Best Practices for Public Transportation:

Guidance for Local Governments and Transit Operators to Achieve the Blueprint Vision of Significantly Increased Transit Use

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Sacramento Transportation & Air Quality
COLLABORATIVE

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EXECUTIVE SUMMARY

Less than 1% of trips in the greater Sacramento region are made each day using public transit. Within Sacramento County the daily mode share for transit is slightly higher, approximately 1.3%

Despite the modest role of public transit in the overall transportation system today, the Sacramento region is positioning itself for a very different future. In recent years, the Sacramento countywide area has become a national leader in demonstrating and quantifying the linkage between land uses and transportation systems. In December 2004 a major milestone was achieved with the Sacramento Area Council of Governments' approval of the 2050 Blueprint Preferred Scenario.

The Preferred Blueprint Scenario illustrates a way for the region to grow through the year 2050 in a manner generally consistent with seven growth principles. A primary objective of these principles is to create a form of development that lends itself to greater transportation choices.

Preliminary analysis of the Blueprint Preferred Scenario was conducted and compared to a future scenario based upon historic land use patterns (referred to as the "base case"). The comparison indicates a clear distinction in the projected mode of travel, vehicle miles of travel per household, and air quality.

Comparison of Base Case and Draft Preferred Blueprint Scenarios for Sacramento County

Key Statistics	2000 (Existing)	2050 Base Case (Historic Trends)	2050 Blueprint Preferred Scenario
Population			
Sacramento County	**1,041,219**	**2,155,000**	**2,326,000**
6-County Region	**1,603,863**	**3,817,000**	**3,817,000**
Type of trips			
Auto	**91.1%**	**93.3%**	**81.1%**
Transit	**1.3%**	**1.1%**	**4.4%**
Bike and Pedestrian	**6.7%**	**5.6%**	**14.5%**
Total	***100%***	***100%***	***100%***
Vehicle miles of travel (per day per household)		**45.1**	**33.7**

Sources:

Pre-Census Travel Behavior Report: Analysis of the 2000 SACOG Household Travel Survey, Sacramento Area Council of Governments, Sacramento, CA, 2001.

Revised Historical City, County and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts, State of California, Department of Finance, Sacramento, California, March 2002.

http://www.sacregionblueprint.org/sacregionblueprint/the_project/discussion_draft_preferred_scenario.cfm

http://www.sacregionblueprint.org/sacregionblueprint/the_project/stats/sacramentocountytotal.pdf

The Collaborative's Transportation Team has been particularly focused on practices that will assist the Sacramento countywide area achieve the vision of at least at 10% shift in travel mode from automobiles to walking, cycling, and transit. Transit use is forecasted to increase from 1.3% of trips to 4% or 5% or more, in the Sacramento countywide area.

Implementation of Blueprint-like growth principles is an important factor in providing greater transportation choice, including creating an environment conducive to increased transit use. However, the form and location of development itself is insufficient to achieve the nearly 350% increase in transit usage that was preliminarily projected as the outcome of implementing Blueprint style growth principles through 2050.

Most of this increase in public transportation ridership will come from automobile drivers choosing to use public transit - these patrons are called "choice" riders. Although the elderly population is anticipated to grow more quickly than the population as a whole, the overall percentage of transit dependent persons will not change substantially enough to create such a dramatic increase in the transit mode share.

This change will only occur if strategic designs are made that create an environment within which transit can succeed. This document describes considerations and "best practices" in each of four critical areas:

- Land Use;
- Transportation;
- Funding; and,
- Collaboration between agencies, including consistency of decisions.

However, this document goes beyond traditional transit references by emphasizing:

- *Local government's critical role in transit*, and suggesting that local governments become more assertive in the provision of public transportation for their residents and employers; and,
- *People*: what transit customers consider in choosing if, when, and how frequently they patronize public transportation.

An additional section is included on performance measurement. The Collaborative's Transportation Agreement (see *Final Report, Volume1: Agreements and Recommendations*) states that "outcome-based performance measures should be used by the jurisdictions within Sacramento County to assess progress toward a more effective and balanced transportation system."

The Role of Local Government

In order to achieve greater transit usage, it will be necessary for local governments to become even more assertive in the planning and provision of public transportation.

This document seeks to provide guidance to local governments. Local jurisdictions are in the best position to coordinate the many pieces of a successful transit service, even if they are not a direct provider of transit services, since they generally have

authority over land use decisions, as well as the local transportation infrastructure that supports public transit.

Transit Riders as "Customers"

Public transportation serves a variety of persons, and their mobility needs. All public transportation systems have one aspect, above all others, in common: *they serve people*. These people are public transportation *customers*.

As with any business, all transit customers – the transit dependent and choice riders alike – have some control over if, when, and how often to use public transportation. To achieve significant increases in transit patronage, customers must be targeted and sold on the available transit products.

Key Best Practices

More than 80 Best Practices are described in the pages that follow. Abbreviated versions of few key best practices are listed below.

Land Use

Readers are encouraged to read the Land Use sections of the Collaborative's *Final Report, Volume I: Agreements and Recommendations* and *Final Report, Volume III: Supplemental Text for Agreements*.

- Local governments and transit providers should work together to create a vision for an attractive community.
- Local governments should work to maximize densities in transit corridors. Residential densities in transit oriented developments should be, at a minimum, 20 units/acre in suburban areas, 30 units/acre in urban areas, and 75 units/acre in metropolitan downtowns.
- Local governments and transit providers should avoid land uses in transit oriented developments that do not support transit, carefully consider urban form, and manage parking supplies.
- Local governments and transit providers should work with land owners to consider how expansion and increased densities might phase in over time.

Transportation

Planning / Scheduling

- Local agencies should develop their own transit plans.
- Transit planning should be based upon data collected about existing and potential customers, and a specific business strategy.

Time Efficiency / Running Speed

- Local agencies should coordinate with transit operators to adjust signal timing to give greater preference to transit routes and to install signal priority systems to extend green lights when transit vehicles are approaching, where feasible.

- ❒ Transit operators should consider the use of headway-based operations, rather than schedule-based operations.

Connectivity, Coordination, and Integration

- ❒ Local agencies and transit operators should work to integrate each transit route within the total transportation system.
- ❒ Local agencies and transit operators should give priority consideration to capital improvements that eliminate gaps in the transportation system.

Accessibility

- ❒ Local agencies and transit operators should incorporate Universal Design into the design standards for transportation facilities and consider Universal Design objectives at all stages of transportation and land use planning.
- ❒ All agencies should obtain feedback from users with special needs in designing transportation systems and projects.

Reliability

- ❒ Transit operators should work to improve schedule adherence and reliability by identifying high-traffic areas and bottlenecks that cause delays, and eliminate these areas from the routes.
- ❒ Transit operators should record data on "turn down" rates of cyclists that cannot store their bicycles, and increase storage capacity on those routes.

Comfort

- ❒ Transit stops and stations should be protected from inclement weather.
- ❒ Transit operators should survey riders to identify comfort needs and develop action plans to respond to the most prevalent requests and complaints.

Safety/Security

- ❒ Transit operators and local agencies should install security cameras and security lighting at all transit stations, major bus stops, and other locations with higher-than-average incident rates.
- ❒ Transit operators and law enforcement agencies should consider co-locating community-oriented policing stations and sub-stations with transit facilities.
- ❒ Transit operators should provide a 24-hour dedicated phone system with a live dispatcher to allow transit riders and others to report incidents. Consideration should be given to serving non-English speaking populations.

Information, Marketing, and Promotion

Information

- ❒ Transit operators should develop automated systems to page subscribers when a bus or light rail train is/will be late.
- ❒ Transit operators should install intelligent transportation system (ITS)-based Automatic Vehicle Locator (AVL) systems in buses and provide reliable, real time information about next bus arrival times at stations, via the internet, and using automated telephone systems.

Marketing and Promotion

- ❒ Transit operators should spend sufficient funds to understand current customers and potential customers.
- ❒ Transit operators should target specific customers and potential customers that are most likely to be attracted by effective marketing.

Employee Training and Development

Employee Training

- ❒ Transit operators should provide customer service training to drivers and dispatchers. Avoid using automated answering systems on reservation lines.
- ❒ New operators should receive documented training. Classroom training topics should include passenger relations/sensitivity skills and practices, especially as relates to special needs populations and inexperienced users.

Employee Development

- ❒ Transit operators should have formal employee development programs.

Complimentary Transportation Facilities

Readers are encouraged to read the companion documents *Best Practices: Complete Streets*, *Best Practices for Bicycle Planning and Design*, and *Best Practices for Pedestrian Planning and Design*, which are included in Volume II of the Collaborative's *Final Report*.

- ❒ Local agencies should provide high quality pedestrian and cycling facilities around transit stations, based on Universal Design.
- ❒ All agencies should consider attracting a car-sharing vendor to reduce the need to own automobiles.
- ❒ Local agencies and transit operators should contract for "guaranteed ride home" services.
- ❒ Transit operators should consider the feasibility of providing bike rentals at major transit stations.

Funding

Readers are encouraged to read the Land Use sections of the Collaborative's *Final Report, Volume I: Agreements and Recommendations* and *Final Report, Volume III: Supplemental Text for Agreements*.

- ❒ Charge premium fares for the highest quality services.
- ❒ Secure long-term dedicated transit funding, including consideration of sales taxes, parcel based fees or taxes, employee payroll taxes, and student fees.
- ❒ Carefully consider using road and parking pricing as a possible source of funding public transit.

- ❒ Carefully consider the possible establishment of transit financing districts in advance of parcel creation in new development areas. Similar districts could be created in existing areas by requiring, as a condition of approval on a development or reurbanization project, that properties join the district. As needed, seek adjustments to laws and regulations.
- ❒ Seek to keep labor costs competitive.
- ❒ Annually contribute sufficient monies to a "sinking fund" to ensure that sufficient funds to replace rolling stock are accumulated over several years. Identify, and seek modifications, to laws and regulations that impede this standard business practice.

Collaboration and Consistency Of Decisions

- ❒ Local agencies should prepare their own Transit Development Plans. Components of the plan should include:
    1. Visions, Goals, and Objectives;
    2. Existing Conditions and Existing Plans;
    3. Transit Route Plans;
    4. Local Land Use and Transportation Actions to Support Transit;
    5. Funding the Plan;
    6. Agreements with Transit Providers; and,
    7. Collaboration.

Performance Measurement

- ❒ Transit operators should establish a performance measurement system.
- ❒ Transit operators should automate data collection and electronic information management to support a performance measurement system.

Each local jurisdiction and agency operating within Sacramento County may refer to this "toolkit" in the planning of new development, in the entitlement process, and in the planning and design of new transportation facilities, including retrofits to the existing, or "built," environment. This toolkit is not intended to be a mandatory set of requirements in any application, including in the entitlement of new development, but instead is intended to illustrate practices that other jurisdictions have found useful.

INTRODUCTION

The purpose of this document is threefold:

- To identify the conditions and factors most prevalent in successful transit systems.
- To document emerging and best practices including citations of specific jurisdictions, transit operations, and transit services that might be looked to for additional consideration. A list of related reference materials that might be consulted for further information is also provided.
- To illustrate the level of transit service necessary to achieve the envisioned level of transit usage under long-term application of the growth principles established during the Sacramento Area Council of Governments' *Blueprint* process.

This document goes beyond traditional transit references by emphasizing:

- *Local government's critical role in transit*, and suggesting that local governments become more assertive in the provision of public transportation for their residents and employers; and,
- *People*: what transit customers consider in choosing if, when, and how frequently they patronize public transportation.

The conditions, factors, and best practices identified herein were gleaned from transit operations recognized as being exemplary or top performers in their peer group, communities with high or rapidly increasing transit ridership, and resource materials prepared by national transportation organizations that are widely used in the public transportation business. The illustration of future transit levels is based upon an application of these principles.

This document is one of five "Best Practice" documents prepared and approved by the Transportation Team of the Sacramento Transportation and Air Quality Collaborative. The documents work together to provide a comprehensive "toolkit" for consideration by local jurisdictions and other agencies.

This document complements the other documents in this series:

- ✓ *Best Practices -- Complete Streets*;
- ✓ *Best Practices -- Bicycle Facility Planning and Design*;
- ✓ *Best Practices -- Pedestrian Facility Planning and Design*; and,
- ✓ *Best Practices -- Universal Design*.

Each local jurisdiction and agency operating within Sacramento County may refer to these toolkits in the planning of new development, in the entitlement process, and in the planning and design of new transportation facilities, including retrofits

to the existing, or "built," environment. These toolkits are not intended to be mandatory sets of requirements in any application, including in the entitlement of new development, but instead are intended to illustrate practices that other jurisdictions have found useful.

Local Government Emphasis

The linkage between transportation and land use is widely documented. The Sacramento region is moving towards land use forms that are likely to be increasingly more supportive of public transit, and in some cases dependent upon the availability of quality transit service. Local governments generally have authority over these land use decisions.

Further, transit systems depend upon complementary road, bike, and pedestrian facilities that are primarily owned and operated by local governments.

Where public transportation is provided by an independent entity, coordinating land development with transit service, with other transportation facilities, is very challenging. This is particularly true given the separation of jurisdictions and authorities, including separate agencies that control funding.

In order to achieve greater transit usage, it will be necessary for local governments to become even more assertive in the planning and provision of public transportation. Local jurisdictions are in the best position to coordinate these many pieces of a successful transit service, even if they are not a direct provider of transit services.

This document seeks to provide guidance to local governments.

Customer Emphasis

Public transportation serves a variety of persons, and their mobility needs.

- ❒ Some transit systems are designed to provide mobility to transit dependent persons with occasional need to access goods, services, entertainment, and other social events.
- ❒ Other services are available to frequent users that rely on quality public transportation for most of their mobility needs within a community, including commuting to and from work.
- ❒ Still others provide mobility within and between communities for both the transit dependent and the discretionary or "choice" rider.

All public transportation systems have one aspect, above all others, in common: *they serve people*.

CONTEXT

The Land Use – Transportation Linkage

In recent years, the Sacramento countywide area has become a national leader in demonstrating and quantifying the linkage between land uses and transportation systems. In December 2004 a major milestone was achieved with the Sacramento Area Council of Governments' approval of the 2050 Blueprint Preferred Scenario[1].

The Preferred Blueprint Scenario illustrates a way for the region to grow through the year 2050 in a manner generally consistent with the following growth principles:

- Transportation choice;
- Mixed-uses development;
- Compact design;
- Housing choice and diversity;
- Use of existing assets;
- Quality design; and,
- Natural resources conservation.

These growth principles are focused on meeting the following objectives (with those directly related to transportation appearing in *italics*).

- Improving the overall quality of life;
- *Encouraging people to sometimes walk, ride bicycles, ride the bus, ride light rail, take the train or carpool, and in the process shorten the average length of the remaining auto trips;*
- *Making better use of existing public infrastructure;*

[1] SACOG has described the preferred scenario as follows.

> The scenario is a result of numerous public workshops and meetings with local government staff and elected officials. It should be interpreted and used as a concept-level illustration of the growth principles. It was developed with parcel-level data and analysis to help ensure that the growth concepts were being applied in a realistic manner; however, it is not intended to be applied or implemented in a literal, parcel-level manner.

SACOG has further explained:

> The map assumes certain levels and locations of both "reinvestment" (i.e., additional development on already-built parcels) and greenfield development (i.e., large-scale development on vacant land). The purpose of this mapping is to illustrate, generally, the amount and locations for these types of growth. It is not intended to indicate that a specific parcel should or should not be developed in a particular manner. That level of planning is the responsibility of local governments, and is beyond the specificity appropriate for regional-scale, long-term scenario planning.

- Improving the sense of community;
- Providing a diversity of housing options, more people have a choice;
- Intensifying the use of underutilized parcels;
- Increasing the amount of public use open spaces; and,
- Conserving resources and protecting species.

Details of the 7 growth principles are included in Appendix B.

Preliminary analysis of the Blueprint Preferred Scenario was conducted and compared to a future scenario based upon historic land use patterns (referred to as the "base case"). The comparison indicates a clear distinction in the projected mode of travel, vehicle miles of travel per household, and air quality. Table 1 provides a summary comparison for the Sacramento countywide area.

Table 1

Comparison of Base Case and Draft Preferred Blueprint Scenarios (2050) for Sacramento County

Key Statistics	2000 (Existing)	2050 Base Case (Historic Trends)	2050 Blueprint Preferred Scenario
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http://www.sacregionblueprint.org/sacregionblueprint/the_project/stats/sacramentocountytotal.pdf

Increasing the Transit Share of Trips

Implementation of Blueprint-like growth principles is an important factor in providing greater transportation choice, including creating an environment conducive to increased transit use. However, the form and location of development, while necessary, is insufficient to achieve the nearly 350% increase in transit usage, if not more, that was preliminarily projected as the outcome of implementing Blueprint style growth principles through 2050.

The success of public transportation is directly related to a number of factors. This document focuses on factors within four policy areas:

- Land Use;
- Transportation;
- Funding; and,
- Collaboration between agencies, including consistency of decisions.

Increasing the mode share of public transportation requires specific consideration of each of these four areas. Like the form of development, each of these is necessary, yet not sufficient, to affect significant change in transit use.

The balance of this document addresses each of these four areas from the perspective of transit serving a greater share of daily trips.

LAND USE

The linkages between land use and transportation are well documented. This correlation is particularly strong for public transit use.

The Land Use section of the Collaborative's *Agreements and Recommendations* suggests hundreds of urban form policies and actions for increasing infill and reurbanization development. These agreements and recommendations are consistent with the principles and objectives of the Blueprint, and would result in new development that is more walkable, more bikable, and more conducive to transit use.

Said differently, the use of public transportation, and its 'success,' is partly dependent on developed areas meeting these characteristics.

Land Use Conditions and Factors Related to Transit Success

In this section, five factors that are directly linked to the use of public transit are reviewed. These factors are:

- Land Use Density;

- Land Use Diversity;
- Housing Diversity;
- Design; and,
- Location of High Trip Attractors and Services.

Land Use Density

There are many types of transit that provide varying levels of capacity, speed and coverage. It is important to recognize that residential and employment densities matter when planning for each type of transit service and for the frequency of transit services.

Table 2 shows the minimum residential density levels that are needed for the various types of transit service.

From the user's standpoint, higher land use densities (combined with mixes of land use type) means more people, jobs, businesses, and services are accessible by a single transit service.

From the perspective of the transit operators, higher land use densities equate to more potential customers in the ¼ mile distance where the greatest share of transit riders are located.

Higher land use densities are correlated with lower per-rider operating costs. The Sacramento Area Council of Governments recently compiled statistics showing this relationship between densities and transit operating costs[2]:

> Older, denser eastern cities with transit-friendly land use patterns (Boston, Philadelphia, Cleveland, Baltimore, St. Louis, and New Orleans) operate in the range of $1.70-$3.30 cost per rider, while newer, more sprawling western cities (Seattle, Dallas, Denver, Portland, San Jose, Sacramento, and Salt Lake City) operate in the range of $2.60-$4.60 cost per rider, while very dense Los Angeles and Orange County operate at $2.20-$2.30 cost per rider.

Research shows that the density of the employment destination is more important in influencing trips than the density of the residential area where the trips originate.

[2] Draft *SACOG Issue Paper for 2007 MTP: Transit Operations Issues*, Sacramento Area Council of Governments, Sacramento, CA, September 2005.

Table 2

Minimum Average Densities for Supporting Fixed Alignment Transit

	Fixed Route – Moderate Service[1]	Fixed Route – Frequent Service[2]	Light Rail[3]	Commute Rail[4]
Dwelling units per acre	7	15	9	12
Residents per acre[5]	18	38	23	30
Employees per acre	20	75	125+	N.A.[6]

These figures represent average densities over large areas. Densities should be highest within 1500 feet of transit stops.

Areas "served" by transit are typically considered to be within ¼ mile of a fixed-route bus stop and up ½ mile from a light rail station.

See additional considerations and information in this section.

Notes:

1. Average density; varies as a fraction of downtown size and distance to downtown.
2. Average density over a two-square-mile tributary area.
3. Average density for a corridor of 25 to 100 square miles; transit to downtowns of 20 to 30 million square feet of nonresidential space.
4. Average density for a corridor of 100 to 150 square miles; transit to downtowns of more than 50 million square feet of nonresidential space.
5. Rounded to nearest whole, based upon 2.5 persons per dwelling.
6. No data available.

Sources:

Public Transportation and Land Use Policy, Boris Pushkarev and Jeffrey Zupan, Bloomington and London, IN, 1977.

The Relationship between Land Use and Travel Behavior in the Puget Sound Region, L.D. Frank and Gary Pivo, Washington State Department of Transportation, Olympia, WA, 1994.

Ten Principles for Successful Development around Transit, The Urban Land Institute, Washington, DC, 2003.

Transit Oriented Development in the Sunbelt, Reid Ewing, Transportation Research Record 1552, Transportation Research Board, National Research Council, Washington, D.C., 1996

Land Use Diversity

Whereas walkable communities rely on mixed-use developments, or a mix of land uses within close proximity, transit systems that operate on fixed alignments need only to have a mix of land uses within its service area, preferably along a single route or line.

A mix of uses, including separate activity nodes, along a transit corridor are integrated, particularly when the various uses are close together, easily accessible, and support each other. It is possible, for example, to live at one station, work at another, and shop at a third, with transit making possible the connections among all three.

In addition, the accessibility of the uses along the corridor, and the diverse types of trips generated by the mix of activity nodes, may help to smooth peak-demand on a transit system. Most transportation systems serve unbalanced peak-period demands (inbound in the morning and outbound during the evening) and transit services are no different. Locating a mix of retail, service, and entertainment uses along a corridor encourages transit usage for after-work or weekend shopping and evening entertainment.

Planning for a diversity of land uses should take into account the two-way nature of the transit corridor. Encouraging travel in both directions, throughout the day, makes the most efficient use of the transit system. One strategy that accomplishes this is locating jobs near suburban stations to encourage reverse commuting.

Housing Diversity

In order to compliment a mix of uses along a transit corridor a variety of housing should also be provided. It is unlikely that the patrons and employees of businesses located along a transit corridor will require a single type of housing. A lack of housing diversity can nullify the advantages in transit ridership gained by mixing land uses.

As examples, housing for senior citizens, single family developments on small lots, multi-family housing, and condominiums all cater to the housing needs of a range of citizens that will work and shop at the variety of employers and businesses located along a transit corridor.

Design

A final consideration is design, and particularly a consideration of how land uses interact with the transportation system, including public transit. Density and diversity of uses can exist in developments that do not interconnect well with public transportation. Design ensures the ease of access between transit services and adjacent developments.

Location of High Trip Attractors and Other Services

In addition to the general density, diversity, and design of land uses along fixed route corridors, it is critical that most high trip attractors (sometimes called "special generators") be located along transit corridors with the highest quality service.

Examples include:

- Hospitals and other medical services, especially those services most likely to serve special needs populations that are transit dependent.
- Universities, colleges, trade schools, and other educational facilities.
- Public agency offices that provide public services (i.e., Department of Motor Vehicles and Social Services).
- Locations where public meetings are conducted.
- Major entertainment facilities.

Providing favorable transit access to these institutions can make a big difference in whether a significant number of employees and "customers" will use transit. Local governments should actively work to gain favorable location and design of such institutions when they are in the planning stage, both initially and as they expand over time. This means locating such "high trip attractors" adjacent to major transit and light rail routes and providing easy pedestrian access from the transit stops to the entrances of the site.

A separate, but similar, issue is locating services for transit dependent populations along transit routes. Many of these services do not attract significant numbers of trips and as such are not considered high trip attractors. Nonetheless, jurisdictions should have policies in place to ensure that services for transit dependent populations are located along transit corridors.

Additional Considerations for Transit Oriented Development

This section does not repeat information above. The prior discussion is intended to apply to transit-supportive land uses in general.

In certain areas, it is appropriate to specifically design land uses with an orientation to transit.

The term transit oriented development is some what of a misnomer. Studies and practice have shown that rubber-tired forms of transit rarely are part of successful transit oriented developments. Conversely, densities of development that support transit-oriented developments are typically less than those surrounding heavy rail.

As such, this section, in practice, is *primarily a discussion of developments around light rail stations*.

A review of successful developments around light rail stations shows that this is a unique form of urban development. No two stations are the same. How a station area should be planned and developed depends on the particular functions and attributes of that station, as well as the surrounding community.

Three factors are commonly found to be critical to the success of any transit oriented development: land uses, urban form, and parking management.

Land Uses Are Critical

Transit supportive uses must be present, including high pedestrian generators that provide opportunities for multi-stop walking trips. Retail examples include convenience stores, daycare centers, coffee shops and full-scale restaurants.

Conversely, land uses that do not support transit service should be avoided. Examples include large footprint stores, retail uses that primarily sell heavy or bulky products, and any use that works against the perception of a safe environment for pedestrians.

The discussion of the land use mix needed to support transit is of particular importance in transit oriented developments.

Uses within walking distance are most critical. Walking distance is typically 5 minutes or up to ½ mile for light rail service. At this distance around a station, there is potential for up to 250 acres of land for transit oriented development.

The highest densities should be located nearest to the station, to optimize transit rider convenience. Intensity of development can taper off away from the station. Examples of existing housing densities within walking distance are:

Santa Clara County CA	25 - 45 units/acre
Puget Sound, WA	10 - 20 units/acre
Denver, CO	25 - 30 units/acre

At the high end of the density spectrum, residential development around the Bay Area Rapid Transit's Fruitvale Station in Oakland is approximately 75 units per acre.

Where possible, land use plans should give consideration to how expansion and increased densities could occur over time.

Urban Form is Nearly as Critical

Frequent, interconnected streets increase the efficiency of transit circulation and offer more choices for pedestrians. Short block lengths keep walking distances short and provide alternative route options. Grid-based street patterns (including modified grids) offer multiple access points to a station and form the overall development framework for long term transit supportive uses.

Architecture is also a factor in making a high-density development appealing and to convey a sense of personal security.

Sightlines supported by directional signage to and from stations help orient pedestrians to their surroundings and should work to reinforce customer perceptions of personal comfort and safety.

Parking Should Be Carefully Managed

Transit oriented development (TOD) lessens the need for automobile use in a station area. However, accommodating vehicles is still critical to the success of a vibrant TOD district. Convenient parking and drop-off zones need to be planned for in all station area plans.

Parking is not just for cars. Ample, convenient and secure bicycle storage locations should be provided close to the entrance of each transit station[3].

TOD provides an opportunity to reduce the amount of parking in the station area through increased transit riderships, reduced residential vehicle ownership and shared off-peak parking at public park-and-ride sites. Setting both minimum and maximum parking standards can help ensure the success of a station area as well as optimize transit ridership.

The purpose of establishing minimums and maximums is to 'right size' the availability of parking in a way that balances maximum developable space and increased competitiveness of transit service for choice riders, with the need for automobile mobility when employees and residents choose to drive. Parking maximums should not be used to create congestion for the purpose of forcing transit use but should be used to complement other measures such as the provision of transit.

Parking lots should be located at the periphery of the station area and to the rear or sides of buildings. This keeps the station and building entrances oriented to the sidewalk and to pedestrian users.

[3] Secure bicycle storage includes bicycle storage boxes, bicycle cages, and bicycle stations.

Larger parking lots can be divided into smaller lots and separated by landscaped walkways. These smaller lots also create an internal movement network and establish a framework for longer term intensification as increased transit usage makes this possible.

Structured parking consumes less land than surface parking and allows maximum development. Station areas should be designed to allow for the evolution of parking from surface lots to parking structures. Parking structures located along key walking routes can enhance the public environment through inclusion of pedestrian-friendly facades and ground floor retail, where feasible.

Land Use Best Practices Related to Transit

- Local governments and transit providers should work to create a vision for an attractive community.
- Local governments should work to maximize densities in transit corridors. Residential densities in transit oriented developments should be, at a minimum, 20 units/acre in suburban areas, 30 units/acre in urban areas, and 75 units/acre in metropolitan downtowns.
- Local governments and transit providers should avoid land uses in transit oriented developments that do not support transit, carefully consider urban form, and manage parking supplies.
- Local governments and transit providers should work with land owners to ensure a mix of land uses along a transit corridor and plan for two-way use of the system.
- Local governments and transit providers should work with land owners to provide a mix of housing types.
- Local governments and transit providers should work with land owners to design developments to interact with the public transportation system.
- Local governments and transit providers should work with land owners to locate high trip attractors along quality transit routes.
- Local governments and transit providers should work with land owners to consider, in land use plans, how expansion and increased densities might phase in over time.
- Light rail stations should be designed as destinations. Some stations might be designed as landmarks to attract visitors as well as to serve public transportation.

Additional best practices and implementation steps for land uses that generally support increased transit use are described in the *Final Report, Volume 1: Agreements & Recommendations*.

Finally, while there are very few examples of development specifically planned and constructed around an express bus service a few cities are trying the concept of bus rapid transit oriented development. Ottawa, Canada has the most experience in this area. In the United States, the Cities of Phoenix and Las Vegas are amongst cities developing projects around express bus terminals. The work of these jurisdictions should be monitored.

Additional References

Best Development Practices, Reid Ewing, American Planning Association Press, Chicago, IL, 1996.

Public Transportation and Land Use Policy, Boris Pushkarev and Jeffrey Zupan, Bloomington and London, IN, 1977.

The Relationship between Land Use and Travel Behavior in the Puget Sound Region L.D. Frank and Gary Pivo, Washington State Department of Transportation, Olympia, WA, 1994.

Statewide Transit-Oriented Development Study: Factors for Success in California, California Department of Transportation, Sacramento, CA, 2002.

Ten Principles for Successful Development around Transit, The Urban Land Institute, Washington, DC, 2003.

Transit Oriented Development in the Sunbelt (Transportation Research Record 1552), Reid Ewing, Transportation Research Board, National Research Council, Washington, D.C., 1996.

Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects (Report 102), Transit Cooperative Research Program, Transportation Research Board, Washington, D.C., 2004.

THE TRANSPORTATION SYSTEM

Providing the transportation systems necessary to support changed land use patterns and to provide competitive choices will be challenging, as a whole, and for transit specifically. Funding, discussed later, is but one of the challenges.

While walking and cycling are envisioned to see the greatest increase in use over time, this increase is primarily in shorter distance trips. Longer distance trips will continue to be made primarily in personal or transit vehicles.

In reading this section the reader should remain cognizant that understanding transit systems and their effectiveness requires an understanding of the people that use or could potentially use public transportation for some or all of their mobility needs.

Types of Users and Their Mobility Needs

Acknowledging the variety of customers is important to understanding the trade-offs when allocating limited funds to a variety of transit services, and is critical to decisions about details of transit services which are then planned and provided.

For the transit dependent there is a far greater likelihood that their travel behavior will be modified to the constraints of available transit services. The "choice rider's" travel behavior – when to travel, where to travel, and how often to travel – is far less likely to be adjusted to take advantage of public transportation.

Users can be grouped and characterized in a number of ways.

- *To what degree is a user dependent on public transit?*

  Some users are fully dependent on public transportation for their mobility to employment, shopping, medical services, education, other public services, social and entertainment activities, religious and other personal business. Others are not at all dependent on public transportation but rather view transit as an option. Still others have some reliance on public transportation.

- *When and how frequently does the user or potential user need transportation? Daily? Weekly? Commute hours? Evenings or "swing shifts"? Weekends?*

Types of Transit Systems in the Sacramento Area

The transit system within the Sacramento countywide area is actually a collection of sub-systems. Four different operators combine to provide five types of service. Each type of service is targeted to a different set of customers and has different cost and funding considerations.

Following is a summary of the characteristics associated with each of the transit services provided in the Sacramento countywide area.

Light Rail Service

- Generally operates at street level, traveling on bridges to cross major intersections and other obstacles such as railroads and bodies of water.
- Upfront infrastructure and rolling stock costs are considerably cheaper than heavy rail service.
- Operates seven days a week at some level.
- Links with bus routes.
- Accessible via stations where bicycles and vehicles can be parked.

Bus Rapid Transit Services

Bus Rapid Transit systems are typically characterized by systems having most or all of the following:

- Exclusive, transit-only travel lanes.
- Traffic management systems that improve traffic flow, such as signal priority systems.
- Frequent service operating at least 16 hours each day, with midday headways of 15 minutes or less and peak headways of 10 minutes or less).
- Prepaid and other advanced ticketing options to minimize on-board fare collection times.
- Low-floor, high-capacity buses with wide doors and aisles.
- Quality transit stops.

"Fixed Route" Bus Services

- Fixed route service is typically provided by larger buses (over 30 feet in length) traveling on a regular, pre-designated, pre-scheduled route.
- Buses traveling on a fixed route do not deviate off the scheduled route.
- Marked bus stops are located along the route.
- A special variation of "fixed route" service that is currently being considered locally is streetcars.

Route Deviation Services (Neighborhood Shuttle Buses)

- Neighborhood shuttles are typically smaller buses, with capacities up to about 20 riders that offer residents greater mobility and another option for local trips within a community.

- Neighborhood shuttles have regular, pre-designated, pre-scheduled routes, but offer special curb-to-curb service (not to be confused with ADA/paratransit door-to-door service).
- Shuttles are able to "deviate" off route up to 1 mile to pick up and drop off passengers. Local shuttle buses are available to riders age 62 and older and disabled passengers with valid paratransit passes.
- Typically reservations must be made at least one day in advance.
- Marked bus stops are located along routes.

Demand Responsive Transit Services (Paratransit or "Dial-a-Ride")

- Demand responsive services are specialized, door-to-door services for people with disabilities who are not able to ride fixed-route public transportation, including lift-equipped buses. The service is typically provided on smaller buses similar to neighborhood shuttles.
- Demand responsive services are for riders pre-determined to be eligible.
- Unlike fixed route or route deviation services, demand-responsive service does not operate on a regular, pre-designated, pre-scheduled route. Typically paratransit services complement other services by operating in the same area, on the same days and during the same hours.

- Demand responsive systems typically provide door-to-door or curb-to-curb service. Typically, drivers do not enter people's homes or their destination locations. Rather, passengers who need extra assistance beyond what the operator provides are often allowed to bring an assistant or "attendant" with them at no additional charge.
- Typically, reservations must be made at least one day in advance within a pick-up window of 30 to 120 minutes on most systems.
- Demand responsive services can make several stops to pick up or drop off other passengers.

In general different services are more likely to match the travel needs of different sets of customers as shown in Table 3.

Appendix C (page C-5) includes a summary of transit operating costs, funding, and performance for operators in the six-county Sacramento region, prepared by the Sacramento Area Council of Governments.

Table 3:
Most Likely Transit Usage by Type of Rider

	Transit Dependent		Choice Rider	
	Occasional	Frequent	Occasional	Frequent
Light Rail	◆	◆	◆	◆
Bus Rapid Transit[4]	◆		◆	◆
Fixed Route	◆	◆	◆	
Route Deviation	◆	◆		
Demand Responsive	◆	◆		

Other Components of a Public Transportation System

There are other versions of public transportation that do not currently operate within the Sacramento Countywide area, including trolleys, jitneys, street cars, and heavy commute rail. Further, there are other aspects of motorized transportation that are sometimes considered a part of the public transportation system:

- Carpools, vanpools, and other shared rides.
- Car sharing programs.
- Taxis.
- Private services such as those provided for clients or facility residents, and airport shuttles.

These are important components of a complete transportation system, but are not discussed in this document.

Existing Plans - Transit System Expansions in the 2025 MTP

The Metropolitan Transportation Plan for 2025 adopted by the Sacramento Area Council of Governments (SACOG) envisions, and provides for, a significant increase in transit service over the next 20 years.

Table 4 identifies transit projects included in the adopted Metropolitan Transportation Plan.

[4] Assumes premium pricing (higher fares) for "better" service.

Table 4

Public Transit Projects / Services in the Metropolitan Transportation Plan

Project	Capital Cost	Annual Operating Cost
Extend light rail, DNA line to Natomas and Sacramento Airport	$620,000,000	$10,100,000
Extend light rail, South line to Cosumnes River College	$150,000,000	$7,000,000
Extend light rail, East line from Rancho Cordova to Folsom	$230,000,000	$17,200,000
Extend light rail, via No Watt Ave to Placer County	$360,000,000	$8,800,000
Extend light rail, Sacramento to Harbor Blvd, West Sacramento	$55,000,000	$1,500,000
Complete NE Line double-track + 24 LRVs, increase service	$65,000,000	$10,700,000
Rehabilitate light rail vehicle fleet	$53,000,000	
Replace buses and equipment, Sacramento RT + other operators	$235,000,000	
Expand Sacramento RT bus fleet from 190 to 420 buses	$53,000,000	$37,000,000
Expand Neighborhood Shuttles from 3 to 17 areas	$106,000,000	$13,100,000
Expand Paratransit fleet from 125 to 175 coaches	$26,000,000	$2,400,000
Build new intermodal station at Sacramento Railyards	$80,000,000	
Improve UPRR main line, Sacramento to Roseville	$26,000,000	
Acquire 5 commuter rail trains, Dixon-Sacramento-Auburn service	$27,000,000	$6,000,000
Add Bus Rapid Transit, along Stockton Blvd to 65th	$14,000,000	$1,600,000
Add Bus Rapid Transit, along Watt Ave, Folsom Blvd to Elkhorn	$20,000,000	$1,600,000
Add Bus Rapid Transit along Sunrise Blvd, Folsom Blvd to Roseville	$20,000,000	$1,600,000
	$2,140,000,000	**$118,600,000**
Source: *Metropolitan Transportation Plan for 2025*, Sacramento Area Council of Governments, 2002		

SACOG is embarking on a new Metropolitan Transportation Plan (MTP) that is expected to be adopted in mid-2007. The MTP update will be a significant effort. The future land use alternatives that will be used to develop the new MTP are expected to be based upon input from local agencies and land use principles similar to those used in the development of the Blueprint Preferred Scenario.

Since these land use principles echo the conditions and factors that have been identified as necessary for transit to be successful it is expected that transit usage will be forecasted to significantly increase. Therefore, a different investment in transit might be expected to emerge in the new MTP, subject to financial constraints.

Transportation Conditions and Factors Related to Transit Success

The many forms of transit will need to combine to serve substantially more riders each day if transit usage is to grow from the current 1.3% of all trips in the Sacramento countywide area to 4-5% or more in the decades to come. Although the elderly population is anticipated to grow more quickly than the population as a whole, the overall percentage of transit dependent persons will not change substantially enough to create such a dramatic increase in the transit mode share.[5] Most of this increase in public transportation ridership will come from automobile drivers choosing to use public transit.

People's use of public transportation is not an exact science. The number of considerations that influence a particular individual's or group's decision to take the bus or light rail are significant, and many involve the personal circumstances of individuals.

However, years of case studies demonstrate a strong, statistically significant, relationship between ridership and specific factors. These factors are also applicable to decisions by the transit dependent, particularly as relates to frequency of use.

This document focuses on 10 factors:

- ✓ Planning / Scheduling
- ✓ Time Efficiency / Running Speed
- ✓ Connectivity, Coordination, and Integration
- ✓ Accessibility
- ✓ Reliability
- ✓ Comfort
- ✓ Safety / Security
- ✓ Information, Marketing, and Promotion
- ✓ Employee Training and Development
- ✓ Complimentary Transportation Facilities

Planning / Scheduling

Planning and scheduling routes involves a number of considerations and requires careful weighing of competing objectives – primarily cost effectiveness balanced

[5] See Table 5. The California Department of Finance projects the percentage of the population age 62 and older will increase from 13% in 2000 to 19% in 2050. However, to date, the majority of the population age 62 and older has not met typical definitions of 'transit dependent.'

with maximizing service and ridership. The following is a brief summary of planning considerations.

Coverage Area / Geographic Reach

The distance that a person is willing to walk to take transit defines the primary service area. This distance is equivalent to roughly a 5 minute walk, or up to ½ mile.

The typical measure of transit service coverage is:

- ✓ ¼ mile from a fixed route bus stop;
- ✓ ½ mile from a light rail station; or,
- ✓ the service area for demand-responsive transit.

An even more accurate measure of the general service area considers actual door-to-stop distances and factors in other barriers.

Headways / Frequency / Wait Times

The frequency of service is generally related to the quality of service, and in particular:

- ❒ Minimizing customer wait times;
- ❒ Improving or ensuring service reliability; and,
- ❒ Maximizing ease of schedule understanding.

Determining headways between buses involves a calculated series of trade-offs.

- ❒ Increasing service (decreasing headways) rarely pays for itself and requires greater subsidies.
- ❒ Service frequency is a significant consideration for choice-riders. Few choice-riders accept bus intervals longer than 15 minutes[6].
- ❒ Reducing wait times makes transit a more attractive mode. Commuters tend to value extra travel time in relation to their wage rate. Studies show that workers consider overall travel time to cost them 1/3 to 1/2 of their hourly wage rate[7].

[6] As a reference, about 20% of Sacramento RT's routes run that frequently.
[7] *Building Transit Ridership: An Exploration of Transit's Market Share and the Public Policies that Influence It (Report 27*), Transit Cooperative Research Program, Transportation Research Board, 1997.

Other considerations:

- Regularizing service frequencies along a route, and to the extent possible within a system, makes for better coordination at transfer points, and also benefits riders by making service schedules easier to remember. Additional operating subsidies are often required, however.
- It is also effective in some applications to mix express bus service with traditional fixed routes on the same corridor. This can be done where there is a balance of riders making longer trips and customers with shorter trip needs. A difference in fare structures can be appealing to different market segments of customers (e.g. charging a "premium price for premium service.")

Hours/Days of Operation

Similar to headways, determining the hours and days of operations also involves balancing a series of trade-offs.

With respect to hours of service:

- Customers are more likely to ride if the service operates later than their anticipated 'last ride of the day.' The potential for being 'trapped' without service is a strong disincentive to use public transit.
- Increasing the length of the service day increases ridership, but virtually always increases the need for operating subsidies.

With respect to days of service, the trade-off is even more complicated:

- Transit dependent people frequently require weekend service, particularly to access employment and also for social/entertainment opportunities.
- Weekend service also has an effect on choice riders, particularly those who live in transit-friendly, mixed-use corridors. Lacking a transit option for some trips can influence a person's overall view of public transportation. And, as with any business, frequency of satisfactory patronage tends to lead to additional purchases (rides).
- However, adding days of service requires additional operating subsidies, often greater subsidies than are necessary for weekday service.

Finally, operators often struggle with how much, if at all, to limit weekend service which has trade-offs as described above under "Headways…"

Route Identification and Location and Spacing of Stops

How attractive a bus route is to potential riders strongly correlates to its relation to adjacent development, connectivity to the full transportation system, and travel patterns.

An added complication is that some areas are difficult to serve because of limitations in the arterial and collector road systems. Gaps and barriers to a connected road system are also gaps and barriers to a connected transit system.

As such, a consideration for future land developments is to avoid areas of development that are more than ¼ mile from a likely transit route. This emphasizes the need for local governments to develop their own transit plans, in conjunction with land use plans, including up-front planning of transit routes.

Dispersed travel patterns make suburb-to-suburb routes particularly difficult to establish. Successful suburb-to-suburb services connect: transit centers located at major activity centers, major travel generators such as medical centers, and fixed-guideway transit stations.

Additional References:

Best Practices for Using Geographic Data in Transit: A Location Referencing Guidebook (Report FTA-NJ-26-7044-2003.1), Federal Transit Administration, Washington DC, April 2005.

Guidelines for the Location and Design of Bus Stops (Report 19), Transit Cooperative Research Program, Transportation Research Board, Washington D.C.

Time Efficiency and Running Speed

Time efficiency refers to a riders' comparison of the time spent making a trip using public transportation vis-à-vis other modes. The time efficiency of a transit trip includes the running speed of the transit trip itself, as well as the 'out-of-vehicle' time. Out of vehicle time includes the walk to/from transit stops and wait and connection times.

Running speed refers to the functional travel speed a transit service provides between two points, factoring in time delays at intersections and stops.

Studies of travel behavior, and the impacts of total trip time, have important implications for how transit services are delivered:

- Commuters tend to value extra travel time in relation to their wage rate. Studies show that workers value overall travel time at 1/3 to 1/2 of their hourly wage rate.
- Studies show that the value of minimizing out-of-vehicle time is greater to riders than reducing the duration of the transit trip itself. Recent modeling efforts suggest that a reduction in out-of-vehicle time has much as four times the perceived value of a like reduction in the transit trip[8].
- Travel time matters for all transit customers, but particularly for choice-riders.
- Out-of-vehicle times tend to be more important to riders for discretionary (primarily non-work) trips.
- For short trips, customers are more likely to walk if wait times are comparatively long or service is unreliable.

Other factors that influence mode choice and frequency of use, in combination with wait times and overall time efficiency, include comfort, climate, safety, and personal economics.

Connectivity, Coordination, and Integration

Connectivity, coordination, and integration involves a number of factors related to how easy it is for a user to get around the public transportation system.

While land uses along a transit corridor should be mixed to maximize opportunities for riders to use a single transit ride to move from place to place, most trips will not correspond to a single transit service.

Important considerations for local agencies and transit operators in their planning include the following:

- Each route should be integrated within the total transportation system.
- Just as out-of-vehicle times are highly significant, most choice riders will not make more than one transfer between transit vehicles. Transit routes should be planned to maximize timed transfers at major points of connection. Priority should be given to optimizing on-time arrivals on routes that serve high volume connections.

[8] *Building Transit Ridership: An Exploration of Transit's Market Share and the Public Policies that Influence It (Report 27),* Transit Cooperative Research Program, Transportation Research Board, 1997.

- ❒ The ability for a rider to transfer easily between services operated by different agencies is important. Agreements should be reached so that transit passes are honored by all operators.

See "Complementary Transportation Systems" for discussion of the integration of transit with bicycle, pedestrian, and road systems.

Accessibility

Accessibility involves a number of factors related to how easy it is for a user to get to, and on, the public transportation system. A number of accessibility-related factors are addressed in the *Planning* section above.

In addition, accessibility relates to designing facilities and systems to accommodate riders with a variety of special needs. Most often the issue of physical accessibility means fulfilling relatively-prescriptive Americans with Disabilities Act (ADA) requirements.

Less frequently discussed is the concept of Universal Design (also called Inclusive Design or Accessible Design). Universal Design refers to facility designs that accommodate the widest range of potential users, including people with mobility and visual disabilities and other special needs. Although Universal Design addresses the needs of people with disabilities, it is a comprehensive concept that can benefit all users. For example, people who are unusually short or tall, carrying packages or pushing a cart are not disabled, but their needs should be considered in facility design.

Increased walkway widths, low-floor buses and smooth walking surfaces improve convenience for all travelers, not just those with mobility impairments. Curb ramps are important for people using handcarts, scooters, baby strollers and bicycles, as well as wheelchair users. Automatic door openers are another example of Universal Design features that can benefit many types of users.

Universal Design can be distinguished from minimal compliance with accessibility standards in the way that the accessible features have been integrated into the overall design. This integration is important because it results in better design and avoids the stigmatizing quality of accessible features that have been added on late in the design process or as modifications after the design is complete.

For more information on Universal Design see the *Best Practices for Universal Design* which is included in Volume II of the Collaborative's *Final Report*.

Reliability

Dependability is a major concern for riders. Unreliable services require riders to either "take a chance" or factor late arrivals into their trip planning. Moreover,

customers of unreliable services experience uncertainty, annoyance, and anxiety, all of which negatively contribute to the rider's overall perception of the quality of service. Inversely, when service is reliable, passengers time their arrival at stops to include minimum wait time.

Studies tend to show that on-time arrival is consistently amongst the most-critical factors that influence choice riders, roughly equivalent to total trip time and cost.

Reliability can be affected by: traffic congestion; vehicle accidents; traffic signals; mechanical difficulties with transit vehicles; driver availability; and, ticketing, boarding, and de-boarding.

A related reliability issue is specific to cyclists. Most transit systems have capacity to accommodate 2-4 bicycles per light rail vehicle or buses. At times the demand exceeds the capacity and cyclists must wait for the next bus/train with no guarantee that there will be available capacity on the next vehicle.

Comfort

Comfort is a highly individualized, qualitative factor. Survey responses from passengers cite a range of considerations.

- Is the transit vehicle clean, temperature controlled, and odor free?
- Are seating areas and chairs comfortable (seat quality, leg-room, individual armrests) for durations of up to 30-45 minutes?
- Do waiting and boarding areas provide shade and shelter from a variety of weather conditions?
- Are interactions with drivers and other employees, as well as other riders, polite and courteous?

To emphasize the range of comfort needs, in some surveys customers have also cited a desire for ambient music at stations and on board, and on-board video/television screens as important.

Personal space needs also vary greatly amongst transit riders. Transit riders in New York and San Francisco are far more comfortable riding under "crush" conditions, whereas riders in more suburban applications expect or need less crowded conditions[9].

[9] Regional Transit representatives report that within the Sacramento area riders have been reluctant to ride under near-capacity conditions.

Safety / Security

Perceptions of safety are commonly mentioned in surveys of both current transit riders and non-users. Perceived safety includes:

- fear of violence while walking to/from a transit station or stop, while at a station or stop, and while on transit vehicles;
- fear of an accident while on a transit vehicle;
- fear of terrorist acts; and,
- fear of becoming lost or confused in an unfamiliar environment.

The effect of these concerns on the use of public transportation is widely debated, in part because of the lack of sufficient data.

In addition to ensuring the safety of passengers, investments in providing and promoting security should be considered as a strategy to increase overall ridership.

Examples of measures that are used most often in increasing security are:

- Station design, and the design of surrounding land uses, to maintain a high level of activity and visibility from many angles, and to eliminate hiding places;
- Lighting;
- Visible security cameras at stations and on transit vehicles;
- Emergency phones;
- Presence of security personnel;
- Strong culture of active enforcement and prosecution; and,
- Training of drivers and other transit personnel.

The following resources provide additional information on transit security.

Who Noticed, Who cares? Passenger Reactions to Transit Safety Measures, Wallace, Richard R., and Rodriguez, Daniel A., and White, Christopher, and Levine, Jonathan, University of Michigan Urban and Regional Planning Program and Ann Arbor Transportation Authority, Ann Arbor MI, 1999.

"The Influence of Personal Security Fears on Women's Travel Patterns", Lynch, G. and Arkins, S., *Transportation*, Vol. 15, 1988, pp. 257-277.

Improving Transit Security (Synthesis of Transit Practice 21), Transit Cooperative Research Program, Transportation Research Board, Washington D.C., 1997.

Information, Marketing, and Promotion

Transit systems and their riders are not insulated from the "information age." Both static and real-time information are important.

Users and potential users require increasing amounts of information as daily life becomes more complex. Riders for decades have needed to know the "when" and "where" information about transit services. Today, advanced information to answer questions such as "what do I do if I need to stay late?" and "what options do I have if my child gets sick at school?" are important to transit riders.

Static Information

To help individuals easily use and access the transportation system, websites, printed materials, maps, signage, non-verbal signage/mechanisms and other communication methods should be developed for all sectors of the community including choice riders, the transit dependent, the disabled, and non-English speaking users.

Real Time Information

Is my train on time? If I miss the next bus how long will I need to wait for another? What is traffic like on the freeway?

Providing this information in "real time" involves three key aspects:

- data collection and verification;
- data organization and analysis, and,
- data distribution.

Collection involves installing mechanisms to collect as much data as possible in an electronic format. Electronic data can be manipulated electronically. Analog data that requires human action works against the timely distribution of data. Collection also involves systems to validate data from a primary source. Distribution of inaccurate information can result in long-term negative impacts on ridership.

Distribution of real-time information requires minimal delays in presenting data, and constant refreshing. A significant challenge is providing multiple opportunities for a rider to access information. Fortunately, as more data is available electronically, and as technology provides more opportunities for distribution, this is becoming much easier. Examples of distribution mechanisms include:

- Internet;
- Automated telephone;

- Text messaging and automatic pages;
- Displays at high traffic locations such as in the lobby of large office buildings, hotels, and hospitals;
- Displays at light rail and bus rapid transit stations and major bus stops; and,
- Displays on board transit vehicles.

Marketing and Promotion

As with any service customers must be informed and reminded about the availability and benefits of transit service. Appropriate outreach mechanisms should be developed to meet the information needs of a diverse range of special-needs populations (e.g., youth, seniors, non-English speaking) to inform them on how to best access the transportation system.

Increasing ridership may be the primary purpose of on-going marketing; however, other important objectives include:

- Retaining existing customers;
- Attracting non-customers to try the system;
- Increasing existing customers' use of the system;
- Attracting new businesses and residents to locate or relocate in proximity to transit services;
- Improving the image of public transportation (particularly with respect to the safety, comfort, and convenience); and,
- Educating partners and about actions and programs that support transit services.

Transit marketing is inherent in many aspects of service provision and marketing activities can take many forms. Examples of marketing-related activities are:

- Consumer-oriented planning;
- Design of attractive services;
- Pricing strategies;
- Mass market information;
- Mass market promotions;
- Targeted information;
- Targeted promotions;

- ❒ Customer information services;
- ❒ Customer training;
- ❒ Real-time transit information dissemination; and,
- ❒ Partnerships with employers and other major traffic generators.

Despite the fact that, nationwide, public transportation is a $10+ billion a year industry, there is relatively little available information about the specific outcomes of marketing programs, e.g. there is little statistically-significant research available to correlate specific marketing programs with specific outcomes, with consideration for the many other variables that affect ridership.

From the information that is available, the following factors are consistently linked to increased transit ridership.

- ❒ Focused promotions (as opposed to mass market promotions) are most likely to result in increased ridership within targeted populations.
- ❒ The effectiveness of mass-marketing promotions is unclear. It generally appears to increase the frequency of use by current customers, more than attracting new customers.
- ❒ Marketing efforts must be on-going. Customers "turnover" regularly due to changes in employment, family circumstances, season, etc. Existing customers may no longer be able to use the same transit service, or any transit service, yet new customer opportunities emerge.
- ❒ The product must be compelling – service level, comfort, reliability, convenience, and perceived safety are extraordinarily important. No amount of marketing can sell a poor or non-existent product. This appears to be true for both transit dependent customers and "choice riders." As with most businesses, products, and services, a single bad experience can result in a customer who is "lost", in many cases for a significant period of time. Unlike many products, there appears to be a greater degree of "transference" or "globalization" of dissatisfaction with one transit experience to all transit providers whereas one bad meal at a restaurant does not materially affect the likelihood of a person to eat out in the future.
- ❒ Available technology provides greater opportunities than ever to plan, execute, and evaluate the effectiveness of marketing efforts. As examples, geographic information system databases that link parcel information, addresses, etc., make targeting potential customers simpler and more cost effective than ever. Promotional materials (such as free 1-day passes) can be coded to determine patterns in responses.

In recent years there has been a focused effort to apply private sector marketing techniques.

The following resources provide additional conditions and factors related to successful transit marketing.

A Handbook on Proven Marketing Strategies for Public Transit (Cooperative Research Program Report 50), Texas Transportation Institute, South West Transit Association, and University of Wisconsin – Milwaukee, Transportation Research Board, Washington DC, (1999).

Over Promise and Over Deliver: The Secrets of Unshakable Customer Loyalty, Barrera, Rick, Porfolio, New York, NY, 2005.

Transit Marketing: Successes and Failures (Synthesis of Transit Practice Number 12), Oram, R. L., National Cooperative Transit Research and Development Program, Transportation Research Board, Washington DC (1987).

Traveler Response to Transportation System Changes: Chapter 11 – Transit Information and Promotion (Report 95, Chapter 11), Turnbull, Katherine F. and Pratt, Richard H, et al, Transportation Research Board, Washington DC, (1999).

Websites:

http://www.nextbus.com

http://www.powerlight.com/products/educational_kiosk.shtml

http://www.southwest.com/about_swa/customer_service_commitment/customer_service_commitment.html

Employee Training and Development[10]

Employee Training

Service providers depend upon the quality of their employees to ensure that every aspect of their operation is properly handled, with particular focus on customer service/satisfaction, cultural sensitivities, efficiencies, effectiveness, and safety.

[10] Note: Best practices for the training of transit riders are addressed under "Information, Marketing and Promotions."

This general principle, obviously, applies as much to transit operators as it does any other business or organization. Transit agencies should have formal training programs to instruct all employees about the organization's mission, goals, culture and philosophy. And, a specific training program should be established for each job classification.

Training programs should include one-time training with periodic refreshers and updates in the more critical areas.

Four groups of transit employees are most likely to be in contact with potential customers and riders, and should receive the most attention in customer service: drivers, security personnel, receptionists and dispatchers, and planning staff.

Employee Development

Training is primarily a reinforcement of current practices. In order for an organization to continue to improve its service in as efficient a manner as possible, new technology and new ideas must be continually integrated into existing operations.

Employee development is intended to be the gateway for forward-thinking operations to learn about, evaluate, and incorporate new ideas. Formal employee development programs are as important as formal employee training programs.

Typical elements of effective employee development programs involve formal networking with peers and mentors, participation in professional and trade associations, and on-going review of national publications.

The following resources provide more detailed information about employee training and development:

A Challenged Employment System: Hiring, Training, Performance Evaluation, and Retention of Bus Operators (Synthesis #40), National Cooperative Transit Research Program, Transportation Research Board, Washington DC, 2001.

Customer Focused Transit (Synthesis #45), National Cooperative Transit Research Program, Transportation Research Board, Washington DC, 2002.

Determining Training for New Technologies: A Decision Game and Facilitation Guide (Report #96), National Cooperative Transit Research Program, Transportation Research Board, Washington DC, 2003.

Websites:

Tennessee Transit Training Center, (www.mtsu.edu/~tttc/ training.htm)

Washington State Transportation Training Coalition (www.wsttc.org)

Complementary Transportation Facilities

Transit does not exist in a vacuum within the transportation system. Most buses operate on public roads, and walking and biking to and from transit stops are very important. Not only is it important for these facilities to be provided, but concurrency is important.

Planning, designing, and concurrently constructing improvements is not easy. Further finding funding for all components of a complete transportation system can be challenging and make concurrency even more complex. Finally, coordinating efforts amongst two or more agencies that own/operate the different systems is also not easy.

In a system with such dispersed authorities, the local agency is in the best position to manage the concurrent provision of these many components.

Street Layout and Design

Earlier, this document discusses the importance of vehicle running speeds and system reliability. The design of streets that serve as transit routes is an important, related factor.

Street design also impacts the ability of customers that do not live or work within a transit service area to access public transportation.

For more information see *Best Practices for Complete Streets* which is included in Volume II of the Collaborative's *Final Report*.

Multi-Modal Access

Pedestrian accesses to, from, and between stops and stations is critical.

- Major connections to the station for pedestrians and bicycles should be constructed at the outset.
- Pedestrian routes between the station and key destinations should be short and direct. Key destinations should be located within a ¼- to ½-mile radius of the station. Circuitous routes should be avoided.
- Pedestrian connections should be continuous.

- Sidewalks should connect directly to the entrances of the station and buildings. Bus stops should be located as close as possible to building entrances. Walking distances from the station to the nearest bus stop should generally be shorter than the distance to the nearest parking space.
- Pedestrian routes should be at ground level, with minimal stairs and grade changes. Adjacent buildings provide "eyes on the street" and informal security.
- Pedestrian routes should be located on public streets unless there are good opportunities to tie in to a safe, existing above-grade system.
- Vehicular and pedestrian ways should be designed to minimize points of conflict.
- Sidewalk and pathway routes should have as few driveway and parking lot crossings as possible.

There is limited research to suggest that there is a correlation between highly walkable and bikeable communities and the use of public transit, beyond the issue of whether transit stops are accessible from these non-motorized modes.

One incentive of auto use is flexibility on return trips – people can leave when they want, access additional destinations to or from the primary destination, and adjust more easily to unforeseen changes. When a user has comfort that alternatives provide a similar level of flexibility, transit use becomes more viable. Particularly in areas with more limited transit service hours, the ability to return or deviate to an unforeseen destination by walking or biking, if needed, is helpful in providing an attractive choice.

For more information about off-site amenities see *Best Practices for Bicycle Master Planning and Design* and *Best Practices for Pedestrian Master Planning and Design* which are included in Volume II of the Collaborative's *Final Report*.

Additional References:

Bicycles and Transit: A Partnership that Works, Federal Transit Administration, Washington DC, 1999.

Special Considerations for Bus Rapid Transit

Bus Rapid Transit systems are typically characterized by systems having most or all of the following.

- Transit-only travel lanes.
- Traffic management systems that improve traffic flow, such as signal priority systems.
- Frequent service operating at least 16 hours each day, with midday headways of 15 minutes or less and peak headways of 10 minutes or less.
- Prepaid and other advanced ticketing options to minimize on-board fare collection times.
- Easy-to-board, high-capacity buses with wide doors and aisles.
- Quality transit stops (most commonly, transit stations).

True Bus Rapid Transit (BRT) requires a significant investment of resources. As an intermediary step, many jurisdictions have implemented variations of San Francisco's Transit Preferential Streets program which employs strategies such as bus bulbs, signal preemption for transit vehicles, increased parking enforcement at selected locations, exclusive bus-only lanes, and automobile turn restrictions. Services on Transit Preferential Streets operate at running speeds greater than normal streets, but less than full BRT.

Transit Only Lanes

Exclusive running ways for BRT include mixed traffic lanes, curb bus lanes, and median busways on city streets; reserved lanes on freeways; and bus-only roads, tunnels, and bridges. Busways are most common in North America

Transit Stations

The spacing of stations along freeways and busways ranges from 2,000 to almost 7,000 feet, enabling buses to operate at high speeds. Spacing along arterial streets ranges upward from 1,000 feet to nearly 1 mile.

Most stations are located curbside or on the outside of bus-only roads and arterial median busways.

Vehicles

Conventional standard and articulated buses are widely used for BRT service. There is, however, a trend toward innovative vehicle design. These innovations include vehicles with low floors, more doors, wider doors, and distinctive looks exclusive to BRT routes.

Traffic Management Systems and Intelligent Transportation Systems

Applications of ITS technologies include automatic vehicle location systems; passenger information systems; and, transit preferential treatment systems at signalized intersections. Some systems get up to 10 seconds additional green time when buses arrive at signalized intersections. ITS can also help provide priorities for buses at freeway ramps, toll plazas, and bridge or tunnel approaches.

Routing

Service patterns reflect the types of running ways and vehicles that should be utilized. Many systems provide an "overlay" of express (or limited-stop) service on top of traditional fixed route service. Frequently, service extends beyond the limits of exclusive busways or bus lanes.

Operating Speeds / Travel Time Savings

Operating speeds are a function of the type of running way, station spacing, and service pattern.

Busways on dedicated rights-of-way generally save 2 to 3 minutes per mile compared with pre-BRT conditions, including time for stops. In some cases savings of as much as 5 minutes per miles in the peak period have been documented. Bus lanes on arterial streets typically save 1 to 2 minutes per mile. The time savings are greatest where the bus routes previously experienced major congestion.

Use of automated ticketing and other strategies to reduce boarding and alighting times can contribute to travel time savings.

Additional references include the following.

Bus Rapid Transit, Volume 1: Case Studies in Bus Rapid Transit, Transit Cooperative Research Program, Transportation Research Board, 2003.

Bus Rapid Transit, Volume 2: Implementation Guidelines, Transit Cooperative Research Program, Transportation Research Board, 2003.

Websites:

Bus Rapid Transit Policy Center, http://www.gobrt.org/index.html

The Bus Rapid Transit Exchange Site, http://knowledge.fhwa.dot.gov/fta/brt.nsf/home

The National BRT Institute, http://www.nbrti.org/

Transportation Best Practices Related to Transit

Planning / Scheduling

- ❒ Local agencies and transit operators should integrate transit and land use planning.
- ❒ Local agencies should develop their own transit plans consistent with their land use plans.
- ❒ Transit planning should be based upon data collected about existing and potential customers, and a specific business strategy.
- ❒ Transit planning databases should be electronic, and, where possible, be incorporated into a geographic information system.
- ❒ Local agencies and transit operators should work cooperatively to protect future rights-of-way and require that land use project proponents dedicate rights-of-way for system expansions.
- ❒ Transit planning should consider alternative services – such as demand-responsive service and subsidized taxis – to provide a minimum level of service during off-peak hours, and in low-density and other areas with insufficient demand to support fixed-route transit service.
- ❒ Transit operators should implement quality control measures such as complaint monitoring and "mystery riders."
- ❒ Transit operators should use customer feedback programs, and involve riders in system evaluation activities such as "walk / bike to transit" audits.

Time Efficiency / Running Speed

- ❒ Local agencies should coordinate with transit operators to adjust signal timing to give greater preference to transit routes, where feasible.
- ❒ Local agencies should coordinate with transit operators to install signal priority systems to extend green lights when transit vehicles are approaching.
- ❒ Transit operators and local agencies should work to consider providing transit-only or high-occupancy vehicle lanes on transit routes.
- ❒ Transit operators should consider the use of headway-based operations, rather than schedule-based operations, to maintain vehicle spacing and not artificially slow ahead-of-schedule vehicles.
- ❒ Transit operators should reduce boarding times by expanding options for pre-payment of fares.

- ❒ Appropriate authorities should increase traffic and parking enforcements where double parking and other violations consistently impede transit vehicle flows.

Connectivity, Coordination, and Integration

- ❒ In order to provide a competitive transportation choice, local agencies and transit operators should work to integrate each transit route within the total transportation system.

- ❒ Transit operators should plan transit routes to maximize timed transfers at major points of connection. Priority should be given to optimizing on-time arrivals on routes that serve high volume connections.

- ❒ Transit operators should negotiate agreements with each other so that transit passes are honored by all operators.

- ❒ Transit operators should work with local agencies to locate east-west and north-south bus stops on the same corner to minimize transfer times.

- ❒ Local agencies and transit operators should give priority consideration to capital improvements that eliminate gaps in the transportation system.
- ❒ All agencies should coordinate within Sacramento County, and adjacent counties, on the design of facilities that cross borders.

Accessibility

- ❒ All agencies should use a broad concept of Universal Design, covering the needs of all potential users, not just people with a specific disability.
- ❒ All agencies should consider Universal Design objectives at all stages of transportation and land use planning, particularly with regard to roadway, pedestrian, transit, taxi and trail facilities and services.
- ❒ Local agencies and transit operators should incorporate Universal Design into the design standards for transportation facilities in each jurisdiction using the most current guidelines and standards.
- ❒ All agencies should obtain feedback from users with special needs in designing transportation systems and projects, from the perspective of Universal Design. Feedback on many projects may be needed at multiple steps since some Universal Design concepts should be considered in the early stages of design (e.g. widths and angles of walkways, location of facilities) while other Universal Design concepts are not applicable until latter stages of design (e.g. door handles).
- ❒ Transit operators should deploy low floor transit vehicles.

- ❒ Local agencies should construct/modify sidewalks to include curb ramps, audible signals at intersections, appropriate street or pedestrian signs and furnishings, clear paths of travel, and other accessibility features, to improve usability and safety for all travelers.

Reliability

- ❒ Transit operators should work to improve schedule adherence and reliability by identifying high-traffic areas and bottlenecks that cause delays and eliminate these areas from the routes.
- ❒ Transit operators should record data, by route, on "turn down" rates of cyclists that cannot store their bicycles due to storage being full, and take actions to increase storage capacity on those routes. Options include providing incentives for riders to acquire folding bicycles, installing higher-capacity bike racks on buses, removing seats to increase on-board storage on all vehicles, and even installing special cars on light rail vehicles for bicycle storage. Another option is offering cyclists "guaranteed" rides home, including transporting their bicycle, when a transit vehicle cannot accommodate them.

Comfort

- ❒ Transit stops and stations should be constructed with sufficient protections from inclement weather.
- ❒ Transit operators should survey riders on an ongoing basis to identify comfort needs and develop action plans to respond to the most prevalent requests and complaints.

Safety/Security

- ❒ Local agencies and transit operators should formally review and evaluate accidents and other incidents and give priority to improvements or other changes to mitigate problems that occur with greater-than-average frequency. At least 4 times per year transit operators and local agencies should meet to jointly review and discuss recent accidents and incidents.
- ❒ Accidents and other incidents should be recorded in an electronic database and where possible incorporated into a geographic information system.
- ❒ Local agencies and transit operators, where possible, should reconstruct existing at-grade crossings with grade separated crossings.
- ❒ Transit operators should work with law enforcement officials on neighborhood-based "adopt a stop" programs.

- ❒ Transit operators should conduct comprehensive new driver and refresher training in all aspects of safety and security.
- ❒ Transit operators and local agencies should install security cameras at all transit stations, major bus stops, and other locations with higher-than-average incident rates.
- ❒ Transit operators and local agencies should install security lighting at all transit stations, major bus stops, and other locations with higher-than-average incident rates.
- ❒ Transit operators and law enforcement agencies should consider co-locating community-oriented policing stations and sub-stations with transit facilities.
- ❒ Transit operators should provide a 24-hour dedicated phone system with a live dispatcher to allow transit riders and others to report incidents. Consideration should be given to serving non-English speaking populations.
- ❒ Transit operators and local agencies should design facilities to maximize visibility from the widest spectrum possible.
- ❒ Transit operators should develop, post, and enforce "zero tolerance" codes of conduct and work with the District Attorney to prosecute violators.

Information, Marketing, and Promotion

Information

- ❒ Transit operators should develop automated systems to page subscribers when a bus or light rail train is/will be late.
- ❒ Transit operators should install intelligent transportation system (ITS)-based Automatic Vehicle Locator (AVL) systems in buses and provide reliable, real time information about next bus arrival times at stations, via the internet, and using automated telephone systems.
- ❒ Transit operators should provide maps and schedules that are easy to understand and read. All text should be printed in a large, bold font. Color-coded maps with contrasting primary colors indicating the different routes should be used.
- ❒ Transit operators and other agencies should conduct mobility training sessions with targeted customers, e.g. holding workshops at facilities for groups of seniors and the disabled.
- ❒ Transit operators should test the intelligibility of information with a variety of users to solicit suggestions on how to make them clearer.

Marketing and Promotion

- Transit operators should spend sufficient funds to understand current customers and potential customers. Spending limited funds on market research is often a difficult policy decision. Like most multi-billion dollar industries, "if you build it they will come" is not an effective marketing strategy.
- Transit operators should target specific customers and potential customers that are most likely to be attracted by an effective marketing campaign. This should not be interpreted as a focus on "choice riders" as even transit dependent customers will benefit from effective marketing.
- Transit operators should carefully design and execute the marketing campaign.
- Transit operators and local agencies should understand and expand the market for Transit Oriented Development. Identify the types of households and businesses that are most amenable to TODs. Educate public officials, planners, developers, residents and business managers concerning the potential benefits of locating in a Transit Oriented Development.
- Transit operators and local agencies should form partnerships with transportation management associations (TMAs) to market transit services to employees.

Employee Training and Development

Employee Training

- Transit operators should provide customer service training to drivers and dispatchers. Avoid the use of automated answering systems on reservation lines.
- New operators should receive documented training. Classroom training topics should include the following:
    - ✓ General orientation of the role of the operator.
    - ✓ Philosophy of transit agency.
    - ✓ Passenger relations/sensitivity skills and practices, especially as relates to special needs populations and inexperienced users.
    - ✓ Passenger assistance. Train drivers to assist passengers with boarding/alighting.
    - ✓ Basic first aid and emergency procedures.

- ✓ Child and youth passenger procedures.
- ✓ Operator policies, expectations.
- ✓ Safety program policies.
- ✓ Fare policies.
- ✓ Procedures to secure wheelchairs.
- ✓ Security

❒ Documented refresher training should be conducted not less than every 2 years for wheelchair securement and safe lifting procedures.

Employee Development

❒ Transit operators should have formal employee development programs. Typical elements of effective employee development programs involve formal networking with peers and mentors, participation in professional and trade associations, and on-going review of national publications.

Complimentary Transportation Facilities

The following are a few examples. Readers are encouraged to read the companion documents *Best Practices: Complete Streets*, *Best Practices for Bicycle Planning and Design*, and *Best Practices for Pedestrian Planning and Design*, which are included in Volume II of the Collaborative's *Final Report*.

❒ Local agencies should provide high quality pedestrian and cycling facilities around transit stations, based on Universal Design.

❒ All agencies should consider attracting a car-sharing vendor to reduce the need to own automobiles.

❒ Local agencies and transit operators should work (possibly in conjunction with transportation management associations) to contract for "guaranteed ride home" services.

❒ Transit operators should provide ample, convenient and secure bicycle storage locations at each transit station.

❒ Local agencies should avoid uncontrolled pedestrian crossings at major transit stops and light rail stations, and instead provide high quality crosswalks.

❒ Transit operators should consider the feasibility of providing bike rentals at major transit stations.

❒ Transit operators should provide on-site drinking fountains at transit stations.

- ❒ Local agencies and transit operators should design transit stops in conjunction with designing bicycle and pedestrian facilities, to minimize access times.
- ❒ Local agencies and transit operators should, where possible, design streets to include curb extensions at transit stops (also known as "bulb outs") rather than turnouts, to maximize running speeds.

Considerations for Specific User Groups

Seniors

The Sacramento region's population is projected to more than double in the next 45 years. During that time, the population of those ages 62 or older is projected to jump from 13.2% in 2000 to over 19% in 2050. The increase in the senior population is off-set by slight reductions in the under 18 population and the 18-to-62 demographic. Table 5 compares California Department of Finance population estimates for 2000 with their projections for 2050.

Table 5

Projected Growth in the Senior Population

Age Range	July 1, 2000		July 1, 2050	
0 – 17	336,922	27.38%	720,223	25.20%
18 – 61	731,123	59.42%	1,589,590	55.61%
62 and over	162,420	13.20%	548,614	19.19%
Total	1,230,465	100.00%	2,858,427	100.00%

Source: State of California, Department of Finance, Population *Projections by Race/Ethnicity, Gender and Age for California and Its Counties 2000-2050*, Sacramento, California, May 2004.

Note: Department of Finance data is provided in 5 year intervals. Mid-interval data was interpolated.

Older persons, more than others, benefit from the location of medical services along transit routes.

The following additional Best Practices related to the transit needs are summarized from *Report 82: Improving Public Transit Options for Older Persons, Volume 1: Handbook* published by the Transit Cooperative Research Program.

- ❒ Develop an understanding of the diversity of needs among older persons and recognize the fact that older persons need different modes of transportation to meet different needs.
- ❒ Develop multiple transportation solutions to fit the varied needs of different older persons.
- ❒ Work with other agencies to offer travel subsidies for seniors with limited incomes. Other agencies can determine who qualifies for such assistance and can help fund this assistance; public transportation should take the lead in administering these programs.
- ❒ Add customer service features such as reserving more seats for older persons and providing friendlier and more detailed large-print travel information.
- ❒ Institute a travel training program for seniors to welcome people who are not accustomed to using transit services. Sign up participants through the local senior centers and the local Area Agency on Aging. Park a transit vehicle at the senior center and invite participants to board the vehicle. Show them that vehicles are accessible, clean, and comfortable. Take them for a test ride. Answer their questions and make sure that all participants get a copy of schedules, route maps, and some free bus passes. Follow up with the participants by telephone to make sure that the training was successful.
- ❒ Provide reserved seating for older persons at the front of the vehicle. Make sure that this seating has appropriate padding and support, and that there are handholds within easy reach (for pulling themselves up off the seats).
- ❒ Improve marketing and outreach efforts to seniors. Distribute promotional materials to senior centers, elder-care facilities, motor vehicle authorities, doctor's offices, shopping malls, churches, and any other places frequented by seniors.

New Immigrants / Language Challenged

Non-English-speaking residents require information that is available in their native language. This is easiest to provide in static form.

Providing real-time information in multiple languages can be challenging.

Where possible, use of international or other standard icons and symbols can simplify the process of communicating to many different language groups.

Sacramento's Transit System vs. Peer Cities

A good way to judge Regional Transit's current service levels is to compare them to its peers around the United States. The Federal Transit Administration (FTA)

provides annual information on the transit service for each "urban area" around the country. The latest information is from 2003.

In 2003, the Sacramento "urbanized area", ranked 28th in the United States based in population. Table 6 compares RT's 2003 service levels to 10 other urbanized areas: the five areas that ranked just higher and the five areas that ranked just lower to Sacramento around the country, based on population. The averages in Table 6 exclude Riverside, which is unusually low in transit service and ridership. This table indicates the following:

- The population of RT's "service area" is 3rd (of 11) in the peer group and the population density of that service area is somewhat greater than the average of the peer group, and 5th overall.

- RT ranks low in the service levels it provides. RT ranks 8th in the number of peak transit vehicles and 8th in the number of vehicle hours of service out of the 11 cities in its peer group.

- In 2003, RT had a total of 229 vehicles (bus and light rail) operating during peak periods. RT ranks 10th in the number of peak vehicles per capita. There are 6,085 persons in the RT "service area" for each transit vehicle. The average of the 9 peer cities (excluding Riverside) is 3,722 persons per vehicle. To reach the average of the other urban areas in its peer group, RT would need to have 374 transit vehicles today.

- RT ranks 10th in the amount of transit vehicle hours of service it provides per capita. To reach the average of the other urban areas in its peer group, RT would need to nearly double its service hours.

- While RT ranks low on in service levels, it ranks 6th in transit ridership, measured by total weekday passenger trips, within its peer group.

Illustration – Transit System Needed to Support the 2050 Blueprint

The information above suggests that a significant increase in the public transportation infrastructure would be needed to support new land use patterns. The purpose of this section is to quantify the level of transit needed to support such a land use.

The most recognized land use scenario which could be used for this exercise is the *Preferred Blueprint Scenario* prepared by the Sacramento Area Council of Governments (SACOG). At 2050, the preliminary analysis conducted by SACOG indicates that the mode share for public transit could more than triple from 1.3% today to about 4.4% by 2050. These percentages include all trips in Sacramento County, for all purposes and all destinations, at all times of the day. The percentage of transit trips for commute trips, trips during peak travel periods, and trips to Downtown Sacramento would be significantly higher.

Table 6
Transit Service Levels in Sacramento's Peer Urban Areas

Urbanized Area			Service Area of Transit Agency				2003 Service Levels									
							Peak Transit Vehicles[1]		Annual Vehicle Hours of Service		Weekday Transit Trips[2]		Persons per Peak Vehicle[3]		Annual Vehicle Hours per Person[3]	
Area	2000 Population	US Rank	2000 Population	Peer Rank	Square Miles	Density (persons /sq mile)	#	Peer Rank	#	Peer Rank	#	Peer Rank	#	Peer Rank	#	Peer Rank
Portland	1,583,138	23	1,253,502	6	574	2,184	631	1	2,629,937	1	312,213	1	1,987	1	2.10	1
San Jose	1,538,312	24	1,729,900	1	326	5,306	404	3	2,029,277	2	151,627	3	4,282	6	1.17	4
Riverside	1,506,816	25	1,283,691	5	250	5,135	85	11	275,115	11	23,398	11	15,102	11	0.21	11
Cincinnati	1,503,262	26	845,303	9	262	3,226	359	5	1,006,247	6	83,594	7	2,355	3	1.19	3
Norfolk	1,394,439	27	1,210,588	7	369	3,281	280	6	938,537	7	58,021	8	4,324	7	0.78	8
Sacramento	1,393,498	28	1,393,498	3	369	3,776	229	8	866,305	8	101,560	6	6,085	10	0.62	10
Kansas City	1,361,744	29	756,557	11	396	1,910	264	7	614,804	10	45,876	9	2,866	4	0.81	7
San Antonio	1,327,554	30	1,468,673	2	1229	1,195	401	4	1,421,146	5	135,025	5	3,663	5	0.97	6
Las Vegas	1,314,357	31	1,314,357	4	280	4,694	225	9	1,504,746	4	142,874	4	5,842	8	1.14	5
Milwaukee	1,308,913	32	940,164	8	237	3,967	431	2	1,744,775	3	191,932	2	2,181	2	1.86	2
Indianapolis	1,218,919	33	791,926	10	373	2,123	132	10	617,148	9	37,784	10	5,999	9	0.78	9
Average of 10 Peer Urban Areas[1]	1,394,515		1,145,663		450	3,099	347		1,389,624		128,772		3,722		1.20	

[1] Includes bus and light rail vehicles operated at maximum service – does not including demand responsive/paratransit vehicles

[2] Unlinked weekday transit trips

[3] Based on population of service area

[4] Averages exclude Riverside which has unusually low transit service and ridership

Source: National Transit Database, Federal Transit Administration

One of the guiding principles in the Transportation section of the Collaborative's *Agreements and Recommendations* states that:

> Improvements to each mode of travel must move forward in a systematic way to achieve the 2050 Blueprint vision of at least a 10% shift in travel mode away from personal motorized vehicles to walking, cycling, and public transit.

Comparison of Mode Split for Sacramento County	**Current**	**Preliminary Projections – 2050 Preferred Land Use Scenario**
Automobile	91.1%	81.1%
Pedestrian and Bicycle	6.7%	14.5%
Transit	1.3%	4.4%

Sources:

1) Blueprint Preferred Scenario Summary Statistics, Sacramento Area Council of Governments, www.sacregionblueprint.org.
2) *Pre-Census Travel Behavior Report Analysis of the 2000 SACOG Household Travel Survey*, DKS Associates for the Sacramento Area Council of Governments, July 2001

Increasing transit's share of countywide trips from 1.3% to 4.4% by 2050, while the population of Sacramento County nearly doubles, will require a substantial increase in transit service and a corresponding increase in capital costs, operating costs, and operating subsidies.

An illustrative region-wide transportation system was created to go with the Preferred Scenario for 2050 (i.e. the land use map) for purposes of identifying the basic connection between those land uses and transportation system performance. Table 7 shows only the transit projects in Sacramento County that were included in the evaluation of the Preferred Blueprint Scenario. The assumed 2050 transportation system includes projects from the adopted 2025 Metropolitan Transportation Plan (MTP) and some additional "post-MTP" projects that were intended to fit the location and amount of development in the 2050 Blueprint and fit with the smart growth planning concepts.

Table 7 Transit Projects Assumed for Evaluation of Preferred Blueprint Scenario			
Project	**Unit Cost**	**Capital Cost**	**Annual Operating Cost**
Metropolitan Transportation Plan 2025			
Extend light rail, DNA line to Natomas and Sacramento Airport	Per Sac RT	$620,000,000	$10,100,000
Extend light rail, South line to Cosumnes River College	Per Sac RT	$150,000,000	$7,000,000
Extend light rail, East line from Rancho Cordova to Folsom	per contract estimate	$230,000,000	$17,200,000
Extend light rail, via No Watt Ave to Placer County	9 mi @ $40 mil/mi	$360,000,000	$8,800,000
Extend light rail, Sacramento to Harbor Blvd, West Sacramento	2 mile w 50% Sac Share	$55,000,000	$1,500,000
Complete NE Line double-track + 24 LRVs, increase service	Per Sac RT	$65,000,000	$10,700,000
Rehabilitate light rail vehicle fleet	per MTP	$53,000,000	
Replace buses and equipment, Sacramento RT + other operators	500 large + 750 small	$235,000,000	
Expand Sacramento RT bus fleet from 190 to 420 buses	per MTP	$53,000,000	$37,000,000
Expand Neighborhood Shuttles from 3 to 17 areas	per MTP	$106,000,000	$13,100,000
Expand Paratransit fleet from 125 to 175 coaches	per MTP	$26,000,000	$2,400,000
Build new intermodal station at Sacramento Railyards	estimated for terminal only	$80,000,000	
Improve UPRR main line, Sacramento to Roseville	per MTP	$26,000,000	
Acquire 5 commuter rail trains, Dixon-Sacramento-Auburn service	5 trains, Sac share = 33%	$27,000,000	$6,000,000
Add Bus Rapid Transit, along Stockton Blvd to 65th	10 mile service, per MTP	$14,000,000	$1,600,000
Add Bus Rapid Transit, along Watt Ave, Folsom Blvd to Elkhorn	10 mile service, per MTP	$20,000,000	$1,600,000
Add Bus Rapid Transit along Sunrise Blvd, Folsom Blvd to Roseville	10 mile service, per MTP	$20,000,000	$1,600,000
	Subtotal (2025 MTP)	**$2,140,000,000**	**$118,600,000**

Additional Projects 2025-2050			
Add light rail grade separation at 15th/16th Streets, Downtown Sac		$40,000,000	
Add Bus Rapid Transit, Antelope to Roseville Galleria	2 mile service	$8,000,000	$400,000
Add 132 light rail vehicles, increase service	132 cars @ $3 mil/car	$400,000,000	$92,000,000
Add Bus Rapid Transit, Sacramento to Folsom via Madison	20 mile service	$30,000,000	$3,200,000
Add Bus Rapid Transit, Consumnes River College via Calvine/So. Watt	12 mile service	$20,000,000	$1,900,000
Add Bus Rapid Transit, Citrus Heights to Folsom via Greenback	11 mile service	$20,000,000	$1,600,000
Build new bus-only American River Bridge at Carmichael	1 mi @ $40 mil/mi	$40,000,000	
Add Bus Rapid Transit, Sacramento-Carmichael-Rancho Cordova	20 mile service	$30,000,000	$3,200,000
Add Bus Rapid Transit, Watt to Rancho Cordova via Kiefer	8 mile service	$16,000,000	$1,200,000
Extend Bus Rapid Transit, Rancho Cordova to Placer Co via Hazel	7 mile service	$15,000,000	$1,100,000
Extend Stockton Bus Rapid Transit to Consumnes River College	5 mile service	$10,000,000	$600,000
Add 8 Commuter Rail Trains, Auburn-Sacramento-Dixon service	8 trains, Sac share=33%	$43,000,000	$12,000,000
Replace buses and equipment., Sacramento RT + other operators	900 large + 1200 small	$400,000,000	
Extend equivalent bus service into new urbanized areas	108 large + 130 small	$46,000,000	$24,700,000
	Subtotal (2025 to 2050)	**$1,118,000,000**	**$141,900,000**
	Total (thru 2050)	**$3,258,000,000**	**$260,500,000**
Source: SACOG			

The assumed 2050 transportation system includes many transit projects in Sacramento County, including:

- Five light rail transit (LRT) projects with about 36 miles of new track;
- Eleven Bus Rapid Transit (BRT) projects with about 115 miles of BRT routes;
- A major increase in the number of buses, light rail cars and paratransit vehicles; and,
- A major increase in the number of "neighborhood shuttles" - the MTP calls for to increase from 3 today to 17 by 2025 – additional shuttles could be included post-2025.

Tables 8 and 9 summarize the growth in population and transit service in Sacramento County through 2050 with the assumed 2050 Blueprint transit projects. A review of the information in these tables leads to the following key points:

- Under the Preferred Blueprint Scenario, Sacramento County's population is expected increase by about 89 percent between 2000 and 2050, while the size of the urban area in Sacramento County is expected to grow by 66 percent. Thus the Blueprint calls for the urban area to be denser than today, which should help make transit service more successful.
- Comparisons have been made to the current transit service provided in RT's service area (the urbanized portions of Sacramento County) and transit service provided in 10 "peer" urban areas (the five areas around the country that ranked just higher and just lower to Sacramento based on population). Currently, the number of transit vehicles per capita in RT's service area is only about 60 percent of the average of our peer urban areas.
- The 2025 MTP calls for Regional Transit's "peak" transit fleet (i.e. the total number of buses and light rail vehicles operating during peak hours) to increase by 162 percent over 2000 levels, which is substantially faster than Sacramento County's estimated population growth of 40 percent by 2025. With the high growth rate in transit service in the 2025 MTP, the number of peak transit vehicles per capita in RT's service area would move above the average of our peer urban areas.

The transit system assumed by SACOG in their evaluation of the Preferred Blueprint Scenario would increase the peak transit fleet serving Sacramento County from 206 vehicles in 2000 to about 830 in 2050. This represents an increase in transit vehicles of about 300%, which is far more than the 89% increase in population expected by 2050.

Table 8
Growth in Population and Transit Service through 2050 with Assumed Blueprint Transit Projects

		Sacramento County			Average of Peer Urban Areas (2003)
		2000	2025	2050	
Population		1,230,700	1,725,700	2,326,000	1,394,000
Square miles of Urban Area		334	n/a	555	450
Peak Transit Vehicles[1]	Bus	174	420	580	n/a
	Light Rail	32	120	252	n/a
	Total	206	540	830	347
Transit Vehicle Hours of Service[1]		850,500	n/a	n/a	1,390,000
Population (Persons) per Peak Transit Vehicle		5,974	3,196	2,802	3,722
Transit Vehicle Hours per Person (Overall Population)		0.69	n/a	n/a	1.20
Transit Vehicles per Square Mile of Urban Area		0.62	n/a	1.50	0.77
Percent of Weekday Travel[2]	Auto	91.0%	92%	81.1%	n/a
	Transit	1.3%	2.%	4.4%	n/a
	Walk & Bike	6.7%	7%	14.5%	n/a

[1] Includes bus and light rail vehicles operated at maximum service – does not including demand responsive/paratransit vehicles (Source: National Transit Database 2000 and 2003, Federal Transit Administration)

[2] Source: SACOG

Table 9
Estimated Percent Growth in Population, Urban Area and Transit Service in Sacramento County

	Percent Growth	
	2025 MTP (2003 to 2025)	**Blueprint (2003 to 2050)**
Population	40%	89%
Square miles of Urban Area	NA	66%
Transit Fleet (operating during peak period)	162%	302%

Source: DKS Associates

While the assumed 2050 transit system outlined in Table 7 represents only one mix of new transit projects and services that could support the 2050 Preferred Blueprint Scenario, it does provide an order of magnitude for the level of transit service that will be needed to increase transit's share of total trips in Sacramento County from 1.3% today to 4.4% in 2050. SACOG's analysis generally indicates that a tripling of the percent of trips by transit will require a tripling of the transit fleet and transit service levels.

The assumed transportation system for the 2050 Blueprint could result in substantial increase in transit's share of travel demand in Sacramento County, although it will also require a major increase in subsidy levels. To be successful and sustainable, the transit system needs adequate ridership levels to maintain a minimum farebox recovery level, which requires comprehensive and continuing planning efforts.

FUNDING

Like many aspects of public services, the major issue for transit is a matter of priorities and limited funding. The adage "I can do anything, I just can't do everything" leads to a discussion of how a finite set of resources should be allocated.

The preceding discussion surfaces a number of difficult policy choices that must be made. Three of the most important are:

- To what extent should limited funds be allocated to marketing, information, safety, comfort and other activities that do not directly provide more, faster, or otherwise improved service?
- How should the needs of the transit dependent be weighed against investing in additional services for commuters and choice riders?

- Is it more important to cover a greater service area with lower quality or less frequent service, or a smaller service area with higher quality, more frequent service?

At a broader level, decisions must be made as to how flexible transportation funds should be allocated between public transit and other modes, such as road, bicycle, and pedestrian facilities.

Funding Conditions and Factors Related to Transit Success

Unlike these other modes, however, decisions to fund transit are unique in that the annual cost to maintain and operate a particular service is much greater in terms of the up-front capital outlay when compared with roads or bicycle paths or sidewalks. As an example, a new large (approximately 45 passenger) bus can be expected to cost at least $350,000 and require an annual operating subsidy of more than $200,000, of which labor costs are the predominant share.

Setting priorities involves a series of policy decisions that must be carefully considered by each jurisdiction. There is no available "best practice" to consult.

However, decisions should be:

- Integrated – tied to a common mission statement.
- Based upon market research.
- Informed by successes and lessons learned, including from pilot projects, and evaluated against established performance measurements.

Like many businesses, acquiring data about existing and potential customers, and developing a specific business (service) plan can help in making decisions.

Moving past issues of how funding priorities are set, in order to plan, implement, and maintain transit services, operators require funding streams that meet four tests:

- *Sufficient*. Is there enough funding to provide the services and amenities that are needed or expected?
- *Stable*. Can most sources of funding be expected to continue for several years?
- *Flexible*. Are a good portion of budgeted revenues able to be re-budgeted between capital and operations or from one type of service or route to another?
- *Predictable*. Are the sources of funding, particularly for operations, from sources that do not fluctuate significantly from year to year?

Ideally, the answer to each of these questions is "Yes!" Though these factors apply to both the need for operating subsidies and for capital investments and replacements, the need is greatest with respect to operations.

Operating Subsidies

The Sacramento Area Council of Governments recently compiled and published a "Fact Sheet" on transit funding that includes the following[11]:

- The fundamental challenge for transit service and expansion in this region centers on operating funds.
- Sacramento Regional Transit operations consume about 90% of all funds currently usable for that purpose, so Sacramento RT's ability to expand operations is effectively capped by operating funding.
- Congress and the Legislature have tried to restrict the use of federal and state funds away from urban transit operations, on the principle that local transit operations should be a local responsibility, although federal funds presently are usable for vehicle preventive maintenance.
- Prior to Proposition 13 in 1978, local general funds used to cover more than one-third of many transit operating costs in the big urban areas, but that source has largely dried up in most cities.
- Sacramento Regional Transit covers only 19.8% of its operating costs from fares, a number that has been gradually declining for at least a decade. The gradual decline of fare revenues as a percentage of operating costs presents a dilemma: better service requires more funding, but fare revenues won't help unless service gets significantly better.
- There are some options for increased funding beyond fares. While TDA and Measure A revenue's expand with the economy, so do Sacramento RT's operating costs; anything beyond a modest and gradual expansion of service will require new operating funds, with a second "Measure B" sales tax seen as the likeliest source.
- Transit carries 0.8% of daily trips in the region today, including 3% of peak hour commute trips and 20% of commute trips to and from downtown Sacramento.
- Sacramento RT estimates somewhat more than half of its current ridership to be transit-dependent, versus choice-riders, with transit-dependent comprising 75% of off-peak riders.

[11] *Draft SACOG Issue Paper for 2007 MTP: Transit Operations Issues*, Sacramento Area Council of Governments, Sacramento, CA, September, 2005.

- The transit-dependent, those who cannot afford to or cannot drive, tend to be sensitive to transit fares and monthly pass cost. Choice-riders, those with an auto available, tend to be sensitive to the out-of-pocket costs of driving: gasoline, parking, and road tolls.

- Automobile economics matters for choice-riders. Auto travel usually would be more flexible, more convenient, timelier, twice as fast, and more comfortable. Most of those who can afford the average sunk cost of $8,000 per year to own an auto can afford the marginal cost to drive it.

- Models indicate behavior begins to shift at about $3.50-per-gallon gasoline or $100-per-month parking, as lower income auto owners look for other options.

- Under today's conditions, for a Sacramento RT route to cover operating cost with fares would require enough passenger turnover that the route could carry 75 riders per run; RT's best current run carries about that many on a daily average, but its system-wide average is about 15 riders per run.

- The demographics of an aging population, including doubling the population over age 75 within 25 years, poses major challenges for paratransit service, which today costs five times as much per rider as regular service; it becomes important to consider ways to serve with regular service those riders of paratransit that could board a bus by themselves.

- Other transit systems, for example Golden Gate Transit, New Jersey Transit, San Diego, and Houston, have been notably successful running express service on carpool lanes for a premium fare.

Each of the following actions increases operational subsidies:

- Increasing coverage;
- Decreasing headways;
- Increasing security; and,
- Adding more express services.

Capital Investments and Replacements

The Sacramento Area Council of Governments' "Fact Sheet" on transit funding also includes the following[12]:

[12] *Draft SACOG Issue PaperfFor 2007 MTP: Transit Operations Issues*, Sacramento Area Council of Governments, Sacramento, CA, September, 2005.

- ❒ The region has no funding source dedicated to transit equipment rehabilitation and replacement; at present, these needs, which total $550 million over the next 25 years, must compete in regular regional funding programs against highway and transit improvements and expansion.

- ❒ Sacramento RT has been running with about 15% spare buses in its fleet, versus a national average of 22%, leading eventually to an increased breakdown rate and extra costs to send out backup buses; deferred bus replacement yields the same result.

Funding Best Practices Related to Transit

- ❒ Charge premium fares for the highest quality services.
- ❒ Secure long-term dedicated transit funding, including consideration of sales taxes, parcel based fees or taxes, employee payroll taxes, and student fees.
- ❒ Consider changing laws, regulations, and other restrictions to encouraging competition and innovation in transit services.
- ❒ Reduce restrictions on funding sources to allow more flexibility in how transit operating costs are subsidized.
- ❒ Support the replacement of existing funding sources with new funding sources that are more flexible in their use.
- ❒ Carefully consider using road and parking pricing as a possible source of funding public transit.
- ❒ Carefully consider the possible establishment of transit financing districts in advance of parcel creation in new development areas. Similar districts could be created in existing areas by requiring, as a condition of approval on a development or reurbanization project, that properties join the district. As needed, seek adjustments to laws and regulations.
- ❒ Give consideration to new funding models for transit, such as moving at least a portion of services from an enterprise model to something closer to a public utility model.
- ❒ Seek to keep labor costs competitive.
- ❒ Annually contribute sufficient monies to a “sinking fund” to ensure that sufficient funds to replace rolling stock are accumulated over several years. Identify, and seek modifications, to laws and regulations that impede this standard business practice.
- ❒ Local agencies should structure property taxes, development fees, and utility rates, to reflect the lower public service costs of clustered, infill development.

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COLLABORATION AND CONSISTENCY OF DECISIONS

Much is documented about the need for transit operators to create partnerships with local governments, regional governments, state governments, private businesses, and non-profit organizations. These partnerships tend to lead to opportunities for innovative financing and finding efficiencies through combined services.

There is significantly less information about what local governments that seek increased transit service might consider. Since local jurisdictions are unlikely to relinquish authority over land use, yet many do not operate one or more transit services that serve their jurisdiction, it follows that local governments will need to become even more assertive in the planning and provision of public transportation. This document seeks to provide guidance to local governments.

Collaboration Conditions and Factors Related to Transit Success

This document identifies numerous land use, transportation, and funding factors that, in combination, are largely determinant of a transit systems' success. Transit should not co-exist with other transportation modes or with land uses, but rather be integrated.

The challenge is that the authority over these many factors is dispersed to many agencies:

- ✓ Cities and Counties have authority over most land uses, and local streets, pedestrian, and bicycle facilities;
- ✓ Public transit operators provide most commute rail, light rail, and bus services;
- ✓ Local and regional funding agencies such as regional planning agencies, taxing authorities, and air districts control much of the available funding;
- ✓ Special land use authorities also exist, such as redevelopment agencies;

- ✓ Private transportation providers serve niche markets; and,
- ✓ The public, including private land owners and electorates, must approve special taxes and assessments, and are sometimes responsible for maintaining sidewalks.

Standard practice is for the many organizations involved to create "partnerships." As the Sacramento area moves to accommodate significant increases in population and employment, and to achieve the vision of the Blueprint, local governments should strongly consider assuming a stronger role in leading these partnerships.

The following 4 step program is suggested as a starting point for local governments. Each step should be taken in close coordination with transit provider(s) and potential funding agencies:

1. *Develop a vision and policies regarding transit service.* What role is transit expected to play, in the context of an integrated transportation system, in the movement of people to and from their homes and their jobs, and the distribution of goods, and services?
2. *Consistent with the vision, develop plans for specific transit services that are is desired.* These plans should link land use plans, roadway plans, bicycle facility plans, pedestrian facility plans, etc. Which roadways and communities are being developed for which types of transit service?
3. *Commit to a set of actions that will be undertaken to make the transit service successful.* What requirements will be placed on new development, through zoning, conditions of approval, etc? How will local funds be allocated? What design standards will be used for new and improved roadways? When will improved pedestrian accesses to transit stations be constructed?
4. *Seek a commitment from the transit provider(s) that if the action plan is implemented, the complementary transit service will be provided*[13].

Like many aspects of local planning this approach should be considered first on a jurisdiction-wide basis, and then for each major corridor in which transit service is desired.

Beyond this procedural approach to planning and decision making based upon collaboration, local agencies and transit operators should work to incorporate a collaborative mindset into everyday thinking. This is a two-way obligation. Day-to-day decisions of transit operators should support local agencies and vice versa.

[13] These commitments need to address the issue of sufficient, stable, flexible, and predictable funding. For this reason, where possible, commitments from funding agencies might be sought as part of a multi-party agreement.

Other areas in which mutual support, collaboration, and consistency of decisions are significant factors in the success of public transportation are the interplays between transit policies and services, and the following:

- Environmental and quality of life policies, including clean air, clean water, open space, neighborhood improvement and preservation, and resource management.
- Additional public policy considerations, including economic vitality, social equity, pricing, and taxation.

The institutional structures necessary to achieve these consistencies is the subject of ongoing discussion in academic, technical, and policy arenas. One proposal is the concept of a "mobility manager" in which one or more organizations considers the needs of the transportation system users holistically, whether it is from door-to-door, from loading dock-to-loading dock, or another scenario[14].

It has even been suggested that mobility management might be a core role and responsibility for future transportation or transit agencies.

Insufficient data exists to conclude whether mobility management, as the mission of any one organization, would contribute to improved transit. The analysis tends to follow the lines of most organizational deliberations about "centralization" vs. "decentralization" of decision-making.

The key underlying concepts of mobility management can be considered a 'best practice' and are directly linked to the success of public transportation, regardless of the institutional arrangements.

Primary is the re-framing of transportation "users" to "customers." This reframing is consistent with the other movements regarding reinventing government, outcome-based performance measurement, and customer orientation and satisfaction.

Collaboration Best Practices Related to Transit

Note: these Best Practices do not restate the suggested practices in the Land Use, Transportation, and Funding sections of this document. Rather, it is assumed that the suggested visions, plans, and programs identified below would be based upon, and would incorporate, many of the concepts discussed throughout this document.

[14] Some definitions of mobility management do not consider the movement of goods and services. In a (perfect world) truly integrated transportation system all mobility needs should be considered to ensure that decisions to benefit one customer or need do not have unintended consequences for other customers or needs.

- ❒ Local agencies should prepare their own Transit Development Plans. Components of the plan should include:
    1. Visions, Goals, and Objectives.
        a. The community's transit plan should include both a vision of the kind of transit the community desires and,
        b. The goals and objectives the community has for transit.
        c. Objectives should include:
            - ✓ Targeted "customers" that will be served.
            - ✓ The type of services (e.g. light rail, fixed-route bus service, bus rapid transit, neighborhood shuttles, etc.) that are envisioned and desired.
    2. Existing Conditions and Existing Plans
        a. A depiction of existing developed areas, existing roadways, and existing transit services.
        b. Opportunities to maximize the efficiency of existing transportation systems.
        c. A summary of plans for new development and redevelopment, and for major transportation infrastructure improvements.
    3. Transit Route Plans
        a. Specify the routes or alignments in which transit services are desired. This includes specifying the roadways that a local agency wants to have served with quality transit services, with a particular emphasis on corridors that are planned for high-speed transit.
        b. Guidelines and/or standards for transit stops and transit stations.
    4. Local Land Use and Transportation Actions to Support Transit
        a. Specific actions local government will take to assure that the roadways, land uses, and other transportation systems will support successful public transit. This includes:
            - ✓ Specific land use planning and zoning actions;
            - ✓ Specific plans and projects to ensure that pedestrian, bicycle, and auto accesses to transit are safe and convenient.
        b. For corridors planned to accommodate high-speed bus transit, specific actions that will be taken to support these services (e.g., installing traffic management systems that improve traffic flow, such as signal priority systems.)
    5. Funding the Plan. Identify specific actions that will be taken to explore and implement new sources of funding for transit

maintenance and operations, as well as capital costs. Funding sources could include:

a. Assessment districts;

b. Parcel taxes;

c. Development fees; and,

d. Other measures.

6. Agreements with Transit Providers. Local agencies need to develop agreements with transit providers to gain the desired transit services.

    a. Commitments from the transit provider(s) that if the Transit Development Plan is implemented, the envisioned transit services will be provided.

    b. These commitments need to address the issue of sufficient, stable, flexible, and predictable funding. For this reason, where possible, commitments from funding agencies might be sought as part of a multi-party agreement.

    c. The local agency's commitment to participate actively in the development of transit operator's policies, plans, and programs.

7. Collaboration

    a. Local agencies should more actively participate in transit aspects of the Metropolitan Transportation Plan and air quality attainment plans.

    b. Additionally, the local agency needs to work actively with neighboring jurisdictions to plan for transit that serves both communities.

- ❒ Periodic, formal meetings should be held between local agencies and transit operators that mutually work in a given geographic area, to discuss upcoming opportunities for collaborative decision-making, other upcoming policy decisions that might impact each other, and to debrief previous collaborative efforts in order to celebrate successes and identify "lessons learned." The frequency of these meetings should depend on the agencies involved, but in no case should be less frequent than once per year. Depending upon the size of the organizations involved it may make sense for separate, parallel, meetings to occur at the Executive, supervisor/manager, and technical staff levels.
- ❒ Periodic, formal meetings should be held between transportation system operators and representatives of other transportation and air quality-related decision makers to develop general priorities and visions for their area[15].

[15] SACOG currently convenes all transit operators in the region as the Transit Coordinating Committee.

- ❒ As needed, formal joint meetings of policy boards and councils, representing various combinations of policy makers, should be used to jointly discuss and resolve issues of mutual concern.
- ❒ Long-term opportunities for jointly locating staff from separate transportation system operators should be explored. Traditionally, efforts to co-locate staffs are proposed as mechanisms to achieve cost savings. A separate benefit comes from the opportunities for informal dialogue (e.g. the water cooler dynamic) and ease of access to one another. Many organizations of peer groups are formed primarily for the ability of members to informally interact and network. This same concept is applicable to the co-location of staffs.
- ❒ Public agencies should establish a network, and publish a formal directory of, transit best practices, experts, and mentors within the greater Sacramento (or larger) region.
- ❒ Transit operators should develop partnerships with parking and traffic enforcers to increase enforcement in problem areas.
- ❒ Local agencies and transit operators should consider themselves "mobility service providers", not just bus or transportation system operators. They should search for innovative ways to improve mobility and access, such as rideshare matching and vanpools[16].
- ❒ Local agencies and transit operators should work to change laws and regulations, as necessary, to encourage competition and innovation in transit services.

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PERFORMANCE MEASUREMENT

Performance measurement is being used increasingly in both the public and private sector. Systematic performance measurement fulfills several functions:

- ❒ Focuses internal and external stakeholders on a common set of performance objectives;
- ❒ Provides objective assessments of current conditions, including successes, deficiencies, challenges, and trends over time;
- ❒ Serves as a mechanism to compare performance over time; and,

[16] SACOG currently operates a Rideshare program, and uses Transportation Management Associations as outreach partners for all marketing efforts related to ridesharing.

- Serves as a mechanism to communicate performance results.

Performance measurement can be implemented at three levels:

1. Transportation system as a whole;
2. Transit system as a whole; and,
3. Individual services and/or routes.

Effective transit performance measurement systems share the following characteristics[17]:

- *Stakeholder acceptance*. Stakeholders include the governing body, management, staff, and customers.
- *Linkage to organizational goals*. Goals and objectives should be quantifiable so that accomplishments can be gauged using the performance measurement system.
- *Clarity*. The measures, the methods, and the reporting of results are important to how well results are understood and accepted.
- *Reliability and credibility*. The accuracy and usefulness of measured results depends on the quality of data used in calculating the measures.
- *Variety of measures*. Performance measures should reflect a broad range of relevant issues.
- *Number of measures*. The variety of measures must be balanced against the need to avoid overwhelming users and reviewers.
- *Level of detail*. Measures should be sufficiently detailed to accurately identify areas where improvement is needed, without being more complex than necessary.
- *Flexibility*. The system should permit change over time as organizational goals evolve, but should preserve enough stability to allow comparisons over time.
- *Realism of goals and targets*. Targets should be realistic, but optimistic.

In addition, as transit service provision is based upon a series of trade-offs and policy choices, the goals and objectives should be consistent with, and reflect, policy directions.

A survey of 22 transit operators and 10 related planning agencies identified the following performance measures as being the most widely used[18]:

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[17] *Regional Transit Performance Indicators: A Performance Measurement Model*, Nakanishi, Yuko J. and List, G.F., Rensselaer Polytechnic Institute, Troy, NY, 2000.

[18] *A Guidebook for Developing a Transit Performance Measurement System, (Report 88)*, Transit Cooperative Research Program, Transportation Research Board, 2003.

Measures Used by at Least 50%

- Cost effectiveness
- Ridership
- On-time performance
- Cost-efficiency
- Accident rates

Additional Measures Used by 25-50%

- Road (service) calls
- Employee productivity
- Missed trips
- Complaint/compliment ratio
- Passenger load

Ideally, each of the Land Use, Transportation (Transit and other supportive transportation), Funding, and Collaboration factors would be tied to one or more quantifiable performance measures.

Additional Examples:

Land Use

- Percent of new/overall households and jobs within ¼ mile of fixed-alignment transit service.
- Number of employees within ¼ mile of light rail stations.

Transit

- Weighted average ratio of auto-to-transit travel times.
- Coverage/turn-down rate for demand-responsive services.
- Customer satisfaction and customer loyalty.
- Incident reports and other measures of passenger safety, including vandalism, other crime, and safety personnel/passenger ratios.
- Energy consumption per passenger.

Other Transportation

- Adherence to level-of-service standards on a set percentage of roadway lane miles.
- Vehicle miles of travel per capital.
- Vehicle trips per capita.
- Percentage of new road lane miles built in transit supportive layouts.
- Percent of pedestrian approaches to transit stops with enhanced street crossings.

Funding

- Percentage of operating funds from sources secure for 5 or more years.
- Percentage of overall funding with flexibility to be used for capital vs. operations.

Performance Measurement Best Practices Related to Transit

Best practices include:

- Transit operators should establish and use a comprehensive performance measurement system that reflects the multiple objectives that can be addressed by public transit, including mobility (improved travel choices for transportation disadvantaged people) and efficiency (reduced traffic congestion, road and parking facility cost savings, consumer savings, crash reductions, environmental protection, and more efficient land use).
- Maximizing the automation of data collection and electronic information management to support a performance measurement system.

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ADDITIONAL CHALLENGES

Providing quality transit services that meet the needs of customers is challenging. The preceding sections describe a number of tough policy issues. Additional considerations are as follows.

- For transit dependent populations, how much service is enough? How frequent, how widespread, how efficient, and how diverse?
- Which is higher priority? Gap closure, system enhancement, or outward expansion?
- How can fare structures balance the ability of customers to pay, with recovering the highest possible share of operating costs? To the extent that new fare structures are contemplated, how can these be implemented for customers that might see significant increases? Is it practical to make major revisions to historic policies for subsidized fares?
- Some view transit in a larger policy context. The transit dependent are often isolated and alienated from society, have increased needs for group homes, and, as a result, have some impacts on public health and housing costs. To what extent should factors other than mobility influence the amount of service provided for the transit dependent?
- Maximizing ridership in response to new or changed services can take time and requires resolve. The majority of ridership on new bus lines, other than transfer passengers, comes from homes within one to three blocks of the route. New bus routes have been found to take 1 to 3 years to reach their full patronage potential. Ridership development on entirely new systems may take even longer. How long should investments be continued in new systems that have not achieved minimum performance levels?

APPENDICES

Appendix A: References

Appendix B: Blueprint Growth Principles

Appendix C: SACOG Draft Metropolitan Transportation Plan Issue Paper - Transit Operations

Appendix A:

References, Resources and Cited Works

The Balanced Scorecard: Translating Strategy into Action, Kaplan, R.S. and Norton, D.P., Harvard Business School Press, Boston, MA, 1996.

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Appendix B:
Blueprint Growth Principles

1. ***Transportation Choices:*** Developments should be designed to encourage people to sometimes walk, ride bicycles, ride the bus, ride light rail, take the train or carpool. Use of Blueprint growth concepts for land use and right-of-way design will encourage use of these modes of travel and the remaining auto trips will be, on average, shorter.

2. ***Mixed-Use Developments:*** Buildings homes and shops, entertainment, office and even light industrial uses near each other can create active, vital neighborhoods. This mixture of uses can be either in a vertical arrangement (mixed in one building) or horizontal (with a combination of uses in close proximity). These types of projects function as local activity centers, contributing to a sense of community, where people tend to walk or bike to destinations and interact more with each other. Separated land uses, on the other hand, lead to the need to travel more by auto because of the distance between uses. Mixed land uses can occur at many scales. Examples include: a housing project located near an employment center, a small shopping center located within a residential neighborhood, and a building with ground floor retail and apartments or condominiums on the upper floor(s).

3. ***Compact Development:*** Creating environments that are more compactly built and use space in an efficient but aesthetic manner can encourage more walking, biking, and public transit use, and shorten auto trips.

4. ***Housing Choice and Diversity:*** Providing a variety of places where people can live –apartments, condominiums, townhouses, and single-family detached homes on varying lot sizes – creates opportunities for the variety of people who need them: families, singles, seniors, and people with special needs. This issue is of special concern for the people with very low-, low-, and moderate-income, often our teachers, other public employees and professionals, as well as retail employees, service workers and other people for whom finding housing close to work is challenging. By providing a diversity of housing options, more people have a choice.

5. ***Use of Existing Assets:*** In urbanized areas, development on infill or vacant lands, intensification of the use of underutilized parcels (for example, more development on the site of a low-density retail strip shopping center), or redevelopment can make better use of existing public infrastructure. This can also include rehabilitation and reuse of historic buildings, denser clustering of buildings in suburban office parks, and joint use of existing public facilities such as schools and parking garages.

6. ***Quality Design:*** The design details of any land use development - such as the relationship to the street, setbacks, placement of garages, sidewalks, landscaping, the aesthetics of building design, and the design of the public right-of-way (the sidewalks, connected streets and paths, bike lanes, the

width of streets) - are all factors that can influence the attractiveness of living in a compact development and facilitate the ease of walking and biking to work or neighborhood services. Good site and architectural design is an important factor in creating a sense of community and a sense of place

7. ***Natural Resources Conservation:*** This principle encourages the incorporation of public use open space (such as parks, town squares, trails, and greenbelts) within development projects, over and above state requirements; along with wildlife and plant habitat preservation, agricultural preservation and promotion of environment-friendly practices such as energy efficient design, water conservation and storm water management, and shade trees to reduce the ground temperatures in the summer. In addition to conserving resources and protecting species, this principle improves overall quality of life by providing places for everyone to enjoy the outdoors with family outings and by creating a sense of open space.

Appendix C:
SACOG Draft Metropolitan Transportation Plan Issue Paper on Transit Operations

DRAFT

September 2005

SACOG ISSUE PAPER FOR 2007 MTP
TRANSIT OPERATIONS ISSUES

This paper begins the dialogue for developing an MTP 2030 transit element that addresses critical challenges facing transit operations over the next 25 years. Key questions to consider include: How is the share of transit's operating costs coming from public funds to be provided? How can the overall funding pool be expanded or the farebox share increased to allow for more service? And finally, how can the region deal with replacement and rehabilitation needs for transit?

Transit operations in the region encompass a wide array of services, from urban light rail and bus service with frequencies less than 15 minutes, to express commuter buses from suburban cities, to assisted paratransit dial-a-ride service for the disabled, to rural lifeline service running once a day or even once a week; this paper focuses on transit in the region, excluding intercity/interregional rail and bus services.

Cost of Transit Operations

- The 14 transit services in the region cost about $160 million per year to operate, covering drivers, mechanics, dispatching, fuel, parts, supplies, services, and administration.
- Sacramento RT accounts for about 70% ($106 million) of the region's operating costs, and carries 80% of the region's 36 million annual transit rides, although smaller suburban operators with lengthy commuter express and rural lifeline routes comprise a larger share of passenger miles traveled.
- For most operators, labor comprises 75-85% of operating cost.

Paying for Transit Operations

- The fundamental challenge for transit service and expansion in this region centers on operating funds.
  - Sacramento RT operations consume about 90% of all funds currently usable for that purpose, so Sacramento RT's ability to expand operations is effectively capped by operating funding.
  - Sacramento RT covers about one-third of its operating cost from TDA (Transportation Development Act, a ¼% sales tax), and all urban Sacramento TDA revenues go to transit.
  - Sacramento RT covers about one-third of its operating cost from Measure A ½% sales tax (currently comprising its own 33% share plus Folsom's), and RT will take 38% of Measure A renewal to sustain that funding stream.
  - Congress and the Legislature have tried to restrict the use of federal and state funds away from urban transit operations, on the principle that local transit operations should be a local responsibility, although federal funds presently are usable for vehicle preventive maintenance.
  - Smaller operators typically rely on TDA funds to cover half of operating cost; public works departments that use remaining TDA funds for road maintenance resist transit expansion that would draw a larger share of TDA funds to cover increased operating cost.
  - Prior to Proposition 13 in 1978, local general funds used to cover more than one-third of many transit operating costs in the big urban areas, but that source has largely dried up in most cities.
- The gradual decline of fare revenues, now less than one-third of operating costs, presents a dilemma: higher fare revenue depends largely on more choice-riders, service must get significantly better to attract more choice-riders, but better service requires more funding, particularly public funding.

- Sacramento RT covers only 19.8% of its operating costs from fares, a number that has been gradually declining for at least a decade; 7-16% is a typical range for smaller operators but some low-cost operators with far suburban commuter express runs get in the 20-30% range.
- Fares are often set for public policy reasons, related to the ability of the transit-dependent to pay, rather than to cover the largest possible share of operating cost.
- Every bus that Sacramento RT puts in service on average costs about $300,000 annually, which requires $240,000 from public funding to supplement fare revenues.

- There are some options for increased funding beyond fares.
  - While TDA and Measure A revenue's expand with the economy, so do Sacramento RT's operating costs; anything beyond a modest and gradual expansion of service will require new operating funds, with a second "Measure B" sales tax seen as the likeliest source.
  - Davis Unitrans presents an interesting case: It receives $1.75 million per year in mandatory UC Davis student fees, which covers 60% of its operating cost, and students get unlimited rides with no fare; this arrangement serves as a prepaid fare by all households in the population, in the manner of a district-wide utility fee.
  - Pending legislation by State Senator Carole Migden (SB 1020) would provide a county option to increase the Transportation Development Act local sales tax rate for transit to ½%, from the current ¼%, providing a substantial funding increase if passed and activated in any county.

Rehabilitation and Replacement of Transit Equipment

- The region has no funding source dedicated to transit equipment rehabilitation and replacement; at present, these needs, which total nearly $600 million over the next 25 years, must compete in regular regional funding programs against highway and transit improvements and expansion.
  - Sacramento RT's light rail fleet, now at 76 vehicles, will need heavy overhaul at least once during the next 25 years, at a cost of $2 million per vehicle = $150 million.
  - The region's fleet of 450 transit buses, with a 12-year service life, will need to be replaced twice over the next 25 years at a cost estimated at $380,000 per bus = $340 million.
  - The region's fleet of 250 small shuttle and paratransit coaches, with a 5-year life service, will need to be replaced five times over the next 25 years, at $80,000 per coach = $100 million.
- New state clean air rules indicate that many suburban operators will have to convert fleets from diesel to clean fuels in upcoming years, making buses costlier, posing new fueling arrangements, and perhaps requiring earlier retirement of older diesel coaches.
- California – and thus this region – fared poorly when seeking federal bus replacement funds during TEA-21. Congress earmarked the program every year, and California, with 14% of the nation's urban transit service, managed to get only 6% of nationwide funding.
- Sacramento RT has been running with about 15% spare buses in its fleet, versus a national average of 22%, leading eventually to an increased breakdown rate and extra costs to send out backup buses; deferred bus replacement yields the same result.

Transit System Performance

- Except for the transit-dependent, transit serves only a small niche in travel in the region today.
  - Transit carries 0.8% of daily trips in the region today, including 3% of peak hour commute trips and 20% of commute trips to and from downtown Sacramento.
  - Current transit service is highly focused on downtown Sacramento - the one area with transit-friendly land use densities - with both light rail lines and 40% of Sacramento RT's bus routes

plus six suburban commuter services going there, yet only 15% of the region's jobs are now located in downtown Sacramento.

- Sacramento RT estimates somewhat more than half of its current ridership to be transit-dependent, versus choice-riders, with transit-dependent comprising 75% of off-peak riders. The percentage of transit dependent riders is much higher for the smaller suburban operators.
- The transit system's two main kinds of customers – transit-dependent and choice-rider – have different travel patterns and are best served with different route and service structures.
- The transit-dependent, those who cannot afford to or cannot drive, tend to be sensitive to transit fares and monthly pass cost. Choice-riders, those with an auto available, tend to be sensitive to the out-of-pocket costs of driving: gasoline, parking, and road tolls.
- Automobile economics matters for choice-riders. Auto travel usually would be more flexible, more convenient, timelier, twice as fast, and more comfortable. Most of those who can afford the average sunk cost of $8,000 per year to own an auto can afford the marginal cost to drive it. Models indicate behavior begins to shift at about $3.50-per-gallon gasoline or $100-per-month parking, as lower income auto owners look for other options.
- Travel time matters for choice-riders; commuters tend to value extra travel time at their wage rate. Route transfers add to travel time and uncertainty, yet Sacramento RT's route structure forces about half of its riders to transfer between bus and light rail or between buses.
- Service frequency also matters for choice-riders. Few choice-riders accept bus intervals longer than 15 minutes, but only 20% of Sacramento RT's routes run that frequently, and in far suburban and rural areas 15 minute service is rare and hourly service the general rule.

- Under today's conditions, for a Sacramento RT route to cover operating cost with fares would require enough passenger turnover that the route could carry 75 riders per run; RT's best current run carries about that many on a daily average, but its system-wide average is about 15 riders per run.
- The demographics of an aging population, including doubling the population over age 75 within 25 years, poses major challenges for paratransit service, which today costs five times as much per rider as regular service; it becomes important to consider ways to serve with regular service those riders of paratransit that could board a bus by themselves.

Comparisons

- The Blueprint intention to provide more compact development and community activity centers offers hope the conditions for transit service will improve in the future.
  - Urban density matters. Older, denser eastern cities with transit-friendly land use patterns (Boston, Philadelphia, Cleveland, Baltimore, St. Louis, and New Orleans) operate in the range of $1.70-$3.30 cost per rider, while newer, more sprawling western cities (Seattle, Dallas, Denver, Portland, San Jose, Sacramento, and Salt Lake City) operate in the range of $2.60-$4.60 cost per rider, while very dense Los Angeles and Orange County operate at $2.20-$2.30 cost per rider.
  - Sacramento RT lies at the high end of operating cost per hour, at $110.70, compared to a national average of $96.90, partly because it operates mainly in a low density suburban environment; most of the comparative cities above fall in the range of $85-$105 per hour, with only San Jose and Dallas noticeably higher in the $145 per hour range.
- The transit fleet in peak service in Sacramento is relatively small, at 290 buses per million population; most of the comparative cities above fall in the range of 500-750 buses in peak service per million population, and only Dallas at 270 is close to Sacramento.
- Other transit systems, for example Golden Gate Transit, New Jersey Transit, San Diego, and Houston, have been notably successful running express service on carpool lanes for a premium fare.

Transit Operating Costs, Funding, & Performance

(Data mostly from 2003 sources)

Operator:	Sac RT Light Rail	Sac RT Bus	PT Inc	Folsom	South Co.	YCTD	Davis	Yub-Sut	El Dorado	Roseville	Placer	Pla. CTSA	Lincoln	Auburn
System:														
Light Rail Cars	36													
Full Size Buses		258		12	14	34	44	37	38	32	31	25	4	4
Shuttle Buses		21	158				2							
Routes	2	83		3	3	7	15	7	12	12	7		3	2
Base Fare	$1.50	$1.50	$3.00	$1.50	$1.00-$3.00	$1.50	Free-$1.00	$1.00-$3.00	$2.00	$1.30	$1.00	Variable	$0.75	$0.80
Park-and-Rides														
Costs:														
Operating Labor	$13.3m	$49.7m	$10.8m	$1.08m	$1.24m	$3.65m	$2.26m	$2.45m	$1.89m	$3.81m	$2.45m	$1.08m	$243,000	$235,000
Eqpt. & Supplies	$10.0m	$22.0m	$1.3m	$.21m	0.24m	$0.95m	$0.55m	$0.24m	$0.34m	$0.68	$0.42m	$0.29m	$31,000	$50,000
Other Opns. Costs	$4.8m	$7.0m	$1.9m	$.56m	$0.07m	$0.83m	$0.42m	$.40m	$0.41m		$0.82m	$0.26m	$157,000	$31,000
Total Opns. Costs	$28.1m	$78.7m	$14.0m	$1.85m	$1.55m	$5.25m	$3.23m	$3.09m	$2.64m	$4.49m	$3.69m	$1.63m	$431,000	$316,000
Funding:														
Fares	$22.1m		$0.9m	$.30m	$0.12m	$1.22m	$0.18m	$0.66m	$0.81m	$0.51m	0.71m	$1.06m	$32,000	$24,000
TDA Funds	$32.9m		$1.8m	$1.55m	$0.72m	$2.25m	$0.75m	$1.14m	$1.61m	$3.49m		$0.55m	$327,000	$224,000
County Sales Tax	$25.0m		$1.8m											
State Funds (STA)	$2.3m				$0.10m			$0.14m	$0.22m	$0.16m	$0.14m	$0.02m		$18,000
Fed. Funds (5307)	$8.9m					$0.54m	$0.42m	$0.80m						
Fed. Funds (5311)					$0.03m	$0.12m		$0.19m						
Other Sources	$15.2m		$9.5m		$0.58m	$1.13m	$1.88m	$0.16m		$0.33m	$2.74m		$72,000	$50,000
Total Opns. Funding	$106.4m		$14.0m	$1.85m	$1.55m	$5.25m	$3.23m	$3.09m	$2.64m	$4.49m	$3.69m	$1.63m	$431,000	$316,000
Performance:														
Annual Ridership	8,900,000	19,800,000	607,000	151,000	114,000	1,322,000	3,150,000	628,000	298,000	372,000	242,000	165,000	23,000	37,000
Riders/Veh./Hr.	84	32	3	7	5	19	46	10	9	7	8	3	5	7
Oper. Cost/Rider	$3.50	$3.45	$23.00	$12.25	$13.60	$4.00	$1.05	$4.90	$8.85	$12.10	$15.25	$9.90	$18.75	$8.55
Oper. Cost/Hour	$290.30	$110.70	$51.10	$78.70	$65.60	$74.90	$44.10	$44.60	$75.30	$48.80	$69.50	$28.30	$72.40	$37.80
Public cost/passenger	$2.95		$21.60	$10.25	$12.50	$3.05	$0.40	$3.85	$6.15	$10.70	$12.30	$3.45	$17.35	$7.90
Fare % Oper. Cost	20.8%		6.4%	16.2%	7.7%	23.2%	59.8%	21.4%	30.7%	11.4%	19.2%	65.0%	7.4%	7.6%

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