had the largest effect of increasing support in Los Angeles and the Central Valley—the areas with the worst air quality problems in California. The option of varying the fee based on emissions or mileage also increased support particularly among female, lower-income, non-white, younger (18–34 years old), and college educated respondents. Table 4 shows the variation of support for an environmental vehicle registration fee among different demographic groupings of likely voters.

Table 4 Support by Likely Voters for and Environmental Vehicle Registration Fee (Raising the Vehicle Registration Fee and Varying the Rate by Emissions and Fuel Economy)

Question: Another option is to increase the vehicle registration fee to an AVERAGE of \$62 per year for all vehicle owners, but vary the fee according to how much pollution the vehicle emits and how much gas mileage it gets. Vehicles that emit more pollution or get lower gas mileage would pay HIGHER fees and those that emit less pollution or get better gas mileage would pay LOWER fees.

Respondent Category	For (%)	Against (%)	Don't know (%)
Statewide	45	51	4
North/South			
North	47	49	5
South	43	54	3
Region			
Bay Area	54	42	5
Los Angeles	44	53	3
Other Southern California	45	53	2
Central Valley	40	55	5
Central Coast	41	55	4
Rural	36	58	6
Gender			
Men	45	53	2
Women	44	50	5
Race			
White	47	50	4
Latino	38	58	4
Asian	50	44	6
Black	39	58	3
Age			
18-34 years	49	48	3
35-54 years	44	52	3
55+ years	44	52	5
Education			
Less than college graduate	40	56	5
College graduate	49	48	3
Income			
Less than \$50,000	42	52	5
\$50,000-100,000	45	52	3
Over \$100,000	51	47	2
Transit Use			
Used transit in last month	54	41	5
Has not used transit	42	55	4
Weekly Driving			
Drives less than 100 miles per week	48	48	4
Drives 100 or more miles per week	43	54	3
How much of a problem is the quality of the transportation system for you?			
Big or somewhat	42	55	3
Not much or no problem	47	49	5
Spending priority			
Focus on highways	37	59	3
Focus on transit	54	43	3
Both	41	54	6

Source: Weinstein, Dill, Goldman, et al, 2006. Note: **Bold** indicates that the differences between groups within each category (e.g. age or region) are significant at $p < 0.05$.

2.2.3. Raising the gas tax

Fuel taxes have traditionally been the primary source of funding for highway infrastructure. They were originally adopted in large part because they are user fees, with revenues devoted to the transportation system and users of the system paying the tax through fuel purchases. However, most states, including California, have not raised these taxes enough to keep up with inflation or travel demand. There are a variety of ways that fuel taxes could be increased from the current state fuel tax of 18¢ per gallon on both gasoline and diesel fuel. For the purposes of this study, three proposals were examined: (1) Increasing the motor fuel tax by 6¢ per gallon in 2007; (2) Increasing the motor fuel tax by 1¢ per gallon per year, for ten years, between 2007 and 2016; and (3) Increasing the motor fuel tax in 2007 and every year thereafter to maintain the tax rate at its inflation-adjusted 2006 levels (indexing). Increasing fuel taxes could be one of the highest revenue-generating options of those considered in this analysis. For example, raising the motor fuel tax by 6¢ per gallon would generate \$1.07 to \$1.12 billion in 2007, but that revenues will be eroded by inflation reaching \$700–\$880 million in 2020. But this is about 33% more than would be generated without any change in the tax rate.

Contrary to the perception that raising fuel taxes is politically infeasible, recent experience shows that modest increases are politically feasible under certain scenarios. In the state of Washington voters and legislators both supported raising fuel taxes despite determined opposition. In November 2005, the voters of Washington defeated a ballot initiative that would have repealed a 9.5¢ per gallon increase in the state's gas tax approved by the legislature in May of that year. Overall, 21 states nominally increased their motor fuel taxes between 2003 and 2005 (Federal Highway Administration, 2005, Table MF-205).

This study's survey of California residents found that 43% of likely voters would support a 10¢ increase imposed as a 1¢-per-year increase over ten years. This modest level of support for a relatively large increase in the tax may indicate some political feasibility for a more gradual increase. Table 5 shows the breakdown of support among different demographic groupings of likely voters.

Table 5 Support by Likely Voters for Increasing the Gas Tax by 1 Cent per Year for 10 Years

Question: One idea is to increase the 18-cents-a-gallon state gas tax by one cent per year for ten years. Would you vote for or against such a measure?

Respondent Category	For (%)	Against (%)	Don't know (%)
Statewide	43	54	3
North/South			
North	46	51	4
South	41	57	2
Region			
Bay Area	53	42	5
Los Angeles	44	55	2
Other Southern California	40	58	2
Central Valley	38	59	4
Central Coast	39	57	4
Rural	44	55	1
Gender			
Men	47	51	2
Women	39	57	4
Race			
White	45	52	3
Latino	38	59	3
Asian	43	53	3
Black	38	60	3
Age			
18-34 years	40	55	5
35-54 years	43	55	2
55+ years	46	52	3
Education			
Less than college graduate	38	59	3
College graduate	47	50	3
Income			
Less than \$50,000	39	57	4
\$50,000-100,000	41	56	2
Over \$100,000	52	47	2
Transit Use			
Used transit in last month	52	43	5
Has not used transit	40	57	2
Weekly Driving			
Drives less than 100 miles per week	43	54	3
Drives 100 or more miles per week	44	54	3
How much of a problem is the quality of the transportation system for you?			
Big or somewhat	40	57	3
Not much or no problem	45	52	3
Spending priority			
Focus on highways	37	61	2
Focus on transit	49	48	3
Both	43	52	5

Source: Weinstein, Dill, Goldman, et al 2006. *Note:* **Bold** indicates that the differences between groups within each category (e.g. age or region) are significant at $p < 0.05$.

The level of support for an increase in the fuel tax would depend upon how the state proposes to spend the new funds and how the proposal is presented or framed. For example, the successful Washington gas tax ballot measure had a list of projects and programs that the tax would fund—or that would not be funded if the tax were repealed. (Many other polls and actual votes on local option sales taxes have supported the finding that voters are more likely to support tax increases when the measure includes a list of proposed projects for funding.) In addition, voters may be less likely to repeal an existing tax than to approve a new tax. Finally, a recent *New York Times* poll found that 55% of adults supported an increase in the gas tax if it reduced dependence on foreign oil and 59% supported an increase if it reduced global warming. This contrasted with 85% who opposed an increase if it was presented without any direct outcomes. The poll did not specify the amount of the increase (Uchitelle and Thee, 2006).

3. Summary Recommendations

State leaders face a daunting task to secure sufficient revenues to support California's transportation infrastructure over the next decades. They will need to sift through dozens of revenue and financing options to identify the ones that have strong revenue potential, promote state objectives such as reducing congestion and improving environmental quality, and also are acceptable to political stakeholders and the public. Despite the challenges, there are promising solutions. This section begins with laying out the case for a continued state role in raising transportation revenues, recommends that states take a multi-phased approach to doing so, and highlights the advantages of pursuing tolls, environmental registration fees, and higher gas taxes.

3.1. *The Continuing Need for State-Generated Transportation Revenues*

State-generated revenues are a cornerstone of available transportation revenues, especially for the state highway system. Unless states grant local governments much greater flexibility in their taxing powers, locals are unlikely to be able to make up the gap created by shrinking state funds. In addition, rural counties have large road systems but small populations and tax bases, a situation that makes it especially hard for them to raise money independently. Thus, there remains an important role for the state to provide a substantial portion of the money needed to maintain, operate, and expand the nation's transportation infrastructure.

Second, states have historically played a key role in setting guidelines and priorities for how funds are spent, helping to manage the transportation network so that it functions effectively as a statewide system. States therefore have a continuing interest in ensuring that scarce transportation dollars are spent in ways that support their key policy priorities. In the coming years, states will face a number of policy challenges that are truly statewide in scope: accommodating a surging population, meeting the needs of rural areas that are struggling economically, protecting critical habitats and valuable farmland for future generations, improving long-distance intercity travel, ensuring that residents breathe air free of unhealthful pollutants, and confronting the challenge of global climate change. One of the most effective ways for states to ensure that their policy goals are addressed in transportation decision making is to maintain their historical commitment to funding their share of the transportation system.

3.2. *Crafting a Multi-Phased Approach*

To address current and future funding shortfalls, so that states can continue to fulfill these two functions, they need a multi-phased approach that considers near-, medium-, and long-term options. In crafting a comprehensive strategy for each time frame, a sensible approach would be to pursue a variety of strategies simultaneously, given the substantial amount of funds needed and the political reluctance to pursue large increases in any single revenue source.

In the near term, state leaders could look to options with relatively strong political appeal that require no new administrative apparatus to implement, and that fare well under the equity and transportation system efficiency criteria. Of the tax and fee options evaluated, voters were most supportive of raising annual vehicle registration fees if the rate varied according to the vehicle's emissions or fuel economy. Also, despite general anti-tax sentiments, 43% of California voters supported increasing the gas tax by 1¢-per-year over ten years (54% would oppose this).

In both the near and medium term, tolled facilities have strong potential to help fund new infrastructure in certain locations. Tolls can be used to build, improve, and maintain some new facilities, although toll facilities by themselves are not a long-term solution to the state's transportation needs. If states partner with private firms to build and operate toll roads, these arrangements can reduce the need for government investment (and thus revenues) by leveraging private capital to help finance new infrastructure. Likely California voters in the study's second survey were open to the idea of private companies building and operating toll facilities, particularly with state oversight.

As economic conditions, transportation technologies, and political realities change with time, the outlook for measures that look unacceptable today may change as well. Long-term solutions that address fundamental changes in the transportation system and vehicle fleet will likely require significant shifts in attitudes and approaches. One alternative attracting growing interest among transportation experts is replacing fuel taxes with a mileage-based fee. An advantage of a mileage-fee approach is that it charges road users in rough proportion to the benefits they receive from driving and the cost of providing them with road infrastructure, while also capturing revenue from the growing number of alternative fuel vehicles that pay little or no fuel taxes. For these reasons, mileage fees are worth exploring further, despite the low levels of public support at the moment and concerns regarding the implementation of such a system. Three pilot projects are currently underway in the U.S. to test the technical feasibility of mileage-based taxation systems.

3.3. *Three Particularly Promising Near-Term Revenue Options*

3.3.1. Tolling: Support Grows with Experience

There are reasons to be optimistic of the potential for expanding tolling as a funding mechanism. A majority of likely voters supported the HOT lane concept, one of the most popular options explored. Toll roads, while not garnering majority support, were more popular than any of the tax or fee options. Our study and other research shows that support for tolling transportation

infrastructure is higher in areas that already have such facilities. For example, in our survey, support for tolled facilities was generally higher in Los Angeles and the rest of Southern California, where such lanes already exist. This suggests that even if residents of a region initially oppose a toll road, these negative opinions will not last.

Support for tolling was higher among younger adults. A key question is whether there will be a cohort effect (i.e. younger people will maintain these attitudes as they age) or if attitudes change with age. If a cohort effect occurs, supporters of tolling should be optimistic. If, on the other hand, their attitudes change with age, then support for gas taxes may grow as the population ages, since older adults were more supportive of traditional gas taxes.

Finally, support for pricing options was not clearly related to income or ethnicity, as might be expected based upon the debates over equity that arise when tolling options are considered. For example, lower income respondents were about equally likely to support toll roads, express toll lanes, and HOT lanes. While these survey results don't refute the equity concern that tolls are regressive, they do demonstrate that lower-income people may nevertheless value the benefits that the facility provides.

3.3.2. Trying Something Brand New: Public Interest in “Environmental” Taxes

The concept of linking transportation taxes or fees to environmental objectives and externalities has not been implemented widely in the U.S., nor have policy makers explored it in much depth. Given the 11% increase in support our survey found when respondents were asked about raising environmental vehicle registration fees compared to a flat increase in the fees, policy makers should seriously examine varying fees and taxes to meet environmental objectives. Although our study only tested the relatively strong popularity of an environmental vehicle registration fee, the principle of fee rates that vary by environmental impacts could likely be applied to other types of taxes or fees well.

Findings from other polls reinforce the finding that environmental fees or taxes should be considered. A 2006 *New York Times* poll found that 55% of adults supported an increase in the gas tax if it reduced dependence on foreign oil and 59% supported an increase if it reduced global warming. This contrasted with 85% who opposed an increase if it was presented without any direct outcomes (Uchitelle and Thee, 2006). A 1997 nationwide poll found that 73% of adults were willing to pay 5 cents more per gallon of gasoline “if it would significantly reduce global warming” (Pew Research Center for the People & the Press, 1997). People may be more supportive of charging varying rates based upon the environmental impacts of vehicles. A nationwide poll conducted by ABC News found that while only 36% of respondents supported opening up HOV lanes to single drivers paying a toll, 54% supported allowing single drivers in hybrid cars to use the lanes for free “as a way of encouraging the use of these cars” (ABC News/Time Magazine/Washington Post, 2005). A large share of Texas residents (73%) thought that charging higher tolls for larger, heavier, or higher polluting vehicles was a good idea, and 62% agreed that trailer trucks should pay higher tolls (Kockelman et al., 2006). Forty-two percent of Washington state voters surveyed in 2004 expressed support for a tax based on a car's weight (Washington State Department of Transportation, 2004).

3.3.3. Don't Give Up On the Gas Tax

The gas tax performs well under the holistic evaluation across various criteria discussed above, yet many policy makers have concluded that raising the gas tax is politically impossible and therefore not worth pursuing. Our study results suggest otherwise. The survey of California residents conducted for this study and the recent experience in Washington State indicate that policy makers should not dismiss traditional fuel taxes as a revenue source in the near and medium term. Three tax options—gas taxes, sales taxes, and the vehicle license fee—had virtually the same levels of overall support. This finding suggests that policy makers should pursue the option that performs best under other criteria such as equity and the impact on transportation system performance, rather than just choosing the option thought to most appeal to voters. Also noteworthy is the fact that 40% of all respondents (and 43% of likely voters) supported a fairly high increase in the gas tax—ten cents per gallon spread over ten years. A smaller increase, particularly one tied to specific funding objectives or projects, might garner significantly more support.

The fact that support for increasing statewide gas and sales taxes was about the same in our surveys may seem inconsistent with recent political experience in California, where voters have supported many county sales taxes for transportation. However, it may be that voters have supported these sales taxes not because sales taxes as such are particularly acceptable as a type of tax, but because the measures have been local, accompanied with a list of specific projects to which revenues will be dedicated, and usually have an expiration date. While choosing infrastructure projects solely based upon political acceptability is not desirable, the message that the public is more supportive of funding when they know where the funds go is important. This concept has not been applied equally to traditional funding sources, such as the gas tax. Educating the public about how funds are spent or about the potential environmental benefits may also raise support for increasing the gas tax.

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5. Acknowledgements

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POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Transforming Technologies for Tomorrow's Transportation Needs

The Keston Institute for Public Finance and Infrastructure Policy

**Authors:
Richard G. Little**

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Surface Transportation Policy and Revenue Study Commission
February 21 & 22, 2007 Los Angeles, California Hearing

Author: Mr. Richard G. Little, AICP
The Keston Institute for Public Finance and Infrastructure Policy
University of Southern California
650 Childs Way, 331D
Los Angeles, CA 90089
(213) 740-4120
rglittle@usc.edu

Transforming Technologies for Tomorrow's Transportation Needs

California, unlike much of the rest of the nation, is struggling to move an increasingly commingled mass of people and goods safely and efficiently at all times of the day. The effort to maintain, rebuild, and expand the necessary transportation infrastructure to do this has seriously strained the state's resources and ability to address other needs. After spending hundreds of billions of dollars and generating enormous social and environmental disruption over the past 50 years, we still find ourselves in a morass of congestion, air pollution, and petroleum dependence. Yet, despite the sometimes questionable results of this massive level of investment, the only apparent remedy to the current situation is seen as still more spending on our existing highway and rail networks. Efforts are primarily focused on ways to secure the billions of dollars necessary to do this without raising general levels of taxation. Although additional investment in an aged and inadequate transportation system is unquestionably needed now, at some point, we must step back and look for the next generation of transportation technologies and how we might transition to them.

Part of the proposed long term solution for the LA Goods Movement system is a high-speed rail link using Mag-Lev or similar technology. The cost of a realistic pilot project and field trial will be high, possibly billions of dollars. Federal, state, and local funds are insufficient to build and operate such a system. The willingness of the private sector to do so is assumed but is not guaranteed. If this and other technologies are going to make a real difference in the nation's long-term ability to improve mobility and reduce pollution and petroleum dependence, we need to invest in the basic and applied research that will bring them to the point where the private sector can begin to analyze realistically their technical and financial viability and develop and test the most promising.

Obviously, we can't let our existing transportation system decay while we focus on the future. However, we can aggressively pursue the technologies of tomorrow while we concurrently revitalize the existing network. Any national goods movement strategy should include a robust research component aimed at developing new transformational transportation technologies and a policy element structured to facilitate their deployment. We cannot afford to do less.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

Growth of California Ports: Opportunities and Challenges

**California Marine and Intermodal Transportation System Advisory
Council**

Author: Gill Hicks

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.

Growth of California Ports: Opportunities and Challenges

A Report to the California State Legislature

Submitted by

**California Marine and Intermodal Transportation System Advisory Council
(CALMITSAC)**

February, 2007

Report Background and Summary Recommendations

Recognizing a growing crisis in port-related goods movement in California, Assembly Member Alan Lowenthal (now Senator) introduced Assembly Bill (AB) 2043 on February 17, 2004. Governor Arnold Schwarzenegger signed the bill into law on September 29, 2004 creating the Maritime Port Strategic Master Plan Task Force Act. The Act requests the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) to address the many challenges associated with the growth of California's ports. CALMITSAC is a regional subunit of the Marine Transportation System National Advisory Council (MTSNAC), chartered in 2006 by U.S. Secretary of Transportation Norman Mineta under the Federal Advisory Council Act (P.L. 92-463). Its members reflect public, private and academic interests and include, among others, the U.S. Maritime Administration, U.S. Coast Guard, California State Assembly Select Committee on Ports, Senate Office of Research, California Department of Transportation, California State Lands Commission, California Association of Port Authorities, Pacific Merchant Shipping Association, Pacific Maritime Association, California Maritime Infrastructure Authority, and the State's Marine Exchanges.

The tasks outlined in AB 2043 are directly related to CALMITSAC's mission, which is:

To foster development of a Marine Transportation System (MTS) in California that is safe, secure, efficient, environmentally sound, and capable of expanding to meet the demands of the global economy.

Specifically, the Act asks CALMITSAC to address the projected growth and congestion of the ports, impacts of port growth on the state's transportation system, air pollution caused by the ports and proposed mitigations, and port security. The report attempts to summarize the best thinking from around the state on the importance of the ports to the state and U.S. economies, putting forth strategies for improving the efficiency, reliability,

velocity, capacity and security of the MTS, while at the same time addressing the growing public health problems associated with freight, particularly the effects of diesel emissions.

The broadly defined strategies and specific projects recommended for implementation in the report have taken on added significance in the wake of the November 2006 elections. At that time 61% of the California electorate approved the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006. This bond initiative, the single largest in California history, authorized \$19.9 billion in expenditures on the State's roads, bridges and transit systems. \$3.2 billion of that total funds projects tied to our ports and the road and rail networks carrying goods, as well as projects that improve port security and mitigate the air quality impacts of freight-related activity.

The transportation bond initiative was part of a broader \$37 billion public works package, also the largest of its kind placed on the ballot, which enjoyed bi-partisan support. Despite the price tag, California voters indicated their willingness to pay for improvements to the State's infrastructure. In addition to the bonds, voters in five California counties approved half-cent sales tax measures to fund transportation-related improvements over the next several decades. These counties reflect the geographic diversity of the State: rapidly urbanizing Orange County, less urbanized counties Madera and Tulare, and rapidly growing Fresno and San Joaquin counties in the Central Valley. Despite their diversity, they share a common concern with the state of their local infrastructure.

The final CALMITSAC report to be released in February 2007 reflects the fact that there are both localized concerns unique to specific areas of the State as well as problems shared by different regions. As a result, the presentation of problems, issues and proposed strategies is built upon the following assumptions:

- Growth in freight-related activity will remain a constant for the foreseeable future. Global trade patterns will continue to underscore the role of the Pacific Rim as a global gateway for goods originating in Asia. Furthermore, the ever increasing purchasing power of developing nations will mean that trade will be flowing in both directions. In 2005, for the first time, the combined output of emerging economies surpassed that of the developed countries and accounted for more than half of global GDP, measured in purchasing-power parity.¹ China and India, in particular, will become key consumers of US goods and services. This trend is reflected in the fact that the rate of growth in US exports is outpacing the rate of growth in US imports in 2005, a trend that is expected to continue through at least 2008. Because of its proximity to Asia the west coast of the US in general, and California in particular, are well positioned to benefit from this two-way trade.
- The State as a whole, and many of its various subregions, will continue to encourage trade-related growth while attempting to mitigate the negative impacts

¹ "Hot Topic: Emergent Purchasing Power," *PIERS Intelligence@Work* 4(4), Nov. 2006. (<http://www.piers.com/newsroom/#intelligence>)

of that growth. Concerns over congestion and pollution did not prevent the Mayor of Los Angeles from making a widely publicized trip to Asia in October of 2006 to boost commerce and solidify the City's role as principal maritime and air gateway to the US. Long Beach is seeking to annex 642 acres of port-serving industrial uses in the Rancho Dominguez area and include them in an enterprise zone. The City of Carson is interested in the land as well.² A \$600 million expansion and modernization plan at the Port of Oakland will better allow the Bay Area to compete with Southern California.³ The actions of local leaders are driven not only by competition within the State but from other parts of the Country as well. Texas has pursued the development of logistics parks anchored by intermodal operations; and the Dallas-Fort Worth area has the nation's fastest growing air cargo facility.⁴ North Texas in general advertises itself as an advantageous intermodal location because it is directly east of the Southern CA ports. However, community concerns and the increasing number of studies demonstrating the health-related impacts of trade will require officials to address environmental impacts. In the absence of such efforts, the public will not support continued growth.

- Impacts of trade, both positive and negative, will be felt by different parts of the State in different ways. A recent report by the Reason Foundation determined that California needs 13,100 new lane miles of infrastructure to address both population growth and to relieve existing traffic congestion.⁵ However, infrastructure plans must be guided by the needs and priorities of the individual region with an understanding of the impacts of local decision making on other regions and the State as a whole. The unique nature of the CALMITSAC membership ensures that individual regions and smaller ports have their say while at the same time discouraging the turf wars that have marked previous discussions surrounding trade-related growth.
- Identifying needs will be the easy part; identifying funding sources will prove more difficult. The American Society of Civil Engineers recently gave the State's overall infrastructure a grade of C-minus (transportation infrastructure was graded a D-plus) and determined that it would take almost \$18 billion a year for ten years to bring the state's transportation system up to a B grade.⁶ The bond initiative and protection of gasoline sales tax revenues are important starts, but other funding sources must be identified and dollars must be spent wisely. Projects around which consensus has already developed and which can be implemented most quickly should receive priority. This "low hanging fruit" approach will result in

² K. Hanson, "L.B. seeks to annex industrial land," Long Beach Press Telegram (web version), Nov. 9, 2006.

³ A. F. Hamm, "Ports Compete for Valley Traffic." Silicon Valley/San Jose Business Journal (web version). Jan. 28, 2005.

⁴ A. Jares, "Metropolplex becoming Import Hub," Fort Worth Star-Telegram (web version), Sep. 18, 2006.

⁵ T. Balaker, A.T. Moore, G. Passantino, R.W. Poole, Jr., A. Summers, and L. Wang, Addressing California's Transportation Needs: Problems with Proposition 1B and Alternative Approaches. Reason Policy Study 341, Sep. 2006 (http://reason.org/californiaballot/ps341_transportation.pdf)

⁶ Harrison Sheppard, "Engineers say \$42 billion not enough," MediaNews, October 2, 2006.

recognizable benefits for the community and help to develop more broad-based support for future efforts. A broader consensus will translate into reduced costs and time needed to direct projects through the review process. Technology and capital improvements are part of the solution, but the range of options also includes changes in operations that result in system-wide efficiencies.

- Developing consensus means effectively communicating the needs of the State to its residents, to elected officials and to decision makers in Washington. The infrastructure crisis in California has opened a window of opportunity. The USDOT, in the run-up to a 2008 transportation reauthorization bill, has convened a blue-ribbon commission to study future financing and transportation infrastructure needs. A Freight Transportation Industry Roundtable, under the auspices of the Transportation Research Board, is making policy recommendations that should guide the administration and Congress in addressing needs at the national level. Well-developed strategies at the state level will put California in a favorable position to influence the direction taken by the federal government.
- Finally, CALMITSAC recognizes that strategies and recommendations will be impacted by changing circumstances. As a result, the CALMITSAC report is designed to be a blueprint for future action, not the final word on goods movement in California. Where answers are not yet available, future study – and not action – is called for.

A great deal is at stake: air quality, public health, quality of life, efficiency of goods movement, congestion relief, jobs, income, profits, and tax revenue. CALMITSAC believes that growing the economy and protecting the environment and public health are cornerstone objectives. CALMITSAC's approach is consistent with State policy on goods movement, which is to improve and expand California's goods movement industry and infrastructure in a manner that will:

- Generate jobs.
- Increase mobility and relieve traffic congestion.
- Improve air quality and protect public health.
- Enhance public and port safety.
- Improve California's quality of life.

CALMITSAC is pursuing opportunities for environmental and industry stakeholders to find common ground and to develop goods movement solutions that create more and better jobs while advancing California's economic future and quality of life. The following list of recommendations from the final CALMITSAC report reflects that developing consensus:

A. Economic Growth

1. Recognize that growing the economy and protecting the environment and public health are cornerstone objectives. These tasks must be done concurrently.
2. Reject proposals for slow growth, no growth or moratoria on port growth. These proposals would negatively impact the state and national economies, hurt opportunities for upward mobility for blue-collar workers, reduce tax revenue, and result in other negative social impacts.

B. Environment

1. Aggressively seek reductions in diesel emissions. Recognize that diesel engine emissions have serious health effects and are therefore the “Achilles Heel” of port and goods movement development. Use environmental enhancements listed in Appendices C and D of the CALMITSAC report as a guide. Without substantial reductions in diesel emissions, goods movement infrastructure projects are in jeopardy. CALMITSAC believes that reducing truck traffic and accelerating the replacement and upgrading of the truck fleet engines can bring immediate reductions in diesel emissions. Thus, programs like the Gateway Cities truck replacement program should receive significant supplemental funding as is called for in the San Pedro Bay Ports Clean Air Action Plan. Truck replacement should emphasize the newest and cleanest trucks where appropriate, and with data made available from environmental or security analysis.
2. Consider many of the other alternatives such as hybrid vehicles, plug-in hybrids, electric vehicles and clean diesel converted from natural gas.
3. Give serious consideration to market-based approaches to emissions reduction, such as those recommended by the Maritime Goods Movement Coalition, incorporating input from community stakeholders.
4. Continue to implement the San Pedro Bay Ports/ACTA truck trip reduction program.
5. Strongly encourage EPA to rapidly finalize stringent rulemaking for the control of emissions of air pollution from vehicles involved in goods movement.
6. Expand state and federal grants, bond moneys or programs to specifically address the replacement of older locomotives, including short line locomotives, operating in the port areas.
7. To the extent that it is feasible and cost effective, use green construction equipment in developing new goods movement infrastructure.
8. Incorporate specific project mitigation cost into total infrastructure project development costs.
9. Advocate for federal money to supplement state and local government and private funds to reduce diesel engine emissions.
10. Develop collaborative processes involving all stakeholders, such as the statewide LNG Taskforce, to facilitate EIR/EIS review and adoption.
11. Advocate for local development plans and policies that preserve access to ports

C. Project Priorities, Funding, and Public-Private Partnerships

1. Recognizing that available funding is limited, encourage policy makers and funding agencies to consider the selection criteria in the State Goods Movement Action Plan (GMAP) when establishing priorities for major infrastructure projects, operational improvements, and environmental mitigations, using projects lists in Appendices A-D of the CALMITSAC report as a guide.
2. Consult shippers, ports, terminals, vessel operators, trucking companies, railroads, freight forwarders, labor and the environmental community in the selection, and of high-priority infrastructure projects.
3. Concentrate on those projects that are ready to go and clearly of high priority. The Governor's leadership is essential in developing policy that is consistent with the GMAP and with CALMITSAC's Growth of California's Ports: Opportunities and Challenges.
4. Quantify public and private benefits and costs.
5. Continue and strengthen efforts to secure federal funding for critical projects particularly with respect to federal transportation reauthorization.
6. Where appropriate, negotiate joint public-private funding arrangements for high-priority projects. Develop detailed plans of finance, including negotiated shares from federal, state, and local sources and the private sector. Establish appropriate "fire walls" to prevent specifically identified project funds from being diverted to other projects or programs. Ensure that fees correlate to project timelines. Project-based fees should sunset when a project is paid for.
7. Given the limitations of federal and state funding, recognize that "self-help" strategies may be the primary way to complete the financing for high-priority projects. Recognize that projects that have successfully negotiated shared public-private funding arrangements are more likely to receive scarce public funds.
8. Abandon efforts to secure a "Customs carve-out," including proposals to capture an "increment of growth" in customs duties.
9. Establish institutional arrangements for implementation, emphasizing single-purpose entities with a clearly defined mission, decision-making authority, responsibility and accountability. Implementing agencies must have a strong track record in cost and schedule control.
10. Structure project implementation (including institutional arrangements) with the same rigor and transparency required for obtaining "investment grade" revenue bond ratings.

D. Labor Availability and Terminal Productivity

1. Identify sources of inefficiency and delay, and develop specific programs to make better use of existing transportation assets.
2. Measure the severity of the looming shortage in truck drivers.
3. Establish, where feasible, common chassis pools to improve productivity and turn times within the supply chain. Identify Best Practices for chassis pools.

F. Port Security

1. Encourage ports and terminal operators to keep business recovery plans current, including off-site storage of important records including financial records, engineering drawings, “as-built” drawings, etc.
2. Encourage the various agencies involved with port and maritime security, preparedness, response and interoperability to work together to avoid overlap, duplication of effort and conflicting regulations.
3. Encourage sharing of intelligence information among federal, state and local agencies. Identify the barriers to intelligence sharing, such as state government.
4. Closely monitor the implementation and impact of the Transportation Worker Identification Credential (TWIC) and any comparable state program.
5. Urge rapid installation of the Automated Secure Vessel Tracking System (ASVTS) by the U.S. Coast Guard District Eleven Command, which covers all California ports, as a component supporting attainment of a common operating picture for safety and security within the MTS.
6. Urge adoption of a global radio-frequency standard for e-seals for use on marine containers.
7. Establish one or more National Port Security Research Centers in California, and encourage the Department of Homeland Security to request, and the Congress to appropriate, funds from the Department of Homeland Security annual appropriations to implement this initiative to improve port security on a national scale.
8. Recommend the California Transportation Commission support the efforts of California Maritime Academy to seek funding support on behalf of PISCES from the proceeds of Proposition 1B approved by the voters in November, 2006 eligible for port security grants.
9. CALMITSAC adopts and reaffirms the recommendations of the Goods Movement Action Plan concerning the California Green Freight Corridor Network concept, supports the efforts of the Strategic Mobility 21 program toward this goal, and recommends that the California Transportation Commission provide additional matching funds from the proceeds of the Proposition 1B initiative to implement and deploy a statewide Green Freight Network of corridors including Los Angeles Long Beach, the Inland Empire, San Francisco Bay Area, San Diego Border, and Central Valley subject to ongoing evaluation.
10. CALMITSAC urges the State of California to add its voice for accelerated resolution and adoption of RFID controls, and encourage the federal DHS to fully support the resolution of the frequency standard debate. With a globally agreed upon radio-frequency standard, the industry will likely adopt e-seals and RFID technology on its own.
11. Recognize the California Maritime Security Council’s role to enact statutory language to implement a multi-jurisdictional port security taskforce as recommended in the Goods Movement Action Plan.

G. Education

1. Identify research opportunities as part of the SAFETEA-LU funded “National Cooperative Freight Transportation Research Program” that contribute to our understanding of goods movement in California.
2. Encourage industry leaders to identify skill sets needed for workers at all levels of employment, including entry level. Encourage academic leaders to review curricula within planning, business and engineering programs to ensure that adequate training opportunities exist to produce supply chain management professionals with those various skill sets.
3. Review state directed research programs and priorities to ensure that they emphasize goods movement and trade and transportation issues. Available funding, grants, and training opportunities will encourage faculty who already have an interest in these topics and develop new educators in the trade and transportation disciplines.
4. Encourage state agencies to apply training and continuing education funds toward professional development in the area of goods movement, logistics, maritime, supply chain management and trade and transportation.



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

***White Paper: California Marine and Intermodal Transportation System
Advisory Council***

**California Marine and Intermodal Transportation System Advisory
Council**

Author: Multiple Authors

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



White Paper Submitted to:
National Surface Transportation Policy and Revenue Study Commission
February 21, 2007
Los Angeles, CA

By:
California Marine and Intermodal Transportation System Advisory Council
(CALMITSAC)

CALMITSAC is a regional affiliate of the Marine Transportation System National Advisory Council (MTSNAC) established by former Secretary of Transportation Norman Mineta. CALMITSAC has over 30 members representing a broad cross section of goods movement-related stakeholders from industry, government and academia. A list of our members is attached to this testimony.

This month CALMITSAC will be publishing Growth of California Ports: Opportunities and Challenges: A Report to the California State Legislature (February 2007). The report addresses the projected growth and congestion of the ports, impacts of port growth on the state's transportation system, air pollution caused by the ports and proposed mitigations, and port security. The report summarizes the best thinking from around the state on the importance of California's 11 public ports to the state and U.S. economies, putting forth strategies for improving the efficiency, reliability, velocity, capacity and security of the Marine Transportation System (MTS), while at the same time addressing the growing public health problems associated with freight, particularly the effects of diesel emissions.

CALMITSAC is a member of the West Coast Corridor Coalition (WCCC), which includes representatives from the West Coast states of Alaska, Washington, Oregon, and California. When it comes to improving goods movement, CALMITSAC and WCCC share many of the same goals and objectives. The WCCC believes that the West Coast needs to:

- Be positioned for the future requirement that federally-designated corridors be multi-state.
- Share best practices to gain full value from infrastructure investments.
- Set priorities at the system level rather than project level to gain synergy and save money.

- Develop a shared message to make a national case for the need to invest in the Corridor.

The West Coast Corridor System is a crucial national asset. The Pacific State port gateways link the U.S. with its largest offshore trading partners. Half of the container cargo in the U.S. moves through West Coast ports. In the next 20 years, the current volume of trade through these gateways will double or triple. The north-south West Coast corridor links the U.S. with Canada and Mexico – two of the four top trading partners moving \$1.5 billion per day in three-nation trade. Crucial choke-points are “maxed out” today and face service quality declines without further investment. The extraordinary costs required to maintain gateway and corridor capacity are borne by West Coast states and regions, not nationwide.

The WCCC is an agent for change. Transportation is not an end in itself; it is a means to personal choices of where to live and work, how to satisfy basic needs such as jobs, health care, and recreation, and getting consumer goods to market. Freight mobility solutions are inseparable from personal mobility solutions. Major trade gateways are located in large metropolitan areas. Highways and railroads require sharing capacity or paying to build separate routes. Communities bear the environmental impacts of all modes.

West Coast stakeholders and the federal government need to develop a fair-share funding arrangement to carry the cost of a national benefit. The greatest jobs of trade are wholesale and retail sales, manufacture of products with imported components, and U.S. exports. These benefits are spread nationwide. The expense of moving trade goods shipped to or from West Coast gateways through major metropolitan areas to the rest of North America is borne largely by gateway regions and states. Federal funding formulas for transportation do not reflect the West Coast Corridor system’s value as a national asset or the cost of protecting and enhancing its capacity. Congress needs to recognize goods movement needs and the uneven regional impacts in supporting the costs of freight mobility. To assure a robust economic future, the time is now for a national investment in the West Coast Corridor System.

Unfunded Trade Mandate: the Federal Government Must Pay its Fair Share

It is the policy of the U.S. government to reduce barriers to trade wherever possible. While these policies promote international commerce and jobs growth, they also create an *unfunded trade mandate* for gateway regions such as California ports. The federal government has not provided any special funds for international gateways to effectively cope with the surge in cargo through its ports and airports and along its roads and railways.

Thus, there is a major disconnect between federal trade and transportation policies. As a result, funding for goods movement-related projects has fallen way behind the actual need. Agencies received far less than they requested in the most recent national

transportation reauthorization legislation, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

Federal assistance is essential to compensate the region for the disproportionate costs borne locally and regionally for the goods movement services and the significant economic benefits provided to the rest of the nation. (Our accompanying “white paper” goes into more detail about these economic benefits and the environmental challenges facing the state’s Marine Transportation System.) The next reauthorization must recognize the importance of a *national goods movement system*, establish appropriate levels of federal funding support, as well as provide further opportunity for flexibility in the use of federal funds.

CALMITSAC endorses the Coalition for America’s Gateways and Trade Corridors’ call for a “dedicated and predictable freight infrastructure funding.” Funding and allocation strategies need to be developed for Projects of National and Regional Significance (PNRS). CALMITSAC joins with the Coalition for America’s Gateways and Trade Corridors in urging the National Surface Transportation Policy and Revenue Commission to place dedicated freight funding as a top priority.

California Has Pledged its Fair Share.

The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B), approved by voters on November 7, 2006, provides for \$19.925 billion in General Obligation bond funds to fund transportation investments statewide. Of this total, \$3.1 billion will be set aside in a Ports Infrastructure, Security, and Air Quality Improvement Account to fund goods movement-related infrastructure, emission reductions strategies and homeland security improvements:

- 1) The Trade Corridor Improvement Fund (TCIF), to be allocated by the California Transportation Commission (CTC), will provide \$2 billion for improvements along trade corridors of national significance.
- 2) An additional \$1 billion will be allocated by the California Air Resources Board (CARB) for emission reductions from activities related to goods movement.
- 3) \$100 million will be allocated to ports for port-related security improvements.

Other components of the infrastructure bond program could potentially fund goods movement-related projects related to congestion mitigation, intercity passenger rail, and highway-railroad crossing safety.

Private Sector Must Contribute Its Fair Share.

Even with the new funding resources from Proposition 1B and possibly from the federal government, there will not be enough funding to pay for all of the necessary infrastructure and mitigation projects recommended for the region. To help reduce the funding gap, all levels of government as well as private industry must participate and pay a share.

Given the limitations of federal and state funds, it must be recognized that “self-help” public-private funding arrangements will be the best way to complete the financing for critical projects.

Thus, CALMITSAC strongly endorses efforts to negotiate cargo or container fees for infrastructure and environmental mitigation projects. The value of improvements to the study area’s goods movement system must be converted into revenue for improving infrastructure and mitigating environmental impacts. Federal and state funds require local/private matching funds, thus private sector contributions will add strength to applications for leveraging federal and state funds. CALMITSAC believes that fees should be negotiated by goods movement stakeholders in each region.

Projects that successfully negotiate shared public-private funding arrangements should be rewarded by receiving higher priority in the allocation of federal and state funds.

While private ownership of facilities may be one way to bring private resources to the table, it is not the only way and should not be preferred over equally viable public-private financing mechanisms. For example, the Alameda Corridor is publicly owned by the Ports of Los Angeles and Long Beach but relies on a revenue stream from the railroads. The ports are currently investigating the feasibility of cargo or container fees to pay for other critical infrastructure and environmental mitigation projects on a “pay-as-you-go basis” without the need for borrowing. If successful in these negotiations, projects should be rewarded by receiving higher priority for federal and state funding.

Principles for Successful Public-Private Negotiations

Specific plans of finance must be developed around a limited set of high-priority projects; i.e., future success stories, that all stakeholders agree are absolutely essential, as opposed to mandating user fees through legislation. The industry has repeatedly said, “There is no trust in trust funds”. Some funds have been raided; some have been over-collected and under-spent. Project-specific revenue streams for focused, well-managed projects can be protected for the benefit of bondholders and users alike.

Plans of finance should include a mix of funding sources (federal, state, local and private). Assuming that projects have multiple beneficiaries, no one sector should bear the whole financial burden. Failure to develop feasible plans of finance simply means the projects will not get built, leaving us with more congested traffic, additional delays to the movement of cargo, cargo diversion, economic dislocation, and greater environmental degradation.

Keys to success in negotiating joint public-private funding arrangements include:

- Consensus on what high-priority projects to build
- Private sector “buy in”

- Clear delineation of costs and benefits
- A balance of economic and environmental benefits
- Consensus on funding shares, point of collection of any fees and method of payment
- Legal authority
- Stable revenue stream
- Funding firewalls
- Sunset clauses
- Appropriate allocation of risk
- Cost and schedule control
- Experienced project management
- Product orientation not process orientation
- Focused agency mission
- Clear decision making authority

When negotiators understand these basic principles, there should be a greater chance of success.

The MTS: Crucial to Economic Growth and Upward Mobility

The economy and the quality of life in California depend on a successful resolution to the funding problem. California ports are major economic powerhouses and are the gateways to the rest of America. As a result of trade and manufacturing trends, both the largest ports as well as the fastest growing ports are in Asia. The top five fastest growing ports alone are in China, which is California's top trading partner. Not surprisingly then, California ports are benefiting from this trade and enjoying rapid growth in cargo volume.

The lockout of West Coast ports in September and October of 2002 dramatically illustrated the importance of maritime commerce. The combined 10-day lockout and 23-day backlog are estimated to have disrupted trade valued at \$6.28 billion just at the Ports of Long Beach and Los Angeles. Severe terminal, highway or railway capacity constraints can have the same economic effects as the lockout of 2002. Transport delays will impact the cost of doing business, the environment, and our nation's ability to compete internationally.

The "economy" is not an abstract concept. A recent study done by economist Dr. John Husing for the Southern California Association of Governments (SCAG) demonstrates that the logistics sector is a very important employer, particularly for blue-collar workers. Dr. Husing asserts that the logistics sector can help replace lost manufacturing jobs and offer upward mobility for blue-collar workers.

The logistics industry provided the following major benefits in Southern California in 2005:

- \$170.4 billion of \$1,375 billion in total economic activity (12.4%).

- \$113.2 billion of \$812.6 billion in economic value created (13.9%).
- 1,441,016 of the 11,321,518 people employed (12.7%).
- \$98.6 billion of \$750.6 billion earned income (13.1%).
- \$14.6 billion of \$62.0 billion in tax and fee revenues to government (23.5%).

Each new logistics job supports a total of 2.19 new jobs in the regional economy. A \$1.00 increase in logistics activity sets off a total of 1.97 times that amount in the local economy.

In 2005, 44% of the region's adults 25 and up had not finished one college class. Manufacturing used to provide good entry-level pay and career paths that allowed many to work at blue collar jobs and climb to incomes near the median level, which in 2005 was \$53,121. However, the manufacturing sector lost 361,300 jobs (28.2%) from 1990-2005, so job growth in an alternate sector is needed.

The logistics sector can fill an important role in providing opportunities for economic upward mobility:

- In 2005, it offered a median starting pay 32.1% above the minimum wage to workers without training or experience.
- It has defined paths by which workers can graduate to median pay levels over \$40,000 per year.
- In 2005, its mean average pay was \$45,987.
- The affiliated construction sector had a mean average pay of \$41,457, with infrastructure construction workers as the industry's best paid.
- Others sectors with few barriers to entry had much lower mean pay: retail (\$28,840), gaming (\$28,385), hotel (\$24,019), agriculture (\$22,793), other services (\$22,340), eating and drinking (\$15,132).

The economic benefits of goods movement are being threatened, however, by valid concerns over congestion, productivity (efficiency of use of existing transportation assets), air pollution, community impact, limited capacities of highways and railways, and inadequate funding levels. The inherent trade advantages enjoyed by California, and by extension the United States, could be negated if there is not a concerted effort to maintain, enhance, modernize and expand the base of port facilities and services at our ports, while at the same time, mitigating the various environmental impacts of this growth.

Diesel PM: the "Achilles Heel" of Goods Movement Expansion

Port operations are a significant source of diesel particulate matter (diesel PM) and oxides of nitrogen (NOx). Ocean-going vessels are the largest source of diesel emissions from ports. Cargo handling equipment, trucks and trains are other important sources of diesel exhaust.

The South Coast Air Quality Management District estimates that the ports are responsible for more NO_x than the daily emissions of 11 million passenger cars, the approximate number in operation in Southern California. Unless substantial emission controls are applied, these impacts will become even worse as cargo throughput increases. Recent health risk studies have generated more and more concern about goods movement related air pollution, including the impacts on those who work in the industry. In 1998, the California Air Resources Board identified diesel PM as a toxic air contaminant based on its potential to cause cancer. Diesel PM includes carbon particles or “soot” that can be seen in exhaust streams, and particles too small to be seen by the naked eye. The number of premature deaths statewide attributable to PM now equals the number from second-hand smoke and traffic accidents.

On December 1, 2005, CARB released an emission reduction plan for ports and international goods movement in California. According to CARB staff, the health impacts of pollutants commonly associated with emissions from goods movement include premature death, cancer risk, respiratory illnesses, and increased risk of heart and blood vessel diseases. CARB staff estimated that emissions from current (2005) goods movement activities in the state would result in approximately 2,400 premature deaths per year. Without additional emissions controls, that figure could rise to approximately 920 premature deaths per year by 2020.

CARB estimates that 60% of premature deaths associated with goods movement are in the South Coast Air Basin, which has more emissions and more people than other regions. CARB also released a draft health risk assessment for exposure to diesel PM emissions for areas near the Ports of Long Beach and Los Angeles. It estimated that about 50,000 people living closest to the port are exposed to cancer risks of up to, and in some cases over, 500 new cancer cases per million people – just from diesel PM sources within the boundaries of the ports.

There are also concerns about impacts on communities in places like San Bernardino and Riverside counties which are adjacent to the roads, freeways and rail systems that carry goods away from the ports. A major study sponsored by the National Institute of Environmental Health Sciences, CARB, USEPA and the South Coast Air Quality Management District among others determined that young children who live in pollution corridors near a major road (in the vicinity of 650 feet) are significantly more likely to have asthma than children who live blocks away.

For the 15-year period between 2005 and 2020, CARB estimated that the economic valuation of goods-related health effects is approximately \$70 billion in present value dollars. This assumes a value of \$9.3 million (in 2020) per life ended prematurely.

CALMITSAC is seeking opportunities to reduce environmental and negative public health impacts while allowing the economy to grow at the same time. The economy could stagnate, however, if the problems of increasing congestion and limitations in transportation capacity are not addressed.

Conclusion

In summary, CALMITSAC applauds the hard work of this Commission and pledges its support in your ongoing efforts to find feasible solutions to the nation's pressing financial problems. I believe the key to success will be continued collaboration and a willingness of all stakeholders – both public and private – to not only share in the benefits of key projects, but to also accept shared responsibility for the problems facing our transportation system and a shared responsibility for funding these projects.

The State Goods Movement Action Plan (GMAP) calls for “simultaneous and continuous” improvement in goods movement infrastructure and environmental mitigation. CALMITSAC strongly endorses this policy.

Time for action is now. It is not possible to do everything for everyone, but California needs a series of success stories and a willingness to fund them. Coalition building and successful fund raising depends on commitment, coordination, collaboration, consensus and compromise. CALMITSAC is taking this spirit of collaboration into the development of a strategic plan for California's Marine Transportation System.

We would like to close with some insightful comments by two leaders in the maritime industry.

Excerpts from Chris Koch, Executive Director of the World Shipping Council, speech at 6th Annual Trans-Pacific Maritime Conference, March 3, 2006.

The federal government has basically shown what role it will play. There are existing, significant programs that may be available for providing a share of the necessary resources. But Washington doesn't own the infrastructure and will not be the leader of developing or implementing the solutions. Nor would it be realistic to expect dramatic new spending initiatives out of Washington to address these issues. The solutions lie with the industry – including freight owners – working with the proper levels of local government to seek a consensus on the priority projects and the funding shares and mechanisms to make the specific projects work. When that happens, the transportation infrastructure will be improved.

Excerpts from Journal of Commerce editorial February 6, 2006 by Peter Tirschwell, re DOT's Framework for a National Freight Policy:

We must bear in mind that it's one thing to issue a report; it's something else to do something about it. At every turn you find phrases such as "public-private collaboration." That's another way of saying the private sector will be asked to chip in. That's stumbling block No. 1, because shippers are accustomed to seeing their user-fee dollars disappear into thin air.

Until policy-makers realize that the private sector will resist being a serious participant in infrastructure upgrades until it is guaranteed a meaningful say in

how the money will be spent and a guarantee that money collected will go entirely for its intended purpose, more time will be lost, and gridlock detrimental to the economy will draw ever closer.



**CALIFORNIA MARINE AND INTERMODAL
TRANSPORTATION SYSTEM ADVISORY COUNCIL**

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Co-Vice Chair: Bob Gore, Infrastructure Delivery Council

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James FitzGerald	Burlington Northern and Santa Fe Railway Company
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Bob Gore	Infrastructure Delivery Council
Gary Gregory	California State Lands Commission
Robin Grove	Pacific Coast Council (of Customs Brokers and Freight Forwarders)
Lee Hieber	California Marine Affairs and Navigation Conference
Bill Jones	U.S. Environmental Protection Agency
Captain Lynn Korwatch	Marine Exchange of San Francisco Bay Region
Bill Lyte	Consulting Engineers and Land Surveyors of California
Lawrence Mallon	So. Cal. Marine Transportation System Advisory Council
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Richard Nordahl	California Department of Transportation
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Barry Sedlik	California Business, Transportation and Housing Agency
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Marianne Venieris	Center for International Trade and Transportation



POLICY & TECHNICAL PAPER

**SUBMITTED TO
THE NATIONAL SURFACE TRANSPORTATION POLICY & REVENUE
COMMISSION**

**FEBRUARY 21 & 22, 2007
LOS ANGELES, CALIFORNIA**

White Paper Submitted by: The Port of Long Beach, the Port of Los Angeles and the Alameda Corridor Transportation Authority

**Port of Long Beach
Port of Los Angeles
Alameda Corridor Transportation Authority**

Author: Multiple Authors

The opinions presented are those of the author(s) and do not necessarily represent an opinion or endorsement of the Surface Transportation Policy and Revenue Study Commission Steering Committee members.



**NATIONAL SURFACE TRANSPORTATION POLICY
AND REVENUE STUDY COMMISSION
FEBRUARY 21, 2007, LOS ANGELES, CA**

**WHITE PAPER SUBMITTED BY:
THE PORT OF LONG BEACH, THE PORT OF LOS ANGELES &
THE ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY**

As America's Gateway, the San Pedro Bay Port Complex, comprised of the Port of Long Beach and the Port of Los Angeles (Ports), in partnership with the Alameda Corridor Transportation Agency (ACTA), are the two busiest seaports in the United States and the busiest train corridor. Combined, the Ports are the fifth busiest in the world and the busiest seaport complex in the nation, moving more than 43% of the nation's containerized cargo. In 2006, the Ports moved over 15.7 million TEU's (twenty-foot equivalent containers), and handled more than \$260 billion in trade. The Alameda Corridor, a major link to the nation, currently accommodates 20,000 trains a year. As America's Gateway, we facilitate millions of jobs across the nation, and play a critical role in the seamless, invisible, reliable movement of goods that our nation's businesses and consumers rely on every day. The Ports are very proud that our port complex is an important economic engine to the national economy; however, the rapid increase in international trade is placing an unprecedented demand on our air quality and transportation infrastructure system.

I. Objectives

The Ports support the recommendations made by the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) for the improvement of goods movement which include the following objectives:

- Be positioned for the future requirement that federally-designated corridors be multi-state;
- Share best practices to gain full value from infrastructure investments;
- Set priorities at the system level rather than project level to gain synergy and save money; and
- Develop a shared message to make a national case for the need to invest in the west coast corridor.

The Ports and ACTA are aligned with the Surface Transportation Policy and Revenue Commission's mission and are ready to work with the Commission towards a successful study and plan for the benefit of the entire nation. In addition, the Ports are very committed to improving air quality while improving the transportation infrastructure system that services the nation with its containerized goods.

II. America's Gateway, a National Goods Movement Corridor - Projects of National and Regional Significance

Needless to say, the efficient movement of cargo through America's Gateway, a National Goods Movement Corridor, is vital to the nation's economy and quality of life. In order to continue serving the nation and its international imports, improvements to this Corridor have been identified and the federal government and Congress have recognized the importance of these facilities by designating them as "Projects of National and Regional Significance" and "High Priority Projects" in the national transportation reauthorization legislation, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). These projects are as follows:

- I-710 and the Gerald Desmond Bridge
- SR 47 Expressway
- Alameda Corridor (built)
- Alameda Corridor East

Equally important are the connections to the above listed Projects of National and Regional Significance and are equally important to America's Gateway, a National Goods Movement Corridor:

- Colton Crossing
- Seaside Avenue/Ocean Boulevard & Navy Way Interchange
- I-110 Connector Improvement Programs
- Port of Los Angeles/Port of Long Beach Rail Systems
- Advanced Transportation Management Information and Security Systems

The attached table summarizes the above projects. In addition, these projects are high-priority projects recommended for the State of California Proposition 1B Bond funding in the recently released State of California Business, Transportation, & Housing Agency/CalEPA *Goods Movement Action Plan*. In anticipation of the expected tripling of trade through America's Gateway, the Ports and ACTA have committed to improving critical goods movement infrastructure in conjunction with environmental solutions that offset the disproportionate impacts in the region. The recently adopted San Pedro Bay Ports Clean Air Action Plan will reduce truck and auto emissions as well as increase the use of rail, which has the added benefit of congestion reduction and improving supply chain reliability. Over the last decade, the Ports have made significant investments of port generated revenue in critical infrastructure, including the construction of the Alameda Corridor.

San Pedro Bay Ports Clean Air Action Plan (CAAP) The Port of Los Angeles and the Port of Long Beach, with the participation and cooperation of the U.S. Environmental Protection Agency, California Air Resources Board, and South Coast Air Quality Management District (AQMD), have developed a sweeping, aggressive strategy to significantly reduce the health risks posed by air pollution from port-related sources. The CAAP is the most comprehensive, far-reaching strategy to combat air pollution ever developed by any United States seaport. It will involve hundreds of millions of dollars of investment by the Ports and private sector businesses, and will expedite the introduction of new and innovative methods of reducing emissions prior to that of any federal or state requirements. For the first time ever, the Ports have established uniform air quality standards at three key levels: the San Pedro Bay level, Project Specific level, and Source Specific Performance level. The Ports will leverage a number of implementation mechanisms for attaining the proposed standards, including but not limited to: lease requirements, tariff changes, California Environmental Quality Act (CEQA) mitigation, and incentives. Over \$400 million has already been committed by the Ports towards implementation of this plan. The Project Specific standard requires development to be below the threshold of significance for health risk.

Measures

Within the next five years, implementation of the CAAP is expected to eliminate diesel particulate matter (PM) emissions by 47% (-1,200 tons/year), smog-forming nitrogen oxide (NOx) by 45% (-12,000 tons/year), and sulfur oxides (SOx) by 52% (- 8,900 tons/year). The following summarize the key measures:

- **Trucks:** By the end of 2011, all trucks calling at the ports will meet or be cleaner than EPA 2007 particulate emissions standards, thereby eliminating “dirty” diesel trucks from the Ports and surrounding communities.
- **Ships:** All major container cargo and cruise ship terminals will be equipped with shore-side electricity within five to ten years so that vessels can shut down their diesel-powered engines while at berth. Ships also would be required to reduce their speeds when entering or leaving the harbor region (24-miles off shore), use low-sulfur fuels, and employ other emissions reduction measures and technologies.
- **Terminal Equipment:** Within five years, all cargo-handling equipment would be replaced or retrofitted to meet or emit at levels below those called for in the toughest U.S. Environmental Protection Agency emissions standards for new equipment. Without the Clean Air Action Plan, much of the cargo handling equipment not affected by the California Air Resource Board’s recently adopted cargo handling equipment regulation would be allowed to operate at current emission levels until it wears out.
- **Train Locomotives:** Within five years, all switching locomotives operating in the Ports will also meet the toughest U.S. Environmental Protection Agency standards for new locomotives, use cleaner fuels and exhaust treatment and devices that will automatically shut off engines to prevent extensive idling. In addition, all new rail yards must use the cleanest technologies available for locomotives, trucks, and cargo handling equipment within their facilities.

III. Policy Recommendations

Freight Funding Program

A freight funding program should be developed and funded around the established Projects of National and Regional Significance designation. The I-710 corridor, which includes the Gerald Desmond Bridge, along with the Alameda Corridor, SR-47 Expressway and Alameda Corridor East are critical components of America's Gateway, a major National Goods Movement Corridor. Together, these Projects of National and Regional Significance help deliver over 43% of the nation's waterborne imports on to their destination. The federal government should prioritize these projects and vital connections to these facilities from origins such as the Ports and ensure SAFETEA-LU funding levels are maintained for the most critical projects. The re-authorization of SAFETEA-LU should not create additional Projects of National and Regional Significance and should allocate future funding to those already designated and prioritized to ensure their timely completion.

Private Sector Participation

Even with the new funding resources from State Proposition 1B and possibly from the federal government, there will not be enough funding to pay for all of the necessary infrastructure and mitigation projects recommended for the region. To help reduce the funding gap and preserve the continuance of the Highway Trust Fund, all levels of government as well as private industry must contribute a share in the cost of improving goods movement related infrastructure.

Unfunded Trade Mandate: the Federal Government Must Pay its Fair Share

It is the policy of the U.S. government to reduce barriers to trade wherever possible. While these policies promote international commerce and job growth, they also create an *unfunded trade mandate* for gateway regions such as our Ports. The federal government has not provided any special funds for international gateways to effectively cope with the surge in cargo through its ports and airports and along its roads and railways and address the air quality of these regions. At America's Gateway, the Port of Long Beach and the Port of Los Angeles, ACTA, the private sector, and the State of California using Bond funding are ready to pledge more than their fair share.

Federal assistance is essential to compensate the region for the disproportionate costs borne locally and regionally for the goods movement services and the significant economic benefits provided to the rest of the nation. Again, approximately 43% of the nation's waterborne containerized imports come through the Port of Los Angeles and Port of Long Beach. The next reauthorization must recognize the importance of a *national goods movement system*, establish appropriate levels of federal funding support, as well as provide further opportunity for flexibility in the use of federal funds.

Additionally, the federal government has not recognized that the nation's transportation corridors also have an unintended affect of increased diesel emissions. As America's Ports, the Port of Los Angeles and the Port of Long Beach have committed to over \$400 million to our Clean Air Action Plan. It is time that the federal government integrate goods movement infrastructure and environmental improvements into a seamless set of solutions. This type of integration has not taken place at the federal level, but truly needs to be addressed together.

There is a major disconnect between federal trade and transportation policies. As a result, funding for goods movement-related projects has fallen way behind the actual need. Agencies received far less than

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they requested in the most recent national transportation reauthorization legislation, SAFETEA-LU. It is time that the federal government examines a full range of creative strategies to address this lack of funding to improve our goods movement infrastructure system and air quality, including but not limited to, a dedicated percentage from U.S. Custom Duties collected to be reinvested in the ports of entry. The U.S. Customs Los Angeles District Office collects over \$12 million a day. Currently, 30% of U.S. Customs Revenues collected goes towards federal Agricultural Programs, 10% goes toward the operations of the U.S. Customs Office, while the remaining 60% of the revenues goes to the federal budget. Identifying a portion of U.S. Customs Duties could effectively address the funding shortfall so desperately needed.

The Ports and CALMITSAC endorse the Coalition for America's Gateways and Trade Corridors' call for a "dedicated and predictable freight infrastructure funding." Funding and allocation strategies need to be developed for Projects of National and Regional Significance. CALMITSAC joins with the Coalition for America's Gateways and Trade Corridors in urging the National Surface Transportation Policy and Revenue Commission to place dedicated freight funding as a top priority. This national goods movement system program also should include research/planning and education/outreach elements.

In closing, as America's Gateway, a National Goods Movement Corridor, the Port of Los Angeles, the Port of Long Beach, and the Alameda Corridor Transportation Authority, thank you for the work that your Commission has undertaken and for reviewing our recommendations to address the federal need to improve that nation's goods movement corridors and integrate an air quality improvement program to these projects of national significance. We are committed to working with the federal government and are confident that working together this goal can be achieved.

Footnote:

This document is intended to complement the white paper submitted by CALMITSAC, which is a regional affiliate of the Marine Transportation System National Advisory Council (MTSNAC) established by former Secretary of Transportation Norman Mineta. CALMITSAC represents the ports in California.

According to the Marine Transportation Study prepared by the U.S. General Accounting Office, Customs duties for import commodities through marine transportation for fiscal years 1999, 2000, and 2001 were about \$14.3 billion, \$15.6 billion and \$15.6 billion, respectively. The cost of Customs operations for the same years were about \$484.2 million, \$538.4 million and \$577.2 million, respectively. According to U.S. Customs, our Port users pay approximately \$12 million each day in Customs duties, with the Los Angeles Customs District leading the nation in total duties collected for maritime as well as air cargo.

Attachment

America's Gateway, A National Goods Movement Corridor – Port of Los Angeles and Port of Long Beach High Priority Transportation Projects



TITLE	AUTHOR	ORGANIZATION	PANEL #
<i>Highway Trust Fund and Transportation Issues</i>	John Horsley	American Association of State Highway and Transportation Officials	2
<i>A Plan to Fly California (Without Ever Leaving the Ground): Highlights of the California EIR/EIS</i>	Mehdi Morshed	California High-Speed Rail Authority	2
<i>Benefits of the California High - Speed Train System</i>	Mehdi Morshed	California High-Speed Rail Authority	2
<i>Preferred Alignments and Stations - Statewide</i>	Mehdi Morshed	California High-Speed Rail Authority	2
<i>Bond Funding First Step of Many Needed to Rebuild the State's Transportation Network</i>	David G. Ackerman	California Chamber of Commerce	2
<i>California Transportation Commission Background Briefing Materials Issues for 2007</i>	John Barna	California Transportation Commission	3
<i>Expanded Use of Public Private Partnerships Will Accelerate the Development of Transportation Infrastructure and Reduce Pressure on Public Finance</i>	R. Sean Randolph	Bay Area Economic Forum	3
<i>Expanding Use of Tolls for Funding Border Infrastructure</i>	Gary Gallegos	San Diego Association of Governments	3
<i>Introduction Material from the OCTA Comprehensive Annual Financial Report for Fiscal Year Ended June 30, 2006</i>	Arthur Leahy	Orange County Transportation Authority	3
<i>Supplemental Materials 91 Express Lane Schedule</i>	Arthur Leahy	Orange County Transportation Authority	3
<i>National Transit Policy and Implementation in California</i>	Kent Woodman	Thompson Coburn LLP	3
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<i>Surface Transportation Authorization Principles</i>	James D. Waltze	The Associated General Contractors of America	4
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