

VI-2. TRANSIT

The key to expanding person trip mobility is providing a diversity of mobility choices - choices that link where people live to where they want to work, shop and play. Transit services are the most efficient form of passenger travel, providing an opportunity to diversify travel choice by offering a high occupancy, high frequency person-trip mobility option to solo driving and carpooling.

THE TRANSIT IMPERATIVE

Based on interviews with representatives from Santa Cruz Metropolitan Transit District, over the next twenty years they target an approximately 25 percent increase in transit ridership mode split, increasing locally from 8 percent to 10 percent and regionally from 3.8 percent to 4.75 percent.

Based on the travel analysis forecast, to achieve a no growth scenario, a more aggressive 50 percent increase in transit ridership mode split needs to be achieved for both "local" internal trips and "commute in" and "commute out" external travel. To effectively achieve a higher transit mode split will require a long-term regional transit strategy. An important element of that strategy will be supporting transit services that move independently from the effects of vehicle congestion.

A long-term transit strategy must address regional mobility needs including alternatives to vehicle traffic congestion on Highway 1 and addressing the forecast growth in the south county areas and Watsonville, as well as serve the local Santa Cruz travel market.

Several key opportunities are available to the City of Santa Cruz to define and promote a regional transit strategy that will support both local and regional achievement of MTS goals:

1. The implementation of TDM measures as incentives and programs to ensure higher levels of transit ridership at existing employment centers.
2. The potential for incremental BRT on arterial streets as a first step to address the congestion issues facing the City.
3. The potential of the rail corridor in the mid-term for Bus Rapid Transit and in the long-term -- with increasing residential density and higher density employment along the corridor -- to support low cost rail services such as wireless diesel multiple units (DMU).
4. The benefit of the existing high UCSC transit mode splits, and the potential to continue to capture high levels of transit ridership with future UC growth.
5. The potential to increase transit ridership by developing higher density housing and mixed-use village centers along transit corridors.

6. The potential to provide high occupancy Bus Rapid Transit on HOV lanes.

MARKETS, STRATEGIES & OBJECTIVES

Primary Markets and Destinations

The key destinations in the City of Santa Cruz for transit trips by the priority travel groups are:

- UCSC - students, faculty and staff.
- City of Santa Cruz Schools - local school students.
- The Downtown - employment, shopping and tourism.
- The Boardwalk - tourism, local recreation and employment.
- Harvey West - employment.
- Mission/Soquel Retail - shopping and employment.

Short Range Strategies

Transit Strategies

MTS transit strategies focus on the key travel destinations in the City of Santa Cruz. They are designed to maximize marketability to the student, employee, shopper and tourist travel groups. The attractiveness of transit is enhanced through:

- **Increasing service frequency** - reducing wait times at bus stops.
- **Providing direct service** - reducing number of transfer from bus to bus, reducing onboard travel time, and with the long-range strategies, avoiding highway and street traffic congestion.
- **Increasing service capacity** - reducing crowding and standing.
- **Giving priority to transit service** - expanding and giving priority to transit service on the street travelways, such as providing bus queue jump lanes, or priority signalization timing necessary for all other improvements.

Transit Objectives

By making transit a more attractive alternative for local and regional travel, transit services can support the following objectives:

- Shift regional trips entering the City of Santa Cruz from SOV to transit.
- Build on the existing METRO system with a minimization of service overlap, with no reductions to existing local and regional services, and compatibility with METRO's countywide service enhancements and development.

- Encourage a short walk to transit, given that a majority of City residences and activities are currently within a five- to ten-minute walk to a METRO bus stop.
- Enhance services to increase and expand existing ridership and to attract new transit riders from other travel modes.
- Establish a core, high frequency cross-town transit network that connects key activity centers. Ensure good connections between core routes and where possible, with local feeders.
- Reduce cross-town travel times with more direct, express services that minimize the need to transfer from bus to bus and reduce wait times at bus stops.
- Increase Beach Shuttle ridership and productivity.
- Provide shuttle services between outlying, intercept parking and key destinations.
- Provide incremental BRT elements to move transit independent of vehicle congestion

Short-Term Recommendations

Evaluation Criteria

The MTS evaluated several short and long term transit strategies for application to Santa Cruz and the Santa Cruz region, based on the following criteria:

- **Vision** - consistency and potential to achieve the MTS vision and goals.
- **Mode shift** - potential to affect a significant mode shift relative to other short and long term strategies.
- **Marketability** - the potential to attract key travel group riders.
- **Cost** - both operating and capital costs.
- **Capacity** - potential to achieve the MTS twelve to sixteen percent SOV trip reduction.
- **Feasibility and implementation** - when and how easily can the strategy be introduced.

Key Recommendations

The following priorities emerged from the evaluation of a range of short-term (5-years) concepts:

1. Refine and **build on the successes of the existing METRO** system;
2. **Augment key transit services** of the existing transit system to **offer a core, high-frequency limited-transfer transit network serving activity centers & region;**

3. **Develop Metro Base;** It is required for the successful implementation of expanded and improved transit services; and,
4. **Give right-of-way priority to transit where feasible,** including exploration of **incremental Bus Rapid Transit (BRT)** improvements leading to a long-term BRT system. Incremental improvements include bus queue jump lanes and transit priority signalization.

While the short-range enhancements improve the transit attractiveness primarily for the City of Santa Cruz market, some initiatives will enhance transit attractiveness to regional markets traveling to and from key destinations within the City of Santa Cruz.

Route Modifications

As shown on Figure 4: the following short-term (5-years) transit concepts have the highest potential to increase ridership:

Eastside — UCSC Connector. Provide a direct, high frequency, local and express service to bypass downtown between UCSC and East Side residential neighborhoods with service extended to Cabrillo College.

North — South Central Route. Provide a direct, high frequency service along the City's central north-south area connecting the Harvey West, Downtown, Metro Center and Boardwalk areas.

East — West Connector. Provide direct, east - west transit route with limited stop express and local service linking the West Side residential neighborhoods, Mission Street retail, Santa Cruz High School, the Downtown, Soquel Avenue retail, East Side, and residential neighborhoods, with Cabrillo College.

Ocean Street Hotel/Beach Shuttle. Seasonal, weekend shuttle providing 30-minute service between the Ocean Street hotels and the Boardwalk area.

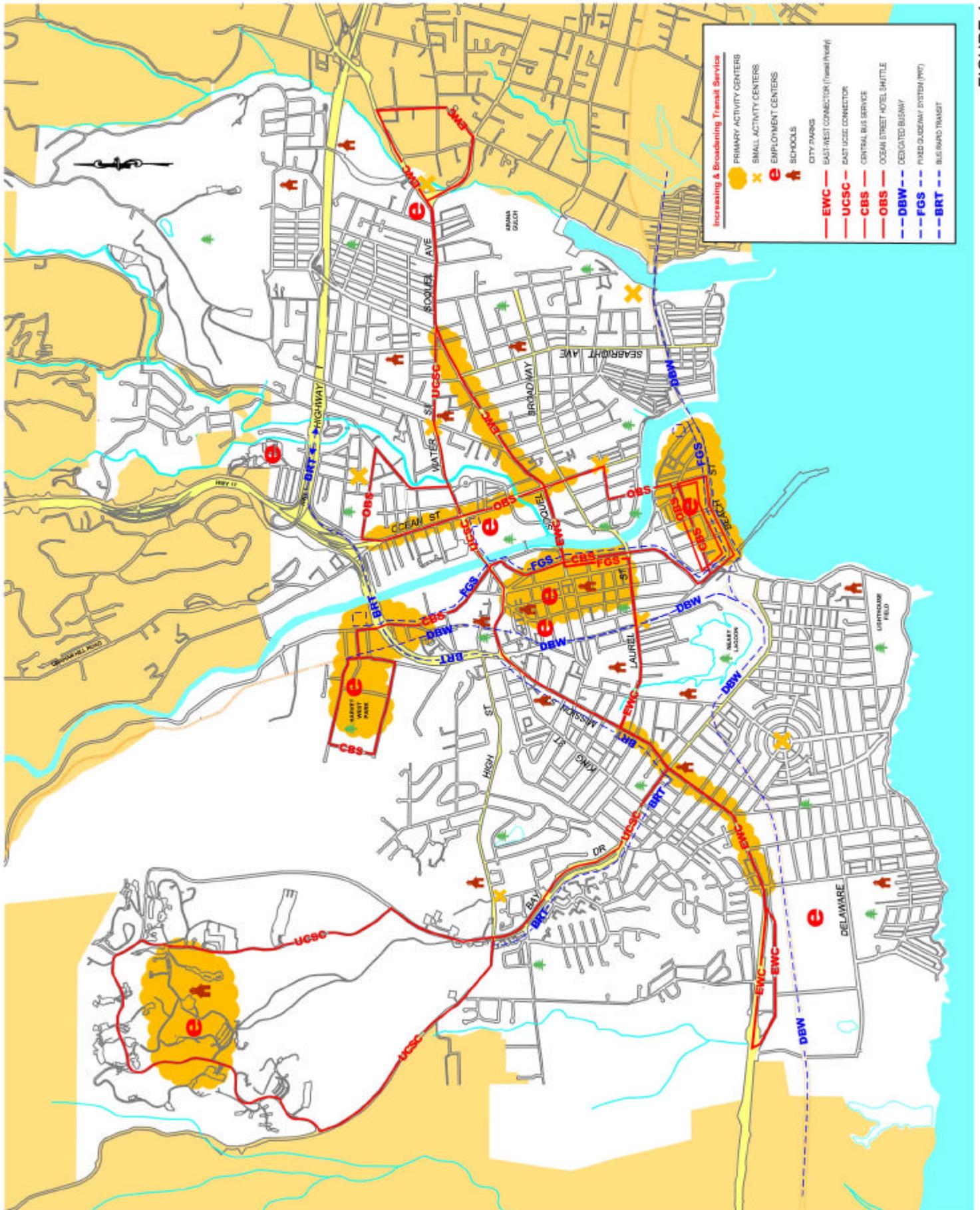


FIGURE 4

Long-Term System Considerations

To be effective, transit needs to offer high occupancy and high frequency, minimum-transfer service, serving higher-density housing and employment concentrations to achieve sustainable levels of ridership. For the population and scale of the City of Santa Cruz, transit options need to be considered within the planning framework of improving regional mobility. Local and regional benefits of increased ridership, greater travel choice and relieved vehicle traffic congestion can be achieved through coordinated transit system planning, land use changes and parking management programs.

A long-term transit strategy can enhance transit for both local and regional markets. A long-term, regional strategy will have a higher potential for influencing a 25% to 50% increase in the transit mode shift over the next 20 years. This is especially true if these more capital-intensive strategies are tied with park and ride facilities, higher density residential development or more diverse, transit oriented developments. The longer-range strategies should be used as tools to guide future land use development.

The type of transit technology and strategy that is appropriate for Santa Cruz and the Santa Cruz region is dependent on the travel markets to be served; the clustering, density, and mix of land uses at key destinations; the availability of right-of-way for routing and stations; and long-term availability of capital and operations funding. The greater the transit investment, the higher the density required to justify it.

Midterm to Long Range Options

The following key concepts underlie planning for future transit options:

- 1. Transit and carpooling offer the greatest promise for traffic reduction through mode shift from SOVs.**
- 2. Based on the travel analysis, to achieve no future growth in vehicle traffic in year 2020 from year 2000 levels, transit ridership levels need to increase for the external, commute in and out, regional trips. For a transit emphasis solution, external transit mode splits need to increase from 3.8 % and average 8.6% (5.3% commute out and 11.8% commute in) a 125% increase by 2020.**
- 3. To achieve this level transit mode split, the City can benefit from a regional transit strategy, however any regional transit strategy must address both the regional mobility challenge of the high levels of vehicle traffic on Highway 1, and the low density distribution and growth of development in South Santa Cruz County.**

Highway 1, a four-lane freeway, currently operates at Level of Service (LOS) "F" for multiple hours each day. Typical northbound AM mid week recurrent morning congestion lasts for over 3.5 hours; mid week southbound PM congestion lasts for over 4 hours. The AMBAG travel forecasting model projects that the 2020 Average

Annual Daily Traffic (AADT) volumes along Highway 1 will increase to 115,000 near State Park Drive and to 144,000 between Morrissey and Soquel, a 25 to 33 percent increase over today's levels. A regional transit solution must provide relief to the increasing level of peak-hour vehicle traffic congestion.

By 2020, 69 percent of projected Santa Cruz County population growth will be in the Watsonville and the unincorporated areas of Santa Cruz County. Growth in these areas, which is predominately zoned for low-density development, will contribute to increasing auto dependence and is less responsive to shifting to non-SOV modes and fixed route transit services.

4. **At this time, a Bus Rapid Transit (BRT) system is the most flexible and cost effective transit technology for the Santa Cruz region.**

Bus Rapid Transit is a rubber tire vehicle system operating on exclusive transit way or dedicated busways with flexibility to operate on surface streets with mixed flow traffic. BRT is an "adaptive" technology; it can service the "many originations" to "few destinations" nature of Santa Cruz regional travel from unincorporated South County to Cabrillo College, Capitola Mall, downtown Santa Cruz and UCSC.

The consultants evaluated several transit technologies for application to the City of Santa Cruz and the greater Santa Cruz County region as part of the MTS. See Table 7 for a comparison of transit technologies evaluated for Santa Cruz.

5. **At this time there are three potential rights-of-way available to implement future high occupancy, high frequency BRT technology that can address regional mobility and growth challenges: the rail corridor, local arterial streets and Highway 1.** Given Santa Cruz's vision to achieve a sustainable transportation future, a policy level evaluation of the benefits and impacts associated with the application of BRT to these right-of-ways is summarized below.

- a. **Local Arterial Street Network.** On a concept level, a BRT system could be applied to the local arterial street system during peak-hour travel. The following outlines some of the right-of-way and operational considerations needing further exploration to evaluate the feasibility:

Delivery time: Through an incremental approach, an arterial street application could achieve incremental benefits, which can be realized in a shorter timeframe than the rail corridor or Highway 1.

Right-of-way considerations: Increasing transit services along arterial streets -- i.e. BRT applied to Soquel Avenue and Water Streets for example - would need to accommodate a peak hour dedicated HOV/BRT lane within the existing constrained right-of-way. Potential approaches to this problem include:

- i. A reduction in the number of peak hour travel lanes or on-street parking - which requires exploring the potential for reversible flow lanes to take advantage of differential AM and PM peak travel flows;
- ii. *Elimination of left turns during the peak hour* -- which requires traffic calming to address possible induced neighborhood cut-through traffic; or

iii. *Widening Soquel Avenue to an 80-foot right-of-way with five travel lanes to enable reversible lanes for peak hour transit services.* Widening Soquel Avenue would offer additional capacity for transit without reducing existing vehicle traffic capacity. The two northern most lanes would be reversible. In the PM peak there would be an HOV/BRT curb lane, two east bound travel lanes, a TWLTL and a west bound lane.

Impacts: For example, reducing the number of peak hour travel lanes for existing traffic will shift Soquel Avenue vehicle traffic into the surrounding residential neighborhoods (e.g. Broadway/Frederick Streets).

- b. **Rail Corridor.** On a concept level, BRT on the rail corridor right-of-way provides a sustainable option, consistent with the MTS vision and goals. As discussed below, however, prior to selection of this system, additional design and engineering are needed to evaluate ridership, overall system design and performance, and integration with the local street signalized intersection level of service.

System description: As a mid-term (5 -10 years) action, it is recommended to introduce a bus rapid transit (BRT) technology on the rail right-of-way from Park Avenue north to the downtown Santa Cruz, up to Harvey West and the Westside Industrial area. This route permits BRT to bypass Highway 1 and Highway 17 congestion to provide faster, high-occupancy service to city employment centers. This route expands on the Major Transportation Investment Study (MTIS) busway alternative to include the downtown and Harvey West, which will increase potential transit ridership from the MTIS analysis. Design of the right-of-way cross section requires paving a 12 foot busway travel lane in each direction, preservation of trackway for rail use, and space for both bicycle and pedestrian routes.

Benefits: In absolute terms, it offers the benefits of:

- 1) A new travel choice
- 2) Reducing local street vehicle congestion
- 3) An independent, east-west alternative to Highway 1 vehicle congestion and local arterial street congestion
- 4) Support for pedestrian/bicycle/transit-oriented land use change
- 5) Potential for long-term expansion
- 6) Improving weekend & beach travel
- 7) Financial feasibility with an approximately 1/4-cent sales tax increase with a potential for surplus funds for other priority transportation projects.

Relative to widening Highway 1 for HOV lanes, BRT on the rail corridor:

- 1) Is independent from Highway 1 and local arterial street congestion, permitting free-flow service with reliable travel times
- 2) Does not induce greater weekday SOV travel
- 3) Reduces support for auto-oriented, low density growth, which contributes to greater SOV travel
- 4) Is financially feasible, within a 1/4-cent sales tax to cover costs and with the potential availability of Federal Transportation Administration demonstration project funding for busway projects.

Impacts: The key impacts of a BRT system are:

- 1) Coordination with local street signalized intersections to permit high levels of service for both transit and local street vehicle traffic
- 2) Need for a 1/4 cent sales tax to be financially feasible
- 3) Potential environmental impacts on established neighborhoods and commercial districts
- 4) More buses on UCSC serving roads.

Support for future rail: To maximize the benefits of public investment with a mid-term BRT technology, supportive land use policies are required to increase transit ridership overtime. Land use policies need to encourage gradual infill and redevelopment of land within a 1/4 to 1/2 mile of transit stations and along transit corridors to mixed-use, higher density housing. In the long-term, when higher transit ridership levels are achieved, low cost rail technologies become feasible, such as wireless diesel multiple units (DMU). Given the rail corridor's independence from Highway 1 congestion, in the long-term, the rail corridor could be an effective, viable right-of-way option for high occupancy, high frequency transit service.

Economic considerations: The location of the rail corridor right-of-way provides a competitive transportation choice to highway travel because the major activity and employment centers within the city would be directly served by high frequency peak-hour transit services within walking distance.

- c. **Highway 1.** On a concept level, widening Highway 1 to accommodate HOV lanes where buses would share the carpool lanes also has potential to be a feasible transit solution.

Before selection of this option, engineering of the improvements will need further design and evaluation. Furthermore, a review of the Caltrans Project Study report underlines the need for the City to carefully evaluate an environmental analysis of the potential local street vehicle traffic impacts and the potential to increase local SOV travel.

System description: Currently, the Highway 1 right-of-way is a four-lane freeway, without travelway or right-of-way dedicated to high-occupancy, high frequency transit service or ride sharing during peak hours. Bus service travels in mixed-flow lanes with single occupant vehicle traffic, without any significant timesaving incentives to SOV use.

Widening Highway 1 would add one HOV lane in each direction between Highway 17 and State Park Drive. To ensure high ridership on a highway based BRT system, specific infrastructure improvements are needed to support a high occupancy, high frequency Bus Rapid Transit system, including ramp bypass lanes, and station areas.

Design issues: An evaluation of the effectiveness of HOV lanes will also need to study the transition of HOV lanes onto Highway 17, to avoid queues backing up the northbound AM HOV lane, as well as an evaluation of the low density growth and increase in auto dependency induced by freeway widening. An effective HOV lane solution will need to be tied to an effective regional land use strategy to focus future growth in locations that can benefit from BRT.

Benefits: An HOV system provides better street system interconnectivity, depending on the design of the transitions from local city streets to Highway 1, **Impacts:** If an HOV system requires more than a 1/2 cent sales tax to implement it could potentially reduce or eliminate future transportation funding. In addition, the Caltrans Project Study Report predicts outcomes for the system that could increase local street traffic congestion through induced travel demand. The document also identifies possible environmental and quality of life impacts related to air quality, visual impacts, parking and construction. The traffic impacts during construction would need analysis, including the impacts related to incremental traffic growth. Parking impacts associated with increased SOV and carpooling would also need analysis. The application of BRT on local arterial streets should be evaluated as a potential traffic mitigation.

6. **The Rail Corridor right-of-way option must be preserved for higher occupancy transit services, and pursued to achieve project funding in conjunction with whatever effort is made to modify Highway 1.**
7. **Environmental analysis needs to be conducted to ensure HOV proposals are sensitive to City needs and the MTS vision including the effect on local streets, single occupancy vehicle use and land use impacts.**

Given the regional pressure to fund a Highway 1 HOV solution, the City of Santa Cruz needs to 1) **support a careful evaluation of the potential environmental impacts of the proposal**, 2) ensure the environmental analysis includes local street, SOV use, and land use impacts locally and regionally, 3) pursue independent planning, design and programs to ensure the effectiveness of HOV and the inclusion of BRT system design, and 4) ensure that HOV lanes are not converted to SOV lanes.

The rail corridor option could benefit from a potential Capitola/Santa Cruz partnership to link the two towns together, to expand support for BRT and long-term rail corridor options.

8. **The most efficient spatial configuration is to have high occupancy, high frequency, and minimum transfer service along direct routes linking major local and regional activity centers.**
9. **Future growth of UCSC, beyond assumptions projected in this document, will require consideration of a new connection to an enhanced regional transit system. Any new connection must be designed and engineered for environmental sensitivity. See issues paper in Appendix 7.**
10. **In the future, the city should continue to consider the application of new, innovative technologies to increase local and regional transit ridership. Possible options are discussed in the following sections of this report.**

Potential Systems

Bus Rapid Transit

At this time, for the long-term -- 15 - 20 + years in the future -- Bus Rapid Transit is the technology that has the highest potential to increase ridership and shift travel modes to transit.

Bus Rapid Transit is a rubber tire vehicle system operating on exclusive transit way or dedicated busways with flexibility to operate on surface streets with mixed flow traffic.

A Bus Rapid Transit system (BRT) has significant potential to affect a regional commute shift away from SOV to transit for trips to and from the UCSC campus, the Downtown, and Harvey West. A BRT busway either could operate on an a dedicated HOV lane along Highway 1 or on an shared bus/freight/bicycle lane right-of-way using the Union Pacific rail corridor as a dedicated "line haul" segment to bypass Highway 1 congestion.

Using the rail corridor as a dedicated busway would provide an alignment for an effective local and regional BRT service as well as develop a future commute market to support future use of the rail right-of-way for LRT, DMU or commute rail, if higher densities or sufficient park and ride markets are developed.

A BRT bus way strategy is a regional improvement that will provide a marketable alternative to regional trips in and out of the City of Santa Cruz. It will also develop a market for higher capacity rail options if densities increase to justify the capital investment in right-of-way and rolling stock. Use of the current rail corridor will ensure right-of-way availability for longer-range passenger rail options.

Other Transit Technologies

As presented in Table 7 in the Transit Background following this section, other technologies were evaluated as potential long-term regional transit solutions. The following rail and fixed guideway technologies have been investigated during the MTS process for consideration, and are included here as part of the set of options considered.

Rail options

Three fixed rail transit systems were evaluated in the MTIS. Each alternative utilized the rail corridor alignment. Each differed based on the end destination in Santa Cruz, either at Natural Bridges, Harvey West or UCSC. The MTIS evaluation determined that at this time, and as defined in the MTIS study, the alternatives provided higher ridership than a BRT system, and provided an alternative parallel route to Highway 1 traffic. They were not, however, financially feasible even with 1/2 cent sales tax strategy. They also had a high cost per new rider, and are fairly inflexible systems.

Fixed Guideway Systems

Of the potential fixed-guideway systems, Personal Rapid Transit (PRT) was frequently mentioned by PRT advocates as a potential fixed-guideway system. PRT is a lightweight, fixed-guideway above and on-grade system with high frequency service provided by small, 3-person size cabs. Using linear induction motor technology, PRT industry representatives claim PRT average speeds of 30 mph.

As proposed by representatives of the PRT industry, PRT is a "lower (relative) cost" technology than traditional fixed-guideway systems that support high-occupancy vehicle travel. Costs are reduced due to smaller vehicles that need smaller support structures and smaller scale, lightweight infrastructure. To provide higher levels of station boarding, cabs work as "platoons" when arriving at a station with several cabs available for boarding simultaneously. As proposed by representatives of the PRT industry, application of this technology could be public or privately financed, with costs recovered by fare box revenues.

Currently, it is a commercially untested technology. According to representatives of the PRT industry, it could be applied to serve the local tourist/weekend beach market by linking the downtown and the beach with an above grade, fixed guideway system. However, since this is only a summer seasonal market, on a concept level, economic viability of a PRT system would need to serve an additional market, such as part of the UCSC local travel market with its travel demand during the fall, winter and spring seasons.

Application to the UCSC student, faculty and staff market would highly depend on complementary land use strategies that would locate higher density UCSC housing in the downtown and/or Harvey West areas of a PRT alignment. Provision of a park and ride lot at Highway 1/9 along with frequent and efficient regional bus connections could reduce SOV trips on the Westside of Santa Cruz.

Application to the UCSC market would need to demonstrate that this technology could meet the local and regional transit travel demand of the university to justify its application over other competitive, proven and reliable transit technologies.

Application of this technology has some merit in Santa Cruz for the primary tourist market, given that the boardwalk already has tourist attractions and this technology could appeal as a tourist attraction connecting the downtown to the beach. As an elevated system, however, it raises visual and other environmental impacts, which would require environmental analysis and evaluation.

One proposed route for PRT service would first link the beach and downtown areas and subsequently link to the university. The route would connect to the Harvey West Highway 1 and 9 park and ride lot for tourist access to the system. To further support

tourist access, a spur line linking the county building on Ocean Street could link the hotel and visitor commercial uses to the downtown and the boardwalk.

PRT, however, is not presently recognized as a regional transit solution. To achieve the no growth mode split goals for year 2020, a regional transit solution is needed to reduce regional travel in and out of the City. The above proposed PRT route does not serve primary regional markets or destinations to provide a regional transit solution, and would not be a competitive technology to receive regional funding. Until the proposed technology is demonstrated and proven, at this time and as presently defined, PRT can only be considered as a privately financed system. However, PRT demonstration projects presently under construction and scheduled for completion in the 2003 - 2004 timeframe may demonstrate PRT as a system for future consideration for public funding and implementation.

TRANSIT BACKGROUND

Travel Markets

The following summarizes the priority markets served by the proposed MTS transit strategies:

East - West Connector

Employees

- Direct, limited stop express service for Downtown employees from West and East Side neighborhoods.
- Direct, limited stop express service for Mission and Soquel retail employees from West and East side neighborhoods.
- High frequency, single transfer for UCSC faculty and staff living in the County of Santa Cruz east of the City via timed transfer with Eastside - UCSC Connector
- High frequency, single transfer service for Harvey West employees living in West and East Side neighborhoods via timed transfer with North - South Central Route.
- High frequency, single transfer service for local and regional employee trips to and from the Boardwalk area via timed transfer with North - South Central Route.
- High frequency, limited stop express service to METRO Center or Soquel Park and Ride Lot for West Side residents commuting via Highway 17 Express.

Students

- Direct, high frequency, limited stop express service for students at Santa Cruz High School and Cabrillo College from West and East Side neighborhoods.

- High frequency, single transfer service for UCSC students in the County of Santa Cruz east of the City via timed transfer with Eastside - UCSC Connector.

Shopping trips

- Direct, high frequency service for Mission Street, Downtown and Soquel Avenue shoppers from West and East side neighborhoods.

Tourist trips

- High frequency, single transfer service for local and regional recreation trips to and from the Boardwalk area via timed transfer with North - South Central Route.

Eastside - UCSC Connector

Students

- Direct, high frequency, limited stop express from East Side neighborhoods and local service along the Water/High Corridor for UCSC and Cabrillo College students.

Employees

- Direct, high frequency, limited stop express from East Side neighborhoods and local service along the Water/High Corridor for UCSC and Cabrillo College faculty and staff.
- High frequency, single transfer service for Downtown, Harvey West and Boardwalk employees from East Side neighborhoods and along High/Water street corridors via timed transfer with North - South Central Route.

Tourist Trips

- High frequency, single transfer service for local recreation trips to and from the Boardwalk area from the East Side and the Water/High Corridor via timed transfer with North - South Central Route.

North - South Central Route

Employees

- Direct, high frequency service for Harvey West and Downtown employees living in Beaches neighborhoods.
- High frequency, single transfer service for UCSC and Cabrillo College faculty and staff from the Beach neighborhoods via timed transfer with East - West Connector and UCSC - Eastside Connector.
- Direct, high frequency service for tourists between the Boardwalk, Downtown and Highway 1 & 9 Intercept Lot.

Students

- High frequency, single transfer service for UCSC and Cabrillo College students from the Beach neighborhoods via timed transfer with East - West Connector and UCSC - Eastside Connector.

Ocean Street Hotel/Beach Shuttle

Tourist Trips

- Shuttle with 30-minute frequency to and from Boardwalk for tourists staying at motels along Ocean Street.
- In addition, serves day tourists using the Court House parking lot as a Boardwalk park and ride.

Dedicated Bus Ways

Employees

- Direct, high frequency and high capacity service for UCSC faculty and staff living in County of Santa Cruz communities east of the City.
- Direct, high frequency and high capacity service for Cabrillo faculty and staff living in West Side and Beach residential neighborhoods.
- Direct, high frequency and high capacity service for Harvey West, Downtown and Boardwalk employees living in County of Santa Cruz communities east of the City and in City's West Side and Beach areas.

Students

- Direct, high frequency and high capacity service for UCSC students living in County of Santa Cruz communities east of the City.
- Direct, high frequency and high capacity service for Cabrillo students living in West Side and Beach residential neighborhoods.

Shopping Trips

- Direct, high frequency and high capacity service for Downtown shoppers living in County of Santa Cruz communities east of the City and in City's West Side and Beach areas.

Tourist Trips

- Direct, high frequency and high capacity service for tourist and day recreation trips from County of Santa Cruz communities east of the City and on City's West Side as well as tourists using the Highway 1 Intercept Parking Lot.

Fixed Guide Way System (PRT)

Employees

- Direct, high frequency and high capacity service for UCSC faculty and staff living in the Downtown and Beach neighborhoods, or using the Boardwalk off-season parking.
- Direct, high frequency and high capacity service for Harvey West and Downtown employees living in the Downtown and Beach neighborhoods, and Boardwalk employees living in the Downtown.

Students

- Direct, high frequency and high capacity service for UCSC students living in the Downtown and Beache neighborhoods, or using the Boardwalk off-season parking and Highway 1 & 9 Intercept Parking Lot.

Tourist Trips

- Direct, high frequency and high capacity service for Downtown and Boardwalk day tourists using the Highway 1 & 9 intercept Parking Lot.

| Table 1: Eastside - UCSC Connector | |
|---|--|
| Description | <p>Direct, high frequency service between east side neighborhoods and UCSC with service extension to Cabrillo College:</p> <p>Downtown and METRO Center bypass reduces travel time.</p> <p>15-minute peak hour frequency and 30-minute off peak frequency.</p> <p>Limited stop express along Water Street and local service on Bay Street and the UCSC campus. and the Prospect Heights and Frederick Street/Seabright Avenue neighborhoods.</p> <p>Buses could be scheduled to alternative clockwise and counterclockwise on the UCSC campus, alternating service on campus, and alternating service segments splitting at Water and Morrissey to serve the Prospect Heights and Frederick Street/Seabright Avenue neighborhoods.</p> |

| Table 1: Eastside - UCSC Connector | |
|---|--|
| Evaluation | <p><u>Marketability</u></p> <p>High frequency, increased capacity and reduced travel time, increase attractiveness to:</p> <ul style="list-style-type: none"> ● UCSC and Cabrillo College students, faculty and staff living on the east side and using the Highway 1 & 9 Intercept Parking Lot. ● Harvey West, Downtown and Boardwalk employees with good connections to North - South Central Route. <p><u>Cost</u></p> <ul style="list-style-type: none"> ● \$1,050,000 for three additional 40-foot buses or \$1,500,000 for three larger capacity articulated buses (amortized over 12 years). ● \$856,000 required annually to support additional 9,000/annum revenue hours. <p><u>Effectiveness</u></p> <p>Transit capacity increased in each direction to 200 passengers/hour. Strong potential to support 12 to 16% SOV trip reduction.</p> <p><u>Feasibility</u></p> <p>New service builds on an expansion of the existing METRO Route 15.</p> <p>Will require maintenance and storage facility to accommodate higher capacity, articulated buses - resolution of METRO Base issue.</p> <p>Reduced travel time enhanced by the installation of transit queue jump signals required at key intersections.</p> <p><u>Implementation</u></p> <p>Short-range implementation is possible with funding support for additional fleet, METRO Base capacity and operating hours requirements.</p> <p>Include as a local service improvement priority in SCMTD's Short Range and Long Range Planning process.</p> <p><u>Priority</u></p> <p>Ranked first of the Short-Range Transit Strategies because of high potential to reduce UCSC student, faculty and staff SOV trips. UCSC is currently METRO's major destination in the City of Santa Cruz.</p> |

| Table 2: North - South Central Route | |
|---|---|
| Description: | <p>Direct, high frequency north - south service between the Boardwalk and Harvey West via the Downtown:</p> <ul style="list-style-type: none"> ● 20-minute frequency during peak and midday hours with headways increased to 15-minutes from noon on Saturdays, Sundays and Holidays from Memorial Day through Labor Day weekends to handle additional loads from Highway 1 & 9 Intercept Parking Lot. ● Limited stop express between the Highway 1 & 9 Intercept Parking Lot and the Boardwalk. |
| Evaluation: | <p><u>Marketability</u></p> <p>Higher frequencies, and direct, cross-town routing increase attractiveness to:</p> <ul style="list-style-type: none"> ● Harvey West and Downtown employees living in the Beaches neighborhood. ● Boardwalk employees living in the Downtown. ● Downtown and Boardwalk tourists using the Highway 1 & 9 Intercept Parking Lot. ● Harvey West and Boardwalk employees living east of the City along Route 69 corridor with good connections with East - West Connector. ● UCSC students, faculty and staff living in the Beaches neighborhoods with good connections with the East Side - UCSC Connector. <p><u>Cost</u></p> <ul style="list-style-type: none"> ● \$1,050,000 for three additional buses (amortized over 12 years). ● \$399,000 required annually to support additional 4,200/annum revenue hours. <p><u>Effectiveness</u></p> <p>Transit capacity on old Route 4 and 7 corridors is increased from 50 to 150 passengers/hour in each direction. Strong potential to support 12 to 16% SOV trip reduction.</p> <p><u>Feasibility</u></p> <p>New service combines the existing METRO Routes 4 and 7 into a direct Harvey West/Boardwalk connector. Additional bus storage and maintenance capacity required - development of planned METRO Base facility.</p> <p><u>Implementation</u></p> <p>Short-range implementation is possible with funding support for additional fleet and operating hours requirements.</p> <p>Include as a local service improvement priority in SCMTD's Short Range and Long Range Planning process.</p> <p><u>Priority</u></p> <p>Ranked second of the Short-Range Transit Strategies because of strong potential to shift employee and tourist SOV trips, especially if opened and marketed in conjunction with opening of Highway 1 & 9 Intercept Parking Lot.</p> |

| Table 3. East-West Connection | |
|--------------------------------------|---|
| Description: | <p>Direct, high frequency cross-town route connecting Mission Street, Downtown and Soquel Avenue retail concentrations with destinations east of City:</p> <ul style="list-style-type: none"> ● 15-minute peak and 30-minute off peak frequency in both directions. ● Limited stop express service along Mission and Soquel with stops strategically located to enhance connections with other cross-town routes and retail concentrations. |
| Evaluation: | <p><u>Marketability</u></p> <p>Higher frequencies, increased evening service hours, and direct cross-town routing increase attractiveness to:</p> <ul style="list-style-type: none"> ● Full and part time retail employees working in the Downtown or along the Mission and Soquel retail corridors. ● Shoppers traveling to Downtown or Mission and Soquel retail concentrations. ● Students attending Santa Cruz High School. ● Cabrillo College students, faculty and staff. <p><u>Cost</u></p> <ul style="list-style-type: none"> ● \$350,000 for one additional bus (amortized over 12 years). ● \$380,000 required annually to support additional 4,000/annum revenue hours. <p><u>Effectiveness</u></p> <p>Transit capacity increased to 200 passengers/hour in each direction. Potential to support 12 to 16% SOV trip reduction.</p> <p><u>Feasibility</u></p> <p>Will operate as a west end extension of METRO Route 69 with minimal additional bus and service hours requirements.</p> <p>Reduced travel time enhanced by the installation of transit queue jump signals required at key intersections.</p> <p><u>Implementation</u></p> <p>Short-term implementation is possible with funding support for additional fleet and operating hours requirements.</p> <p>Include as a local service improvement priority in SCMTD's Short Range and Long Range Planning process.</p> <p><u>Priority</u></p> <p>Ranked third of the Short-Term Transit Strategies because of more limited local potential to shift employee, shopper and student SOV trips.</p> |

| Table 4: Ocean Beach Hotel/Beach Shuttle | |
|---|---|
| Description: | <p>Service would replace the existing Beach Shuttle operating from Memorial Day Weekend through Labor Day Weekend operating:</p> <p>On a 30 minute frequency from 10:00 AM to 9:00 PM on all Saturdays, Sundays and Holidays:</p> <p>On Ocean Street with a north end loop via Plymouth, Button, Market and Water and a Boardwalk loop via 2nd, Beach and Riverside.</p> |
| Evaluation: | <p><u>Marketability</u></p> <p>Attractive to guests staying at Ocean Street Hotels and current Santa Cruz Beach Shuttle patrons using the Court House parking lot.</p> <p><u>Cost</u></p> <ul style="list-style-type: none"> ● No capital budget requirements. Service can be provided with existing fleet. ● \$38,000 required annually to support additional 400/annum revenue hours. <p><u>Effectiveness</u></p> <p>Expands service coverage and market of current Beach Shuttle. Potential to reduce Boardwalk automobile traffic from Ocean Boulevard Hotels. Little potential to reduce SOV trips.</p> <p><u>Feasibility</u></p> <p>There are no additional fleet requirements. Additional operating hours are minimal</p> <p>To be successful, the service would require a joint public/private sector marketing partnership. The service would have to be marketed with hotel reservations and with general tourism marketing.</p> <p>Would duplicate service provided by the current Beach Shuttle. The current Beach Shuttle could be discontinued if the North - South Central Route is introduced and providing tourist-oriented service between the Downtown and the Boardwalk.</p> <p><u>Implementation</u></p> <p>Short-term implementation is possible with funding support for additional fleet and operating hours requirements.</p> <p>Include as a local service improvement priority in SCMTD's Short Range and Long Range Planning process.</p> <p><u>Priority</u></p> <p>Ranked fourth of the Short-Range Transit Strategies Although there is minimal potential to reduce SOV trips, there is potential to reduce Boardwalk automobile traffic.</p> |

| Table 5: Dedicated Busway | |
|----------------------------------|--|
| Description: | <p>A dedicated bus way system would use the current Southern Pacific right-of-way on a shared basis with limited rail traffic:</p> <p>Supporting five-minute headways along rail right-of-ways. Initial frequencies of 15-minute peak and 30-minute off peak are suggested.</p> <p>Buses would bypass Highway 1 traffic congestion between Watsonville, Aptos, Capitola and the City of Santa Cruz.</p> <p>Express service would be operated along the rail right-of-way with feeder services operating as locals within the downstream communities or as express services from regional park 'n' ride or transit oriented developments.</p> <p>In the City of Santa Cruz, Dedicated Bus Way services would operate on existing rail right-of-ways and on local streets as express service to UCSC (via Bay Street), METRO Center and Harvey West.</p> <p>Providing the framework for an effective regional and local BRT service.</p> <p>Alternative alignments could include Highway 1 if widened to include bus access to HOV lanes or the combined use of Highway 1 between Watsonville and Park Avenue and the UP/SP right-of way between Capitola and Bay Street. (Santa Cruz MTIS, 1997)</p> |
| Evaluation: | <p><u>Marketability</u></p> <p>High frequency, increased capacity and reduced travel time has strong market potential to attract regional commute trips by:</p> <ul style="list-style-type: none"> ● UCSC students, faculty and staff commuting from the communities east of the City of Santa Cruz. ● Harvey West, Downtown and Boardwalk employees living in the City of Santa Cruz and the communities east of the City. ● Cabrillo College students, faculty and staff living in the City. ● Tourist and recreation trips from the communities east of the City. ● City and regional commuters using the Highway 17 express. <p>Establishing direct services to key destinations such as UCSC, the downtown and Harvey West to eliminate the need to transfer, would further enhance marketability. Express buses would split off to the different local destinations once they reached the Boardwalk area.</p> <p><u>Cost</u></p> <ul style="list-style-type: none"> ● \$16,000,000 to improve rail right-of -way or incorporated in the projected \$302M for Highway 1 widening. ● \$3,500,000 for seven additional articulated buses (amortized over 12 years). ● \$2,522,250 required annually to support additional 26,550/annum revenue hours. Some hours from existing commute services could be reallocated. |

| Table 5: Dedicated Busway | |
|----------------------------------|--|
| | <p><u>Effectiveness</u></p> <p>Increased regional transit commute capacity from east county communities to key City destinations by 400 passengers/hour in each direction during the peaks and 200 passengers/hour in each direction during the off peaks with 15 minute/30 minute headways.</p> <p>Capacity could be increased further to 1,200 passengers/hour with 5-minute headways.</p> |
| | <p>Highest potential of strategies to affect a regional shift in SOV trips.</p> <p><u>Feasibility</u></p> <p>Need to establish a shared use agreement with the railway or secure approval for Highway 1 HOV widening project..</p> <p>Feasibility study required to determine actual costs to improve rail bed and bridges for safe bus operations, and to determine capacity requirements to each of the key travel destinations.</p> <p><u>Implementation</u></p> <p>Conduct bus way feasibility study and review long-range priorities with SCMTD and County of Santa Cruz.</p> <p>Longer term implementation over next ten to twenty years</p> |

| Table 6: Fixed Guide Way System | |
|--|---|
| Description: | <p>Initial phase development would provide a high frequency/high capacity connector between key City attractors including the UCSC campus, Harvey West, the Highway 1 & 9 Intercept Parking Lot, the Downtown, the County Government Center, and the Boardwalk:</p> <ul style="list-style-type: none"> ● Harvey West/Boardwalk alignment would follow River Street, Front Street, looping at the Third Street parking lot. |
| Evaluation: | <p><u>Marketability</u></p> <p>High frequency and direct service would increase transit attractiveness for:</p> <ul style="list-style-type: none"> ● Local UCSC students, faculty and staff living in the Downtown and Beache neighborhoods, or UCSC commuters using off season Boardwalk parking and the Highway 1 & 9 Intercept parking Lot. ● Harvey West and Downtown employees living in the Beache neighborhoods. <p><u>Cost</u></p> <p>Projected capital costs range from \$18,000,000 to \$70,000,000 based on an initial seven-mile system.</p> |
| | <p><u>Effectiveness</u></p> <p>PRT offers potential for local tourist trips between the beach and downtown. Capacity estimates range as high as 6,000 passenger trips per hour.</p> <p>Potential to reduce SOV trips to UCSC, the Beach and Downtown. Could complement other short- and long-range transit strategies by reducing UCSC bus traffic along Bay Street. Transfers could be designed at the METRO Center.</p> <p><u>Feasibility</u></p> <p>Feasibility study is required to confirm costs, right-of -way requirements, potential to influence high-density residential and transit-oriented development in the Downtown and private funding commitment.</p> <p><u>Implementation</u></p> <p>Conduct feasibility study and environmental assessments, secure funding and establish an implementation/construction timeline.</p> <p>Review with other City priorities.</p> <p>Longer term implementation over next ten to twenty years.</p> <p><u>Priority</u></p> <p>PRT has some potential to shift SOV trips within the City of Santa Cruz if complementary land use change is implemented with higher density residential concentrations in the Downtown or other activity center areas.</p> <p>PRT also has the potential to reduce bus traffic on UCSC approaches if effectively integrated with other local and regional transit strategies with seamless inter-modal transfers at METRO Center.</p> |

Table 7: Comparison of Transit Systems

| Mode | Base Population | Density Requirement/ Downtown Non-Residential Floor space | Capital Cost/Mile | Rolling Stock Cost/Unit | Comments |
|--|--------------------------------|--|---|--|---|
| Heavy Commuter Rail¹ | 250,000+ | 40 or more persons/acre 75-500 million square feet commercial floor space in downtown | \$2M to \$17M/Mile | \$3M to \$4M per unit | Costs presented reflect use of existing rail right-of ways. General focus on large metropolitan downtowns from satellite residential communities. Capacity - up to 3,000 passengers per hour (15 minute headways). |
| Light Rail Transit² | 100,000+ | 12 or more persons/acre 20 to 75 million square feet commercial floor space in downtown or major business park. | Mean - \$36.1M/Mile Range - \$9.6M to \$126M/Mile (Sacramento - Los Angeles) | \$2M per unit | Capital costs greatly impact by land assembly costs, tunneling, grade separation requirements and the number and design of stations. Capacity - up to 2,600 passengers per hour (15 minute headways). |
| Diesel Mobile Units³ | 100,000+ | 12 or more persons/acre 20 to 75 million square feet commercial floor space in downtown or major business park. | \$2M to \$17M per mile. | \$3M to \$3.6M per FRA-compliant unit. | DMU can be used in both regional commute and as an alternative to electric LRT on established rail right-of-ways - eliminating the need to install overhead wires. Capacity in a commute mode is 760 passengers per hour (15 minute headways). |
| Bus Rapid Transit⁴ | 100,000+ | 12 or more persons/acre 20 to 75 million square feet commercial floor space in downtown or major business park. | Arterial streets \$200K to \$9.6M/mile HOV Lanes \$1.8M to \$37.6M Busways \$7M to \$55M/mile Use of rail right of way \$2M to \$17M/Mile | \$350K - 40 Foot transit coach \$500K - Articulated transit coach \$1M - Special purpose BRT vehicle | BRT most effective for regional commute using either HOV lanes of exclusive right-of-way busway. Can operate on both exclusive right-of-way and local arterials to minimize need to transfer. |
| Demand Response⁵ | Suburban and rural populations | One or more persons/acre | Minimal capital improvements. | \$50K to \$75K/vehicle | Curb to curb dial-a-ride type service. Capacity ranges from approximately 2 passengers/hour for special needs Para transit to 6 passengers/hour for general public services. Designed to serve low density or special needs markets. Can be used to introduce service to an area and to develop a market for fixed route service. |

| Table 7: Comparison of Transit Systems | | | | | |
|---|-----------------|---|---|--|--|
| Mode | Base Population | Density Requirement/ Downtown Non-Residential Floor space | Capital Cost/Mile | Rolling Stock Cost/Unit | Comments |
| Personal Rapid Transit⁶ | 50,000+ | 6 or more persons/acre. | \$5/\$10M per mile | \$25K/pod | Innovative technology with limited implementation and operating experience. Potential as a lower cost high capacity system for local travel between key destinations. Capacity estimates range as high as 6,000 passenger trips/hour. Individual PRT pods are designed to carry 1 to 3 passengers. |
| Fixed Route Transit⁷ | 50,000+ | 6 or more persons/acre. Strong relationship between density and bus frequency. As density increases, potential ridership can support higher bus transit frequency. | Minimal capital improvements. Additional capital costs associated with transit priority signals, queue jump lanes, bus pullouts, signs and shelters. | \$350K - 40 Foot transit coach \$500K - Articulated transit coach | Provides a base local neighborhood network and commute service with higher peak hour frequencies, express and limited stop services. Capacity improvements are possible with the peak hour operation of articulated buses. Capacity can be as high as 640-passenger trips/hour using articulated buses operating on a 15-minute headway. |

Table 7. Comparison of Systems Footnotes:

¹Las Vegas Valley Transit System Development Report Final Report, Transit Mode Options, RTC of Southern Nevada.

²Las Vegas Valley Transit System Development Report Final Report-Transit Mode Options, RTC of Southern Nevada.

³Las Vegas Valley Transit System Development Report Final Report-Transit Mode Options, RTC of Southern Nevada. Interviews with OCTRANSPO planning staff (Ottawa).

⁴Las Vegas Valley Transit System Development Report Final Report - Transit Mode Options, RTC of Southern Nevada. Interviews with Lane County Transit District planning staff.

⁵Capital costs based on current industry mini-bus costs.

⁶Edmund W. F. Rydell, Personal Rapid Transit - Transportation Renaissance - The Personal Rapid Transit Solution. Dr. David Walworth on Personal Rapid Transit. Additional data provided by Ken Porter and Ray MacDonald.

⁷Costs based on Santa Cruz Metropolitan Transit District cost data, current industry bus costs, and projected service hours.

