NOTE LOCATION THIS MONTH
Board of Supervisors Chambers
701 Ocean St
Santa Cruz CA

NOTE
See the last page for details about access for people with disabilities and meeting broadcasts.

En Español
Para información sobre servicios de traducción al español, diríjase a la última página.

AGENDAS ONLINE
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COMMISSION MEMBERSHIP

Caltrans (ex-officio) Rich Krumholz
City of Capitola Kirby Nicol
City of Santa Cruz Don Lane
City of Scotts Valley Randy Johnson
City of Watsonville Antonio Rivas
County of Santa Cruz Ellen Pirie
County of Santa Cruz John Leopold
County of Santa Cruz Mark Stone
County of Santa Cruz Neal Coonerty
County of Santa Cruz Tony Campos
Santa Cruz Metropolitan Transit District Dene Bustichi
Santa Cruz Metropolitan Transit District Ron Graves
Santa Cruz Metropolitan Transit District Marcela Tavantzis

The majority of the Commission constitutes a quorum for the transaction of business.
Article 8 Transportation Development Act Claims – only City and County representatives vote
Article 4 Transportation Development Act Claims, Policy Issues, and SAFE – all 12 members vote
1. Roll call

2. Oral communications

   *Any member of the public may address the Commission for a period not to exceed three minutes on any item within the jurisdiction of the Commission that is not already on the agenda. The Commission will listen to all communication, but in compliance with State law, may not take action on items that are not on the agenda.*

   *Speakers are requested to sign the sign-in sheet so that their names can be accurately recorded in the minutes of the meeting.*

3. Additions or deletions to consent and regular agendas

   **CONSENT AGENDA**

   *All items appearing on the consent agenda are considered to be minor or non-controversial and will be acted upon in one motion if no member of the RTC or public wishes an item be removed and discussed on the regular agenda. Members of the Commission may raise questions, seek clarification or add directions to Consent Agenda items without removing the item from the Consent Agenda as long as no other Commissioner objects to the change.*

**MINUTES**

4. Approve draft minutes of the November 4, 2010 regular SCCRTC meeting

5. Accept draft minutes of September 15, 2010 Safe on 17 Task Force meeting

6. Accept draft minutes of the October 28, 2010 Sustainable Transportation & Access Rating System (STARS) Technical Advisory Committee meeting

7. Accept draft minutes of November 18, 2010 Interagency Technical Advisory Committee (ITAC) Meeting

**POLICY ITEMS**

*No consent items*

**PROJECTS and PLANNING ITEMS**

8. Accept first quarter quarterly Regional Transportation Commission (RTC) work program progress report

9. Accept American Recovery and Reinvestment (ARRA) delivery

**BUDGET AND EXPENDITURES ITEMS**

10. Accept status report on Transportation Development Act (TDA) revenues
11. Approve Fiscal Year (FY) 10-11 budget and work program amendment (Resolution)

ADMINISTRATION ITEMS

No consent items

INFORMATION/OTHER ITEMS

12. Accept monthly meeting schedule

13. Accept correspondence log

14. Accept letters from SCCRTC committees and staff to other agencies
   a. Letter from the Bicycle Committee to Caltrans regarding the Pacific Coast Bicycle Route realignment in the City of Santa Cruz
   b. Letter from RTC to Monterey Bay Nursery regarding Highway 1/17 Interchange Merge Lanes Landscaping Project
   c. Letter from RTC to US Census Bureau regarding comments on Federal Register Notice 8/24/10, Vol 75, No. 163 Proposed Urban Area Criteria for the 2010 Census

15. Accept miscellaneous written comments from the public on SCCRTC projects and transportation issues - None

16. Accept information items - None

REGULAR AGENDA

17. Commissioner reports - oral reports

18. Director’s report – oral report
   (George Dondero, Executive Director)

19. Appreciation of departing commissioners for their service
   (Randy Johnson, Commission Chair)

20. Election of 2011 RTC chair and vice-chair
   (Randy Johnson, Commission Chair)

21. Caltrans report and consider action items
   a. Construction projects report
22. Presentation from Santa Cruz County Public Works
   \textit{(Steve Wiesner, County of Santa Cruz Assistant Public Works Director)}

23. Status report on Sustainable Transportation Access Rating System (STARS)
   \textit{(George Dondero, Executive Director)}
   
   a. Staff report
   b. STARS Technical Advisory Committee roster
   c. STARS \textit{Pilot Project Application Manual} (mailed to Commissioners separately and available at \url{www.sccrtc.org})

24. Update on the Monterey Bay Area Regional Blueprint plan and SB375 implementation
   \textit{(Rachel Moriconi, Senior Transportation Planner)}
   
   a. Staff report
   b. Presentation by John Doughty, Executive Director of the Association of Monterey Bay Area Governments (AMBAG)
   c. Summary of the \textit{2035 Monterey Bay Area Regional Blueprint}
   d. Priority areas

25. Draft 2011 state and federal legislative programs and legislative update
   \textit{(Rachel Moriconi, Senior Transportation Planner)}
   
   a. Staff report
   b. Draft 2011 state legislative program
   c. Draft 2011 federal legislative program

26. State 1 Corridor System Management Plan (CSMP)
   \textit{(Rachel Moriconi, Senior Transportation Planner)}
   
   a. Staff report
   b. Presentation by Caltrans District 5 Planning Staff
   c. Map of SR 1 CSMP segmentation
   d. Draft State Route 1 CSMP (enclosed separately for Commissioners only and available at \url{www.sccrtc.org})

27. Review of items to be discussed in closed session

   \textbf{CLOSED SESSION}

28. Annual Performance Review for Executive Director pursuant to Government Code 54957

   \textbf{OPEN SESSION}

29. Report on closed session

30. Adjourn to special meeting of the Service Authority for Freeway Emergencies
a. No agenda items this month

31. Next Meetings

The next SCCRTC meeting is scheduled for Thursday, January 13, 2011 at 9:00 a.m. at the Santa Cruz City Council Chambers, 809 Center Street, Santa Cruz, CA.

There are no Transportation Policy Workshops scheduled for December 2010 or January 2011.

HOW TO REACH US

Santa Cruz County Regional Transportation Commission
1523 Pacific Avenue, Santa Cruz, CA 95060
phone: (831) 460-3200 / fax (831) 460-3215
email: info@sccrtc.org / website: www.sccrtc.org

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- Aptos Branch Library
- Branciforte Library
- Central Branch Library
- Scotts Valley Library
- Watsonville Library

For information regarding library locations and hours, please check online at www.santacruzpl.org or www.watsonville.lib.ca.us.

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HOW TO REQUEST

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SERVICIOS DE TRADUCCIÓN/ TRANSLATION SERVICES

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1. **Roll call**

The meeting was called to order at 9:05 am.

Members present:
Donald Hagen (Alt)  John Leopold
Gustavo Gonzalez (Alt)  Kirby Nicol
Neal Coonerty  Robin Musitelli (Alt)
Ron Graves  Antonio Rivas
Randy Johnson  Mark Stone
Don Lane  Marcela Tavantzis
Rich Krumholz (ex officio)

Staff present:
George Dondero  Luis Mendez
Gini Pineda  Yesenia Parra
Cory Caletti  Daniel Nikuna
Tegan Speiser

2. **Oral communications - None**

3. **Additions or deletions to consent and regular agendas**

   Executive Director George Dondero said that there was a handout for Item 19.

   **CONSENT AGENDA**
   *(Stone/Nicol)*

   Commissioner Alternate Gonzalez abstained on Items 4 and 5.

   Commissioner Tavantzis voted “no” on Item 12.
MINUTES

4. Approved draft minutes of the October 7, 2010 regular SCCRTC meeting
5. Approved draft minutes of the October 14, 2010 special SCCRTC meeting
6. Accepted draft minutes of the October 12, 2010 Elderly & Disabled Transportation Advisory Committee meeting
7. Accepted draft minutes of the October 14, 2010 Budget & Administration / Personnel Committee meeting
8. Accepted draft minutes of the October 18, 2010 Bicycle Committee meeting

POLICY ITEMS

No consent items

PROJECTS and PLANNING ITEMS

9. Approved 511 Traveler Information System plan – release Request for Proposals
10. Approved Highway 1 HOV Lane federal fund extension (Resolution 12-11)

BUDGET AND EXPENDITURES ITEMS

11. Accepted status report on Transportation Development Act (TDA) revenues

ADMINISTRATION ITEMS

12. Accepted GASB 45 actuarial report and approved funding method

INFORMATION/OTHER ITEMS

13. Accepted monthly meeting schedule
14. Accepted correspondence log
15. Accepted letters from SCCRTC committees and staff to other agencies
   a. Letter from the Regional Transportation Commission to the California Coastal Commission regarding support for the Arana Gulch Master Plan
   b. Letter from the Elderly and Disabled Transportation Advisory Committee to the RTC regarding accessible passenger trains on future RTC owned right-of-way
   c. Letter from the Bicycle Committee to the City of Santa Cruz Public Works regarding the Mission Street Extension bicycle-pedestrian path revision
16. Accepted miscellaneous written comments from the public on SCCRTC projects and transportation issues - None

17. Accepted information items
   a. Letter from SDRMA regarding no reported Workers’ Compensation claims for the RTC in 2009-10

REGULAR AGENDA

18. Commissioner reports - none

19. Director’s report

   Executive Director George Dondero reported that the RTC, which acts as the Service Authority for Freeway Emergencies (SAFE), released a request for proposals last month for a tow service contract for the Freeway Service Patrol program. The current contract expires in July 2011. He said that a new contract for call answering center service was executed between the RTC and CDSNet, LLC for 2.5 years of call answering service for Santa Cruz County call boxes which are owned and operated by the RTC.

   Mr. Dondero said that Rideshare Week’s Grand Prize winner is Bill Eppler of Community Bridges.

   Mr. Dondero reported on the STARS Technical Advisory Committee meeting held October 28, saying that the committee recently completed a review of the first 12 credits under development including an application manual. The STARS Pilot Project Manual for application of the twelve credits will be released early next year. He also said that the California Transportation Commission did not consider the funding for the Rail Line Acquisition project at their November meeting but it has been agenized for the January meeting. Mr. Dondero summarized results of the November 2nd election regarding statewide ballot measures that could affect transportation.

20. Appoint nominating committee for RTC Chair and Vice-chair

   Commissioner Rivas arrived.

   Commission Chair Johnson asked for Commissioner volunteers to serve as the nominating committee for the 2011 Chair and Vice-chair.

   Commissioner Nicol moved and Commissioner Alternate Hagen seconded to appoint Commissioners Pire, Leopold, Bustichi and Rivas to the nominating committee. The motion passed unanimously.
21. Caltrans report and consider action items

Rich Krumholz, Caltrans District 5, said that he was glad to see progress on the Highway 17 project landscape installation.

He referred to his written reply regarding work hours at the Salinas Rd/Highway 1 improvement project, reiterating that modifying the contract terms would result in delays and added expense. He emphasized that there are no lane closures during peak commute times for this phase of the project.

Mr. Krumholz said that the new state budget will allow about 73 projects to move forward and vendors to be paid. He added that the state cut Caltrans’ budget by about 6% which will include cuts for Project Study Reports and oversight duties. He said that furloughs on specific Fridays of the month are no longer required; however, Caltrans employees must continue to take furlough days and will schedule them as they can be accommodated.

22. FY 10-11 Transportation Development Act (TDA) Article 8 allocation claim from the City of Santa Cruz for bicycle and pedestrian improvement projects

Senior Planner Cory Caletti gave the staff report saying that the City of Santa Cruz presented a TDA claim as prescribed by the RTC Rules and Regulations.

Commissioner Leopold moved and Commission Alternate Musitelli seconded to approve the Bicycle Committee, the Elderly & Disabled Transportation Advisory Committee and staff recommendations that the Regional Transportation Commission approve a resolution for the following:

1) An Article 8 allocation claim from the City of Santa Cruz for FY 10/11 Transportation Development Act for $111,000 for the following projects:
   a. Bikeway Striping and Minor Improvements ($10,000);
   b. Bicycle Parking Program ($1,000);
   c. Laurel Street Pedestrian Crossing ($50,000); and
   d. Mission Street Extension Bike-Pedestrian Path Revision ($50,000)

2) The return of $29,370 previously allocated for the Shared Roadway Markings project to the City’s unallocated balance; and

3) Release of the City of Santa Cruz from an agreement to maintain the TDA funded Soquel/Front Garage Bicycle Cage project for 20 years.

A roll call vote was taken and the motion (Resolution 13-11) passed with Commissioners Coonerty, Gonzalez, Johnson, Lane, Leopold, Musitelli, Nicol, Rivas and Stone voting “aye”.
23. Proposed amendments to the Fiscal Year (FY) 10-11 budget and work program

Deputy Director Luis Mendez said that the proposed budget is a balanced budget that implements the RTC’s priority projects and on-going programs. He said that while it does not achieve the RTC’s established goal for Transportation Development Act (TDA) reserve funds (8% of revenues) due to the continuing economic difficulties, it does maintain the established minimum TDA reserve fund (3% of revenues) in part due to competitive grants secured by the RTC. In addition, TDA recipients will return to FY 09-10 levels of funding. He described other changes in the budget including a fund to replace office equipment, money for a salary study, and funding for traffic counts which will be necessary in FY 10-11. The budget also provides for a ½ time staff person necessary to update the Regional Transportation Plan (RTP).

Commissioners discussed the reserve level and whether the progress on the rail line acquisition would allow staff to transfer their duties from the rail project to other projects.

It was noted that staff time would still be required for the rail project. In addition, projects funded by grants are time sensitive and grant funds could be lost if staff time is not allocated to fulfilling grant requirements.

Responding to questions from Commissioner Tavantzis, Mr. Mendez said that money saved in the previous fiscal year from voluntary time off without pay, furloughs, reduced travel and other cost cutting measures provided carry over funds to better manage this FY 10-11 budget.

Commissioner Leopold noted that the Budget and Administration/Personnel Committee had long discussions regarding the budget and moved to approve the Budget and Administration/Personnel Committee and staff recommendations that the Regional Transportation Commission adopt a resolution approving the proposed amended FY10-11 Budget and Work Program. Commissioner Stone seconded.

The motion passed (Resolution 14-11) with Commissioner Alternate Hagen and Commissioner Tavantzis voting “no”.

24. Adjourn to special meeting of the Service Authority for Freeway Emergencies

a. No agenda items this month

25. Next Meetings

The meeting adjourned at 10:04 am.

The Transportation Policy Workshop meeting scheduled for Thursday, November 18, 2010 has been cancelled.
The next SCCRTC meeting is scheduled for Thursday, December 2, 2010 at 9:00 a.m. at the Board of Supervisors Chambers, 701 Ocean St., Santa Cruz, CA.

Respectfully submitted,

Gini Pineda, Staff

ATTENDEES

Chris Schneiter       City of Santa Cruz Public Works
Dan Herron            Caltrans
JOINT MEETING OF
SANTA CRUZ COUNTY TRAFFIC OPERATIONS SYSTEMS (TOS) OVERSIGHT COMMITTEE
AND
SAFE ON 17 TASK FORCE

DRAFT MINUTES
Wednesday, September 15, 2010
10:00-12:00

Santa Cruz County Regional Transportation Commission
1523 Pacific Avenue
Santa Cruz, CA 95060

TOS Oversight Committee and Safe on 17 Task Force Meeting Participants
Marshall Ballard, Valley Transportation Association
Ramin Bolourchian, Caltrans District 4 TMC
Susana Cruz, Caltrans District 5 Public Affairs (videoconference)
Russell Ellingworth, Caltrans District 5 Maintenance
Shawn Enjily, Caltrans District 4 Design
Hugh Holden, Santa Cruz CHP
Lynda Kiersted, Caltrans District 4 Maintenance
Deb Larson, Caltrans District 5 Traffic Safety (videoconference)
Christina Manriquez, Santa Cruz CHP Captain
Colleen McMahon, Santa Cruz Police Department
Scott Morris, Caltrans District 5 Scott Morris (videoconference)
Dave Nelson, Caltrans District 4 Maintenance
Stefanie Pow, Metropolitan Transportation Commission
Ernesto Ramirez, Caltrans District 4
Siobhan Saunders, Caltrans District 5 Construction
Nicole Stewart, CHP Monterey Dispatch
Pranav Shah, Caltrans District 4 Traffic Systems
Earl Sherman, Caltrans District 4 Maintenance
Lazaro Villarreal, Caltrans District 4 Electrical
Scott Wood, San Jose CHP
Rachel Zack, Metropolitan Transportation Commission

Staff Present
Ginger Dykaar
David Garti
Luis Mendez
Tegan Speiser

1. Introductions – Introductions were made.

2. Additions or Deletions to the Agenda – None.
3. Reviewed and Accepted Minutes of the March 23, 2010 Joint TOS Oversight Committee and Safe on 17 Meeting

4. Received Information Items
Tegan Speiser provided an update on the development of a Monterey Bay Area 511 Traveler Information System Feasibility and Implementation Plan. She informed the committee that RTC staff will be requesting their input on the 511 Feasibility and Implementation Plan. RTC is in the midst of conducting a survey to get input from the public, partner agencies, and stakeholders on what type of traveler information system will be useful for our area.

Ginger Dykaar stated that there were articles that were published in local newspapers that discussed the 511 Traveler Information System that is being considered for the Monterey Bay area and encouraged people to take the survey.

Ginger Dykaar gave an update on the Freeway Service Patrol (FSP) program stating that the program is running smoothly but FSP State funding for FY11/12 could be affected due to the lack of congestion data. Deb Larson, District 5 offered to involve Caltrans staff in the traffic operations unit to help resolve this and ensure that funding is not lost.

Ginger Dykaar reviewed Mr. Roadshow articles that are interesting examples of public's perception of traffic and safety on Highway 17.

5. Received Update California Highway Patrol Safe on 17 Program Statistics and Public Information Efforts
Lieutenant Wood of the San Jose Area Highway Patrol reported that collisions decreased and citations increased. There was 1 traffic fatality this year on the Santa Clara side of Hwy 17. The number of collisions can be increased by secondary collisions that occur due to the initial collision. This can skew the numbers as sometimes there are 4 to 5 secondary collisions after an initial collision. The cabbage truck that overturned on Hwy 17 on the Santa Clara side took approximately 5 hours to clear. There was a Mr. Roadshow article where people wrote in asking if trucks can be banned on Hwy 17. People complain that trucks go either too fast or too slow. Lt. Wood stated that commerce cannot be shut out from most state routes. Truck collisions are driver error 99% of the time. CHP has not seen any increase of speeds from normal on Hwy 17. Traffic still seems to be a bit lighter than normal due to economic downturn. Lt. Wood suggested adding a blurb in the 511 video about educating drivers to get 511 information prior to driving or hands free on the road.

Ginger Dykaar noted that when there was extra enforcement in fall 2009, there was an average of 10 collisions per month versus the spring of 2009 and 2010 with essentially no extra enforcement shows 15 to 16 collisions per month. This shows that extra enforcement is helping to reduce the number of collisions but wondered what strategy works best to reduce collisions; concentrate hours in wet winter months or hours spread out throughout the year. Lt. Wood explained that his professional judgement is that they get the greatest benefit of extra enforcement hours in the fall when the wet weather starts to help people change their behavior from summer driving. Lt. Wood mentioned that we don't know how many collisions would have occurred if there was not extra enforcement in the wet weather. The Santa
Clara County side of Hwy 17 continues to see a reduction in collisions so the strategy seems to be working.

Officer Holden reported that for the Santa Cruz County side there is a slight increase (12.5%) in the number of collisions compared to this time last year. Citations issued are up 2.5 percent over this time last year. It appears that the bulk of the collisions this past year occurred in the rainy months and in July due to increase in tourist traffic. Only 1 traffic fatality occurred on the Santa Cruz side of Hwy 17 this year. Ginger Dykaar mentioned that Santa Cruz CHP has only used $40,000 worth of funds for the last 2 years instead of the full $50,000 that is available each year. Funds for Santa Cruz County can be rolled over to the next fiscal year so $70,000 in funds is available for the current fiscal year for concentrated or distributed enforcement. Captain Manriquez expressed a preference for consistently increased enforcement throughout the year with some extra in the winter due to wet weather and extra in the summer due to increased traffic during tourist season. Captain Manriquez will talk to overtime coordinator to determine how overtime is tracked and then will get back to staff. Santa Cruz CHP will plan to spend $70,000 that is available for FY 10/11.

David Garti announced that the 2 Safe on 17 signs have been replaced on Hwy 17 in the beginning of August. The signs are a good reminder to the public that Hwy 17 is a safety corridor. Signs are not typically replaced but because of the continued funding of the extra enforcement program, Caltrans provided the new signs.

6. Received Major Incident Review
Officer Holden summarized the incident where the tractor trailer combination truck overturned on Hwy 17 going southbound near Glenwood Drive curve on Sept 2, 2010 at 6:09 am. The driver was going faster than he could handle with the weight of the beer in the truck. He intentionally went into the embankment and bounced back out into the road. SB lanes closed for 4 hrs 15 mins. The majority of the time was spent offloading the beer from the truck. There was a discussion on what information is being conveyed after an incident and how it can be improved. Changeable message signs (CMS) were well utilized. Luis noted that there was no information on exactly where the incident was located so it was difficult to decide on the best alternate route. Colleen McMahon suggested using Nixel Alert (free notification system that agencies can sign up for from computer or cell phone) to identify alternate routes. Suggestion was made to use signs to tell people how long the delay may last. Ramin mentioned that CMS have limited space and it is difficult to pinpoint the exact location of an incident as people do not know minor cross roads.

Other state routes can be suggested for some highways but Hwy 17 does not have other state routes nearby. There are ramifications if people are told to use a county route. Siobhan recommends that we get highway advisory radio (HAR) system operational as HAR does not have the limitations of signs and sigalerts. HAR is not working in Santa Cruz County. There is a licensing issue over the signal which is taking time to resolve and the issue is exacerbated by budget problems.

7. Received Review of Operations and Status of TOS
Ramin extended invitation to staff to tour Dist 4 TMC facility to show process and limitations. Closure of 50% or more of facility for more than 20 minutes, triggers a sigalert. Ramin requested that the TMC at District 4 be informed immediately when a CMS is not working.
8. Received Highway 17 Project Update from Caltrans District 4 – Wet Weather Project
Shawn Enjily said that due to the furloughs and issues related to water quality requirements, the schedule was extended. Hopefully, once the budget is passed, the schedule will not be affected further. Luis Mendez added that the Wet Weather project will benefit from providing construction information via the CMSs and the HAR. When HAR is discussed at the next meeting, the Wet Weather Project will be part of the consideration in getting the HAR operational. Funds have been set aside for public information about construction project.

9. Received Highway 17 Project Update from Caltrans District 5
Siobhan Saunders reported that the Caltrans project to update the guardrail and barriers is about 20% complete. The contractor is going bankrupt and therefore the bonding agency will be hiring another contractor to complete the work. The project will start up again in the spring. Another project near Vine Hill Road is not completed due to Caltrans rejecting the pavement. This contractor is also going bankrupt. The project will not be completed until the spring. Another job on SB Hwy 17 to improve guardrails may be delayed due to the budget not being passed and the migratory bird act that only allows trees to be cut at certain times of year.

10. Received New Highway 1 Changeable Message Sign Update
Siobhan Saunders reported that the Highway 1 CMS will not be installed. It is likely that a place with an adequate sight distance was not available.

11. Received Traffic Operations System Improvements
Siobhan Saunders reported that installation of detection equipment on Highway 1 including vehicle counting and closed circuit television cameras (CCTV) started Monday (9/13/10). It should take about 3 months to install.

Shawn Enjily asked if there have been any problems with moveable barriers for projects on Hwy 17. Siobhan responded that as far as she knows the moveable barriers have worked quite well.

Ginger Dykaar requested that Caltrans inform RTC if any call boxes are going to be affected by the guardrail project that will start up again in the spring.

Deb Larson reported that priorities for the Santa Cruz area have been to activate the CCTV cameras in the fishhook area where they were installed in 2008 as part of the interchange improvement project. There are 3 cameras: Emeline, Ocean St and Pastiempo. The Emeline CCTV is online and the Ocean St and Pastiempo CCTVs should be online by the end of this year. The Laurel curve CCTV still needs a router and there is currently no purchasing allowed at Caltrans except for emergency equipment. Hopefully, once a state budget is approved, there will be maintenance funds to make purchases necessary to get the Laurel Curve CCTV and microwave vehicle detection equipment hooked up to router.

Deb Larson initiated a project on Hwy 17 that will be looking at shoulder widening, concrete guardrails and/or retaining walls at 3 different locations. The project will provide more recovery area and sight distance around the curves. Locations are just north of Laurel Road going NB, NB near Sugarloaf Rd, and near Glenwood Cutoff in the SB direction.
Marshall Ballard is working with Dist 4 to get a full inventory of ITS equipment on Hwy 17. Marshall presented maps for both Santa Cruz and Santa Clara that show all the ITS equipment on Hwy 17. He plans to add to this inventory, what equipment is operational. Marshall stated that they will try to use this information as leverage to get more funding. Luis suggested that it may be possible for VTA to partner with SCCRTC and TAMC to increase the possibility of securing funding.

12. Received an update of the SB 1418- SAFE Modernization Bill
Luis Mendez reminded members that SB 1418 is the bill that would allow an increase in a vehicle registration fee from $1 to $2 to provide an increase in funds for Service Authority for Freeway Emergencies (SAFE). Grace Blakeslee from SCCRTC and Rebecca Long from MTC worked very hard to try to move the bill along. Unfortunately, the bill failed in the Assembly Transportation Committee in late June, 2010. It was hoped that this would increase the funding for call boxes, Freeway Service Patrol, extra enforcement for Hwy 17 etc. Staff may try again next year to get the bill passed.

13. Additional Items
Caltrans maintenance is concerned about public perception of tree trimming on Highway 17. Tree trimming is subject to daytime and Migratory Bird Act restrictions. It never seems to be the “right time” to do this work. Tree trimming that was started this summer was suspended and it is not known when it will be resumed. Caltrans traffic counts indicate that there was little traffic during time of tree trimming. Public perception may be biased by radio station hosts who may be looking for entertainment value of message rather than presenting accurate information. Caltrans Public Information Officers work with radio stations but it is still a problem. Gary Richards and Ramona Turner do a good job presenting well informed and accurate information.

Luis Mendez mentioned it took over 4 hours to open the highway after the beer truck overturned on Hwy 17. This is a long time from the motorists’ perspective. Are there ways to move the cargo quicker? Lt. Wood emphasized that moving the cargo is what takes the majority of the time. Captain Manriquez said that the cargo needs to be saved unless there is agreement with the company who owns the goods.

14. Approved Next Meeting Date: Joint Safe on 17 Task Force & TOS Oversight Committee meeting – March 23, 2011

Respectfully submitted by Ginger Dykaar

It was moved (Christina Manriquez/Luis Mendez) to place on agenda for March 23, 2011 meeting to have a representative from District 4 talk about what is being done to make the highway advisory radio operational for both Santa Cruz County and Santa Clara County and how it can best be used to inform travelers of incidents, congestion and alternate routes.

Action Item: Staff was directed by Chair of Committee to set up tour of District 4 TMC facility and inform members of committee of date to tour District 4 TMC.
MINUTES
Meeting #5
October 28, 2010
RTC Conference Room 1:00 PM

Summary:

- The fifth meeting was attended by 8 TAC members, plus RTC and STARS staff.
- TAC members agreed that the Climate & Energy credit should shift the focus from travel time to predictability.
- TAC members reviewed and approved the remaining credits, completing and approving all 12 credits.

TAC Present
Karen Christensen, David Casterson, Parag Mehta, Aileen Loe, Paul Schoellhamer, Tami Grove, Tom Hart, Laura Bonich (by phone)

STARS Team: Peter Hurley

RTC Staff: George Dondero, Yesenia Parra, Karena Pushnik, Kim Shultz

Others: Brynna McNulty, Ginger Dykaar, Tegan Speiser

Meeting was called to order at 1:15 pm

A. Introductions - Self introductions were made

B. Changes or additions to agenda - None

C. Discussion of STARS Credits as proposed by TAC members (100)

- Climate + Energy 2: Evaluate Vehicle Mile Reduction Strategies

Aileen Loe asked for clarification on the base measurement. George responded that staff has been working with AMBAG and that they have received a grant to include transit in the model. He also responded that VMT data is not collected it is estimated based on traffic volumes. He said that staff will work with estimates derived from other information to determine a “baseline VMT.”
Responding to another question regarding data, George said that AMBAG will be able to derive origin/destination data from their regional model. Peter added that the 2005 data will be able to provide the information that is required by STARS. George added that staff is working with AMBAG to supplement their data resources, like augmenting the sample size for the National Household Travel Survey, and that significant progress has been made in the last 4 weeks. Laura Bonich said that AARP has begun to offer Pay-As-You-Drive insurance including a device to its members that tracks miles traveled and speed. Paul Schoellhamer also noted that truckers carry transponders that also track this data. FasTrak devices or smart phones may also be able to collect/transmit travel data in the future.

Tom Hart asked how the model will measure discrete areas, for example, Pajaro Valley High School had a huge impact on Freedom Blvd. due to the location of the school and the increase in teenagers driving an additional vehicle. RTC staff indicated that the model is regional, that it includes individual projects, and that it uses generally accepted trip generation rates from the Institute of Transportation Engineers (ITE) manual.

Paul noted that all credits in STARS require measuring things in the future and doing so means the data will not be perfect.

- **Climate + Energy 3: Evaluate Improving Vehicle Flow**

Peter gave a brief summary on this credit, noting that it's intent is to ensure the projects go for net energy and net benefits, and to optimize benefits gained. He also noted that the credit language was modified to make it clearer, but requested the committee's input about whether to shift the focus from absolute travel times to predictability. Paul noted that this credit can be viewed similarly to the work that is being done for airport security is connected in that people are looking for travel time predictability and that is what is important. Peter responded that when vehicles are moving at a lower speed, the predictability is easier to measure than when they are traveling in faster speeds. He also noted that breaking and acceleration impact energy use and greenhouse gas emission rates.

Parag Mehta agreed, saying that the Caltrans changeable message signs indicating how long to get to destinations are more useful than just the warning of “congestion ahead”. Referring to the graph on vehicle speed vs. fuel consumption (figure 7) of the manual, Paul suggested that the text of optimal average speed needs to match the graph and Peter agreed to revisit the text and the graph. He also said that more research will be done. Paul suggested that it should read “around 55 or an average of 55. He also noted that if the credit is shifted to concentrate more on predictability, then speed is not as much of an issue. Peter responded to a question regarding how predictability is translated in travel time. He said that it has to do with reducing breaking and acceleration. You can predict travel time more accurately if you have less breaking and acceleration. Aileen added that more movement and more variables equates to obstacles, like possible accidents as opposed to a smooth flow. An analogy of rice poured into a
funnel was discussed to illustrate how even flow keeps the rice moving. George noted that when driving a Prius or other vehicle that has the technology, the information on fuel consumption is on screen and you can see the difference between driving at a normal speed versus higher speeds. He also noted that with the new cell phone technology, collecting real time data is much easier. Google traffic maps display real-time speed data received from iPhone users who (perhaps unknowingly) are transmitting vehicle speed via the GPS unit in the phone.

Peter noted that the next steps for this credit are to change the language to match the graph (figure 7) in the manual and to include language to address net energy. He also said that additional research will be done on predictability and energy use. However, the credit can stand on its own and examples from the research will be included as they are completed.

Karen Christensen asked how we assess, in a credit, the process and incentives for encouraging people to make the right choice when purchasing new vehicles that will help reduce energy use. Will a jurisdiction be rewarded if they have accomplished the goal of having more people purchasing the energy efficient vehicles. Peter responded that in Climate and Energy credit 6, the language rewards the jurisdiction for encouraging and incentivizing people to buy energy efficient vehicles.

Responding to a question regarding the recommended process in the “credit standards” section in the manual, Peter said that the intent is that the project managers are transparent about assumptions. This section is intended as a guide to what methodology they could use. He said that if there are recommendations on how better to describe this section, that they should be sent to him.

Paul was concerned with the language throughout all the credits specifying that improvement of all modes would receive credit, indicating that drive alone modes are improved at the same rate as non-drive alone modes. He recommended that the language be changed to give more credit if “non-drive alone modes are improved more than” drive alone modes. George responded that the goal is to reduce greenhouse gas emissions and that if we change it to Paul’s request, the goal might not be accomplished. Peter said improvements by mode shows up throughout the credits; however it is bounded by the climate and energy requirement that indicates that an overall reduction in greenhouse gas emissions must be achieved. The system requires improvements for all modes.

Peter agreed that the manual would benefit from language that clarifies exactly what the improvements must be.

It was agreed that the language used in the “intent” section also be included in the “requirements” and “documents” sections.

- **Cost Effectiveness Analysis 2: Selecting Cost-Effective Projects and Programs**

Peter said that the goal of this credit is to have the project team think up front about the economic implications and the life cycle costs. Projects will need to show a matrix of life cycle costs for various components and performance measures.
Responding to a question regarding the methodology that will be used to determine carbon cost, Peter said a project would need to do some analysis then use the cost appropriate to the project and define how the price was determined. It was also noted that a future version of the manual will include the Ecological Function credit. Karen Christensen volunteered to work on this. Also, it was noted that under CEA2 a project evaluation should include a comparison to what happens if you do nothing.

- **Access 2: Evaluate Expanded Transportation Demand Management Strategies**

Peter gave a definition of demand management highlighting incentives/disincentives, information, and policies that affect people’s choices. Karena Pushnik questioned whether including seniors and people with disabilities would affect this goal. It was suggested that video conferencing and teleconferencing be added as a trip reduction strategy (the trip not taken) in Access 1 be called out more clearly as a performance measure.

**D. Discussion of remaining credits**

- **Access 3: Evaluate Expanded Transportation System Management Strategies**

This credit quantifies ways of improving predictability, for example travel time. It was suggested that traveler information systems, such as 511 systems, be included in the strategies. It was also suggested that results be included under the Green Wave bicycle signal timing example.

- **Access 5: Evaluate Expanded Transportation Supply and Service**

This credit measures the infrastructure and service options. Peter summarized the credit stating that travel quality has 3 components: safety, physical activity and user satisfaction. For a project to be sustainable, it requires safety maintenance for all modes. Physical activity clearly applies to activities other than driving alone. User satisfaction can be applicable to any mode, however-sustainability is about applying it to all modes. The way the credit is written states that you need to improve user satisfaction for bike and pedestrian more or equal to SOV. Paul suggested that the credit be revised so that no credit is given for improving SOV even though improvements will ultimately improve for all.

Peter requested that Tegan Speiser provide language to substitute for ‘single occupant vehicles.’

- **Climate + Energy 4: Evaluate Construction Materials and Methods**

No discussion of this credit.

- **Climate + Energy 5: Evaluate Renewable Energy and Energy Efficiency**
No discussion of this credit.

- **Cost Effectiveness Analysis 1: Cost Estimate and Cost-Effective Calculations**

  Peter described this credit as benefits divided by cost. The intent is to capture a broader range of benefits and cost, including those where a dollar figure cannot be assigned. An example might be: a person now walks to the grocery store because a new pedestrian bridge is available, so they may not save travel time but they have more access to goods and services. The increased access would be divided by the cost of building the bridge and the maintenance (the full life cycle cost) then factor in the private cost, public cost and the social cost (e.g. carbon pollution).

  The numerator is the STARS goal.

**E. Next Steps in STARS and HOV Lane Development (15)**

The comment period is open until November 1 for Version 1.0. Peter noted that the manual will be posted to the City of Portland’s website on November 15 (note: delayed to Nov. 24). The Portland team plans to

George outlined some possible next steps:

1. Propose a citizens stakeholder committee -- which could consist of members of this group, plus additional community stakeholders and elected officials, potentially as ex-officio members. Members of the committee would be required to attend a workshop on sustainability, tentatively scheduled for March 2011.

2. Recommendations from this committee will be taken to the RTC. This will be in conjunction with the environmental document for the Highway 1 HOV project. This would happen in the Fall 2011.

3. The RTC could submit an application to STARS for Pilot certification in December of 2011.

He noted that if there are recommended outcomes from the STARS evaluation of the Highway 1 HOV project, that they might be added to the Highway 1 HOV EIR as a mitigation strategy or they can be standalone projects or programs.

George asked the committee members to let him know if they are interested in being part of the stakeholder committee. He also commented that at the December 2 RTC meeting he would be inviting a few committee members to attend the meeting to report on the work of the STARS committee.

**GENERAL COMMENTS:**

Peter noted that Brynna McNulty, from the Parsons consulting group, is working with him to establish a credit for goods movement and freight. Aileen Loe noted that ordering goods online does not necessarily reduce a freight trip. Peter mentioned
that the STC will soon be releasing an RFP to develop the STARS framework for planning projects. He also noted that credits are not weighted, but are pass/fail in the pilot phase. In the fully developed edition of STARS credits will be weighted. Language in the manual will also be augmented to make it clear that a project must, at a minimum meet requirements under A1, EF1, IP1, and CE1 credits.

George reported that Community Television taped an interview with Peter and RTC staff. The email link will be sent the committee. The show will air several times over the next few months.

Peter said the first 12 credits are being tested with a project in Portland Oregon and the Hwy 1 HOV lanes project. The STARS group is hoping to apply the credits to several other projects in the next year. The remaining 17 credits which are part of STARS 2.0 will be developed as pilot projects are being requested. The goal is to have version 2.0 with all 29 credits completed in fall of 2011. The South Portal project in the Portland area is at the beginning stage.

5:20 Adjourned

Respectfully submitted,

Yesenia Parra, Staff
Santa Cruz County Regional Transportation Commission
Interagency Technical Advisory Committee (ITAC)

DRAFT MINUTES

Thursday, November 18, 2010
1:00 p.m.

SCCRTC Conference Room
1523 Pacific Ave, Santa Cruz, CA

ITAC MEMBERS PRESENT
Angela Aitken, SCMTD
Taylor Bateman, City of Scotts Valley Planning
Tove Beatty, SCMTD
Teresa Buika, UCSC
Mark Dettle, City of Santa Cruz Public Works
David Fairchild, MBUAPCD
Dan Herron, Caltrans District 5
Steve Jesberg, City of Capitola Public Works
Bhupendra Patel, AMBAG
Maria Esther Rodriguez, City of Watsonville Public Works
Todd Sexauer, County Planning
Steve Wiesner, County Public Works
Majid Yamin, City of Scotts Valley Public Works

STAFF PRESENT
Rachel Moriconi
Kim Shultz
Gini Pineda
George Dondero

OTHERS PRESENT
Russell Chen, County Public Works
Donn Miyahara, Caltrans District 5
Adam Fukushima, Caltrans District 5
Alan Romero, MBUAPCD
David Murray, Caltrans District 5

1. Call to Order – Chair Rodriguez called the meeting to order at 1:02 p.m.
2. Introductions – Self introductions were made.
3. Oral communications -None
4. Additions or deletions to consent and regular agendas - None

CONSENT AGENDA (Dettle/ Rodriguez) approved unanimously

5. Approved minutes of the August 19, 2010 ITAC meeting

REGULAR AGENDA

6. Status of ongoing transportation projects, programs, studies and planning documents - Verbal updates from project sponsors
Project sponsors gave updates on their projects.

City of Scotts Valley - Majid Yamin reported that the city’s two ARRA projects were finished. Caltrans conducted an informal audit of their ARRA projects in October.

MBUAPCD - Dave Fairchild reported that the agency is updating CEQA guidelines to include GHG emissions and set thresholds that will allow projects to stay within targets. Changes will mainly affect larger projects that may be considered for an Environmental Impact Report.

County of Santa Cruz - Steve Wiesner reported that ARRA- and RSTP-funded road repair projects are near completion. A chip seal repair project using Proposition 1B funds is done. The Live Oak overlay project is finishing this week. Several storm damage repair projects are completed, with the Glenwood Drive project still outstanding. He said that the East Cliff bluff protection project is finished and the parkway improvement project is slated for construction in spring 2011. A curb, gutter and drainage project on Soquel/17th Avenue is 50% complete as is construction on the Green Valley Rd/Holohan/Airport Blvd project. The County is still working on the Calabasas Rd project design and is planning to award a construction contract for the Graham Hill Rd improvement project by the end of the year.

SCMTD - Tove Beatty reported that SCMTD is installing new fareboxes and ticket vending machines that will allow more ticket options, including rolling 30 day passes. SCMTD is about 50% finished with scheduling/dispatching software updates. SCMTD recently received a Caltrans grant to fund the Watsonville Transit Planning Study. A decision on the Greyhound property adjacent to the Metro Center will be made soon. Three ARRA funded paratransit vehicles are due to arrive soon.

SCCRTC - Rachel Moriconi reported that the California Transportation Commission is expected to allocate funds to purchase the Santa Cruz Branch rail line in January. The RTC has finished negotiating an agreement with a shortline operator. The Soquel-Morrissey Auxiliary Lanes project design is nearing completion and the project is expected to go out to bid Spring 2011.

Caltrans - Dan Herron reported that although Caltrans will continue to have furloughs, they will not be closed on Fridays. He announced that Safe Routes to School grant funds were recently awarded to the Cities of Watsonville and Santa Cruz. He said that March 30 is the deadline to apply for next round of transportation planning funds.

City of Santa Cruz - Mark Dettle reported that the City of Santa Cruz is asking the Coastal Commission for permission to resubmit the Arana Gulch project for approval. The Depot Park roundabouts are under construction and should be completed by spring break 2011. The City’s draft Climate Action Plan is available for review and comment. Transportation is a key component of the plan, with increasing transit use and reducing single occupancy vehicle trips by 30% recommended. Sidewalk improvements on Soquel Ave in front of Staff of Life are finished; the Park Ave turn on Soquel Drive is in design; and the Water St sewer project will be completed this month.

AMBAG - Bhupendra Patel reported that the Blueprint plan is now available for public review, with comments due December 15. MTIP amendment #1 will be on the January AMBAG agenda. New JARC/New Freedom projects and any other changes to federally-funded projects should be submitted to AMBAG for the MTIP by early December. Rachel Moriconi will send links to the documents and deadlines to the ITAC.

USCS - Teresa Buika reported that the signal light at the west campus entrance is complete. Three
ARRA funded disability vans arrived in late September. The Ecology Action administered ZipCar program is expanding with more cars available in Santa Cruz at Laurel and Blackburn Streets, Mission Street at the CVS, and in the parking lot behind the RTC offices. Mark Dettle asked for an update to be given to the Downtown Commission.

City of Capitola – Steve Jesberg reported that the city is redesigning improvements at Capitola Rd and 41st Ave. Right-of-way work at 38th Ave is underway. This project will have sidewalks and bike lanes.

City of Watsonville – Maria Rodriguez reported that Green Valley Rd is under construction for at least six weeks. Preparations are being made for spring construction on Freedom Blvd. The Safe Routes to School grant funds will be used for sidewalks, traffic calming and school pick up sites.

Rachel Moriconi reminded everyone that HSIP (safety) grant applications are due December 9th. Donn Miyahara added that there will be tight timelines to construct projects and you cannot have delayed older projects.

7. Draft Highway 1 Corridor System Management Plan (CSMP)

Dave Murray reported on the CSMP saying it was designed to be a tool to manage the corridor and describing the boundaries of the corridor. He acknowledged that the corridor is too long to be truly analyzed without additional real time data collection and that they were unable to use the microsimulation model to analyze different scenarios for the corridor.

Mark Dettle suggested that the northern boundary of the corridor be changed from King St to Bay Avenue to more fully incorporate the traffic to and from UCSC.

Mr. Murray said that future plans would be designed for smaller segments of the corridor.

Members discussed shortening and widening the corridor description to factor parallel arterials and cross streets into the equation and the need for better detection equipment on and off the highway. Caltrans will make a presentation on PeMS data website at a future meeting.

Comments on the draft plan are due to Caltrans 11/24/10.

8. Draft State and Federal Legislative Program

Rachel Moriconi gave an overview of key legislative issues for 2011. She noted the possible impacts that Proposition 26 could have on transportation funding, especially related to the “gas tax swap”. She said that while SB 1418 to increase the vehicle registration fee to support the Freeway Service Patrol (FSP) program did not make it through the legislature in 2010, staff recommends again making it a priority for the RTC in 2011. She also reported that Caltrans’ budget for oversight and planning was cut and there is a push to pass the cost of oversight for highway projects implemented by local agencies along to local agencies.

On the federal front, it is unclear when the federal transportation act will be approved as it requires additional funding, but there is little political interest to increase gas and other taxes.

Ms. Moriconi asked for comments on the legislative program to be submitted by Friday in order to be presented to the RTC at its next meeting.
Dan Herron said that he would like to see federal transit funding become more flexible to be used on operations, as well as capital.

9. **Overview of the AMBAG Regional Travel Demand Model Improvement Plan**

Bhupendra Patel provided an overview of the Regional Travel Demand Model (RTDM) and Implementation Plan for the next model update. He said that Association of Monterey Bay Area Governments (AMBAG) is required to update the model every five years. Any capacity project in the region must be included in the model.

Angela Aiken asked how data that was relevant in 2005 was updated for the model to reflect SCMTD’s decrease in service due to budget cuts, saying that the supposition in the model is an increase in service and growth. Discussion ensued about the accuracy of scenarios if the base year is 2005.

Mr. Patel said it was up to local jurisdictions to inform AMBAG of changes before running future updates. He said that the 2010 base year model would incorporate census data, parcel level land use data, the California Household Travel Survey and traffic counts. It was suggested that local jurisdictions provide funding for Household Travel Surveys.

Ms. Aiken asked AMBAG to solicit information annually from each entity using the model to ensure that AMBAG has the correct information to share with all the other entities.

In response to questions, Mr. Patel noted that unemployment and gas price fluctuations were factored into the model and agencies noted how they use the model.


Rachel Moriconi said that most ARRA projects have outstanding balances and that invoices must be submitted for reimbursement at least every six months.

11. **Santa Cruz Metropolitan Transit District (SCMTD) Bus Stop Improvement Project**

Tove Beatty reported that $500,000 in STIP funding was programmed for bus stop repairs. SCMTD will add some funding to make sure that improvements are equitable throughout the county. Members received a list of planned improvements.

Rachel Moriconi suggested that local jurisdictions review the list and coordinate with SCMTD if they intend on making improvements in the same areas. Ms. Beatty will send a map of planned bus stop improvements to local jurisdictions.

Mark Dettle noted that SCMTD may need a use permit for projects within the city.

The meeting adjourned at 3:04 pm.

The next ITAC meeting is scheduled for **January 20, 2011** at **1:00 PM** in the SCCRTC Conference Room, 1523 Pacific Avenue, Santa Cruz, CA. There is no meeting planned for December.

*Minutes prepared by: Gini Pineda*
101 Work Program and Budget

The 2009 triennial performance audit of the RTC, Transit District, and the specialized transit operators (Community Bridges and the Volunteer Center) was completed, accepted by the Commission, and submitted to Caltrans. Staff closed the books for FY2010 and coordinated with the Independent Auditor on preliminary FY2010 fiscal audit field work. Caltrans approved FY2010 indirect cost rate of 78% in August and staff billed the revenue grants for reimbursable indirect costs.

Staff requested the County Auditor to review the FY2011 TDA Revenues estimate and staff received a new estimate with a slight reduction in funds. Staff worked on the major fall budget amendment to be presented to the Budget and Administration Personnel Committee in the second quarter.

General Administration

Since the County of Santa Cruz decided to longer process the RTC’s payroll or provide ancillary benefits to RTC staff beginning in this fiscal year, RTC staff implemented a new payroll system and new ancillary benefits policies. Staff worked with the consultant to implement GASB 45, the Governmental Accounting Standards Board statement regarding other post-employment benefits (OPEB) other than retirement.

112 Plan Coordination

During this period, staff attended meetings of the California Transportation Commission (CTC), the Regional Transportation Planning Agency (RTPA) Group, the California Association of Councils of Government (CalCOG), the Caltrans Regional Coordination Group, and monitored agendas for the Santa Cruz Metropolitan Transit District (SCMTD) Board of Directors and Air District (MBUAPCD). Staff participated in regional coordination meetings with staff from the Association of Monterey Bay Area Governments (AMBAG), the Transportation Agency for Monterey County (TAMC), and the San
Benito Council of Governments (SBCOG). The Interagency Technical Advisory Committee (ITAC) met once this quarter.

With the assistance of its state and federal legislative assistants, staff continued to monitor and report on various state and federal legislative issues, including bills introduced this year, the State Budget, SAFETEA-LU Reauthorization,, and Propositions on the November 2, 2010 state ballot.

113 Public Information

The RTC sent information to the media about the following: availability of RTC’s new County Bike Map, RTC’s decision to manage construction of the Highway 1 Auxiliary Lanes project, and requesting input into the potential new 511 Traveler Information System for the Monterey Bay Area (joint project with RTC and the Transportation Agency for Monterey County).

During this period, the RTC taped its first transportation talk show on Community TV. The subject was the Sustainable Transportation Access Rating System (STARS). The program will be rebroadcast over the course of the next 2-3 months. The RTC and Community TV have discussed having a quarterly show on transportation topics. In addition, RTC staff initiated additional meetings with representatives of the media to discuss the RTC’s projects and media outreach strategies.

In addition, the RTC continues to broadcast through Community TV its regular monthly meetings and place agendas and packets for its meetings on the RTC website. The RTC also provides summary actions from the meetings and sends out highlights to the media and interested recipients. Current agendas for committee meetings and other information such as audit reports, approved budgets and work programs, and project information are also placed on the RTC website and regularly maintained. The public may request “enews” on specific RTC projects/projects and staff sends out bulletins, as developments arise.

RTC staff provided two guest blogs in the local media for the Street Smarts column this quarter on the Sidewalk Maintenance Report and the Bikes Secure programs.
During this period, the project to redesign and refresh the Commission and Commute Solution websites moved forward with completion of on the final design.

175 **Monterey Bay Area 511 Traveler Information System**

Staff conducted several meetings with the 511 Workgroup Team including RTC and TMC staff. Staff worked with a contractor to produce a video that will be a key component of the project’s public participation plan. The video concept and message was refined and video was produced, finalized and distributed. A new website dedicated to the project was created and launched. The site is also available in Spanish. The 511 input survey was completed and posted to the website along with the video. Staff worked on translating the survey into Spanish. Public outreach meetings in the region were held in September. Emails were sent out to large numbers of people informing them about the 511 project for Monterey Bay Area, announcing public meeting times and locations and inviting them to watch the video, take the survey and let others know about the survey. Press releases and calendar events were sent to the local media. RTC staff attended a national workshop on 511 Traveler Information Systems held by the 511 Deployment Coalition. Staff continued research on 511 systems and began writing the request for proposals for a consultant to conduct a 511 Feasibility Analysis and Implementation Plan for the Monterey Bay Area.

177 **Freeway Service Patrol (FSP)**

RTC continued to administer the FSP contracts for Highways 1 and 17. Staff began planning for a new procurement for FSP service for Highway 17 that will begin in July, 2011.

Staff coordinated a refresher training class for FSP drivers with TMC. The first training (July 14, 2010) was organized by CHP Officer Orta from Monterey at TMC. The next class will be held at RTC office on November 2, 2010 and will be run by CHP Officer Hansen. Presenting the refresher training class locally allows for the CHP officers and the tow operators to more readily discuss scenarios that are unique to Santa Cruz and Monterey.
Staff completed all monthly reporting requirements for the FSP ARRA funds. Staff received and reviewed monthly FSP assist data used to monitor program effectiveness.

178 **Service Authority for Freeway Emergencies (SAFE)/Call Boxes**

RTC staff worked with the RTC’s call box service providers, including Case Systems Inc., AT&T and Connections Communications to maintain the system and provide service. Staff continued planning with MTC to procure a new call box call answering center contract. The evaluation committee chose CDSNet for the call box call answering center contractor. RTC staff is working on negotiations with CDSNet for a contract start date of October 15, 2010 for full service beginning on January 1, 2011.

Staff is working with CASE SYSTEMS to perform site retrofits at some of the callboxes to make them ADA accessible. Staff worked with Case Systems to move a callbox on Hwy 1 that was in an area that was typically flooded during the rainy season. Staff worked with Case Systems and AT&T to determine a strategy for hooking up a callbox on Hwy 1 to a landline due to no cellular service in area.

Staff continued to administer the Safe on 17 Program including reviewing invoices and tracking injury and fatal collisions on Highway 17. Staff worked with the Metropolitan Transportation Commission to administer the Safe on 17 funding agreement. Staff organized the semi-annual Safe on 17 Task Force/Traffic Operations Systems Committee Meeting on September 15, 2010.

Staff continued to work to advance the SAFE Modernization proposal through the State Legislature. Unfortunately, the bill failed in the Assembly Transportation Committee.

179 **Transportation Demand Management (TDM) – Commuter Services**

Through employer contacts, the website, the 429-POOL phone line, and email, Commute Solutions produced carpool matchlists, provided personalized trip planning services and referrals, and served as a clearinghouse for information about transportation demand management.
Staff continued collaborating with the Metropolitan Transportation Commission (MTC) and its contractor, Parsons Brinckerhoff, to provide web-based carpool/vanpool and bike-buddy matching services to Santa Cruz County residents and commuters.

Commission staff continued working with employers and local, regional and state partner agencies including: Caltrans, the Association of Monterey Bay Area Governments (AMBAG), Ecology Action (EA), the Pajaro Valley Transportation Management Association (PVTMA), the Transportation Agency for Monterey County, San Benito County Council of Governments and the Monterey Bay Unified Air Pollution Control District (MBUAPCD), Santa Cruz Metropolitan Transit District (SCMTD) and local jurisdictions on general sustainable transportation outreach. In cooperation with other regional rideshare agencies and an advertising agency contractor, staff continued planning for a regional Rideshare Week campaign that will run October 4-10, 2010.

Implementation and marketing of the countywide carpool incentive program "Cash for Carpools" continued. Through its integrated suite of commute program planning tools such as facility site assessments, commute surveys of employees and residential density maps, staff helped employers to design effective workplace commute programs.

Staff continued distributing Santa Cruz County Bikeways maps to area bicycle shops, community agencies and transportation partners.

231 **Transportation Monitoring and Evaluation**

Staff worked with AMBAG staff to identify data needs for the next regional model and Regional Transportation plan updates. Staff monitored and provided input on the forthcoming California Household Travel Survey.

411 **Land Use/Transportation Coordination**

RTC participated in regional Blueprint meetings and provided input on plan development. Staff participated in discussions with AMBAG regarding planning for the implementation of SB 375 Sustainable Communities Strategy (SCS) for future RTP updates and on grant applications to fund this state-mandated work.
RTC Staff held two meetings of the Pedestrian Safety Work Group this quarter. Attendees included representatives from the Transit District, the Elderly & Disabled Transportation Advisory Committee, Hope Services for developmentally disabled adults, vision impaired individuals and a former member of the Commission on Disabilities. The group discussed how to implement the next steps outlined in their sidewalk maintenance document regarding responsibilities of private property owners and local jurisdictions. In addition, the group discussed the ADA Transition Plan requirement and its relevance to their work. RTC staff also developed maps of pedestrian injuries and fatalities using the SWITRs and Geographic Information Systems (GIS). RTC staff also added layers to show origins/destinations frequented by seniors and people with disabilities, bus stops, and populations of seniors and people with disabilities per the 2000 census.

The Bicycle Committee met once during this quarter. The Committee agreed to continue bimonthly meetings for FY 10-11 because of revenue and corresponding staffing shortages. Re-invigorated subcommittees continued to work towards Committee goals and staff facilitated their work by providing resources or information. Staff provided the Bicycle Committee with a monthly packet of information on current issues and followed up on projects as directed. Staff worked with local jurisdiction representatives to review design elements of new projects, signs or roadways needing improvement. Staff also wrote letters regarding bikeway facilities, policies or funding issues on behalf of the Bicycle Committee. Staff continued to recruit and orient newer members to the Bicycle Committee’s roles, responsibilities and procedures. Staff also solicited new members to fill vacancies.

With completion and approval of the 2010 Regional Transportation Plan, staff provided materials to facilitate prioritization of projects by the Bicycle Committee.

Staff continued planning work on the RSTP funded Countywide Bicycle Route Signage Program. The way-finding or guide signage program will direct bicyclists to safe and convenient facilities when navigating through the county’s roadways. With extensive assistance from a student intern, a survey of possible way finding signs and best practices from other jurisdictions was completed. A Draft Implementation Plan was crafted and proposed signage types, placement guidelines and administrative scenarios for implementation.
were outlined. A meeting with representatives from local jurisdictions will be convened to review options and select appropriate courses of action. Coordinating with local jurisdiction representatives regarding implementation activities is a critical component.

A major update of the Santa Cruz County Bikeways Map was completed this quarter. The update includes a comprehensive GIS inventory of all existing and newly constructed bikeways as well as a never-included-before feature of off-road multi-use trails. Staff coordinated printing and delivery of the maps to distributors of large quantities. A tracking system to monitor distribution rates and remaining supplies was implemented. The map was also posted on the RTC’s website and the GIS files were provided to Google’s “Bike There” feature as well as the County of Santa Cruz’s GIS office for web posting.

As part of the Bikeway Map update process and associated mapping projects, staff continued coordinating with Caltrans and City of Santa Cruz staff to re-designate the Pacific Coast Bicycle Route (PCBR) off of Mission St in Santa Cruz and define alternate roadways as the preferred alignments due to the thoroughfare’s high commercial truck and personal vehicle traffic, as well as the number of bicyclist fatalities on that segment. RTC staff catalogued existing PCBR signs on Mission Street, as well as bike route signs on the proposed alternate roadways; input the data and photographs in Google maps; and submitted the information to Caltrans to facilitate the re-designation. Staff followed up with City of Santa Cruz staff to complete Caltrans’ administrative requirements.

RTC staff continued assisting local jurisdictions with updates of their Bicycle Plans in anticipation of Caltrans’ December, 2010 deadline. This quarter’s emphasis was placed on finalization of the City of Capitola and the County of Santa Cruz draft Bicycle Plans in preparation of Bicycle Committee review. The RTC is responsible for ensuring the plans are in compliance with the Streets and Highways Code.

Staff attended monthly meetings of the Community Traffic Safety Coalition (CTSC) coordinating with this group on issues relating to bicycle and pedestrian safety. RTC staff also provided assistance to the CTSC’s South County Bicycle/Pedestrian Work Group. RTC staff worked with Ecology Action’s Bike to Work/School Program and the Health Service Agency’s Community Traffic Safety Coalition and Ride ‘n Stride
Programs to administer and process invoices for RTC allocated Transportation Development Act funding. Staff also continued administering the remaining Folding Bikes in Buses Program funds as the program drew to a close. Staff worked with the implementing agency, Ecology Action, to submit a final report and to process final invoicing requirements.

Staff communicated with public works department’s staff regarding Bicycle Hazard Report and Pedestrian Access Report forms submitted by members of the public. Members of the public submit reports regarding bicycle or pedestrian hazards or access issues and RTC staff informs public works staff members for follow up action. RTC staff continued promotion of the reporting program and fielded inquiries regarding the online submission form to be integrated into the upcoming RTC website update.

Staff processed applications and distributed bike racks through the Bikes Secure Phase IV Program and advertised the program to community organizations. The program is funded through the Monterey Bay Unified Air Pollution Control District’s A2766 program.

Staff continued negotiations with the consultant firm RRM Design for the production of a Master Plan and Environmental Review for the Monterey Bay Sanctuary Scenic Trail (MBSST) Network, a planned bicycle and pedestrian pathway network spanning the length of the Monterey Bay coastline. RTC staff sought and received authorization from the RTC to enter into a contract with the Coastal Conservancy for receipt of supplemental funds to extend planning work to the northern boundary of the Santa Cruz/San Mateo county line. RTC staff coordinated draft contracts with the Coastal Conservancy and RRM Design to clarify deliverables and ownership rights of final products. Final agreement negotiations with RRM Design and the Coastal Conservancy have been scheduled, as well as an issuance of a notice to proceed. A kick-off meeting is being planned.

621 Specialized Transportation

The Elderly and Disabled Transportation Advisory Committee (E&D TAC) met once this quarter. Meeting topics included: review of the Metro’s Bus Stop Improvement Program/Process; receiving information about Community Bridges Mobility Outreach and Education Program; receiving an update about the 2-1-1 System; brainstorming outreach strategies for bus and paratransit service to the County Fair;
receiving an update from the Pedestrian Safety Work Group; and providing input into the updated Guide for Specialized Transportation.

622 Regional Transportation Plan

The RTC website was updated to include the adopted 2010 Regional Transportation Plan (RTP). Staff began working with regional partners to prepare for the next update of the RTP.

Staff continued to work with local agencies to implement the projects and policies included in the Regional Transportation Plan through their planning and capital improvement program actions and staff continued to monitor projects to ensure consistency with the RTP.

Staff continued to monitor California Air Resources Board, legislative, and California Transportation Commission (CTC) proposals for expanding the focus of RTPs to address global warming. Staff reviewed state updates to RTP Guidelines.

631 Transportation System Management

Staff continued to investigate applications of TSM elements to relieve congestion in Santa Cruz County. Staff reviewed usage of existing TSM elements and tracked the detection and reporting of incidents by Caltrans Traffic Management Centers.

641 Transportation Improvement Program

Staff met with project sponsors, Caltrans, and CTC staff several times this quarter to discuss funding needs of proposed and existing state and federally funded projects.

Staff worked with project sponsors and Caltrans to continue to implement projects selected to receive $12.1 million in federal American Recovery and Reinvestment Act (ARRA) funds, including shifting cost savings between projects.

Staff worked with project sponsors, Caltrans, Association of Monterey Bay Area Governments (AMBAG) and the California Transportation Commission (CTC) to implement funding amendments, allocations, and obligations, including development of the 2010 Federal Transportation Improvement Program (FTIP), amendments to the 2008 FTIP and allocation of state funds for STIP projects. Staff
continued to work with project sponsors to ensure that state and federal funding deadlines and other requirements were met.

Staff attended meetings of the California Transportation Commission. Meetings centered on State Budget proposals, STIP funding options for transit projects, Proposition 1B programs, global warming initiatives, and various state and federal regulations.

682 Rail/Trail Authority

With the assistance of negotiating consultants, the RTC completed negotiations with Union Pacific (UP) for purchase of the Santa Cruz Branch Rail Line (Rail Line) and continued negotiations with Sierra Northern Railway (Sierra) for operation and maintenance of the Rail Line. Staff worked with the negotiations consultant and technical consultants to prepare information required for negotiations with UP and Sierra. During this period, the RTC and its staff and consultants worked to meet the funding conditions established by the California Transportation Commission (CTC). The RTC adopted resolutions making the commitments required by the CTC to meet the funding conditions and CTC staff and consultants worked to provide CTC staff with all the information required. RTC approved a revised allocation request and funding application and it was submitted to CTC and Caltrans for consideration.

683 Highway 1 HOV Lane - Project Approval/Environmental Document (PA/ED)

Preliminary environmental technical studies completed in 2007 are being revised as required in response to agreement on geometric design details with Caltrans. The target date for completing the administrative draft environmental document, along with technical reports, for Caltrans review is December 2010.

As part of the environmental documentation, the Federal Highway Administration (FHWA) requires submittal of a realistic project management and a financing/implementation plan within 90 days following approval of the Final Environmental Document (FED). The project team met with FHWA representatives last quarter to review requirements of the management/implementation plan and review project elements. A draft Phased Implementation Plan was prepared and submitted to FHWA for inclusion in the Draft Environmental Document (DED) that is released for public comment. This Plan will
include a phased construction plan that provides the best congestion relief in the most cost effective.

As part of the preliminary design phase the RTC is working with the North American Sustainable Transportation Council in the development and application of the Sustainable Transportation and Access Rating System (STARS) to the HOV Lane project. The goal of the STARS evaluation process is to: improve access for the movement of people and goods; cut transportation and climate and energy pollution; and, maximize benefit-cost.

Recommendations developed through the STARS process will be evaluated by the Project Development Team (PDT) for input and subsequent consideration by the RTC for inclusion in the project, as appropriate. As part of this process, the RTC has created a STARS Technical Advisory Committee (STARS TAC) in January 2010, comprised of 20 representatives of public and private sector organizations and affiliations.

The STARS TAC met in July and September to provide comments on draft credits developed to date pertaining to Integrated Planning, Access, and Climate and Energy. The committee also reviewed the draft Pilot Project Application Manual which provides guidance to applying the STARS credit assessment at the project level, f.. The STARS TAC will next meet in October to review further updates to the STARS credits and Project Application Manual.

684 Highway 1 Soquel Avenue to Morrissey Boulevard Auxiliary Lanes Project

Through this period the project team resolved final design issues identified through the 65% design level review and worked towards submittal of 95% level plans in October 2010. plans Caltrans and Parsons Brinkerhoff, RTC’s construction management consultant, will review those plans and specifications as part of a constructability review. The Project Development Team’s goal is to complete the design package by January 2011, to qualify for funding allocation from the California Transportation Commission in March 2011 to begin construction beginning in late summer 2011.

In June 2010, the consultant team submitted permit applications to state and federal resource agencies consistent with the project’s
proposed Habitat Mitigation and Monitoring Plan (HMMP). The project team is continuing discussions with the City of Watsonville to participate in the Phase 2 Manabe Wetlands Restoration project to meet the riparian woodland, wetlands, and wet grassland mitigation requirements for the project.

Caltrans has coordinated a utility relocation plan with PG&E which is the critical path for all agreement with all other utility companies regarding relocation of utilities that conflict with proposed improvements. Caltrans has also progressed in negotiations with property owners for temporary construction easements to construct the La Fonda Avenue bridge structure and relinquishment of excess right-of-way in association with construction of soundwalls and long term maintenance responsibilities for drainage.

In August, the RTC authorized the Executive Director to sign the Construction Cooperative Agreement with Caltrans vesting responsibility in the RTC to administer the project’s construction phase. Accordingly, the project team is developing project specifications and contract language with the contractor to address agency liability issues, and procedures for processing contractor progress payments and contract change orders.

Subject to availability of funding and issuance of construction permits, staff anticipates construction beginning in the summer of 2011.

683 **Highway and Roadway Planning**

Work continues on the planning effort to evaluate traffic congestion and mobility constraints along the corridor as required in the Corridor Mobility Improvement Account (CMIA)-mandated *Corridor System Management Plan* for the Highway 1 corridor. Caltrans staff proposes to release the draft plan in early November for comment. Caltrans will make a presentation of the plan at a future RTC meeting. Traffic monitoring systems have been constructed on the Highway 1 Corridor in Santa Cruz County as part of this planning and monitoring program. Staff is hopeful this information will be available at the regional level for planning and operational applications.
LOCAL JURISDICTION PLANNING PROJECTS FUNDED BY FEDERAL CMAQ FUNDS

The progress reports for CMAQ-funded projects are attached to the invoices.

SURFACE TRANSPORTATION PROGRAM (STP) EXCHANGE PROGRAM

Staff worked with project sponsors and the Interagency Technical Advisory Committee (ITAC) to identify projects ready to proceed this fiscal year to receive state RSTPX funds in exchange for previously approved federal Regional Surface Transportation Program (RSTP). Staff made payments to projects previously approved to receive RSTP Exchange (RSTPX) funds and continued to monitor projects receiving those funds.

Go Green Program

Staff monitored work done by Ecology Action (EcoAct) to implement the Go Green campaign at Cabrillo College, services offered through EcoAct’s sustainable transportation membership, and the RideSurance Emergency Ride Home service and made payments to this project which was previously approved to receive RSTP Exchange funds.
AGENDA: December 2, 2010

TO: Regional Transportation Commission (RTC)
FROM: Rachel Moriconi, Senior Transportation Planner
RE: American Recovery and Reinvestment Act (ARRA) Delivery

RECOMMENDATION

This item is for information only.

BACKGROUND

At its February 5, 2009 and June 4, 2009 meetings the Regional Transportation Commission (RTC) selected projects to receive $12.1 million in funds from the “highway” portion of the federal economic stimulus bill - the American Recovery and Reinvestment Act (ARRA/Recovery Act). Based on cost savings, some funds were spread to additional projects. A list of projects using the RTC’s share of ARRA funds is shown in Attachment 1.

DISCUSSION

Project sponsors have done an outstanding job utilizing American Recovery and Reinvestment Act funds to put people to work by quickly constructing transportation projects throughout Santa Cruz County. Statewide, over 90% of the Recovery Act transportation projects have been completed or are currently under construction. California ranks second nationally in spending transportation Recovery Act funds. The Recovery Act has provided an opportunity to catch up on some of the backlog of critical local transportation needs in spite of other tax revenue losses. Of the $12.1 million that RTC was able to secure and award to local transportation projects:

- 15 projects (including several lump sum repair projects) received ARRA funding;
- 100% of transportation projects approved by the RTC for ARRA funds have been awarded to contractors, allowing construction to start;
- 10 projects have completed construction;
- $11 million used to repair over 50 roadways;
- $180,000 being used to manage and relieve congestion on Highway 1 through the Freeway Service Patrol tow truck program.

While contractors have received payment from local jurisdictions, because ARRA funds are only available on a reimbursement basis, most RTC-funded ARRA projects do have outstanding balances. Caltrans Local Assistance and RTC staffs are working with local agencies to ensure that they invoice for these funds and close out completed projects.

SUMMARY

The Santa Cruz County Regional Transportation Commission awarded $12 million in federal American Recovery and Reinvestment Act (ARRA) funds for local transportation projects. These projects have helped provide and preserve jobs, in addition to addressing a portion of the massive backlog in local transportation maintenance and improvement needs.

Attachment: Status of ARRA Projects Approved by the RTC
\\Rtcserv2\shared\RTC\TC2010\TC1210\ARRA\ARRAdeliveryDec2010sr.doc
### Economic Stimulus: Status of ARRA (STP) Projects

**Santa Cruz County Regional Transportation Commission (SCCRTC)**

**November 19, 2010**

<table>
<thead>
<tr>
<th>RTIP #</th>
<th>Implementing Agency</th>
<th>Project Description</th>
<th>Approved ARRA Funds</th>
<th>Construction Schedule</th>
<th>Outstanding Balance</th>
<th>Closed Out</th>
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<tr>
<td>CAP13</td>
<td>Capitola</td>
<td>41st Ave Rehab: Capitola Road to Clares</td>
<td>$230,000</td>
<td>Completed Fall 2009</td>
<td>$0</td>
<td>Yes</td>
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<tr>
<td>CO 42</td>
<td>County of Santa Cruz</td>
<td>Green Valley Rd. Rehab (Freedom Blvd. to Devon Lane)</td>
<td>$2,133,057</td>
<td>Completed Summer - Fall 2009. Cost savings shifted to other County Road Repairs Spring 2010.</td>
<td>$737,843</td>
<td>In process</td>
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<tr>
<td>CO 44</td>
<td>County of Santa Cruz</td>
<td>San Andreas Rd Rehab (Sunset Beach Dr to Wats Slough bridge)</td>
<td>$2,544,943</td>
<td>Summer-Fall 2010</td>
<td>$2.5 M, though invoice in progress</td>
<td>No</td>
</tr>
<tr>
<td>CO 53</td>
<td>County of Santa Cruz</td>
<td>Carlton Rd Improvements (Hwy 129/Riverside Dr to Lakeview Rd)</td>
<td>$1,350,000</td>
<td>Summer-Fall 2009 (Morrissey:8/31-11/16/2009; Market:9/4-11/16/2009; West Cliff:9/28-20/2009)</td>
<td>$228,853</td>
<td>No</td>
</tr>
<tr>
<td>CO 55</td>
<td>County of Santa Cruz</td>
<td>Lump Sum Road Repairs (Glen Canyon Rd: Branciforte Dr to S.V. City Limits; Freedom Bl: Petery Ln to Watsonville City Limits; Empire Grade: Jamison Creek Rd to 500’ S/ Alba Rd; Holohan Rd: Green Valley Rd to Hwy 152; Bear Creek Rd: Post Mile 4.95 to Hwy 35/Summit Rd)</td>
<td>$1,000,000</td>
<td>Summer 2010 - $50K cost savings to West Cliff Ph. 2</td>
<td>$181,571</td>
<td>No</td>
</tr>
<tr>
<td>SC41</td>
<td>Santa Cruz, City</td>
<td>Lump Sum Road Repairs: Morrissey Blvd. (Water to Fairmount), Market Street (Water to Highway 1), and West Cliff Drive (Bay to Almar)</td>
<td>$1,000,000</td>
<td>Este March 2011 - Using cost savings from other projects</td>
<td>$300,000</td>
<td>No</td>
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<tr>
<td>SC 43</td>
<td>Santa Cruz, City</td>
<td>Beach Area Roundabout</td>
<td>$750,000</td>
<td>10/14/10-Spring 2011. Est. cost savings went to West Cliff Ph. 2</td>
<td>$744,936</td>
<td>No</td>
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<td>SC 44</td>
<td>Santa Cruz, City</td>
<td>Lump Sum Pavement Repairs - (Pacific St, 2nd Ave, &amp; 3rd Ave)</td>
<td>$1,000,000</td>
<td>Summer 2010 - $50K cost savings to West Cliff Ph. 2</td>
<td>$181,571</td>
<td>No</td>
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<tr>
<td>SC 44A</td>
<td>Santa Cruz, City</td>
<td>West Cliff Drive Roadway Preservation Phase 2 (Almar to Swanton)</td>
<td>$300,000</td>
<td>Este March 2011 - Using cost savings from other projects</td>
<td>$300,000</td>
<td>No</td>
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<tr>
<td>SV21</td>
<td>Scotts Valley</td>
<td>Bean Creek Road Rehab</td>
<td>$160,000</td>
<td>January 2010</td>
<td>$33,687</td>
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<td>SV 23</td>
<td>Scotts Valley</td>
<td>Whispering Pines Rehab/Lump Sum Roadway Repairs</td>
<td>$115,000</td>
<td>Spring 2010</td>
<td>$40,000</td>
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<tr>
<td>WAT35</td>
<td>Watsonville</td>
<td>Lump Sum Road Repairs (11 miles on 33 roadways)</td>
<td>$1,200,000</td>
<td>Completed Summer-Fall 2009</td>
<td>$0</td>
<td>Yes</td>
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<tr>
<td>WAT 36</td>
<td>Watsonville</td>
<td>Green Valley Road Rehab, bicycle &amp; pedestrian facilities</td>
<td>$2,000,240</td>
<td>November 8, 2010 through January 2011</td>
<td>$1,999,020</td>
<td>No</td>
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<tr>
<td>RTC01</td>
<td>SCCRTC</td>
<td>Freeway Service Patrol</td>
<td>$180,000</td>
<td>July 2009-June 2011</td>
<td>$65,403</td>
<td>No</td>
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<tr>
<td>UC05</td>
<td>UCSC</td>
<td>Paratransit vehicle replacements</td>
<td>$125,000</td>
<td>Vehicles received 9/30/10</td>
<td>$125,000</td>
<td>No</td>
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</table>

**Total Programmed ARRA** $12,088,240

**Designated for local roadway repairs** $11,033,240

*Note: RTC programmed ARRA funds February 2009 and June 2009. Amendments were made to projects in October 2009 and Spring 2010. List includes cost savings shifted between projects.*
<table>
<thead>
<tr>
<th>MONTH</th>
<th>FY09-10 ACTUAL REVENUE</th>
<th>FY09-10 ESTIMATE REVENUE</th>
<th>FY10-11 ACTUAL REVENUE</th>
<th>FY10-11 DIFFERENCE</th>
<th>DIFFERENCE AS % OF PROJECTION</th>
<th>CUMULATIVE % OF ACTUAL TO PROJECTION</th>
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<tr>
<td>JULY</td>
<td>454,800</td>
<td>410,500</td>
<td>410,500</td>
<td>0</td>
<td>0.00%</td>
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<td>AUGUST</td>
<td>539,000</td>
<td>539,000</td>
<td>547,300</td>
<td>8,300</td>
<td>1.54%</td>
<td>100.87%</td>
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<td>SEPTEMBER</td>
<td>719,093</td>
<td>719,093</td>
<td>819,955</td>
<td>100,862</td>
<td>14.03%</td>
<td>106.54%</td>
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<td>OCTOBER</td>
<td>490,500</td>
<td>490,500</td>
<td>458,300</td>
<td>-32,200</td>
<td>-6.56%</td>
<td>103.56%</td>
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<tr>
<td>NOVEMBER</td>
<td>555,900</td>
<td>555,900</td>
<td>611,000</td>
<td>55,100</td>
<td>9.91%</td>
<td>104.86%</td>
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<td>DECEMBER</td>
<td>625,785</td>
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<tr>
<td>JANUARY</td>
<td>465,300</td>
<td>465,300</td>
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<tr>
<td>FEBRUARY</td>
<td>620,400</td>
<td>620,400</td>
<td></td>
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<tr>
<td>MARCH</td>
<td>607,400</td>
<td>607,401</td>
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<tr>
<td>APRIL</td>
<td>385,100</td>
<td>385,100</td>
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<tr>
<td>MAY</td>
<td>562,700</td>
<td>562,700</td>
<td></td>
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<tr>
<td>JUNE</td>
<td>605,859</td>
<td>605,859</td>
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<tr>
<td>TOTAL</td>
<td>6,631,837</td>
<td>6,587,538</td>
<td>2,847,055</td>
<td>132,062</td>
<td>2.00%</td>
<td>43%</td>
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</table>

Note:
S:\RTC\TC2010\TC1210\[FY10-11 TDA Revised.xls]FY10-11revised
TO: Regional Transportation Commission (RTC)
FROM: Luis Pavel Mendez, Deputy Director
RE: Fiscal Year (FY) 2010-11 Budget and Work Program Amendment

RECOMMENDATIONS

Staff recommends that the Regional Transportation Commission (RTC) adopt the attached resolution (Attachment 1) amending the FY 2010-11 budget as shown on Exhibit A to Attachment 1 to move funds within the rail/trail authority budget and add recently secured grant funds to the planning budget.

BACKGROUND

The RTC establishes a budget each fiscal year to ensure that its planning responsibilities, administration needs, priority projects and transportation services are adequately funded. The RTC amends its budget as necessary to ensure that all of the RTC’s work can be accomplished. Due to longer than anticipated negotiations surrounding the Santa Cruz Branch Rail Line and new revenues secured through a grant, it is necessary to amend the RTC’s FY 2010-11 budget.

DISCUSSION

Since 2001, the RTC has been negotiating with Union Pacific (UP) to purchase the Santa Cruz Branch Rail Line (Rail Line). The RTC has an approved budget to complete the purchase and amends it as necessary. Negotiations with Sierra Northern Railway for operation of the Rail Line were longer and more arduous than anticipated, which required more consultant work than previously estimated. In order to pay consultants for the negotiating work required and complete the final steps to ensure purchase of the Rail Line, it is necessary to move funds within the rail/trail authority budget. The RTC budgeted $300,791 for purchase of a hazardous materials and pollution insurance policy and the most recent premium quote for that policy is $197,000. Therefore, RTC staff proposes moving $50,000 from the hazardous materials budget line to the negotiation attorney line, which does not change the overall budget for the project.

The RTC continuously works to secure grant funds for transportation needs. The RTC recently secured a federal New Freedom grant in the amount of $165,000 for construction of pedestrian improvements to transit facilities. The funds will be used to work with local jurisdictions on delivering specific pedestrian projects that improve access and safety to transit facilities. The grant requires 20% in matching funds, a majority of which is expected to come from the local jurisdictions to obtain some of these grant funds for improvements within their boundaries. RTC staff proposes adding these new grant funds to the RTC’s planning budget. Once RTC and local jurisdiction staff determine the projects to be implemented and the amount of matching funds to be provided, RTC staff will return to the RTC with a future budget amendment recommendation in connection with these grant funds.
Staff recommends that the RTC adopt the attached resolution (Attachment 1) amending the FY 2010-11 RTC Budget as shown on Exhibit A to Attachment 1 to move funds within the rail/trail authority budget and add grant funds to the planning budget.

SUMMARY

The RTC maintains fiscal year budgets to carry out its planning, project and service responsibilities and amends it as necessary. It is necessary to amend the FY 2010-11 budget to move funds within the rail/trail authority budget and add recently secured grant funds to the planning budget. Staff recommends adopting the attached resolution (Attachment 1) amending the FY 2010-11 budget as shown on Exhibit A to Attachment 1.

Attachments:
1. Resolution amending the RTC FY 2010-11 budget
RESOLUTION NO.

Adopted by the Santa Cruz County Regional Transportation Commission
on the date of December 2, 2010
on the motion of Commissioner
duly seconded by Commissioner

A RESOLUTION AMENDING THE FY 2010-11 BUDGET AND WORK PROGRAM
FOR THE SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION

BE IT RESOLVED BY THE SANTA CRUZ COUNTY REGIONAL TRANSPORTATION
COMMISSION:

1. The FY 2010-11 Budget and Work Program for the Santa Cruz County Regional Transportation
Commission, are hereby amended as shown in Exhibit A.

AYES: COMMISSIONERS

NOES: COMMISSIONERS

ABSTAIN: COMMISSIONERS

ABSENT: COMMISSIONERS

______________________________
Randy Johnson, Chair

ATTEST:

______________________________
George Dondero, Secretary

Attachments: Exhibit A - SCCRTC FY 10-11 Budget as amended
Distribution: RTC Fiscal
AMBAG
## PROJECTED REVENUE SUMMARY

<table>
<thead>
<tr>
<th>SOURCES</th>
<th>FY 2010-11</th>
<th>FY 2010-11</th>
<th>DIFFERENCE</th>
<th>NOTE</th>
</tr>
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<tr>
<td>Auditor’s 1/4 Cent Sales Tax Estimate</td>
<td>6,587,537</td>
<td>6,587,537</td>
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<td>Reserves budgeted</td>
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<td>71,750</td>
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<td>RTC apportionment funds returned</td>
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<td>Interest Estimate</td>
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<td>Total TDA Apportioned</td>
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<td>State Transit Assistance (STA)</td>
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<td>Rural Planning Assistance (RPA)</td>
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<td>STIP for Planning (PPM)</td>
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<td>RSTP Exchange - Eco Act and Comm Traff Saft Coal</td>
<td>175,947</td>
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<td>FHWA - Earmark</td>
<td>380,000</td>
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<td>FHWA - Planning (PL) - from AMBAG</td>
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<td>Coastal Conservancy</td>
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<td>AB2766/Air District Funds:</td>
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<td>Env. Justice Context-Sensitive Planning Grant</td>
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<td>New Freedom Grant</td>
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<td>New grant for pedestrian improvements to transit facilities</td>
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<td>RTC Funds Budgeted</td>
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<td>Planning/Other Total</td>
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<td>2,159,468</td>
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<td>RSTP and RSTP Exchange</td>
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<td>CMAQ - Rideshare</td>
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<td>AB2766</td>
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<td>DMV Fees and interest</td>
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<td>Other - MTC SAFE and Partnership Planning Grant</td>
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<td>Caltrans Grant</td>
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<td>American Recovery and Reinvestment Act (ARRA)</td>
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<td>Proposition 116 and STIP</td>
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## SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION

### APPORTIONMENT SUMMARY

**FY 2010-2011 BUDGET**

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<td>62,234,934</td>
<td>62,399,934</td>
<td>165,000</td>
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(1) TDA apportionments are based on the formulas in the RTC's Rules and Regulations. Balance not used for Planning and Administration is allocated to other TDA claimants as follows: 85.5% is appropriated to SCMTD, 8.4% to Community Bridges and 1% to the Volunteer Center; the remaining funds are proportionally allocated to cities and the County according to population.

-2-
### OPERATING BUDGET SUMMARY

**FY 2010-2011 BUDGET**

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>FY09-10 ADOPTED DETAIL</th>
<th>FY10-11 ADOPTED DETAIL</th>
<th>FY10-11 PROPOSED DETAIL</th>
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<td>11/04/10</td>
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<td>201,000</td>
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<td>461,221</td>
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<td>(23,787,649)</td>
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### OPERATING BUDGET COMPARISON

**PRIOR YEAR AND BUDGET YEAR**

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<td>(35,544)</td>
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<tr>
<td>Rideshare</td>
<td>294,100</td>
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**Notes:**
- Includes staffing shown on page 15

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**SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION**

**OPERATING BUDGET SUMMARY**

**FY 2010-2011 BUDGET**

**TOTAL OPERATING BUDGET**

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<td>(23,787,649)</td>
<td>(43,898,734)</td>
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**Notes:**
- Includes staffing shown on page 15
## SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION
### OPERATING BUDGET BY PROGRAM - RAIL/TRAIL AUTHORITY
#### FY 2010-2011 BUDGET

### RAIL/TRAIL AUTHORITY: 722100

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<td><strong>20,693,724</strong></td>
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**Note:**

- STIP: 10,000,000
- Proposition 116: 10,214,918
- Federal Earmark: 29,805
- Transfer from TC Funds: 102,129
- Rail/Trail Authority Reserve Funds Budgeted: 316,872

Note:

- STIP: 10,000,000
- Proposition 116: 10,214,918
- Federal Earmark: 29,805
- Transfer from TC Funds: 102,129
- Rail/Trail Authority Reserve Funds Budgeted: 316,872

**Subtotal Services & Supplies:**

- 20,593,724

**TOTAL EXPENDITURES:**

- 20,693,724
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<th>FY10-11 PROPOSED 12/02/10</th>
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<td>165,000</td>
<td>165,000</td>
<td>- New grant for pedestrian improvements to transit facilities</td>
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<td>17 AB2766/Air District Funds:</td>
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Note:
# PLANNING EXPENDITURES

## WORK ELEMENT NUMBER

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Note: - New grant for pedestrian improvements to transit facilities.
## SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION
### OPERATING BUDGET BY PROGRAM - PLANNING FUND SOURCE DETAIL
#### FY 2010-2011 BUDGET

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<th>RTC</th>
<th>RPA</th>
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<th>STIP</th>
<th>FHWA Earmark</th>
<th>Env Just Plng Grant</th>
<th>New Freedom Grant</th>
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<td>-</td>
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<td>-</td>
<td>-</td>
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| **Services & Supplies** |
| Biking & Pedestrian Safety Programs | 614 | 34,427 | 34,427 | - |              |        |      |              |                   |                  |                  |       |
| 26 South County Bike/Ped Safety (Comm Traffic Safety Coalition) | 614 | 69,852 | - | - | 69,852         |        |      |              |                   |                  |                  |       |
| 27 Go Green Campaign (Ecology Action) | 66,095 | 66,095 | - | - |              |        |      |              |                   |                  |                  |       |
| 28 Emergency Ride Home (Ecology Action) | 3,738 | 3,738 | - | - |              |        |      |              |                   |                  |                  |       |
| 29 Safe Paths to Transit         | 165,000 | - | - | 165,000 | | | | | | | | |

| **Professional Services** |
| 32 Sacramento Assistant | 112 | 36,000 | 36,000 | - |              |        |      |              |                   |                  |                  |       |
| 33 Washington Assistant       | 112 | 44,600 | 44,600 | - |              |        |      |              |                   |                  |                  |       |
| 34 Transportation Funding Development Consultants | 622 | 2,356 | 2,356 | - |              |        |      |              |                   |                  |                  |       |
| 35 Engineering and Other Technical Consultants | 641 | 40,000 | 25,000 | 15,000 | | | | | | | | |

| **RTC Work Element Related Items** |
| 41 Bike Secure Program          | 614 | 30,660 | 1,660 | - | 29,000         |        |      |              |                   |                  |                  |       |
| 42 Traffic Monitoring services  | 231 | 25,000 | - | 1,500 | 23,500         |        |      |              |                   |                  |                  |       |
| 43 Printing RTP, RTIP, other Documents and Pub Info Materials | 622 | 25,000 | 15,000 | - | 10,000         |        |      |              |                   |                  |                  |       |
| 44 MBSST Network Plan Outreach  | 614 | 30,000 | - | - | 30,000         |        |      |              |                   |                  |                  |       |
| 45 Transfer to TDA Reserve      | 682 | 122,129 | 52,949 | 69,180 | 5,340 | | | | | | | |
| 46 Transfer to Rail/Trail Authority | 305,000 | 250,000 | 53,000 | - | | | | | | | |
| **Subtotal Services & Supplies** | 1,382,671 | 368,056 | 62,090 | - | 32,738 | 38,840 | 330,000 | - | 165,000 | 250,000 | 135,947 |

| **TOTAL EXPENDITURES** |
| 49 TOTAL EXPENDITURES | 2,349,478 | 374,971 | 62,090 | 315,000 | 228,231 | 32,738 | 331,501 | 380,000 | 34,000 | 165,000 | 250,000 | 175,947 |
## Fund Balances and Reserves: FY 2010-2011 BUDGET

### Fund Balances & Reserves: 12/02/10

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<tr>
<th>DESCRIPTION</th>
<th>TDA Fund (1)</th>
<th>RTC Fund (2)</th>
<th>RIDESHARE</th>
<th>RAIL/RAIL AUTHORITY FUND</th>
<th>HIGHWAY ONE PA/ED FUND</th>
<th>HWY 1 CONSTR FUND</th>
<th>SAFE OPERATING FUND</th>
<th>FSP FUND</th>
<th>RSTP EXCHANGE FUND</th>
<th>STA (3) FUND</th>
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<td>93,682</td>
<td>7,760,956</td>
<td>2,802,101</td>
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<td>Reserves budgeted</td>
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<td>(1,280,443)</td>
<td>(2,150,000)</td>
<td>(48,800)</td>
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<td>(7,760,957)</td>
<td>(2,801,550)</td>
<td>(16,025,954)</td>
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<td>From RTC Funds</td>
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<td>Target for Reserves - 8%</td>
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<td>Surplus &lt;Deficit&gt; from Target</td>
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<td>(18,559)</td>
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<td>Unappropriated Revenues</td>
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<td>Total Fund Balance</td>
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<td>(18,559)</td>
<td>11,571</td>
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<td>200,891</td>
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### Notes:
- Numbers in parentheses are negative numbers. All other numbers are positive numbers.
- Funds within each category (column) are restricted for use on projects/programs within that category.
- **Fund Balance (7-01-10)** = Balances of funds not used at the end of prior fiscal year.
- **Budgeted Carryover/New** = Portion of Fund Balance used in current fiscal year budget.
- **Target for Reserves** = Minimum Fund Balance recommended to cover potential revenue shortfalls. For TDA and RTC Funds see notes 1 & 2 below
- **Unappropriated Revenues** = Amount of revenues designated for specific projects/programs that likely will not be expended in FY10/11, but will be needed in future years.

1. 8% reserve established in RTC Rules and Regulations not met due to continuing use of reserve funds; 3% minimum maintained thanks to funds returned by RTC
2. 8% reserve target consistent with TDA reserve fund; 7.8% available
3. This is a pass-through fund, all receipts are paid to Santa Cruz Metro.
4. Includes combination of budgeted carryover and budgeted new for RTC Fund
# Santa Cruz County Regional Transportation Commission

## THREE MONTH MEETING SCHEDULE

**DECEMBER 2010 through FEBRUARY 2011**

(Revised 11/8/10)

All meetings are subject to cancellation when there are no action items to be considered by the board or committee.

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Meeting Day</th>
<th>Meeting Type</th>
<th>Meeting Time</th>
<th>Meeting Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/02/10</td>
<td>Thursday</td>
<td>Regional Transportation Commission</td>
<td>9:00 am</td>
<td>Board of Supervisors Chambers</td>
</tr>
<tr>
<td>12/09/10</td>
<td>Thursday</td>
<td>Budget and Administration/Personnel Committee</td>
<td>3:30 pm</td>
<td>Commission Offices</td>
</tr>
<tr>
<td>12/13/10</td>
<td>Monday</td>
<td>Bicycle Committee - Note Special Time</td>
<td>6:30 pm</td>
<td>Commission Offices</td>
</tr>
<tr>
<td>12/14/10</td>
<td>Tuesday</td>
<td>Elderly &amp; Disabled Transportation Advisory Committee - Note Special Time</td>
<td>2:30 pm</td>
<td>Commission Offices</td>
</tr>
<tr>
<td>12/16/10</td>
<td>Thursday</td>
<td>Interagency Technical Advisory Committee - Cancelled</td>
<td>1:00 pm</td>
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<tr>
<td>01/10/11</td>
<td>Monday</td>
<td>Bicycle Committee - Cancelled</td>
<td>6:30 pm</td>
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<tr>
<td>01/13/11</td>
<td>Thursday</td>
<td>Regional Transportation Commission - Note Special Date</td>
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<td>Santa Cruz City Council Chambers</td>
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<tr>
<td>02/03/11</td>
<td>Thursday</td>
<td>Regional Transportation Commission</td>
<td>9:00 am</td>
<td>Watsonville City Council Chambers</td>
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<tr>
<td>02/08/11</td>
<td>Tuesday</td>
<td>Elderly &amp; Disabled Transportation Advisory Committee</td>
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<tr>
<td>02/10/11</td>
<td>Thursday</td>
<td>Budget and Administration/Personnel Committee</td>
<td>3:30 pm</td>
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<td>02/14/11</td>
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<td>Bicycle Committee - Note Special Time</td>
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<td>02/17/11</td>
<td>Thursday</td>
<td>Transportation Policy Workshop</td>
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<tr>
<td>02/17/11</td>
<td>Thursday</td>
<td>Interagency Technical Advisory Committee - Note Special Time</td>
<td>1:00 pm</td>
<td>Commission Offices</td>
</tr>
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Commission Offices - 1523 Pacific Ave - Santa Cruz CA 95060
Board of Supervisors Chambers/ CAO Conference Room/ RDA Conf Room - 701 Ocean St - Santa Cruz CA 95060
City of Santa Cruz - 809 Center St - Santa Cruz CA 95060
City of Watsonville - 275 Main St - Watsonville CA 95076
S:\RTC\TC2010\TC1210\[3month meeting schedule.xlsx]\Sheet1
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<td>08/31/10</td>
<td>Email</td>
<td>O</td>
<td>KP</td>
<td>Robert</td>
<td>White</td>
<td>Karena</td>
<td>Pushnik</td>
<td>SCCRTC</td>
<td>E&amp;D TAC Inquiry re: Dinner Train</td>
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<td>10/21/10</td>
<td>Letter</td>
<td>I</td>
<td>George</td>
<td>Dondero</td>
<td>SCCRTC</td>
<td>Richard</td>
<td>Krumholz</td>
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<td>10/25/10</td>
<td>Fax</td>
<td>I</td>
<td>SCCRTC</td>
<td>Patti</td>
<td>Eller Robb</td>
<td>Walt Eller Company</td>
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<td>Request for Train Schedule</td>
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<td>10/26/10</td>
<td>Letter</td>
<td>O</td>
<td>Donn</td>
<td>Miyahara</td>
<td>Department of Transportation</td>
<td>Daniel</td>
<td>Nikuna</td>
<td>SCCRTC</td>
<td>Progress Billing Invoice #1 for PS&amp;E Phase of the State Route (Highway) 1 Auxiliary Lanes Project</td>
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<td>11/01/11</td>
<td>Letter</td>
<td>O</td>
<td>Bimla G</td>
<td>Rhinehart</td>
<td>California Transportation Commission</td>
<td>George</td>
<td>Dondero</td>
<td>SCCRTC</td>
<td>Santa Cruz Branch Rail Line Acquisition Project CTC Condition 2</td>
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<td>11/05/10</td>
<td>Letter</td>
<td>I</td>
<td>Leslie R</td>
<td>White</td>
<td>SCMTD</td>
<td>George</td>
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<td>Amendment to the FY10-11 Budget and Work Program</td>
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<tr>
<td>11/17/10</td>
<td>Letter</td>
<td>O</td>
<td>David</td>
<td>Fairchild</td>
<td>Monterey Bay Unified Air Pollution Control District</td>
<td>Luis</td>
<td>Mendez</td>
<td>SCCRTC</td>
<td>Payment Request for the Retention on Grant NO: 08-26 - Santa Cruz County Study of Vehicular GHG Emissions</td>
<td></td>
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</table>
October 28, 2010

Richard Krumholz, District Director
Caltrans District 5
50 Higuera Street
San Luis Obispo, CA 93401-5415

RE: Pacific Coast Bicycle Route Re-Alignment in the City of Santa Cruz

Dear Mr. Krumholz:

I am writing on behalf of the Santa Cruz County Regional Transportation Commission's (RTC) Bicycle Committee to offer our unanimous support for the re-designation of the Pacific Coast Bicycle Route (PCBR) through the City of Santa Cruz. While the current PCBR through Mission Street provides access to many commercial establishments, the two bicycle fatalities in 2007 and 2008 coupled with the lack of bicycle lanes make re-routing cyclists off Mission Street critical. In addition, the proposed alignment along the coast via scenic West Cliff Drive will facilitate enjoyment of one of Santa Cruz County’s most cherished treasures. A few blocks from the terminus of West Cliff Drive is downtown Santa Cruz where many amenities are available to bicyclists of all persuasions.

The Committee acknowledges with appreciation Caltrans' continued efforts to improve bicycle facilities and enhance the safety of bicyclists. If you have any questions, please feel free to contact the RTC Bicycle Coordinator and staff to the Bicycle Committee, Cory Caletti, at (831) 460-3201 or by email at ccaletti@sccrtc.org.

Sincerely,

Daniel Kostelec
Chair, SCCRTC Bicycle Committee

cc: Cheryl Schmitt, City of Santa Cruz Public Works Transportation Coordinator
    Adam Fukushima, Caltrans District 5 Transportation Planner
    Santa Cruz County Regional Transportation Commission
    Santa Cruz County Regional Transportation Commission Bicycle Committee
November 19, 2010

Luen Miller
Clark Magruder
Monterey Bay Nursery
P.O. Box 1296
Watsonville, CA  95077

RE: Highway 1/17 Interchange Merge Lanes Landscaping Project

Dear Mr. Miller and Mr. Magruder:

On behalf of the Santa Cruz County Regional Transportation Commission, I would like to express my appreciation to you and the staff at the Monterey Bay Nursery. We understand that you were instrumental in ensuring that the Highway 1/17 Interchange Merge Lanes project included native coast plant species.

Your efforts to start and grow Coast Redwoods for the project not only confirms that plant replacement for this project includes species that thrive in this region, but also that these trees constitute an improvement over the non-native, intrusive vegetation that were removed as part of the project.

Enclosed is an article that appeared in the online Santa Cruz Sentinel which acknowledges your work. In addition, KSCO radio’s garden show host is also interested in doing a show on this topic.

Thank you for your valuable work to make our community a better and more beautiful place.

Sincerely,

George Dondero
Executive Director

cc: Caltrans, District 5

S:\CORRESP-Outgoing\2010\1110\10-1119_MontBayNursery.doc
Highway 1/17 merge lanes project is complete

Posted by Ramona Turner on November 9th, 2010

The long-awaited end to the Highway 1/17 Interchange Merge Lanes project is here. Landscaping has been installed, marking the final stage of the project, which began in 2006. The landscaping consists of nearly 4,000 trees, shrubs and vines, along with the trenching of about four miles of pipe.

The vegetation was replaced at a rough one-to-three ratio for every plant removed. This will provide a freeway corridor with dense plant life. While many of the plants removed were invasive and non-native species, many of those that were planted are native to the area.

Local nurserymen, Luen Miller and Clark Magruder, provided 450 coast Redwoods to the project from their Monterey Bay Nursery.

The new plants installed as part of the project were chosen based on their low water use, pest resistance, fast growth, and evergreen qualities, as well as their proven success in other Santa Cruz County locations.

Vines were planted approximately 8 feet apart to provide quick sound wall coverage, increasing the landscaped areas and reducing areas for litter and graffiti to collect.

For the next three years, the plants will be cared for by the contractor.

Planning for the Highway 1/17 Interchange Merge Lanes project began in the 1980s. It included lengthening and constructing merge lanes in both direction between the Highway 1 and the Morrissey/La Fonda area, as well as on Highway 17 at Pasatiempo Drive. The project also included sound walls and new medians. Five bridges were rebuilt, two in sensitive creek areas. Construction of the merge lanes began in 2006 and wrapped up ahead of schedule in November 2008.

The project was a collaboration effort between the Santa Cruz County Regional Transportation Commission, Caltrans, the City of Santa Cruz Redevelopment Agency, Pavex and CC Myers, and Watkin & Bortolussi.
November 22, 2010

Mr. Timothy Trainor
Chief, Geography Division
U.S. Census Bureau
Washington, DC 20233-7400

Re: Comments on Federal Register Notice 8/24/10, Vol 75, No. 163
Proposed Urban Area Criteria for the 2010 Census

Dear Chief Trainor:

The Santa Cruz County Regional Transportation Commission (SCCRTC) appreciates the opportunity to provide comments on the Federal Register Notice regarding Proposed Urban Area Criteria for the 2010 Census. Based on our review of the proposed criteria, we hereby request that the Department of Commerce’s Geography Division eliminate the proposed Salinas-Santa Cruz-Watsonville urban agglomeration and maintain the population threshold for splitting agglomerations at 250,000.

The SCCRTC recognizes that the Census Bureau delineates urban areas after each decennial census in order to improve the classification of urban and rural territory; however, the proposed creation of the Salinas-Santa Cruz-Watsonville urban agglomeration does not make sense for several reasons.

1) Growth policies and regulations governing this geographic area prohibit the agglomeration from happening as projected by the Census Bureau. Local and State regulations, growth measures, policies and patterns, including the California Coastal Act, general plans, ballot initiatives, and local codes prevent the suggested consolidated urban area from becoming functionally whole;

2) The proposed Santa Cruz-Watsonville-Salinas agglomeration cannot be achieved with the proposed methodology and therefore urban area definitions in this region should not be modified. Existing geographic constraints prevent the suggested consolidated urban area from becoming functionally whole; jump sizes over 2.5 miles remain, and Census tracts and Census 2000 maps demonstrate significant breaks in urban areas;

3) Furthermore, the Census Bureau and Geography Division are obligated to adhere to measures detailed in Title VI of the Civil Rights Act of 1964, the Americans with Disabilities Act (1990), and other federal regulations to assess the impact of its decisions and actions related to equal access under law and environmental justice.

Classification of Santa Cruz-Watsonville-Salinas as one urban area (UA) is inappropriate given local and state governance and regulations and physical features that prohibit urbanization of area between Watsonville and Salinas. As demonstrated by the Monterey Bay Area 2008 Regional Forecast Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035, which...
takes into consideration state and local regulations and patterns, the Salinas, Santa Cruz, and Watsonville urban areas will not merge into one larger urban area in the foreseeable future.

The Geography Division’s methodology, when applied to Santa Cruz County and the proposed agglomeration, also does not work given the unique geography of this part of Central California, which covers legally protected coastal zones, wetlands, urban cities and woody, rural towns. We understand that the Geography Division has identified “bodies of water and wetlands,” as exempted areas—but their distance does not justify any sort of jump scenario between Watsonville and Salinas. This area is in the coastal zone and separated by Elkhorn Slough. The protected status of the ecosystems in Elkhorn Slough and the surrounding watershed prohibit growth in the area. In recognition of the California Coastal Act and physical constraints, the proposed agglomeration should be eliminated.

Finally, we believe that the Division, Bureau and Department have a greater obligation to the populations they may affect with this exercise and should extend the comment period in order to allow further examination, outreach and input. The creation of this urban agglomeration could lead to loss of substantial transit funding in the Monterey Bay region and should be evaluated in relation to Title VI of the Civil Rights Act of 1964, the Americans with Disabilities Act (1990), and regulations regarding environmental justice. A number of federal agencies use the Census Bureau’s urban-rural classification for allocating program funds, setting program standards, and implementing aspects of their programs. Changes to the urban area criteria affect funding eligibility under these programs. This includes Federal Transit Administration (FTA) Section 5307 and Section 5340 apportionments used to pay for operating assistance. If the proposed consolidation happens, transit agencies in this region would no longer be eligible to use these funds for transit operations, severely reducing transit service which is most heavily used by lower income, elderly, disabled, and youth populations. Furthermore, in a time in which the U.S. is working to reduce Greenhouse Gases, the reduction of any transit operating funds is counter productive to any census benefit derived.

Since the proposed methodology demonstrably does not work in our area and given the Census Bureau’s own preference for separating UAs along metropolitan statistical boundaries, the SCCRTC request that current urban and rural designations remain in place.

We sincerely appreciate your consideration of these comments.

Sincerely,

George Dondero
Executive Director

cc: Representative Anna Eshoo
    Representative Sam Farr
    Senator Diane Feinstein
    Senator Barbara Boxer
CONSTRUCTION PROJECTS REPORT

UPDATED INFORMATION

PRESENTED TO:
SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION

Information submitted on November 18, 2010
For the meeting of December 2, 2010

HWY. 1 – MONTEREY COUNTY - SALINAS ROAD INTERCHANGE

NORTH OF MOSS LANDING AT SALINAS ROAD (PM 99.9 – 101.5)

- Project: Construct new interchange
- Resident Engineer: Jennifer Wilson
- Contractor: Desilva Gates Construction LP, Dublin
- Construction Cost: $12 Million
- Start Date: April 15, 2010
- Estimated Completion: Winter 2012
- EA: 315924

HWY. 1 – TRANSPORTATION MANAGEMENT SYSTEM – FREEDOM BOULEVARD SOUTH

- NEAR WATSONVILLE AT VARIOUS LOCATIONS FROM SOUTH OF THE 1/129 SEPARATION TO LARKIN VALLEY ROAD UNDERCROSSING (PM 0.5 – R7.7)

- Project: Construct Transportation Management System
- Resident Engineer: Bertha Roman
- Construction Cost: $304,000
- Start Date: September 13, 2010
- Estimated Completion: Mid-December 2010
- EA: 0N2504
HWY. 1/17 – MERGE LANES LANDSCAPE

IN SANTA CRUZ ON ROUTE 1 FROM LA FONDA AVENUE OVERCROSSING TO ROUTE 1/17 SEPARATION AND ON ROUTE 17 FROM ROUTE 1/17 SEPARATION TO PASATIEMPO (PM 1, 17 15.4 – 17.1, 0.1 – 0.7)

- Project: Highway planting and irrigation
- Resident Engineer: Bertha Roman
- Contractor: Watkin & Bortolussi Inc., San Rafael
- Construction Cost: $695,000
- Start Date: April 19, 2010
- Project Completed: October 26, 2010, with 3 year plant establishment
- EA: 129114

HWY. 9 – RETAINING WALL

- NEAR SANTA CRUZ SOUTH OF RINCON CREEK BRIDGE (PM 1.8)
- Project: Construct Retaining Wall
- Resident Engineer: Bertha Roman
- Contractor: Gordon N. Ball Inc., Alamo
- Construction Cost: $500,000
- Start Date: May 24, 2010
- Estimated Completion: December 2010
- EA: 0P6504

HWY. 9 – MICRO-SURFACING

- AT FELTON AND BEN LOMOND FROM RUSSELL AVENUE TO NORTH OF GLEN ARBOR ROAD (PM 6.1 – 8.2)
- Project: Thin overlay to existing roadway
- Traffic Controls: One-way traffic control Sundays through Thursdays 9 pm to 6 am and Fridays 12 midnight to 6 am
- Resident Engineer: Patrick Dussell
- Contractor: Valley Slurry Seal Co., West Sacramento
- Construction Cost: $400,000
- Start Date: October 10, 2010
- Estimated Completion: End of November 2010, weather permitting
- EA: 0S1604
HWY. 17 – GUARDRAIL UPGRADES

NEAR SCOTTS VALLEY AT VARIOUS LOCATIONS FROM SANTA’S VILLAGE ROAD TO THE SANTA CLARA COUNTY LINE (PM 6.0 – 12.6)

- Project: Upgrade guardrail, crash cushions, end treatments and retaining walls for guardrail
- Traffic Controls: Alternating lane closures northbound Sundays through Thursdays from 7 pm to 5 am and Fridays 9 pm to 5 am and southbound Sundays through Thursdays from 8 pm to 2 pm and Fridays 8 pm to 12 pm.
- Resident Engineer: Patrick Dussell
- Contractor: K L M Construction Inc., Puyallup, WA
- Construction Cost: $5.5 Million
- Start Date: January 13, 2010
- Estimated Completion: Spring 2011
- EA: 0L70U4

HWY. 17 – VINEHILL WET WEATHER IMPROVEMENTS

- NEAR SCOTTS VALLEY FROM SOUTH OF WEST VINEHILL ROAD TO SOUTH OF VINEHILL ROAD (PM 7.0 – 7.3)
- Project: Construct soldier pile wall
- Traffic Controls: One lane closed in each direction Mondays through Fridays from 8 pm to 5 am. One lane will remain open in each direction at all times. Traffic delays should be less than 15 minutes.
- Resident Engineer: Patrick Dussell
- Contractor: H S R Inc., Santa Clara
- Construction Cost: $1.5 Million
- Start Date: June 20, 2009
- Estimated Completion: Spring 2011
- EA: 0P8104
UPCOMING PROJECTS

HWY. 17 – SANTA’S VILLAGE ROAD GUARDRAIL

- NEAR SCOTTS VALLEY FROM JUST NORTH OF SANTA’S VILLAGE ROAD TO CRESCENT DRIVE (PM 6.1 – 6.6)

- Project: Construct concrete guardrail
- Resident Engineer: Patrick Dussell
- Contractor: M C M Construction Co., North Highlands
- Construction Cost: $2.9 Million
- Estimated Start Date: Pending award and approval
- EA: 0G4004
RECOMMENDATION

Staff recommends that the Regional Transportation Commission (RTC):

1. Accept the STARS Pilot Project Application Manual with the 12 credits selected by the RTC-approved Technical Advisory Committee;
2. Direct staff to provide the Pilot Project Application Manual with the 12 STARS credits to the Highway 1 HOV Lanes Project Development Team for analysis of applying the credits to the project; and
3. Direct staff to return to the RTC with an analysis of implications of applying the 12 STARS credits to the Highway 1 HOV Lanes project for RTC consideration.

BACKGROUND

At the October 15, 2009 Transportation Policy Workshop (TPW) meeting, the RTC received a presentation regarding the Sustainable Transportation Access Rating System (STARS) being developed by over a dozen professionals in the public and private sectors in the Pacific Northwest under the non-profit North American Sustainable Transportation Council (STC). The approach is similar to that of the Leadership in Energy and Environmental Design (LEED) green building rating system, developed by the U.S. Green Building Council. A hallmark of LEED is that it is an open, voluntary and transparent process. STARS is being developed to fill a notable gap in the transportation field. Now that states are mandating that local and regional agencies set goals to reduce greenhouse gas emissions, the need for evaluation, design and planning tools to reach those goals is clear and immediate. Approximately 2/3 of all fossil fuel consumed is by our built environment (heating, lighting, etc) and transportation. If sustainable strategies in both arenas can be implemented, great progress can be made to reduce emissions that contribute to climate change.

Once it is fully developed, STARS will have applications at three different levels: transportation plans, employer programs, and transportation projects. The current work is focused on the application to projects. The primary goals are to improve access for all people, maximize cost effectiveness, and cut transportation climate pollution and energy use. Traditional approaches to designing transportation projects have emphasized vehicle mobility, whereas STARS focuses on improved access for people. Access is mode-neutral and assumes there are multiple ways to meet underlying human needs.
In 2009 the STARS development team was looking for a project which had not completed the environmental process. The team expressed interest in the Highway 1 HOV Lanes Project as a candidate test-bed project. STARS would be used to analyze and inform the many elements of the Highway 1 HOV Lanes Project to provide options for increased access and sustainability.

At the December 2009 TPW meeting, the RTC authorized a contract with the North American Sustainable Transportation Council to work with RTC staff, project consultants and a working, community based, technical advisory committee (TAC) to develop credits and their potential application to the project. At the January 19, 2010 meeting the RTC approved a recommendation to create the STARS TAC. Membership was purposely selected to include a broad base of community interests and professional disciplines. See Attachment 1. In February 2010, the RTC approved the STARS TAC and RTC staff recommendation to develop 12 credits for potential application to the Highway 1 HOV Lanes project.

DISCUSSION

Work of the STARS TAC

The first charge of the STARS TAC was to recommend 12 of a potential 29 credits for development and application to the HOV Lanes project. The STC recommended several “foundation” credits for inclusion in the list, as these will be required credits under a fully operational STARS framework, and many of the remaining credits will be dependent upon or intimately tied to work accomplished in meeting the foundation credits. At the February 18, 2010 TPW meeting, the RTC approved the 12 credits recommended by the STARS TAC.

The STARS TAC worked diligently over the past eleven months. RTC staff and Peter Hurley of the STC facilitated five four-hour workshop meetings in February, June, July, September and October of 2010. As the draft document for each credit was delivered by the STC development teams, our STARS TAC spent many hours reviewing, analyzing and critiquing each credit. Much valuable feedback was provided to the STC team in Portland which was integrated into the final credits. After several drafts, each credit was then sent to a peer review panel of experts composed of transportation professionals from the private sector, local governments and academia.

Throughout all their evaluation, the local STARS TAC contemplated the application of the credits to the Highway 1 HOV project.

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RECOMMENDATION

Staff recommends that the Regional Transportation Commission (RTC):

1. Accept the STARS Pilot Project Application Manual with the 12 credits selected by the RTC-approved Technical Advisory Committee;
2. Direct staff to provide the Pilot Project Application Manual with the 12 STARS credits to the Highway 1 HOV Lanes Project Development Team for analysis of applying the credits to the project; and
3. Direct staff to return to the RTC with an analysis of implications of applying the 12 STARS credits to the Highway 1 HOV Lanes project for RTC consideration.

BACKGROUND

At the October 15, 2009 Transportation Policy Workshop (TPW) meeting, the RTC received a presentation regarding the Sustainable Transportation Access Rating System (STARS) being developed by over a dozen professionals in the public and private sectors in the Pacific Northwest under the non-profit North American Sustainable Transportation Council (STC). The approach is similar to that of the Leadership in Energy and Environmental Design (LEED) green building rating system, developed by the U.S. Green Building Council. A hallmark of LEED is that it is an open, voluntary and transparent process. STARS is being developed to fill a notable gap in the transportation field. Now that states are mandating that local and regional agencies set goals to reduce greenhouse gas emissions, the need for evaluation, design and planning tools to reach those goals is clear and immediate. Approximately 2/3 of all fossil fuel consumed is by our built environment (heating, lighting, etc) and transportation. If sustainable strategies in both arenas can be implemented, great progress can be made to reduce emissions that contribute to climate change.

Once it is fully developed, STARS will have applications at three different levels: transportation plans, employer programs, and transportation projects. The current work is focused on the application to projects. The primary goals are to improve access for all people, maximize cost effectiveness, and cut transportation climate pollution and energy use. Traditional approaches to designing transportation projects have emphasized vehicle mobility, whereas STARS focuses on improved access for people. Access is mode-neutral and assumes there are multiple ways to meet underlying human needs.
In 2009 the STARS development team was looking for a project which had not completed the environmental process. The team expressed interest in the Highway 1 HOV Lanes Project as a candidate test-bed project. STARS would be used to analyze and inform the many elements of the Highway 1 HOV Lanes Project to provide options for increased access and sustainability.

At the December 2009 TPW meeting, the RTC authorized a contract with the North American Sustainable Transportation Council to work with RTC staff, project consultants and a working, community based, technical advisory committee (TAC) to develop credits and their potential application to the project. At the January 19, 2010 meeting the RTC approved a recommendation to create the STARS TAC. Membership was purposely selected to include a broad base of community interests and professional disciplines. See Attachment 1. In February 2010, the RTC approved the STARS TAC and RTC staff recommendation to develop 12 credits for potential application to the Highway 1 HOV Lanes project.

DISCUSSION

Work of the STARS TAC

The first charge of the STARS TAC was to recommend 12 of a potential 29 credits for development and application to the HOV Lanes project. The STC recommended several “foundation” credits for inclusion in the list, as these will be required credits under a fully operational STARS framework, and many of the remaining credits will be dependent upon or intimately tied to work accomplished in meeting the foundation credits. At the February 18, 2010 TPW meeting, the RTC approved the 12 credits recommended by the STARS TAC.

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STARS is a project of the North American Sustainable Transportation Council (STC), a registered non-profit organization. If you have questions about STARS, please contact the North American Sustainable Transportation Council. Please direct questions to Peter Hurley at 503.823.5007 or peter.t.hurley@portlandoregon.gov.

Acknowledgements

We'd like to thank the Santa Cruz County Regional Transportation Commission, the SCCRTC staff and their Technical Advisory Committee members, who have provided time, funding, and inspiration for the development of the credits in this Project Application Manual.

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Kelly Rodgers, Confluence Planning, LLC
Susie Serres, Serres Sustainability Consulting, LLC
Caleb Winter, Metro
# STARS Project Application Manual

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INTRODUCTION

Overview

This STARS Pilot Project Application Manual is the result of an intensive collaboration among public agencies (the Santa Cruz County Regional Transportation Commission and the Portland (Oregon) Bureau of Transportation), private sector firms (CH2M HILL, Parsons Brinkerhoff, ECONorthwest, Brightworks and Confluence Planning), and the non-profit organization sponsoring STARS, the North American Sustainable Transportation Council (STC).

This Manual, and the STARS system, are designed to help transportation professionals, elected officials, and citizens improve a transportation project’s short-term and long-term performance.

Used effectively, the STARS Pilot Project credits in this Manual can help to:

- Develop consensus among professionals, decision-makers, businesses, and professionals around project goals, objectives, and strategies/alternatives;
- Show which project strategies help meet goals and objectives for providing people and businesses more and better travel and location options;
- Show which project strategies help meet goals and objectives for reducing energy use and greenhouse gas emissions;
- Show which project strategies may be particularly cost effective;
- Evaluate the performance of project strategies short-term (five years) and long-term (2050).

The twelve credits in this Manual are the “core” credits of STARS-Project. They are the first part of a larger STARS planning, evaluation, and rating system designed to improve performance of transportation plans, projects, and employer programs, collectively or individually, in a single, integrated system. See Figure 1 below.

![Figure 1: The three components of STARS: plans, projects, and employer programs](image)

The credits are ready for testing in a series of pilot projects in late 2010 and 2011. Further STARS-Project credit development is planned to occur simultaneously with testing the core credits in this Manual.
What is STARS?

STARS is an integrated planning framework for transportation plans, projects, and employer programs. Based on sustainability principles\(^1\), STARS evaluates the full life cycle of transportation projects. Since the operations of a transportation project (e.g., the vehicles moving along it) often have more lasting consequences on a community than the construction phase, the decision of what to build in the first place is just as important (if not more) than how it is constructed. This “upstream” approach to transportation projects distinguishes STARS from other rating systems that are centered on the design and construction phases.

Additionally, STARS is performance-based, encouraging users to set and achieve clearly-stated goals and objectives. Rather than comply with a list of standards, STARS asks users to evaluate strategies to help them achieve their goals – goals that have been set through an integrated process. Furthermore, STARS promotes improved “access” rather than improved transportation mobility. That is, STARS encourages a mix of transportation and land use strategies to meet the needs of residents and businesses for access to goods, services, and information. This shift in focus enables users to conceive of solutions to transportation problems that might otherwise be overlooked with a traditional transportation approach.

State DOTs, regional agencies, cities, and counties are wrestling with how to improve transportation within seriously constrained budgets, and to help achieve energy and climate goals. They need practical tools to compare their transportation projects, programs, and plans using a national best practices standard, which STARS is designed to provide.

Initial STARS users are likely to be project managers, consultants, elected officials, and planners seeking to:

- Provide people and businesses more and better travel and land use choices;
- Improve health by encouraging safe, active transportation;
- Improve the local economy by reducing money spent on imported petroleum;
- Reduce climate pollution (greenhouse gas emissions); and
- Reduce project costs and maximize cost effectiveness.

It is important to note that using STARS does not change the roles of the decision-making body, project manager, or consultants. Nor does it replace or replicate NEPA, state, or local requirements. Using STARS is designed to provide valuable information to enhance and inform project decision-making. See Figure 2 below for how STARS relates to NEPA.

\(^1\) STARS uses The Natural Step as a sustainability framework
Background

STARS began in July 2008 when a dozen transportation and sustainability professionals discussed how to shift transportation from moving vehicles to providing people with more and better choices, while reducing energy use and climate pollution in a financially constrained era. Many in the group were frustrated that transportation lagged the energy and building sectors in adopting sustainability and climate-friendly practices. The group drew inspiration from Leadership in Energy and Environmental Design (LEED™) and the Living Building Challenge,™ a product of the International Living Building Institute, planning and certification systems that are transforming the building construction industry by rewarding projects for increasingly higher levels of performance.

In developing STARS, the group recognized that transportation is a means to an end, not an end in itself. People travel to access employment, education, goods, and services. People do not always need to travel to achieve these objectives. They may work at home or take classes or find information on the web. For example, there are multiple means to gain access to work: driving alone, carpooling, taking transit, bicycling, walking, working at home, and telecommuting. It was this realization that prompted STARS to focus on access, rather than only transportation mobility.

In July 2009 George Dondero, Executive Director of the Santa Cruz County Regional Transportation Commission (SCCRTC) contacted Peter Hurley, a Portland Bureau of Transportation Project Manager and a lead developer of STARS. SCCRTC was interested in a tool to evaluate the sustainability of their Highway 1 HOV Improvement Project. In February 2010 the SCCRTC Board approved a contract with the North American Sustainable Transportation Council (STC) to develop the first twelve STARS-Project “core credits,” including credits for Integrated Process, Access, Climate and Energy, and Cost Effectiveness Analysis.
The STC contracted with five private sector firms to develop the core credits in the spring and summer of 2010. Volunteer Technical Advisory Committee members and “peer review” subject matter experts in Washington, Oregon, California, and Nevada reviewed several draft and final versions of the credits, which were refined by the credit development teams. Several hundred thousand dollars in volunteer time and intellectual capital joined with the contract work to produce the twelve credits in this manual.

In the fall of 2010 the SCCRTC’s Highway 1 Improvement Project will be the first project to apply STARS credits. The lessons learned from that experience will inform the STARS continuous improvement process.

**Transportation: Changing Direction**

Transportation has major economic, environmental and social implications. The ability to provide access to goods and services is fundamental to economic health and social equity, but current transportation practices are often financially, economically, and environmentally unsustainable.

Transportation is one of the largest and fastest-growing sources of U.S. greenhouse gas emissions. As the number of miles Americans drive increases, so does petroleum consumption and greenhouse gas emissions. In fact, the number of miles Americans drive has grown three times faster than the U.S. population. The increase in vehicle miles traveled (VMT) is driven by land use patterns that require driving to access daily needs and the fact that 80% of federal transportation investments, and over 90% of most state transportation investments, are focused on highways.

A key issue for the new transportation era is transportation choice. In many communities, the only safe and convenient option Americans have for accessing essential goods, services, and experiences is to use a personal automobile. Only half of U.S. households have access to any sort of public transportation system near their residence. Many communities have been designed without places to walk or bicycle safely. Intercity rail and bus services in many places are anemic, making automobile travel a necessity rather than a choice.

Our current transportation system increases reliance on the use of autos as the primary mode of transportation, which contributes to the negative health impacts from sedentary lifestyles. Additionally, increased travel and congestion creates public health hazards, especially emissions hotspots that increase asthma and other respiratory diseases among children and the elderly.

Transportation investments have disproportionately benefited some and burdened others, often along race and income lines. Historically, low-income and minority communities were damaged by highway construction in which they had little voice. Many transportation projects and plans are still developed without meaningful involvement of affected communities, leading to projects that detract from their quality of life, safety, and mobility.

STARS is designed to move the transportation industry toward sustainability in the areas where transportation has the greatest impacts: access, climate and economic health. STARS provides a roadmap for planners and communities seeking a better way to solve their transportation problems, without the unintended consequences of sprawl, congestion, and pollution.
Other Developing Transportation Rating Systems

STARS is designed to serve a different need than the other transportation rating systems under development, therefore allowing other systems to be used complementarily. Other developing transportation rating systems include the Federal Highway Administration’s (FHWA) Sustainable Highways project, Greenroads™, and GreenLITES (a New York State Department of Transportation tool to evaluate State transportation projects upon completion). All three focus on road projects.

STARS explicitly evaluates multimodal access benefits and costs over the full life cycle, including operations, where most of a project’s benefits and impacts occur. STARS is most effective when used to plan a project or series of corridor projects; other systems are most effective during project design and construction phases. STARS also has a unique emphasis on reducing energy use and climate pollution, and on evaluating the cost effectiveness of different strategies.

Depending on the type and goals of a project, one system may prove more appropriate, or two can be used together to provide a more comprehensive view of a project’s performance. For example, STARS may be used for planning the type of transportation project that should be built and how it is operated while Greenroads™ may provide value during design and construction.

How a STARS-Project is Structured

STARS is a planning and evaluation tool for transportation projects. Subsequent versions of STARS will include credit weighting, scoring, and certification for all projects that enter the STARS program. At that point, STARS will serve as both a planning tool and as a rating system for transportation projects, plans, and employer commute trip reduction incentive programs, individually or together.

Credit Categories and Functions

STARS is organized into 29 “credits,” twelve of which are detailed in this Pilot Project Application Manual. To achieve a credit an applicant must take, or agree to, specific actions. Not all credits are applicable to or realistic for all projects, so only a portion of the credits are required for a given project.

The twenty-nine credits are organized into six credit categories: Integrated Process, Access, Climate and Energy, Ecological Function, Cost Effectiveness Analysis, and Innovation. The first credit in each of the first five categories is a “required” credit.

The five “required” credits must be achieved, along with several non-required credits, in order for a project to be considered for STARS certification. The five required credits are performance-based, i.e., they require an applicant to either establish performance goals and objectives or to analyze the performance of potential strategies.

Several of the non-required credits provide applicants an option between a “performance path” (the preferred option, as it provides project-specific information) and a “prescriptive path” option. For the performance path, users do their own modeling and projections. For the prescriptive path, STARS recommends default actions. Not all credits provide a prescriptive path option.
Users should use the performance path, unless the cost of acquiring necessary data and/or performing the analysis is prohibitive. STARS values use of the performance path more highly when considering which projects to certify.

Within each category, STARS is generally organized by four types of credits:

1. Establish goals and objectives (typically required)
2. Evaluate strategies to achieve the objectives
3. Implement the strategies
4. Measure performance

The relationship between the credits is described in Figure 3 below.
Figure 3: Organizational structure of STARS
Credit Scorecard (Complete List of Credits)  
During initial development of STARS, credit developers outlined a suite of credits, shown below.  
Through the SCCRTC credit development project, 12 core credits were completed, which are the credits described in this Manual. These core credits are highlighted in Table 1 below.

<table>
<thead>
<tr>
<th>Integrated Process</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>IP1</td>
<td>Establish Project Framework and Goals <em>(Required)</em></td>
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<tr>
<td>IP2</td>
<td>Multi-Discipline Project Team</td>
</tr>
<tr>
<td>IP3</td>
<td>Public Stakeholder Engagement</td>
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<table>
<thead>
<tr>
<th>Access</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A1</td>
<td>Establish Access Goals and Objectives <em>(Required)</em></td>
</tr>
<tr>
<td>A2</td>
<td>Evaluate Expanded Transportation Demand Management Strategies</td>
</tr>
<tr>
<td>A3</td>
<td>Evaluate Expanded Transportation System Management Strategies</td>
</tr>
<tr>
<td>A4</td>
<td>Evaluate Expanded Land Use Strategies</td>
</tr>
<tr>
<td>A5</td>
<td>Evaluate Expanded Transportation Supply and Service</td>
</tr>
<tr>
<td>A6</td>
<td>Select Preferred Strategies from A2 – A5</td>
</tr>
<tr>
<td>A7</td>
<td>Implement Selected Strategies</td>
</tr>
<tr>
<td>A8</td>
<td>Assess Performance Over Time</td>
</tr>
<tr>
<td>Climate and Energy</td>
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<td>-----------------------------</td>
<td>-----------------------------------------------------------------</td>
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<tr>
<td>CE1</td>
<td>Establish Climate and Energy Goals and Objectives <em>(Required)</em></td>
</tr>
<tr>
<td>CE2</td>
<td>Evaluate Vehicle Mile Reduction Strategies</td>
</tr>
<tr>
<td>CE3</td>
<td>Evaluate Improving Vehicle Flow</td>
</tr>
<tr>
<td>CE4</td>
<td>Evaluate Construction Materials and Methods</td>
</tr>
<tr>
<td>CE5</td>
<td>Evaluate Renewable Energy and Energy Efficiency</td>
</tr>
<tr>
<td>CE6</td>
<td>Cleaner Vehicles and Fuels Goal and Evaluation</td>
</tr>
<tr>
<td>CE7</td>
<td>Maintenance and Preservation Goal and Evaluation</td>
</tr>
<tr>
<td>CE8</td>
<td>Carbon Offset Evaluation</td>
</tr>
<tr>
<td>CE9</td>
<td>Implement Climate and Energy Strategies</td>
</tr>
<tr>
<td>CE10</td>
<td>Climate and Energy Performance</td>
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<tr>
<td>Ecological Function</td>
<td></td>
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<td>-----------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>EF1</td>
<td>Identify &amp; Quantify Ecological Resources <em>(Required)</em></td>
</tr>
<tr>
<td>EF2</td>
<td>Protect and Restore Ecological Functions</td>
</tr>
<tr>
<td>EF3</td>
<td>Stormwater Quantity and Quality Management</td>
</tr>
<tr>
<td>EF4</td>
<td>Integrated Stormwater Management</td>
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<tr>
<td>Cost Effectiveness Analysis</td>
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<td>-----------------------------</td>
<td>-----------------------------------------------------------------</td>
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<tr>
<td>CEA1</td>
<td>Cost Estimation and Cost-Effective Calculations</td>
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<tr>
<td>CEA2</td>
<td>Selecting Cost-Effective Projects and Programs</td>
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<tr>
<td>Innovation</td>
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<td>-----------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>IV1</td>
<td>Additional Actions Resulting in More Access and/or GHG Reductions</td>
</tr>
<tr>
<td>IV2</td>
<td>Actions Improving STARS Effectiveness</td>
</tr>
</tbody>
</table>
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**Table 1: Complete list of STARS credits**
Becoming a STARS 1.0 Certified Pilot Project

STARS Project 1.0 is designed to apply to transportation projects in the early stages of development. As a planning tool, STARS is intended to inform how transportation projects are developed, before alternatives have been devised. However, a Project Team can apply STARS Project 1.0 at the start of alternatives analysis in order to help evaluate the performance of alternatives. Some of the procedural requirements differ – particularly for Integrated Process – but most of the credits apply as written.

There is a six-step process for projects seeking to become a “STARS 1.0 Certified Pilot Project.”

1. Ask Questions
   - Ask what problems you have for a corridor or transportation study area. Problems with recurring congestion, insufficient multi-modal options, insufficient construction or operating funds and lack of public support are indicators of potential STARS candidate projects.
   - Ask what goals you have for a corridor or transportation study area. Improving the sustainability of the transportation system, providing people more and better travel options, integrating transportation and land use, identifying low cost improvement strategies and meeting energy and climate goals may all signify potential STARS candidate projects.
   - Ask where in the process your project is. As noted above, STARS is most effective the earlier it is applied in the project development process, though projects later in the development process may still find STARS provides valuable decision-making information.

2. Contact the North American Sustainable Transportation Council (STC)
   - Contact Peter Hurley to start the conversation. Peter is a Portland Bureau of Transportation Project Manager and Chair of the STC. He can be reached at 503.823.5007 or peter.t.hurley@portlandoregon.gov.
   - After discussing the questions above, you’ll talk with the STC about each of the twelve core credits in this manual, discussing how each might apply to the project you’re considering, identifying which credits you may want to apply to the project. The conversation will start to identify data issues, methodology questions, priority goals and objectives and priority credits.
   - Decide whether the project is likely to benefit from STARS and whether STARS is likely to benefit from the project.

3. Agree on Responsibilities and Become a STARS 1.0 Candidate Pilot Project
   - The project agency and the STC will sign an informal written agreement outlining which credits the project intends to pursue, the responsibilities of each party and designating the project a “STARS 1.0 Candidate Pilot Project.” This will usually involve a low-cost financial partnership between the organizations.

4. Apply the Credits
   - Most projects will start with a one-day STARS training for their Project Team (and, perhaps, decision-makers).
   - All projects will host a Sustainability Workshop, conducted by the STC, in collaboration with Project Team members, decision-makers and the Community Stakeholder Committee (see Credit IP 1 for details).
   - Submit a “pre-analysis proposal” to the STC, outlining what methods you intend to use for each credit you consider. This would allow the STC to work with you to address issues, before
spending a significant amount of time and money on actions which the STC may consider insufficient.

• Integrate credits into your project planning process. Credit application will occur primarily by the Project Team. The STC will be available to address interpretation questions.
• The Project Team will document issues and benefits that arise during credit application.

5. Documentation

• The project team will provide documentation to the STC how each credit was applied. See “Documentation” in each credit for additional details. The STARS development team found using “Basecamp” as a common website to post comments, questions and draft documents to be a valuable tool; the project may wish to use it or a comparable tool to communicate with the STARS team.
• The STC will review the documentation and decide “Pass” or “Improve” for each credit. Projects that “pass” all four required credits and at least five optional credits will be designated a “STARS 1.0 Certified Pilot Project.” Of the five optional credits, at least two shall be access credits and at least two shall be Climate and Energy credits.

6. Celebrate!

• At this point you should have a more sustainable project with greater public support. Celebrate!

Credit Standards

Assumptions: STARS requires transparency and fairness. A project seeking to earn STARS credits will disclose assumptions, and the basis for those assumptions, used in credit projections/modeling to the Community Stakeholder Committee (CSC), the general public and the North American Sustainable Transportation Council (STC).

The STC encourages project sponsors to discuss assumptions that could materially change project outcomes with both the CSC and the STC as early in the process as possible, as it could save time and money by not having to redo work to earn a credit or earn the support of the CSC. Assumptions should reflect median values of a broad literature review, modified to reflect project-specific conditions. Assumptions should not be skewed to make a strategy look better or worse, absent compelling project-specific conditions.

Induced Demand Evaluation: Induced demand is commonly seen in strategies and projects that reduce travel time or increase capacity. A project seeking to earn STARS credits will quantify the induced demand implications of potential strategies over the four STARS Design Year periods, using factors reflecting median values of a broad literature review, potentially modified to reflect project-specific conditions. STARS users will include induced demand factor(s) in all STARS credits where reduced travel time or increased capacity could result (all credits except CE4 and CE5). As above in “Assumptions,” the induced demand factor(s) should not be skewed to make a strategy look better or

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worse, absent compelling project-specific conditions, which are disclosed and justified as early as possible in the process.

**Credit Thresholds**: Determining when a project earns a credit is partly objective (“Did they meet the letter of the requirement?”) and partly subjective (“Did they meet the intent of the requirement?”). The STC will consider both “letter” and “intent.” Regarding “intent,” the STC will ask “Does it seem fair and reasonable, or does it seem designed to lead to a specific outcome?”

**Definitions**

**Base Year**: The year from which goals are measured. The STARS base year is usually 2005 or 2008, depending on which has higher quality data available, or reasonably acquirable.

**Choice-Constrained Populations**: People with constrained access choices (for example, low income, elderly and disabled, and those without cars).

**Environmental Justice Community**: Environmental Justice (EJ) communities are low-income or minority populations who may be adversely impacted by transportation projects, consistent with Federal definitions of EJ communities.

**Mode Split**: Type of travel, including drive-alone, 2+ carpool/vanpool, transit (bus, light rail, streetcar, commuter rail), walk, bike, and trip-not-taken (i.e., compressed work week).

**Project Goals**: Are general, directional (increase, decrease) statements that guide the project, defined in accordance with sustainability principles. An example of an Access goal is “The project will increase the number and percentage of trips in the Transportation Study Area using options to driving alone in each of the four STARS design years.”

**Project Objectives**: Are quantified goals, usually for the Access and Climate and Energy goals. An example of an Access objective is “The project will increase the absolute percentage of trips in the Transportation Study Area using options to driving alone by 5% in 2015, 10% in 2020, 20% in 2030 and 40% in 2050.”

**Project Problem Statement**: The project problem statement identifies how the current transportation condition violates sustainability principles. Specifically, it addresses the problems of the corridor relating to access, climate and energy, ecological function and economics.

**Project Team**: The project team refers to the agency and consultant team responsible for the planning and design of the transportation project.

**STARS Design Years**: In order to reflect performance in the short, medium and long-term, STARS specifies that projects use four design years: 5, 10 and 20 years from the start of project implementation, and 2050, the year commonly used for state and federal greenhouse gas reduction goals. Viewing a
project over time provides a more accurate view of project benefits and costs than a single, twenty year snapshot commonly used.

**STARS Project Study Area:** The project study area includes the Transportation Study Area (see below), as well as areas in which the project may impact air or water quality.

**STARS Transportation Study Area:** The STARS transportation study area defines the area in which transportation goals, objectives and strategies will be established, evaluated and implemented. The STARS transportation study area includes the majority of origin and destination trips using a transportation corridor. The transportation corridor includes the facility or facilities that are the focus of the study, plus current and potential future alternate routes. The Transportation Study Area is the larger travelshed where trips using the corridor originate and terminate.

**Transportation Corridor:** The transportation corridor includes the facility or facilities that are the focus of the study, plus current and potential future alternate routes.
INTEGRATED PROCESS

Integrated Process

<table>
<thead>
<tr>
<th>Integrated Process</th>
<th>Description</th>
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<tbody>
<tr>
<td>IP1</td>
<td>Establish Project Framework and Goals <em>(Required)</em></td>
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<td>Public Stakeholder Engagement</td>
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</table>

Overview

NEPA, state, and local public involvement requirements are often more procedural than substantive; they inform the community of technical information and project decisions rather than providing them a role in the decision-making process. STARS increases the likelihood of public support, and better informed decisions, by providing for a Citizen Stakeholder Committee (CSC) where community members talk with, and make recommendations to, decision-makers and the project team. See Figure 4 for an illustration of how the project team, CSC, and decision-makers relate.

![Figure 4: Relationship between project team, CSC, and decision-makers](image)

A NEPA Task Force from the Council of Environmental Quality concluded that good public involvement: “… improves the quality and legitimacy of a decision and builds the capacity of all involved to engage in the policy process. It can lead to better results in terms of environmental quality and other social objectives. It also can enhance trust and understanding among parties.”

While some of the transportation projects seeking STARS certification may engage a NEPA process, other projects will be local and not subject to federal process. Integrated Process credits are not intended to replace or contradict NEPA processes, but complement them.

The first credit in the Integrated Process category, IP1, is a foundational credit in STARS. It establishes a stakeholder group, the CSC, which serves two purposes: first, to ensure that the project has a multi- and interdisciplinary stakeholder group that represents all interests, and secondly, to bring additional information and a new perspective to the project’s problem statement, goals, and objectives, which a strictly technical team may not be able to provide.

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A critical element of Credit IP1 is the requirement for a sustainability workshop for the CSC and the Project Team. In this workshop, participants will develop a shared understanding of sustainability and how it is applied to a transportation project.

Credit IP1 outlines additional responsibilities of the Corridor Stakeholder Committee. The CSC is also engaged in defining the project problem statement; members of the CSC identify what issues are to be solved, in a framework for sustainability. Transportation projects tend to define the problem narrowly, focusing on auto-centric mobility issues. With the understanding that access is the primary objective, the transportation problem can be defined more broadly.

Furthermore, the cost of transportation projects is all too infrequently considered. Many projects are planned that will never be built because there will never be enough money to build for the planned unconstrained capacity, absent a budget constraint. Therefore, STARS requires that the CSC have information about project costs and recommend a budget range for the project upfront.
IP1: Establish Project Framework and Goals *(Required)*

**Intent**

Ensure that a diverse and interdisciplinary stakeholder group defines the STARS project study area, problem statement, and project goals according to principles of sustainability.

**Purpose and Benefits**

Credit IP1 establishes the framework for the STARS process: it sets the expectations for engaging stakeholders, developing a shared understanding of sustainability, and working collaboratively to develop the project’s problem statement and goals. This level of engagement with stakeholders, combined with a shared understanding of sustainability, is intended to identify problems earlier in the process, generate a stronger sense of ownership, and define solutions appropriate to the problem.

**Related Credits**

- IP2 Multi-Discipline Project Team
- IP3 Public Stakeholder Engagement
- A1 Establish Access Goals and Objectives
- CE1 Establish Climate and Energy Goals and Objectives
- EF1 Identify and Quantify Ecological Resources
- CEA1 Cost Estimation and Cost-Effectiveness Calculations

**Performance Path vs. Prescriptive Path**

Many non-required STARS credits identify two pathways for achieving the credit: the performance path that is based on achieving outcomes or the prescriptive path that outlines the actions the STARS user should take. Credit IP1 differs from most STARS credits because it primarily addresses the process for establishing the STARS project study area, the problem statement, and project goals and objectives. The performance or outcomes that this credit hopes to achieve is tied to other credits – the goals for access, climate and energy, and ecological function. While Credit IP1 is not performance-oriented, it is also not prescriptive. Each community will have different considerations for the STARS project study area and problem statement as well as different stakeholder issues, making it difficult to prescribe exactly how a study area should be drawn or what representatives should be included in the stakeholder group. In short, this credit lies between the performance and prescriptive path. Only one methodology and set of requirements are described as part of the credit.

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*Note that the Corridor Stakeholder Committee is setting Project goals, not STARS goals as defined in A1, CE1, or EF1*
Integrated Process Credit 1 Components

1. Establish Baseline

**Requirements and Documentation**

Acquire greenhouse gas emission, energy use, and vehicle mile traveled data for all trips using the project corridor.

At a minimum, establish baseline and projected “do nothing” future trip demand, mode split, vehicle miles traveled, energy use, and greenhouse gas emissions in the four STARS Design Years. In order to reflect performance in the short, medium and long-term, STARS specifies that projects use four Design Years: 5, 10 and 20 years from the start of project implementation, and 2050, the year commonly used for state and federal greenhouse gas reduction goals. Viewing a project over time provides a more accurate view of project benefits and costs than a single, twenty year snapshot commonly used.

**Methods**

Greenhouse gas emission, energy use, and vehicle mile traveled data is necessary to provide a basis for setting goals and objectives and comparing performance of project strategies and alternatives. Data should be actual, from 2005 or 2008, dependent upon which provides higher data quality. Projections are acceptable if actual data is not available or reasonably acquirable.

2. Corridor Stakeholder Committee

**Requirements and Documentation**

STARS users must develop a diverse and interdisciplinary Corridor Stakeholder Committee (CSC) to help develop the STARS project study area, problem statement, and goals. This stakeholder group includes, among others, technical staff, local interest groups, user groups, and neighborhood representatives. Elected officials are not required to be voting members of the CSC, but are encouraged to serve as ex-officio members. The CSC is intended to be engaged in all stages of stages of the project, particularly at times of key decision points (e.g., reviewing alternatives).

Describe the structure of the CSC. Identify the name and title of representatives on the CSC from the following categories; required positions are indicated with an asterisk (*). If no representative is available or applicable, explain why. If other representatives were included on the committee other than the types described below, please identify them on the list as well. In addition, provide a flow chart that describes how information is provided and decisions are made.

**Elected Officials**

- State Representative(s)
- Metropolitan Planning Organization Council or Commission
- City Council or Commission(s)

**Government Agencies**

- State transportation agency
- Local transportation agency/ies*
• Local land use planning agencies*
• Transit agency*
• Permitting agencies*
• Public health*

**User Groups**
• Pedestrian users*
• Bicycle users*
• Transit riders (choice and transit-dependent)*
• Freight interests*
• Emergency response providers
• Drivers (carpool, vanpool, SOV)*
• Mobility-impaired*
• Car-free constituent*

**Community and Neighborhood**
• Neighborhood Association(s)*
• Homeowner Associations
• Major property owners*
• Environmental justice communities*
• People impacted by air quality issues*
• Schools (e.g. Safe Routes to School, PTA, teachers)*

**Other Interests**
• Environmental organizations*
• Recreation-based organizations
• Environmental justice organizations*
• Employer representatives*
  o Larger employers
  o Medium and smaller employers

**Methods**
In order to create a multi- and interdisciplinary stakeholder group, develop a list of potential groups and populations affected by the project. This includes elected officials; representatives from Federal, State, and local governments; pedestrian, bicycle, and transit users; local interest groups; environmental justice groups; underserved and disadvantaged populations; emergency response providers; and neighborhood and homeowners associations (see the required list under documentation, above). Stakeholders should be drawn from across the project area so that the CSC is geographically balanced. Also check with the local agencies’ participation plans for further guidance on selecting stakeholder representatives. The NCHRP Report 480: A Guide to Best Practices for Achieving Context Sensitive Solutions contains additional suggestions for the process of identifying stakeholders. In addition, STARS recommends that stakeholders are interviewed to identify other potential users or interest groups that may be impacted by

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the project. It is preferable to conduct interviews with stakeholders in places that are comfortable and convenient for them.

Determine how the Corridor Stakeholder Committee will be structured, and whether elected officials will be invited to participate in this CSC or serve on a separate committee. The CSC will be engaged with the definition of the STARS project study area (below) and may invite other representatives to the CSC if they feel that an interest is missing. A diversity of opinions should be encouraged on the CSC. As such, the decision-making format need not be consensus-based, but can allow for minority reports.

Ensure that project information is made readily available to the Corridor Stakeholder Committee, either as a website or through other means, as the information becomes available.

3. **STARS Project Study Area**

### Requirements and Documentation

The project team will develop a STARS project study area that includes, at a minimum, 50% or more of the origin and destination trips made within the corridor (averaged over a course of year). The STARS project study area will be drawn according to travelshed data in order to determine the majority of origin and destination trips.

The project study area may also include areas in which the project may impact air or water quality, which distinguishes the Project Study Area from the Transportation Study Area.

The Corridor Stakeholder Committee will review and recommend the final project study area to decision-makers. Note that the STARS project study area may not be the same as a legal boundary required by other planning processes.

Provide maps and associated data regarding activity centers and transportation infrastructure, the population composition, and ecological resources within the STARS project study area. A list of data is provided below; required information is noted with an asterisk (*). Other relevant information may be submitted. Provide the source and date of the data, the majority of which should be no older than three years.

<table>
<thead>
<tr>
<th>Activity Centers (current and planned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Major employers*</td>
</tr>
<tr>
<td>• Schools*</td>
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<tr>
<td>• Major shopping destinations, including grocery*</td>
</tr>
<tr>
<td>• Hospitals or other health care centers*</td>
</tr>
<tr>
<td>• Parks and plazas*</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Major Transportation Infrastructure Serving Area Population (current and planned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Roadways*</td>
</tr>
<tr>
<td>• Bicycle and pedestrian facilities*</td>
</tr>
<tr>
<td>• Transit infrastructure and service*</td>
</tr>
<tr>
<td>• Transit stops</td>
</tr>
</tbody>
</table>
• Transit frequency
• Major conflict areas between users of different modes*
• High accident locations*
• Freight and Port facilities*

Demographics (current and projected, if available)
• Age*
• Race*
• Ethnicity*
• Language spoken at home
• Income levels*
• Travel time to work & school & basic needs (grocery, health care)*
• Journey to work & school & basic needs (grocery, health care)*
• Access to personal vehicles (by age, race, income and location)*

Ecological Resources
• Watershed boundaries*
• Major water features, including rivers, streams, and wetlands*
• Drainage patterns and stormwater infrastructure conditions*
• Important habitat areas identified by local, state, and federal agencies*
• Important species habitat identified by local, state, and federal agencies*
• Air quality attainment areas or non-attainment with maintenance plans*
• Local analysis of criteria air pollutants and mobile source air toxics
• Topographical features that affect the transportation corridor, such as bluffs or ravines*

Methods
The project team will determine the initial project study area. The first step in determining the project study area is to understand the travelshed. The project team should map the locations of the majority of the trip origins and destinations using the corridor, by mode including both peak and non-peak trips and over different seasons, particularly if seasonal traffic exists. In addition, a regional travel demand model, if available, can be used to conduct a select link analysis to identify major origins and destinations for users of the project facility/corridor.

The project study area may include areas that significantly influence the air or water quality of the corridor or are significantly impacted by the corridor in terms of air or water quality. In addition, the project team may develop a project study area that incorporates watershed and downstream impacts and air quality influence and impact areas.

The majority of origin and destination trips may lie outside of the funding agency’s political boundary. Too often transportation project teams fail to consider solutions because they are not in the funding agency’s jurisdiction. In cases where the majority of trips are outside the funding agency’s political boundaries, the most effective solution may be to partner with another jurisdiction.

Using Geographic Information Systems or other mapping tools, research the demographics of the proposed study area. Several on-line resources are available for this information, including U.S. Census
data, Melissa Data, Department of Housing and Urban Development data, and internet directories (see Resources below).

In some cases, finding current quality data may be challenging. If only dated or poor quality data exists for the corridor, STARS will reward users for obtaining additional data (TBD).

In the process of defining the STARS project study area, information about the user or stakeholder groups may surface that had not been considered as part of drafting the stakeholder list. As a result, the Corridor Stakeholder Committee may recommend additional representatives to join the CSC and/or change the project study area. The CSC will approve the final STARS project study area.

4. Sustainability Workshop

<table>
<thead>
<tr>
<th>Requirements and Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A majority of the Corridor Stakeholder Committee (community, agency, and technical representatives) project staff and decision-makers must participate in a sustainability workshop that demonstrates how sustainability principles can be applied to transportation projects.</td>
</tr>
</tbody>
</table>

Submit sustainability workshop materials, including the agenda, list of participants, and any presentation materials. (In this pilot stage, STC requests a review of the agenda and materials prior to the workshop).

STARS users will demonstrate how sustainability principles are applied to their project by submitting the project problem statement and access, climate and energy, and ecological function problem statements. Figure 5 illustrates the Credit IP1 process, including the information needed for the sustainability workshop.
Methods

To assist in framing the transportation problem in a sustainability context, host at least one sustainability workshop for the Corridor Stakeholder Committee and decision-makers. Several sustainability frameworks can be used as a starting point for developing a shared understanding of sustainability, including The Natural Step and The Triple Bottom Line. For a more in-depth exploration of sustainability, workshop participants can undertake a “backcasting” process recommended by The Natural Step.6

STARS recommends that the sustainability workshop not only cover the principles of sustainability and how they are applied to transportation projects, but also to use the time to define the project problem statement with the remaining problem statements (access, climate and energy, and ecological function). If time allows, STARS also recommends that the workshop format is used to define the project goals, as well as discuss the project budget.

Additionally, STARS users should consider conducting a scenario planning workshop to further the project team and stakeholders’ understanding of the relationship of transportation issues such as land use, cost effectiveness, and climate. Scenario planning can take the form of mapping exercises with groups of people around tables, computer-assisted mapping, or games that help participants see the consequences of transportation decisions on land use and vice versa. Several other transportation plans

and projects, such as Sacramento’s Metropolitan Transportation Plan and Utah’s Mountain View Corridor, have used these scenario planning tools effectively.

5. Problem Statement

**Requirements and Documentation**

The Corridor Stakeholder Committee must define the project problem statement according to principles of sustainability. The CSC will also define the project problem statement in concert with defining problem statements for Access, Climate and Energy and Ecological Function. Also submit a recommended a project budget range, developed with input by the CSC.

Additionally, submit a summary of the key issues that were discussed at the meeting or workshop, including how issues were resolved.

**Methods**

Examine the root causes of the perceived transportation problem. Consider the users of the system and the needs they are attempting to meet through the transportation facility. Examine the comprehensive plans, general plans or master plans of the area and find out if they are up-to-date and reflect the planning needs of the community. The scenario planning exercise recommended in the Sustainability Workshop (above) may be helpful in exploring the issues of access and mobility in the transportation corridor, particularly if they focus on the connections between land use, transportation, public health, ecology, and climate. The problem statement should not state a solution, such as to build a specific transportation facility.

**Access**

Identify and describe the access problem(s) to be solved. With which of the six access goals are there current or projected problems? For whom within the study area is there a problem? Consider relevant stakeholders, such as employers and employees and choice-constrained populations who have a access problems in the study area. Consider other types of users such as freight users, children, students, emergency service providers, shoppers, recreationalists, users with mobility issues and/or disabilities, the elderly, users with no automobile, and other users who are relevant to the project. Be as specific as possible.

In the problem statement, consider the primary purpose of transportation as defined by STARS, which is to access to goods, services, information, and activities. Which goods, services, information, and activities (i.e., destinations) are people trying to reach using the project area? Are there areas with particularly poor transit, bicycle or pedestrian networks? Few or distant jobs, grocery stores, parks, schools, restaurants, government services or health care services?

**Climate and Energy**

Adopt a Climate and Energy problem statement that reflects local plans and concerns with greenhouse gas emissions, energy use and vehicle miles traveled, adopted by the decision-making body after discussion with the Corridor Stakeholder Committee.
Budget
The Corridor Stakeholder Committee should also discuss what a realistic project budget could be, given available and likely funding, competition from other projects, and whether the project will generate its own revenue (e.g., tolling or parking pricing) and recommend a project budget range.

6. Project Goals

Requirements and Documentation
The Corridor Stakeholder Committee will develop project goals for Access, Climate and Energy, Ecological Function, and Cost Effectiveness and provide a written recommendation of those goals to decision-makers.

Access
Articulate three or more Project Access Goals. Three of the Project Access Goals must be the same as the STARS Access Goals developed for the project. Additional goals can be determined. An overview of the STARS Access Goals is listed below (see Credit A1 for additional information):

1. Improve Modal Access
2. Improve Mode Split
3. Reduce Vehicle Miles Traveled
4. Improve Modal Travel Times and/or Predictability
5. Improve Travel Quality
6. Address Increased Non-Drive Alone Capacity

Climate and Energy
At a minimum, the project must adopt a goal of reducing greenhouse gas emissions and energy use in the corridor for each of the Design Years. The project may adopt additional climate and energy goals, as long as they are consistent with this STARS goal.

Cost Effectiveness Analysis
The project must set goals on reducing the cost of transportation to the users and identifying cost effective strategies that meet Access and Climate and Energy goals.

Submit the project goals and objectives that were developed by the Corridor Stakeholder Committee, as well as the project goals and objectives that were adopted by decision-makers. Provide a summary statement on the changes between the two sets of goals, if any, and identify issues and their resolution.

Methods
STARS recommends that the project goals are developed in a workshop format with the Corridor Stakeholder Committee, as part of or following the Sustainability Workshop. Project objectives may be developed by the project team, who will be more likely to have the resources, expertise, and time to ascertain what objectives may be reasonably accomplished in the project. The CSC will review and recommend the objectives to decision-makers.

STARS Goals are framed in the context of the four STARS Design Years (5, 10, 20 years after project implementation starts, and 2050).
Resources

Transportation and Travel data
- MPO regional travel demand model and travel survey data, if available
- Local transit agency data, if available
- Local pedestrian and bicycle counts from the local transportation agency or pedestrian/bicycle advocacy group
- American Community Survey
- National Household Travel Survey (NHTS)

Demographic data

U.S. Census data: [www.census.gov](http://www.census.gov)
Below are examples of demographic data and a descriptor or illustration of how the data could be used in the project.
- Living in Group Quarters (institutionalized/non-institutionalized)
- Race (insight for environmental justice, cultural differences, and may signal language barriers)
- Language spoken at home
- Nativity and place of birth
- Median age, including 65 years or older (mobility issues, need to hold meetings in daylight hours)
- Civilian non-institutionalized disability
- Educational attainment by degree level (insights for reading comprehension or need for non-written materials)
- Median household income
- Household incomes less than $10,000 (literacy, mobility issues)
- Employment (in labor force, unemployed, not in labor force)
- Poverty status
- Housing Characteristics (units in structure, type of housing)
- Year householder moved into unit (stability of community)
- Vehicles available
- Travel time to work
- Journey to work (commuting mode)
- Time leaving home to go to work (shift workers and when to hold meetings)

Melissa Data: [http://www.melissadata.com/](http://www.melissadata.com/)
Melissa Data is a data quality-focused firm that data quality and address management solutions to customers in a wide range of industries.

Other Agencies and Organizations
- Administration on Aging: [www.aoa.gov](http://www.aoa.gov)
- Modern Language Association: [www.mla.org](http://www.mla.org)

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7 Morris, Anne. PBS&J. “Where do you find information on the community” presentation at FHWA and Hawaii DOT Peer Workshop Implementing CSS in Hawaii through Planning and Process. Honolulu, Hawaii, August 14, 2007
- US Department of Housing and Urban Development EIGS maps
- National Center for Education Statistics http://www.nces.ed.gov/ccd/schoolsearch/ (free and reduced meals, e.g.)
- Great Schools Inc. – race and ethnicity: www.greatschools.net
- National Institute for Literacy - number of adults who read below a 5th grade level (level 1): www.nifl.gov
- Earth Resource System. www.ersys.com/usa - age, urban densities, ethnicities
- State Report Card
- Local newspapers and radio stations indicate interest groups and may also be a good way to communicate events - http://www.shgresources.com/resources/radio/
- Sperling’s Best Places for religious groups (and others)
- Yahoo! Local
- Switchboard Digital Directory and Yellow Pages.com
- Walkscore.com

Context Sensitive Solutions
http://www.contextsensitivesolutions.org/

Sustainability

The Natural Step
http://www.naturalstep.org/en

The Triple Bottom Line
http://www.sustainabilitydictionary.com/t/triple_bottom_line.php

Case Study: Grand Rapids
http://www.grpartners.org/pdfs/resources/TBLFinal1.pdf

Cradle-to-Cradle
http://www.mcdonough.com/cradle_to_cradle.htm


Case Studies

Davis and Weber East-West, Utah
On the Davis and Weber East-West project, public involvement consultants used key stakeholder interviews to identify project issues as well as identify project stakeholders. By interviewing community members, the project team heard from a wider community group about the concerns, interests and needs of project which provided an additional level of information to the planning and design team. Additionally, the interviews helped scope out potential stakeholder committee members and other key
stakeholder groups. This kind of stakeholder engagement also sets the groundwork for determining effective public involvement and outreach strategies needed for credit IP3.

**Town of Dauphin Island, Alabama**

In some cases, it may be difficult to garner stakeholder interest in the project; perhaps because the affected populations have been traditionally marginalized in past public processes or communities otherwise feel that their voice is not heard. This was the situation the project team in the Town of Dauphin Island faced when developing its Strategic Plan for Sustainability. In order “to overcome initial lack of stakeholder interest in public participation, the Facilitation Team became “threads in the fabric of the community” engaging people where they worked, lived, played, and prayed.” By meeting the community where they were (literally), the team was able to garner a much higher level of participation and representation from a broader spectrum of the community. Again, this approach of high community engagement sets the stage for public engagement requirements in credit IP3.

**State Route 520, Washington**

At the beginning of the SR 520 Bridge Replacement Project, an Executive Committee of 47 elected officials was formed to explore all the possible solutions for the project. Their recommendation launched the purpose and need statement, which fed into the draft EIS process. Once the EIS was underway, two additional committees were formed. A Technical Committee was composed of staff from jurisdictions and regulatory agencies and an Advisory Committee composed of a diverse number of interest groups. The Technical Committee was useful for briefing up to their elected officials and down to their staff. Having elected involved at the beginning helped considerably with buy-in.

These committees disbanded once the draft EIS was finished. However, the Westside interchange was not fully resolved so a Mediation Group of Impacted Communities was formed. This group was intended to represent the affected neighborhoods, more so than the Advisory Committee. The Mediation Group forwarded three options as part of a supplemental EIS, which was reviewed by a broad group of stakeholders, including the City of Seattle (who had requested more time to review the proposal). A legislative workgroup was tasked with choosing a final alternative and developing a financial strategy. Like the engagement of the original Executive Committee, bringing legislators into the project was helpful in creating support.

**Mountain View Corridor EIS, Utah**

Before the launch of the Mountain View Corridor EIS, two different studies for regional connectors had been undertaken in two counties. These regional systems were combined in the scope of the Mountain View EIS. The project team took the opportunity to step back and examine the big picture of the regional system, partnering with Envision Utah for an examination of land use. “The project team addressed some of the known environmental issues head-on by initiating discussion of the interaction between land use and transportation through a ‘Growth Choices’ visioning process that included study area mayors, large property owners, and interest group representatives on a Stakeholder Committee in 2003-2004. The Committee agreed on a ‘Vision Map’ that identified preferred transportation modes, corridors, and land uses along with seven growth principles. The Committee provided a platform for interest group representatives to voice their concerns at the start of the process as well as a forum for

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8 2009 State of the Practice Report  
9 ibid.  
10 Suanne Pelley, WSDOT. Personal communication. May 5, 2010
interest groups to hear the local needs and concerns of people who live in the study area.” These concerns fed into the public scoping process for the Mountain View Corridor EIS. As a result of the process, the original plan for a freeway corridor broadened to encompass a transit corridor and trail system.\textsuperscript{11, 12, 13}

**West Garfield Park, Illinois**

This case study illustrates that the best solution for a transportation “problem” lies in the realm of land use. “In Chicago, West Garfield Park was struggling and slated to lose its lone transit rail stop due to low ridership. Through the leadership of Bethel New Life and the Chicago Transit Authority, transit service was maintained \textit{and} upgraded. The heart of the redevelopment is the $4.5 million Bethel Center, a 23,000 sq. ft., two-story building built on a former brownfield. The building features green construction techniques and has applied for LEED Gold certification. In addition to the Center, Bethel also built 50 affordable homes within walking distance of the Center and the Green Line station.”\textsuperscript{14}

**Metropolitan Transportation Plan, California**

When updating their Metropolitan Transportation Plan, Sacramento planners created over 20 focus groups for outreach. Some groups had a direct connection to transportation issues, such as housing, and others a less direct connection, such as agriculture. In the focus group discussion, they asked about other influential people that should be invited to the conversation. They asked the focus groups to develop performance indicators for the following major categories:

1. Transit
2. Hard infrastructure (e.g. freeways)
3. Education and coordination (e.g. TDM)
4. Bicycle and pedestrian facilities (e.g. complete streets).

Planners hosted land-use workshop scenarios to explain the connection between land use and transportation. In the workshops, real-time modeling was undertaken so participants had immediate feedback on performance indicators.\textsuperscript{15, 16}

**References**

Barron, Eileen, MVC Public Information Manager. Personal communication, May 14, 2010.

Chew, Greg, Senior Planner, City of Sacramento. Personal communication, May 24, 2010

\textsuperscript{11} 2009 State of the Practice Report
\textsuperscript{12} Mountain View Corridor Final Environmental Impact Statement. www.udot.utah.gov/mountainview/content/feis
\textsuperscript{13} Eileen Barron, MVC Public Information Manager. Personal communication. May 14, 2010
\textsuperscript{14} Forum on Livability, Complete Streets and Context Sensitive Solutions Web conference presented by www.ContextSensitiveSolutions.org http://www.contextsensitivesolutions.org/content/reading/livability_forum___webinar_mate/resources/Livability_Unanswered_QA.pdf/
\textsuperscript{15} Greg Chew, Senior Planner, City of Sacramento. Personal communication, May 24, 2010
\textsuperscript{16} http://www.sacog.org/mtp/


Mountain View Corridor Final Environmental Impact Statement. www.udot.utah.gov/mountainview/content/feis


Pelley, Suanne, WSDOT. Personal communication, May 5, 2010.


ACCESS

Overview

STARS defines access as people’s ability to reach basic needs and desired goods, services, information, and activities. STARS assumes that the primary purpose of transport (including virtual transport) is for access; that is, for a purpose other than travel itself. Access is the ultimate goal of most transport; therefore, measuring the proposed change in access is an appropriate way to evaluate potential transportation solutions.17

Meeting an access need does not always require travel by the individual; for example, telecommuting and on-line shopping are ways to meet access needs without travel by the individual. Providing better access by locating jobs, housing, schools and services closer to people can also improve access by reducing trip length.

Figure 6: Defining access

The STARS Access Credits are not necessarily aimed at developing new strategies for meeting access needs. While new strategies are certainly welcome, the STARS focus is on encouraging evaluation and implementation of effective strategies to improve access, energy efficiency, and cost effectiveness. The focus on quantified outcomes may be different from a typical transportation project but the strategies to achieve the outcomes are often not new. The STARS user generally identifies and selects strategies, using the hierarchy and examples provided in Credits A2-A5. The STARS system is intended to be flexible and to adapt to new and innovative solutions as they evolve and to the extent they provide better access solutions on performance metrics (e.g., Access, Climate and Energy, Cost Effectiveness).

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For each Access Goal and Objective (see below), the STARS applicant must show how people with constrained access choices (low income, elderly and disabled, and those without cars) benefit at least as much as other populations. This definition could be expanded, for example, to include individuals who live in high-density urban areas but whose access choices are sufficiently constrained by lack of safe, usable infrastructure or supply for transit, bicycling, and walking.

These individuals or groups (defined by STARS as “choice-constrained populations”) are to be defined by the STARS user specific to the given study area. For example, to improve travel quality, sidewalk and bicycle improvements would focus on all neighborhoods (not just higher income neighborhoods) or perhaps even emphasize disadvantaged neighborhoods or individuals. Financial incentives to use non-drive alone modes could be promoted and could focus on lower income workers, who would potentially realize more personal economic benefit.

Also, much traditional transportation analysis focuses on addressing transportation trips during the peak period primarily. While peak periods are when a majority of recurring vehicle congestion occurs, STARS goals apply to all trips, not just peak-period trips. The primary reason for this is to encourage the viability of non drive-alone modes for all relevant trips, not just peak period (e.g., if transit service is available only during peak periods, it is less viable as an option overall).
A1: Establish Access Goals and Objectives *(Required)*

**Intent**

Guide the design and evaluation of access strategies likely to result in more people using a wider range of affordable and higher quality access options.

**Purpose and Benefits**

STARS is designed to support the creation and use of a balanced, efficient transportation system. This means that, over time, roughly the same number of trips would be taken by each of the major modes (walking, bicycling, bus and rail transit, carpool and vanpool, and driving alone).

Because, in most parts of North America, driving alone dominates the other modes, the STARS Access goals are designed to reward improvements to non-drive alone modes equal to or greater than improvements to driving alone. In most cases numerous capital and programmatic improvements over many years will be required to achieve a balanced transportation system.

**Related Credits**

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<td>Evaluate Expanded Transportation Demand Strategies</td>
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<td>A3</td>
<td>Evaluate Expanded Transportation System Management Strategies</td>
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<td>CEA1</td>
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**Access Credit 1 Components**

**Requirements and Documentation**

STARS applicants must adopt at least three STARS Access Goals, described below. Projects will be rewarded for adopting Modal Access,” “Vehicle Miles Reduced,” and “Travel Quality” Access Goals, for these may be more challenging to achieve than the other goals.

- **What** – state the specific objective(s)
- **How much and by when** – targets and time horizons. Using the STARS Design Years established in Credit IP 1, develop appropriate targets for each. Targets should be defined as a percentage improvement over the baseline conditions, not projected “do nothing” conditions. STARS requires using 5, 10, 20 years out, and the year 2050. The short-term targets are intended to identify “quick win” strategies, spur early action, and recognize incremental funding. *At a minimum, time horizons*
should demonstrate continuing improvement over time, with each subsequent increment being substantively greater than the previous one.

• For whom – including specific objective(s) for choice-constrained populations
• Where – The study area for a given project is defined in Credit IP1. If the study area for a particular objective is different, it should be stated.

STARS Access Goals

The six STARS Access Goals are described below, including the goal, its rationale, and an example.

STARS Access Goal 1: Modal Access

• **Goal**: Increase the number of convenient, affordable access options available to more people.
• **Rationale**: Numerous studies show that many people want access to more and better access options. This goal is designed to reward projects that address that stated preference.
  − Convenience: The convenience of a new access should be measured by distance and time in comparison to the existing options. An option is convenient if it is nearby (e.g., transit stop or carshare vehicle located within ¼ mile of user) and if the travel time is reasonable compared to other available options.
  − Affordability: In general, access affordability takes into account direct and indirect costs for all modes and their relation to personal income. For further guidance, see (for example), the Victoria Transportation Policy Institute (http://www.vtpi.org/tdm/tdm106.htm).
  − Convenience and cost/affordability overlap. For further useful discussion, see (for example) the Victory Transportation Policy Institute (http://www.vtpi.org/tdm/tdm84.htm).
• **Sample Project Objective**: Increase trips with access to 3 or more convenient, affordable options to/from the majority of origins and destinations by 10% in 5 years, 20% in 10 years, 40% in 20 years, and 80% by 2050.

<table>
<thead>
<tr>
<th>What</th>
<th>Increase percentage of trips with access to 3 or more convenient, affordable, options to/from the majority of origins and destinations.</th>
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<tbody>
<tr>
<td>How much and by when</td>
<td>By 10% in 5 years, 20% in 10 years, 40% in 20 years, and 80% by 2050. (Convenience and affordability of options should be compared to existing conditions – e.g., access to transit now vs. access to transit future.)</td>
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<td>For whom</td>
<td>For choice-constrained and full populations</td>
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STARS Access Goal 2: Mode Split

• **Goal**: Increase non-drive alone mode splits (walking, bicycling, bus and rail transit, carpool and vanpool).
• **Rationale**: See “Modal Access Goal” above. Note also that simply making a given mode available is not sufficient; for example, a mostly empty bus would score low on mode split, climate and energy, and cost effectiveness criteria.
• **Sample Project Objective:** Increase the percent of walking trips for all purposes by all people, both choice-constrained populations and others, within the study area (travelshed) by _% in 5 years; _% in 10 years; _% in 20 years; and _% by 2050.

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<thead>
<tr>
<th>What</th>
<th>Increase the percent of people walking to work within the study area (travelshed)</th>
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<tr>
<td>How much and by when</td>
<td>_% in 5 years; _% in 10 years; _% in 20 years; _% by 2050</td>
</tr>
<tr>
<td>For whom</td>
<td>Choice-constrained people and all others</td>
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**STARS Access Goal 3: Vehicle Miles Reduced**

• **Goal:** Reduce vehicle miles traveled. (Appropriate measure is total VMT (not per-capita), to assure reductions even with population growth.)

• **Rationale:** Reducing vehicle miles traveled is a positive indicator of efficient land use, effective travel options, improving physical health and reducing climate pollution and energy use.

• **Sample Project Objective:** Reduce per capita vehicle miles traveled for all travelers, including choice-constrained populations and others, by _% in 5 years; _% in 10 years; _% in 20 years; and _% by 2050.

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<tr>
<th>What</th>
<th>Reduce per capita vehicle miles traveled in the study area (travelshed)</th>
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<tr>
<td>How much and by when</td>
<td>_% in 5 years; _% in 10 years; _% in 20 years; _% by 2050</td>
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<tr>
<td>For whom</td>
<td>For all travelers, including choice-constrained populations and others</td>
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**STARS Access Goal 4: Travel Time Consistency**

• **Goal:** Improve travel time consistency. Credit applicants shall adopt objectives showing non-drive alone travel time consistency improving at least as much or more than for drive-alone trips in each of the four STARS Design Years. Since reducing drive-alone travel time and/or improving travel time consistency may induce additional drive-alone trips, and/or longer trips, STARS users shall evaluate whether life cycle VMT is increased or decreased by improving travel time consistency in the four STARS Design Years. If VMT does not decrease, credit will not be given. Projects are more likely to earn credit by focusing on improving consistency for non drive-alone trips.

• **Rationale:** Improving the travel time consistency of a mode can increase the use of that mode (e.g., transit). Providing a better network for walking and bicycling can significantly improve the trip time consistency for those modes. Private vehicle trip time is a common measure of success today; this goal explicitly requires that improvements in non-drive alone trip consistency improve as much or more than for drive alone trips.
• **Sample Project Objective:** Improve average transit travel time consistency between key origins and destinations within the study area for all transit users, including choice-constrained populations and others, by _% in 5 years; _% in 10 years; _% in 20 years; and _% by 2050.

<table>
<thead>
<tr>
<th>What</th>
<th>Improve average transit travel time consistency between key origins and destinations within the study area</th>
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<tbody>
<tr>
<td>How much and by when</td>
<td>_% in 5 years; _% in 10 years; _% in 20 years; _% by 2050</td>
</tr>
<tr>
<td>For whom</td>
<td>For all transit users, including choice-constrained populations and others</td>
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**STARS Access Goal 5: Travel Quality**

• **Goal:** Improve travel quality by increasing safety, user satisfaction and physical activity in the STARS Transportation Study Area. Credit applicants shall establish safety, user satisfaction and physical activity objectives. Safety and user satisfaction objectives must show increases as much or more for non-drive alone trips and access-related physical activity objectives must increase by at least 2% per year, on average, for the four STARS Design Years.

• **Rationale:** STARS defines travel quality using three measures: safety, user satisfaction, and physical activity.
  
  − **Safety:** Actual and perceived safety concerns are often barriers to use of more sustainable modes. Actual and perceived safety should be improved for all modes and the entire trip; for example, the portion of a walk-transit trip that includes waiting for the transit vehicle should include an objective analysis of personal safety.
  
  − **User Satisfaction:** This part of quality is intended to capture the users’ experience during the trip, including the perceived safety of the trip. The quality of the transportation network—the “attractiveness” of a transportation facility or potential solution to an activity need—is a major determinant in what access choice someone makes. Pedestrians and bicyclists are highly sensitive to the character and quality of the environment through which they travel. Similarly, the perceived safety of a given mode choice or given trip also influences travel choice, especially for walking, bicycling and transit. An analysis of the entire trip, not just the portion when one is in a vehicle or actually traveling, should be undertaken. Thus for bus or other transit use, the actual and perceived safety while waiting for the transit vehicle (e.g., lighting, presence of other people to safeguard personal safety) becomes an essential part of the analysis and/or design of the solution. Personal interviews with users may be an appropriate way to collect data on perceived safety. An assessment of perceived safety with respect to mode choice is not intended to substitute for the traditional safety analysis and design (see above) that would otherwise be conducted for a project.
  
  − **Physical Activity:** Walking, bicycling and transit have proven individual and societal health benefits. With the general lack of physical activity in much of North America, promoting “active” modes of transportation is an elegant and obvious way to promote public health, as it provides health benefits while meeting an access. While walking and bicycling bring the most beneficial and obvious benefits, walking to transit, shorter vehicle travel times (less time sitting passively), and access solutions that generate less harmful air pollution. While shorter travel times for walking and
bicycling might at first seem to reduce potential benefits because an individual would expend less physical energy on a given trip, the collective community health benefits would improve if more people choose active over passive modes.

- **Sample Project Objective:** Improve travel quality for non-drive alone trips over existing conditions with respect to safety, user satisfaction, and physical activity for all users, including choice-constrained populations, by an increasing amount in each of the four STARS Design Years

<table>
<thead>
<tr>
<th>What</th>
<th>Improve travel quality for non-drive alone trips with respect to safety, user satisfaction, and physical activity by ___% per year.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much and by when</td>
<td>Over existing conditions, for non-drive alone trips at least as much as for drive alone trips. Note: Safety deficiencies would be expected to be addressed as required by standard engineering practice. User experience improvements would be based on deficiencies identified. Physical health benefits would be expected to scale with the number of users (trips) newly diverted to walking and bicycling modes.</td>
</tr>
<tr>
<td>For whom</td>
<td>For all users, including choice-constrained populations and others</td>
</tr>
</tbody>
</table>

**STARS Access Goal 6: Capacity**

- **Goal:** Achieve the majority of new forecast person trips through non-drive alone strategies.
- **Rationale:** In many cases, significant portions of future travel demand can be addressed through transportation demand management (TDM) and transportation system management (TSM) strategies. Carpool and vanpool, transit, bicycling and walking can frequently address significant portions of remaining demand. The capacity goal rewards projects that seek a balanced approach to providing capacity for future trips. The capacity goal is similar to mode split but targets only new future trips (the increment that will be added in the future); the mode split goal looks at total trips.
- **Sample Project Objective:** Accommodate at least 50% of new forecast person trips through non drive-alone strategies at time of project opening for all travelers, including choice-constrained users and others.

<table>
<thead>
<tr>
<th>What</th>
<th>Accommodate at least 50% of new forecast person trips through non drive-alone strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much and by when</td>
<td>At time of project opening</td>
</tr>
<tr>
<td>For whom</td>
<td>For all travelers, including choice-constrained users and others.</td>
</tr>
</tbody>
</table>
Option B: The Prescriptive Path

The primary path to achieve STARS credits is performance-based, which requires more analysis, but provides higher quality information, a more comprehensive approach and a potentially higher level of certification. The prescriptive path, on the other hand, may be quicker and simpler to achieve for some projects, but provides more limited information and the minimum level of STARS certification.

The items below are intended to lay out a prescriptive path that would be applicable to most STARS projects; however, not every element would be applicable to all projects. Deviations can be proposed by individual projects.

1. Starts with a simple, one dimensional STARS access goal: at a minimum, accommodate/achieve/attract the majority of new projected future trips in/to non-drive alone modes, including trips not taken, over the next five, ten, twenty and forty years, with progress toward a balanced transportation system in each time period (i.e. an increasing percentage of non-drive alone trips in each time period).

2. Requires the project to adopt a Project Access Goal which meets at least the STARS Access Goal minimum threshold, above. If the majority of trips are currently non drive-alone, the Project Access Goal must be established to show substantive and ongoing improvement in the percentage of non-drive alone trips in 5, 10, 20 and 40 years.

3. Requires the project to implement, at a minimum, the following TDM strategies, within five years:
   - An individualized transportation options marketing program (see, for example, Portland SmartTrips and SocialData TravelSmart) that reaches the majority of drive alone trip origins or destinations at least once every five years;
   - Establish parking maximums for new and redevelopment that reflect parking needed when the Project Access Goal is met (e.g., how many parking spaces would be needed when the majority of trips are non drive alone?) and eliminate parking minimums for the majority of commercial and multifamily uses in the study area or require that the majority of parking stalls in the study area are market priced;
   - The majority of employees in the study area have contact with an Employee Transportation Coordinator at least quarterly.

4. Requires the project to implement, at a minimum, the following TSM strategies, within the next five years:
   - Transit Signal Priority and/or HOV queue bypass on transit routes projected to carry the majority of future transit/HOV users;
   - Pedestrian and bicycle priority along the top three projected pedestrian and bicycle routes;
   - Improvements along the top three high accident routes for each: pedestrians, bicyclists, transit users and motorists.

5. Requires the project to actively attempt to implement, directly or through another agency, the following land use strategies within the next five years:
   - Allow and promote retail uses in the majority of multi-family buildings and zones;
• Allow and promote residential and multi-story uses in the majority of commercial buildings and zones;

• Locate new school facilities within safe walking and bicycling routes for the majority of students.

6. Requires the project to implement, at a minimum, the following Transportation Service & Supply strategies within the next five and ten years:

• Improvements that will substantively reduce travel time on the projected top three pedestrian, top three bicycle, top three transit, and top three carpool routes.

Not all of the strategies above may be applicable to a project. An applicant may request approval to replace one or more of the required strategies above by showing a high likelihood that any proposed replacement strategy/ies will perform more effectively at increasing the proportion of new multi-modal trips than the otherwise required strategy/ies.

References


A2: Evaluate Expanded Transportation Demand Management Strategies

Intent

Evaluate and quantify realistically aggressive transportation demand management (TDM) strategies to help achieve the Access and Climate and Energy goals and objectives established in Credits A1 and CE1.

Purpose and Benefits

Transportation demand management (TDM) refers to policies and programs that aim to change travel behavior to increase the efficiency of the transportation system. Commonly, TDM strategies seek to reduce automobile dependence and increase non-single occupancy vehicle mode share. Many TDM strategies also improve access by removing barriers to travel options. This provides travelers with more choice regarding how and whether they will choose to access a destination. Additionally, some TDM strategies can improve access for the transportation disadvantaged by increasing the travel information and/or reducing the cost of options available to low-income populations, those without cars and people with disabilities.

Related Credits

A1 Establish Access Goals and Objectives
A3 Evaluate Expanded Transportation System Management Strategies
CE1 Establish Climate and Energy Goals and Objectives
CE2 Evaluate Vehicle Mile Reduction Strategies
CE3 Evaluate Improving Vehicle Flow
CEA1 Cost Estimation and Cost-Effective Calculations

Access Credit 2 Components

Requirements and Documentation

To achieve Credit A2, applicants must quantify the extent to which TDM strategies implemented within the project study area are likely to help achieve each of the three to six Project Access objectives selected in Credits A1 and the Climate and Energy objectives selected in Credit CE 1 for the selected target dates.

For minimum credit, quantify the access, climate and energy implications of at least one strategy in each of the following categories:

1. Education: includes individualized marketing programs (for example, Portland SmartTrips [http://www.portlandonline.com/transportation/index.cfm?c=43801] and SocialData’s TravelSmart)

18 Schreffler, 2000; Cairns et al, 2004; USEPA, 2004; Litman 2006
and rideshare promotion programs (for example, NuRide (http://nuride.com/nuride/main/main.jsp) and GoLoco (http://goloco.org/greetings/guest) and other rideshare programs);

2. Financial Incentives: includes short-term or longer-term financial incentives (for example, Portland’s Bike and Walk Bucks (www.portlandonline.com/shared/cfm/image.cfm?id=193892) and private sector financial incentive programs);

3. Market Pricing: includes requiring market-rate parking pricing in new development, establishing parking maximums reflecting 2030 mode split objectives (which could have pricing implications over time) and/or pricing roadway access;

4. Equity: TDM measures benefiting people with constrained choices. Includes providing information and incentives to low income workers, low income areas or people without cars.

For double credit, evaluate at least two strategies in each category above. For example, if the project had selected the three access goals Vehicle Miles Reduced, Mode Split, and Capacity, results of the TDM strategies evaluation could be summarized in a table similar to the illustrative one below for each of the target dates.

<table>
<thead>
<tr>
<th>(target date)</th>
<th>Vehicle Miles Reduced</th>
<th>Mode Split</th>
<th>Capacity</th>
<th>Greenhouse Gas Emissions</th>
<th>Energy Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education program(s)</td>
<td>(VMR quantified)</td>
<td>(mode split change)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Incentive(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Pricing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Methods**

The primary types of TDM programs and policies that can help meet the requirements above are:

- Education and Outreach Programs
- Challenge/Incentive Programs
- Rideshare/Carshare Programs
- Parking Policies
- Employer TDM Programs
- Pricing Policies
- Job Access and Reverse Commute (JARC)

Also note that land use policies can help improve access by shortening trip lengths, reducing travel times, and increasing the convenience of using multiple travel options. Smart growth and compact development strategies are covered in Credit A4: Evaluate Expanded Land Use Strategies.
Strategy 1: Education and Outreach Programs

Education and outreach programs can help improve access by providing travelers with the information and knowledge necessary to utilize different travel modes. For example, well developed bicycle maps can help remove a barrier to bicycle travel for less experienced riders. Additionally, individualized marketing programs can target transportation disadvantaged populations, increasing their access to travel options information. Examples of the types of TDM strategies that fall under this category are listed below:

- Individualized Marketing Programs (e.g., Portland, Oregon’s SmartTrips)
- Education Materials on Alternate Modes (bike maps, walking maps, transit maps & schedules, how to put bike on bus, bicycle maintenance 101, etc.)
- Alternate Mode Websites (trip planning & information for alternate modes)
- Awareness Raising Festivals/Events (e.g., Portland, Oregon’s Sunday Parkways; Davis, CA’s annual Cyclebration festival)

Strategy 2: Challenge/Financial and Non-financial Incentive Programs

Challenge programs can help improve access by encouraging travelers to try new modes, helping to remove the barriers a traveler can face when trying something for the first time. For example, a bicycle commute challenge can pair up bicycle buddies and encourage employees to try bicycling to work for the first time, which they might not have done otherwise. Incentive programs can improve access by reducing the cost of different travel modes, making them more attractive (and thus accessible). For example, a discounted transit pass program can reduce the cost of taking transit. Financial incentives are also addressed in Strategies 4 and 5.

Examples of the types of TDM strategies that fall under this category are listed below:

- Commute Challenges (e.g. Bicycle Commute Challenges)
- Reward Programs (e.g. transit commuter of the year)
- Special Events (e.g., breakfast on the bridges –Portland, OR)

Strategy 3: Rideshare/Carshare Programs

Rideshare programs, such as carpool and vanpool match-up services can help remove barriers to finding rideshare partners. However, other “sharing” programs, such as bicycle sharing and carsharing, can also help to improve access. Bicycle sharing/loan programs can increase the access travelers have to bicycles, while car sharing programs, such as Zipcar, can provide travelers without cars with occasional access to a vehicle. Examples of the types of TDM strategies that fall under this category are listed below:

- Ride-Matching Websites/Programs
- Financial Incentives for Carpools/Vanpools
- Emergency Ride Home Programs
- Bike Sharing Programs
- Car Sharing Programs (including sharing of private vehicles – see, for example http://daily.sightline.org/daily_score/archive/2010/06/10)
Strategy 4: Parking Policies
Parking policies can help improve access by reducing parking barriers for alternate mode users (carpools/vanpools, etc) as well as shoppers. For example, providing reserved or discounted parking for carpools can reduce the travel cost, travel time, and door-to-door trip distance for carpoolers. Parking policies can increase access for shoppers by discouraging long-term monthly parking for commuters, while retaining a supply of short-term parking that is important for shopping trips that support economic development.

Examples of the types of TDM strategies that fall under this category are listed below:

- Parking management plans (including for special events)
- Parking incentives/discounts for alternate mode users (including parking cash-out and unbundling)
- Parking time of day/length restrictions
- Shared use of existing or new/future parking
- Establish parking maximums and eliminate parking minimums
- Require market rate parking pricing

Strategy 5: Employer TDM Programs
Employer TDM programs can help improve access by removing barriers to travel options for their employees. Note that while this category may have some overlap with the strategies described above, the policies and programs described here specifically refer to those that employers can implement.

- Transportation Management Associations (TMAs)
- Commute Trip Reduction Programs
- Employer Parking Policies (e.g., parking cash outs, parking priority for alternate mode and HOV users, etc.)
- Incentives/Rewards for Alternate Mode Commuters
- Flexible Work-Hours
- Alt Mode Incentives for Business Trips (free transit tickets, carsharing memberships, telecommuting etc)
- Telecommuting Encouragement Programs

Strategy 6: Pricing Policies
Strategies that increase the cost of single occupancy vehicle travel can improve access for the study area as a whole. Increasing the cost of vehicle use typically reduces miles of travel, as a result of individual choices to drive less, to take other modes, or to make virtual trips. The pricing strategy should be designed to minimize the experience of a reduced access, although some auto dependent individuals may perceive such a reduction as a result of program implementation. Any funds generated net of implementation costs should be expended in a way that increases the access choices available to the region (e.g., by increased transit service, investments in TSM, etc.). Because in some cases pricing can shift trips to parallel “free” routes, the user must verify that the pricing strategy actually helps achieve the TDM goal.

Examples of the types of TDM strategies that could be quantified to achieve this credit include:
• Pay as You Drive (PAYD) Insurance
• Vehicle Mileage Fees
• Road Pricing – Flat tolls (tolls that do not vary with congestion levels) – (for variable tolls that aim to increase the efficiency of the transportation system, see Credit A3)
• Increased License and Registration Fees
• For parking pricing, see Strategy 4 above

**Strategy 7: Job Access and Reverse Commute (JARC)**

Federal funding has helped establish Job Access and Reverse Commute (JARC) programs in a number of locations to address the unique transportation challenges faced by low-income individuals have difficulty accessing the suburban jobs from their inner city, urban, or rural neighborhoods. Many such jobs also require working late at night or on weekends when conventional transit services are either reduced or non-existent. Finally, many employment related-trips are complex and involve multiple destinations including reaching childcare facilities or other services. For more information, see [http://www.fta.dot.gov/funding/grants/grants_financing_3550.html](http://www.fta.dot.gov/funding/grants/grants_financing_3550.html).

**Relevant Access Components**

The relevance of each of the Stars Access Components defined in Credit A1 to evaluating TDM strategies is described below:

- **Modal Access** - TDM measures could increase the convenience and/or affordability of modal options. For example, providing short or long-term financial incentives, such as lower-cost carpool parking, six month vanpool subsidies or monthly “walk, bike and bus buck” programs all improve affordability. Promoting these programs to lower income residents or workers can ensure people with constrained choices benefit at least as much as the population as a whole.

- **Mode Split** – TDM strategies are often a quick, inexpensive and effective method for increasing non-SOV mode split. For example, individualized marketing programs, such as Portland SmartTrips, have frequently boosted mode split for walking, bicycling, carpool and transit use.

- **VMT** – TDM strategies (i.e., encouraging the use of non-SOV modes) are a key component for reducing VMT.

- **Travel Time** – TDM strategies are not likely to directly influence travel time by a given mode; typically, such improvements come from increased supply or service. Travel time in general is relevant to TDM given the travel time disadvantages that non-SOV modes have in many applications in comparison to SOV trips. The user will want to understand what the comparative travel time issues are in assessing TDM strategies.

- **Travel Quality** - Applicable to travel quality for pedestrian, bicycle and transit users primarily, key modes promoted by TDM strategies. While TDM measures may have some influence on travel quality, it is not likely to be great.

- **Capacity** – TDM measures do not typically address transportation supply or capacity but rather the use of the existing supply.
Resources

Identifying TDM Strategies
The following are resources for up to date information on TDM strategies and tools for implementing and measuring the impact of TDM programs and policies.

- Travel Demand Management Toolbox: The Federal Highway Administration (FHWA) Office of Operations hosts a continually updated Travel Demand Management Toolbox that provides TDM resources to help manage congestion. The resources include publications, web links, and training offerings. [http://ops.fhwa.dot.gov/tdm/toolbox.htm](http://ops.fhwa.dot.gov/tdm/toolbox.htm)

- Online TDM Encyclopedia: The Victoria Transport Policy Institute maintains an online TDM Encyclopedia that aims to provide a comprehensive source of information about demand management strategies and TDM planning and evaluation techniques. [http://www.vtpi.org/tdm/](http://www.vtpi.org/tdm/)

- Commuter Choice Decision Support Tool: The FHWA and Environmental Protection Agency (EPA) have developed an online interactive guidance tool to help employers determine the most appropriate commuter choice programs for their worksites. [www.ops.fhwa.dot.gov/PrimerDSS/index.htm](http://www.ops.fhwa.dot.gov/PrimerDSS/index.htm)

- TDM Research: The Center for Urban Transportation Research (CUTR) at the University of South Florida has extensive TDM research online at [http://www.cutr.usf.edu/index.shtml](http://www.cutr.usf.edu/index.shtml).

Evaluation Tools

Trip Reduction Impacts of Mobility Management Strategies (TRIMMS) Model
The National Center for Transit Research at the University of South Florida has developed the TRIMMS model, which allows users to estimate the benefits and costs of travel demand management strategies. Outputs of the model include predicted mode split, the cost/benefit ratio, and the percent trip or VMT reduction as a result of various TDM program packages. The model allows the user to input a mix of local data sources or use national default values based on recent research. The model is available for download online and is free to users. [www.nctr.usf.edu/abstracts/abs77704.htm](http://www.nctr.usf.edu/abstracts/abs77704.htm)

Employer Trip Reduction Model
This software was developed using an artificial neural network (ANN) model to predict changes in average vehicle ridership using about 7,000 employer trip reduction plans from three cities. It was developed by the Center for Urban Transportation Research at the University of South Florida and is available to download free online. [www.cutr.usf.edu/tdm/download.htm](http://www.cutr.usf.edu/tdm/download.htm)

Case Studies

Education and Outreach Example: Smart Trips, Portland, Oregon
Smart Trips is an individualized marketing program that offers customized packets of alternate transportation information and resources to target populations every year in the Portland, Oregon area. Target populations vary from year to year and may include residents in specific neighborhoods, businesses in specific districts, or residents and businesses along certain corridors, such as the Green Line Smart Trip Program that began in 2010 after the opening of the Green Line light rail line (City of
Portland, 2010). Year after year the Smart Trips program has resulted in substantial reductions in single-occupancy vehicle driving (City of Portland, 2010).

**Parking Program Example: Portland Central City Transportation Management Plan**

The City of Portland runs seven city-owned parking garages, Smart Park, designed to discourage parking over 4 hours. Different hourly rates are applied depending upon whether a vehicle is parked for more or less than four hours. This policy, supported by the Portland Central City Transportation System Management Plan, frees up parking spaces for short-term retail trips that boost the local economy, while limiting the supply of long-term parking for commuters.


**Employer TDM Program Example: Lloyd District Transportation Management Association**

Transportation Management Associations (TMAs) are independent entities dedicated to solving transportation problems in a particular geographic area by actively managing transportation demand and encouraging alternate travel modes. The Lloyd District TMA was formed in 1997 to serve businesses, employees, and visitors within the Lloyd District, located on the east side of the Willamette River in Portland, Oregon. Since then the TMA has worked actively to implement TDM strategies, including distributing educational materials, conducting outreach events, and coordinating transit pass and rideshare programs, among others. Since 1997, the single occupancy vehicle commute mode share in the district has fallen 20% - from 60% to 40%, which means that more than half of the employees in the Lloyd District are commuting by alternate transportation modes.

http://www.lloydtma.org/sites/default/files/Assembled%202010%20Annual%20Report.pdf

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A3: Evaluate Expanded Transportation System Management Strategies

Intent
Evaluate realistically aggressive transportation system management (TSM) strategies to help achieve the Access goals established in Credit A1.

Purpose and Benefits
The purpose of Credit A3 is to encourage the consideration, evaluation, and use of transportation system management (TSM) strategies. TSM is a strategy aimed at improving the overall performance of the existing transportation network and system without large-scale, expensive capital improvements. TSM integrates techniques from across disciplines to increase safety, efficiency, and to make better use of existing capacity for all modes of the transportation system.

A typical TSM success measure is one in which a low-cost infrastructure investment accommodates a greater number of travelers, while minimizing travel instability, thus making the transportation system more reliable. Travel reliability is important as it measures the degree to which the transportation system is reliable which has multiple benefits, including minimizing emissions due to idling. Uncertainty in travel times is often also a driver for capacity expansion projects.

While TSM measures are typically thought of as improving the efficiency or efficient use of the existing system (often the roadway system), the examples below and subsequent discussion of their relation to the access definitions in Credit A1 demonstrate their potential influence on access more broadly, in particular promoting multi-modal transportation.

Related Credits
A1 Establish Access Goals and Objectives
A2 Evaluate Expanded Transportation System Management Strategies
A4 Evaluate Expanded Land Use Strategies
CE1 Establish Climate and Energy Goals and Objectives
CE2 Evaluate Vehicle Mile Reduction Strategies
CE3 Evaluate Improving Vehicle Flow
CEA1 Cost Estimation and Cost-Effective Calculations

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19 MIC, 2007
Access Credit 3 Components

Requirements and Documentation
To receive credit, users will need to evaluate strategies against the six access goals defined in Credit A1. This evaluation would document changes to travel time, delay, and/or predictability, as suggested in the examples above. These factors are typically estimated using travel models. Results could be used to document changes in energy use and cost effectiveness as well.

Methods
The types of TSM strategies that improve the overall performance of the transportation network and system without resorting to large-scale, expensive capital improvements are categorized as follows:

- Low-cost Roadway Modifications
- Intelligent Transportation Systems (ITS)
- Congestion or Value Pricing
- Enforcement and incident response programs

The discussion below is not definitive but rather highlights some key TSM applications, focusing on multi-modal examples that relate well to the overall goals of STARS. The effectiveness of any given TSM strategy depends on a variety of factors and care must be taken in establishing that the expected benefits actually will be achieved.

Strategy 1: Low-cost Roadway Modifications
Low-cost roadway modifications optimize the use of the existing roadway footprint. These improvements may benefit multiple modes and can increase person throughput.

Road Diet
One of the best known strategies to expand safe, multi-modal access while keeping the footprint of a roadway the same is the concept of the road diet. Across the country many four-lane roadways exist that unnecessarily constrain overall levels of access for vehicles, transit users, pedestrians, and bicyclists. These four-lane roadways experience a high number of conflicts between all modes, including autos. In a typical four-lane roadway, drivers turn left from the inside left traffic lane, potentially resulting in rear-end crashes and congestion for other drivers. Converting a four-lane roadway (two lanes in each direction) to a roadway striped with two traffic lanes, a continuous center turn lane, and a bicycle lane in each direction thus may increase both safety and access benefits.

The ideal roadway to be considered for a road-diet is often a four-lane road carrying 12,000 to 18,000 auto trips per day.\textsuperscript{20} Figure 6, below, is an illustration of a road diet implemented in Rainer Avenue in Washington.

\textsuperscript{20} Burden and Lagerwey, 1999
Benefits of the road diet are:

- Improved vehicle travel flow
- Fewer conflict points between vehicles
- Potentially shorter pedestrian crossing distances with ability to better accommodate a pedestrian island
- Opportunities for walking and bicycling without expanding footprint of roadway

**Reversible Lanes**

Reversible lanes allow one or more lanes on a facility to shift direction throughout the day to accommodate traffic patterns with a strong directional peak, such as morning and evening peaks. There must be a large directional flow during peak periods to make this a viable solution. By utilizing additional lanes in the direction that demands more capacity, congestion can be reduced and overall capacity can be increased, while maintaining the same overall roadway footprint or minimizing increases. Lane control, signs, and special pavement markings are used to inform motorists of lane direction and movements. While not commonly used, in the right context reversible lanes can be an appropriate solution.
Roadway Bottleneck Removal
Generally applicable to freeways or arterials, bottleneck removal consists of identifying congested or high-conflict areas and addressing the following issues:21

- Insufficient acceleration/deceleration lanes and ramps
- Weaving sections
- Sharp horizontal/vertical curves
- Narrow lanes and shoulders
- Inadequate signage and pavement striping
- Addressing other geometric deficiencies
- Lane balance/merges

With respect to the STARS hierarchy, a bottleneck project that was not a low-cost project would be more appropriately evaluated under Credit A5: Expanded Transportation Supply and Service.

Lane Conversions
Converting existing lanes to high-occupancy vehicle (HOV) use or high-occupancy toll (HOT) use is another tool to make more efficient use of existing capacity at low cost. See also discussion under Credit A5: Evaluate Expanded Transportation Supply and Service.

Strategy 2: Intelligent Transportation Systems (ITS)
Intelligent Transportation Systems (ITS) strategies improve transportation safety and mobility and enhance productivity through the use of advanced information and communications technologies. ITS encompasses a broad range of wireless and wired communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance overall productivity. ITS strategies are generally divided into intelligent infrastructure systems and intelligent vehicle systems.

Signal timing strategies are those that optimize traffic operations through the timing and priority of traffic signals. Selected approaches to signal timing priority and dynamic signal timing are described below.

Green Wave
Green wave technology is the retiming of traffic signals to an average bicycle pace, creating a green “wave”, a progressive cascade of green lights, for cyclists so they do not have to stop. This is a benefit to cyclists because they depend on momentum and energy, and stopping and starting requires more exertion. Green wave timing also increases the comfort for cyclists; both physical discomfort and exertion are barriers to cycling. Signals are timed to turn green consistent with the average speed of a cyclist. As an added benefit, all traffic is slowed to speeds at which crashes are less likely and crash severity much less. Slowing auto speeds may have the added benefit of better metering traffic during highly congested periods and improving traffic flow. Green wave technology has been used in Amsterdam and Copenhagen.

21 NCTCOG, 2010
Signal Timing
A large variety of signal timing tools and strategies are available. Some key strategies are highlighted below.

- Transit signal priority
- Truck priority
- Ramp meters
- HOV lanes on freeway on-ramps
- Pedestrian signal priority
- Signal synchronization and dynamic signal timing

Active Traffic Management
Active Traffic Management is the ability to dynamically manage recurrent and non-recurrent congestion based on prevailing traffic conditions. Focusing on trip reliability, it maximizes the effectiveness and efficiency of a roadway. It increases throughput and safety through the use of integrated systems with technology that allows for automated, dynamic deployment to optimize performance without the delay that occurs when operators must deploy operational strategies manually. This congestion management approach is a combination of operational strategies that are aimed to fully optimize the existing infrastructure and provide measurable benefits to the transportation network. These strategies include speed harmonization, temporary shoulder use, junction control, managed lanes, and dynamic signing and rerouting.

Other ITS Applications
There are many other ITS applications, from incident management plans to ITS control and information systems on managed lanes. Other ITS applications are listed in the Federal Highway Administration’s (FHWA) Research and Innovative Technology Administration (RITA) Office of Intelligent Transportation Systems Applications Overview portion of their ITS website (see at: http://www.itsoverview.its.dot.gov).

Strategy 3: Congestion Pricing
Congestion pricing, also called value pricing, aims to make the traffic system more efficient by quantifying and passing on the incremental cost of congestion to drivers who choose to use that roadway. In this way, people pay more directly for the congestion they contribute. The effect is that some travel shifts to off-peak periods, other modes, or potentially other routes or destinations. By removing even a fraction of vehicles off the roadway, pricing enables the system to flow much more efficiently, allowing more vehicles to move through the same space. Congestion pricing provides a financial incentive to use non-auto modes or to carpool if they are not subject to pricing. The effect of congestion pricing is to make the overall traffic flow more efficient by reducing congestion. Charges may be designed to optimize network or facility travel times, thus increasing accessibility to travelers as a group.

For credit information on other pricing strategies, see Credit A2: Evaluate Expanded Transportation Demand Management Strategies.
**Strategy 4: Enforcement and Incident Response Programs**

Enforcement, typically used as a way to make traffic conditions safer for all users, can also be used to optimize access. Ramp meters, and high-occupancy vehicle lane use can all be managed through photo enforcement.

Incident response programs not only enable quicker response times to crashes of all sorts, they clear crash areas more quickly allowing for greater travel time predictability. Four to ten minutes of traffic congestion (depending on traffic volume) can result from every minute a lane remains blocked. Detecting and clearing incidents rapidly minimizes the impact on congestion, especially during peak periods.

**Relevant Access Components**

The relevance of each of the STARS Access Components defined in Credit A1 to evaluating TDM strategies is described below:

- **Modal Access** – Several of the TSM examples cited in this credit – road diet, “green wave” signal timing, congestion pricing – are intended in part to influence modal access by making more modes available or increasing their attractiveness. The strategies address motor vehicle safety and travel time reliability but do not typically add motor vehicle capacity, while they may add capacity or otherwise reduce barriers for other modes (e.g., new or improved bike facilities). Traveler information systems might indirectly influence mode choice; for example, if the information shows the freeway is very congested, a user might choose another mode. However, the intent is to provide information so the user can make a choice (more typically a route choice, not a mode choice) and not to shift mode.

- **Mode Split** – Several of the TSM strategies cited in this credit are intended in part to influence modal access and as such would be expected to contribute positively toward a mode split goal. See discussion above for the “Modal Access” component.

- **VMT** – See discussion for Modal Access and Mode Split. Clearly, TSM measures that only improve SOV trips (e.g., traveler information for motorists; signal timing) would not reduce VMT and could in fact lead to increases.

- **Travel Time** – Defined by STARS as reducing travel time primarily for non-SOV modes, this measure could be relevant in cases where the TSM strategy improved the facilities for walking, bicycling, or transit trips. However, it would not be a major measure with respect to TSM.

- **Travel Quality** – Similar to Travel Time, it could be relevant in some situations (e.g., a road diet that adds a new separated sidewalk for a significant distance) but would not be the most common or useful measure of TSM success.

- **Capacity** – To the extent that TSM measures can add small amounts of capacity, this measure could be useful for some TSM strategies but in general would not be.
RESOURCES

Case Studies

Road Diet Example: Fourth Plain Boulevard, Vancouver, Washington
Fourth Plain Boulevard connects Interstate 5 to West Vancouver neighborhoods, recreation, and industry, including the Port of Vancouver, Washington, and it serves a variety of transportation users, including truck traffic through west Vancouver. It is designated as a principal arterial. Before the road diet project was implemented, this facility was designated a state truck route. When Fourth Plain Boulevard was converted, a parallel facility, Mill Plain Boulevard, was converted to a truck route bypass. This new bypass contributed to the success of the project by removing some truck traffic from Fourth Plain Boulevard.

The “road diet” converted Fourth Plain Boulevard from a facility with two travel lanes in each direction (four lanes total), to a facility with two travel lanes, a two-way center turn lane, bike lanes, and ADA ramps, using the same roadway footprint. The project length was one mile.

The purpose of the road diet conversion project on Fourth Plain Boulevard was to:
- Cost-effectively enhance the environment for all street users while minimizing operational or spillover effects
- Develop a safe and efficient transportation system
- Reduce the crash frequency and number along the corridor
- Improve pedestrian and bicycle mobility
- Establish a balance between vehicle operations, port freight access and neighborhood livability

The purpose of the road diet conversion aligns with STARS goals to increase accessibility for all modes. Two years after Fourth Plain was converted, an on-line web survey found that most respondents were pleased with the results of the project and have noticed improvements to safety and livability. Retail sales analysis found that the commercial areas on or adjacent to the project experienced above average sales relative to other areas in the city post project implementation, during a time when retail sales were depressed generally. Since project implementation, crashes have been reduced significantly, traffic operations continued to perform adequately without queuing issues, and access for bicyclists and pedestrians has been improved. 22

Green Wave Example: Copenhagen, Denmark
The first “green wave” bike route in Copenhagen was used by 30,000 cyclists. Copenhagen’s aim is to boost bicycle commuting from the suburbs. Currently 55 percent of Copenhagen residents cycle every day; however, only 37 percent of residents of Greater Copenhagen cycle. The City would like to attract people who commute 7-15km (4-9 miles) into the center of Copenhagen with a new bike system, using existing roadways.

To do so, Copenhagen has implemented “green wave” technology, which is an adjustment of signal timing to give cyclists a continuous ride if they travel 20 km/h (12.5 mph). Green wave technology has

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22 Rosales, 2006
been implemented on many main cycling routes in Copenhagen. In addition to the “green wave,” planned routes will be developed on existing bicycle lanes with a number of other design features added:

- Surfaces will be kept smooth and even, free of leaves, ice and snow.
- Routes will be as direct as possible, with no detours.
- Homogenous visual expression, for example, a branded look for wayfinding signs and bike lane coloring through larger intersections.
- ‘Service stations’ with air and bicycle repair tools along the routes.
- Accommodate the possibility to maintain a high speed, with sufficient width to pass slower cyclists.
- Safe and quick crossing priority for cyclists when they approach cross streets in places where “green wave” technology is not used.\(^{23}\)

The use of green wave technology in Copenhagen is an example of a TSM strategy that improves multi-modal access. Copenhagen has developed a system that prioritizes existing facilities for bicycle travel. The Copenhagen example is a more bicycle-oriented approach. If implemented in an otherwise, largely auto-oriented system, approaching planning in this way improves access because it better balances the system for underserved users, cyclists.

**Congestion Pricing Example: MnPASS, Minneapolis, Minnesota**

The Minnesota Department of Transportation (MnDOT) has proven success with the conversion of the existing Interstate 394 high-occupancy vehicle (HOV) or carpool lanes to high-occupancy toll (HOT) lanes. HOT lane tolls allow solo drivers to be able to use HOV lanes by paying an electronic toll. Carpoolers, transit buses and motorcycles can still use the HOT lanes for free. Solo drivers who pay a toll can only use the HOT lanes during designated times, peak travel hours. Tolls are variable based on the level of congestion in the HOT lanes to ensure traffic flows at 50-55 mph. Tolls also vary depending on the length of the HOT lane trip. Tolls average $1 to $4 during peak travel hours, with a maximum toll set at $8. Fees are posted on overhead signs at entrances, and transponders are used to trigger toll charges from a pre-paid account. In addition, MnDOT has implemented a reversible lane to accommodate the dominant flow of traffic depending on the time of day.

Minnesota has also implemented a system of priced dynamic shoulder lanes. MnDOT converted narrow bus-only shoulder lanes along the northbound portion of Interstate 35W between 46th Street and downtown Minneapolis to wider priced dynamic shoulder lanes (PDSLs), and has moved these lanes from the right-most to the left-most portion of the roadway to minimize conflict with entering vehicles. Buses and high-occupancy vehicles operate at no charge in the PDSLs with access allowed during peak times to single-occupant vehicles whose drivers are willing to pay a toll, with prices set to ensure free-flow travel. PDSLs will enable bus speeds to increase to 50 mph from the current bus-only shoulder lane speeds of 35 mph or less. In the longer term, the goal is to convert as many miles as possible of Minnesota's existing 260-mile bus-only shoulder lane network to PDSLs.

Toll revenues are used, in part, to provide transit riders significant fare discounts for trips using the HOT lanes during peak periods. In advance of transit stops, on the roadway, information about transit alternatives will be presented to allow direct comparisons with the time and cost of the driving alternatives.

\(^{23}\) Greater City Providence, 2009
The MnPass System Study Final Report, which evaluated MnPass alternatives, established transportation performance and financial performance evaluation criteria. Transportation system measures related to the project objective, which is to maintain an even traffic flow as much as possible. Therefore the measure used was Vehicle Miles of Travel/Vehicle Hours of Travel, which is average speed. This measure was developed for the regional system, the MnPASS system only, and segments within the MnPass System. Financial performance measures included a cost recovery ratio, and overlaps with transportation performance. Alternatives with a high degree of cost recovery indicate a high travel demand and lower implementation cost.  

The MnPASS example increases accessibility for all modes, because the toll introduces an incentive for more discretionary driving trips to be made at a different time (less congested time), a different route, or a different mode. Moreover, toll revenues have been used to expand transit access through increased service and subsidized fares for those traveling during peak periods.

References


U.S Department of Transportation
http://www.cflhd.gov/ttoolkit/flt/FactSheets/Infrastructure/REVERSIBLE%20LANES.htm


24 Cambridge Systematics, 2005
25 MnPASS, 2010
http://international.fhwa.dot.gov/pubs/pl07012/index.cfm#execfind


MnPASS, retrieved on 5/16/10 from http://www.mnpass.org/
A5: Evaluate Expanded Transportation Supply and Service

Intent
Evaluate a range of transportation supply options, including infrastructure and service, to help achieve the access goals defined in Credit A1.

Purpose and Benefits
Enhancing transportation infrastructure supply and service is perhaps the most powerful access tool with respect to its ability to influence many social, environmental and economic issues (e.g., land use and community form, physical activity, environmental impact, etc.).

This credit recommends that, after transportation demand management and transportation system management (TDM/TSM) options have been evaluated, new infrastructure or service may be explored to meet access goals within the project study area (defined in Credit IP1). This credit addresses both supply (infrastructure such as sidewalks, lanes, rail tracks) and also service (e.g., purchase and operation of transit vehicles, as well as such qualitative factors as comfort, safety, and convenience).

Related Credits
A1 Establish Access Goals and Objectives
A2 Evaluate Expanded Transportation Demand Management Strategies
A3 Evaluate Expanded Transportation System Management Strategies

Access Credit 5 Components

Requirements and Documentation
To receive credit, applicants must quantify the contribution of each infrastructure category, mode, and strategy toward the access goals and STARS Design Years in Credit A1.

While the credit is written in terms of certain access features (e.g., “ramps” or “managed lanes”), credit is given for performance, not simply for constructing features.

Methods
The hierarchy of strategies that follows is an approximate guide; the actual value of a given strategy in meeting the overall STARS goals (Access; Climate and Energy; Cost Effectiveness) will depend on the project specifics.

Infrastructure for Virtual Access
Use of electronic communication or virtual access can provide the same or similar levels of access for certain access needs without travel or with less travel. The opportunity for improved virtual access to meet these needs should be considered as much as any other solution. Types of infrastructure that may expand the use of this access solution could include:
• Local or regional communications infrastructure (e.g., a T1 line)
• Infrastructure for individual organizations or public rental use (videoconferencing facilities, computer equipment for email/web use)
• Personal infrastructure (e.g., home or mobile computers, high-speed internet)

Infrastructure for Non-Motorized Modes
• Walking: sidewalks, trails, crossings, footbridges, and other pedestrian access ways.
• Bicycling: off-street (paths) and on-street (lanes, boulevards, cycle tracks, etc.). Also can include bicycle parking facilities.

Infrastructure for Emerging or Hybrid Modes
The intent of this category is to provide an opportunity for separate classification (and STARS credit) for infrastructure to support potentially emerging modes such as neighborhood electric vehicles, personal electric vehicles (e.g., the Segway), or similar modes whose energy intensity and land use footprints fall between human-powered and traditional motorized modes. Due to the evolving nature of these vehicles, their relative benefits to access over current vehicles, and their infrastructure requirements, this portion of the credits is not being developed further at this time.

Infrastructure for Motorized Modes
High Occupancy Vehicles
• System: fixed guideways (bus rapid transit (BRT), rail (streetcar, light rail transit, commuter rail, heavy rail), tram, etc., or lanes (high occupancy vehicles only, both transit and carpool/vanpool).26
  (Note – construction of unrestricted vehicle lanes that will be used for mixed traffic including buses is a potential strategy but is categorized under Single Occupancy Passenger Vehicles below.)
• Access to system: ramps, pullouts, stations, etc. (including queue bypass lanes for transit)
• Services: Includes transit vehicles and their operation.

Single Occupancy Vehicles
• System: New streets and/or travel lanes for single occupancy vehicle use (no priority) for through travel or auxiliary lanes to access the system.
• Access to system: New turn lanes from other facilities (for local streets) or new ramps (for access-controlled facilities). Function of ramps is to access and, potentially, regulate flow on the system.

Commentary: This credit is designed to accommodate evolving vehicle and fuels technologies. For example, if a passenger vehicle operates with a “zero-carbon” power source, many of the negative energy and climate impacts associated with motor vehicles operations would be eliminated over time. The STARS credits are intended to allow appropriate credit for these changes.

Relevant Access Components
The relevance of each of the access components defined in Credit A1 to evaluating infrastructure supply strategies is described below:

26 HOV as defined here does not include LEVs and hybrids. Any policies for preferential treatment of this vehicle type would be addressed as part of the Climate and Energy goals.
• Modal Access – New supply and service would likely be a key part of providing more modal choices to more people, especially where those choices do not already exist.

• Mode Split – Providing additional supply of non-SOV modes is one contributor toward increasing the mode split for those options but not the only one or necessarily the most significant.

• VMT – Expanding supply and service for non-SOV modes is a key component for reducing VMT; expanding supply of general purpose roadway capacity (lanes) usually increases, rather than decreases, VMT.

• Travel Time – Travel time is a common and appropriate measurement for motor vehicle travel and network performance and may also be a relevant measure for other modes. As described in Credit A1, however, improvements to SOV travel time must be balanced with improvements to non-SOV modes in order to achieve credit.

• Travel Quality - Applicable to travel quality for pedestrian, bicycle and transit users primarily. Expanded supply (and to a lesser extent service) could improve quality for these users.

• Capacity – Expanded transportation supply and service is mostly synonymous with expanded capacity; however, as described in Credit A1, expanded capacity must be linked to reductions in SOV trips in order to achieve credit.

Measuring Performance
For expanded infrastructure and service, travel forecasting models are typically used to predict the change in performance (as measured by the access dimensions above) that would result from implementation of the various strategies identified in this credit.

It should be noted that new infrastructure can induce travel demand. Induced vehicle demand from new infrastructure could change the impacts, benefits, and costs of a strategy in relation to overall STARS goals: induced demand for vehicular trips could reduce a strategy’s effectiveness in some STARS terms; non-motorized and transit trips could enhance a strategy’s effectiveness. To get points, STARS applicants are expected to address induced demand as part of documenting the performance of the identified strategies against the access goals.

References


Highway Capacity Expansion and Induced Travel: Evidence and Implications. Transportation Research Circular Issue Number: 481, Transportation Research Board
ISSN: 0097-8515.
Climate and Energy

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<td>Evaluate Vehicle Mile Reduction Strategies</td>
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OVERVIEW

There are five Climate and Energy credits developed. The focus of Climate and Energy Credits 1 to 5 is to reduce study area greenhouse gas (GHG) emissions and energy use compared to base year conditions, increasing over each STARS Design Year (5, 10, 20 and 40 years). Reductions must be achieved using project strategies, not through the purchase of “offset” credits. The applicant is encouraged to use available analytical tools and follow the performance path for each credit unless it is infeasible; prescriptive strategies are provided for each credit in this event. A listing of each credit and its intent and submittal requirements are shown below:

- **CE1: Establish Climate and Energy Goals.** Intent: Significantly reduce corridor life cycle GHG emissions, energy consumption and vehicle miles traveled. CE1 is required for a project to achieve STARS certification. CE 1 establishes energy use and GHG reduction goals and objectives; subsequent climate and energy credits evaluate how to achieve the climate and energy goals and objectives. STARS applicants must develop project-specific climate and energy goals and objective(s).

- **CE2: Evaluate Vehicle Mile Reduction Strategies.** Intent: evaluate project strategies to determine which are most likely to reduce energy use and climate pollution by reducing vehicle miles traveled (VMT).

- **CE3: Evaluate Improving Vehicle Flow.** Intent: evaluate project strategies to determine which are most likely to reduce energy use and climate pollution from improving vehicle flow.

- **CE4: Construction Materials and Methods.** Intent: evaluate project strategies to determine which strategies are most likely to reduce energy use and climate pollution from materials use (embodied and transport) and innovative construction practices.
• **Credit CE5: Evaluate Renewable Energy and Energy Efficiency.** Intent: evaluate project strategies to determine which strategies are most likely to reduce energy use and climate pollution by use of on-site renewable energy and energy efficiency.
CE1: Establish Climate and Energy Goals and Objectives (Required)

Intent
Significantly reduce corridor life cycle greenhouse gas (GHG) emissions and energy consumption.

Purpose and Benefits
Credit CE1 establishes energy use and GHG reduction goals and objectives to guide development of strategies to achieve the goals.

Related Credits
IP1 Establish Project Framework and Goals
A1 Establish Access Goals and Objectives
A2 Evaluate Expanded Transportation Demand Strategies
A3 Evaluate Expanded Transportation System Management Strategies
A4 Evaluate Expanded Land Use Strategies
A5 Evaluate Expanded Transportation Supply and Service

Climate and Energy Credit 1 Components

1. Establish Baseline

Requirements and Documentation
A primary STARS goal is to reduce greenhouse gas emissions and energy use compared with base year/current conditions. At a minimum, the project must adopt a goal of reducing greenhouse gas emissions and energy use in the corridor for each of the STARS Design Years. The project may adopt additional climate and energy goals, as long as they are consistent with this STARS goal.

The project must adopt numeric greenhouse gas emission and energy use reduction objectives for the 5, 10, 20 and 40 Design Years. The minimum objectives for both energy use and greenhouse gas emissions shall be:

- 5% reduction over the base year within five years from the start of project implementation;
- 10% reduction over the base year within ten years from the start of project implementation;
- 20% reduction over the base year within twenty years from the start of project implementation;
- 40% reduction over the base year by 2050.

The project may establish an objective consistent with a locally or regionally adopted greenhouse gas emission and/or energy use reduction plan with transportation-specific objectives and the plan outlines specific actions to achieve the minimum objectives above.
STARS will reward projects with objectives stronger than those above for one or more of the Design Years.

Submit documentation of the following:

- **Base Year Study Area GHG Budget (tons/weekday):** State the study area’s established base year and Year 2050 GHG budget (if applicable or established)

- **Base Year Weekday VMT:** State the study area’s and project corridor’s established base year weekday VMT

- **Base Year Study Area Weekday Energy Consumption (transportation sources, BTUs):** State the study area’s established base year weekday energy consumption

- **GHG Emissions Reduction Goals:** State the project’s commitment to achieving the STARS GHG emissions reduction thresholds (or identify a different set of thresholds, if more aggressive than STARS):

- **Energy Consumption Goals:** State the project’s commitment to achieving the STARS energy consumption reduction thresholds (or identify a different set of thresholds, if more aggressive than STARS)

Many local, regional, and state governments have prepared climate change policy, initiatives and/or legislation. A number of these use 1990, instead of STARS’ 2005 or 2008, as the base year. If a project is primarily within the boundaries of a jurisdiction with such a base year, there is an opportunity to gain credit by using the year 1990 as that base year instead of 2005 or 2008.

### 2. Travel Demand Model

<table>
<thead>
<tr>
<th>Requirements and Documentation</th>
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<tr>
<td>Attach documentation about the travel demand model and the assumptions relied upon for forecasts. The STARS applicant is encouraged to analyze the potential and effects of the project on induced demand (which is, due to additional transportation capacity provided by a project, additional trip-making that otherwise would not occur without a project, diversion of trips from a non-vehicular mode into a vehicular mode, or diversion of trips from one corridor to the project corridor). The STARS applicant should also provide documentation of their air quality and fuel consumption analysis methodology and procedures, as well as the traffic simulation/operations analysis methodology and procedures for use in Credit CE3: Evaluate Improving Vehicle Flow.</td>
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RESOURCES

There are many protocols and tools used to measure existing and future GHG emissions. Several resources to help define the most useful GHG measuring protocol and tool for individual projects:

- **FHWA: Transportation and Climate Change Clearinghouse.** This website has a number of resources to inform how projects should perform GHG analysis. Specifically, the 2006 TRB report *Assessment of Greenhouse Gas Analysis Techniques for Transportation Projects*, identifies 17 tools and methods that can be used to analyze GHG implications of transportation projects: [http://climate.dot.gov/methodologies/analysis-resources.html](http://climate.dot.gov/methodologies/analysis-resources.html). In general, this website provides many resources to inform project administrators of the climate change issues and strategies to address the impacts of GHG emissions. [http://climate.dot.gov/index.html](http://climate.dot.gov/index.html).

- **EPA: Transportation and Climate.** The EPA website provides information about climate change at all levels--community, individual businesses, etc. The Transportation and Climate page, specifically, provides tools, analysis, fact sheets and technical publications to further inform the subject matter as well as provide guidance on how to measure GHG emissions. [http://www.epa.gov/otaq/climate/index.htm](http://www.epa.gov/otaq/climate/index.htm).

- **Measuring GHG Emissions: A Survey and Demonstration of Tools Communities Can Use.** This was a training session held at the 9th Annual New Partners for Smart Growth conference in Seattle on February 4, 2010. Many of the tools presented in the posted PowerPoint presentations can be used at the corridor and site level: [http://www.newpartners.org/2010/program.html](http://www.newpartners.org/2010/program.html).

- **Greenstep Model** (sketch planning tool to estimate GHG reduction benefits of various scenarios) and **Background Report: The Status of Oregon Greenhouse Gas Emissions and Analysis**. To obtain these tools, contact Brian Gregor, Senior Transportation Analyst, Transportation Planning Analysis Unit, Oregon Department of Transportation, 555 13th Street NE, Suite 2, Salem, OR 97301-4178. [Brian.J.GREGOR@odot.state.or.us](mailto:Brian.J.GREGOR@odot.state.or.us)

Below is a list of resources for help in defining project goals:

- **California SB 375 Implementation and Target Development – Guidance and Tools:** To respond to California’s Senate Bill 375 a document is under development to establish a technical methodology and related process for estimating GHG emissions. Project developers can seek guidance from this information as to how to estimate GHG emissions associated with the project. [http://www.arb.ca.gov/cc/sb375/sb375.htm](http://www.arb.ca.gov/cc/sb375/sb375.htm)

- **California Environmental Quality Act Climate Change Technical Advisory – Tools and Methodologies:** In response to California Senate Bill 97, the Governor’s Office of Planning and Research (OPR) developed recommended amendments to the State CEQA Guidelines for addressing GHG emissions, which were adopted March 18, 2010. These guidelines can be considered by project developers: [http://www.opr.ca.gov/index.php?a=ceqa/index.html](http://www.opr.ca.gov/index.php?a=ceqa/index.html)
• **Smart Mobility 2010**: This report provides an in-depth look at approaches to solving mobility issues. A Call to Action for the New Decade. Caltrans, 2010. [http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf](http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf)

• **AASHTO Center for Environmental Excellence**: The AASHTO Center for Environmental Excellence website provides information to “promote environmental stewardship and to encourage innovative ways to streamline the transportation delivery process.” Many of the tools provided on this website should be considered when projects aim to address the Climate and Energy credits. [http://environment.transportation.org/](http://environment.transportation.org/)

• **Pew Center on Global Climate Change**: The intent of the Pew Center on Global Climate Change is to provide an approach to solve climate change that is based on sound science. This website provides a resource to project developers about innovative solutions to reduce GHG emissions. [http://www.pewclimate.org/](http://www.pewclimate.org/)

• **World Resources Institute Greenhouse Gas Corporate Reporting and Accounting Standard (“The GHG Protocol”)**: The GHG Protocol provides tools for projects to understand, quantify, and manage GHG emissions. The website provides a number of calculation tools to help projects identify their GHG emissions. [http://www.ghgprotocol.org/](http://www.ghgprotocol.org/)

• **The Climate Registry General Reporting Protocol**: This website provides a consistent and transparent standard to calculate, verify and publicly report GHG emissions. [http://www.theclimateregistry.org/](http://www.theclimateregistry.org/)
CE2: Evaluate Vehicle Mile Reduction Strategies

Intent
Determine which strategies are most likely to reduce energy use and climate pollution by reducing vehicle miles traveled (VMT).

Purpose and Benefits
Although vehicles are becoming more fuel efficient, the Growing Cooler report published in 2007 suggests that the benefits of these technological improvements are likely to be offset by growing VMT. Implementing strategies to reduce trip length and the need to rely on vehicles for transport for many trips will be a crucial factor in reducing GHG emissions related to transportation. Reducing VMT often has many co-benefits, notably:

- Improving health by increasing physical activity, and reducing vehicle crashes and reducing commute-related stress;
- Creating more attractive, compact communities;
- Improving the local economy by retaining some of the money spent on fuel consumption and private vehicle maintenance.

Related Credits
IP1 Establish Project Framework and Goals
A1 Establish Access Goals and Objectives
A2 Evaluate Expanded Transportation Demand Strategies
A3 Evaluate Expanded Transportation System Management Strategies
A4 Evaluate Expanded Land Use Strategies
A5 Evaluate Expanded Transportation Supply and Service
CE1 Establish Climate and Energy Goals and Objectives

Climate and Energy Credit 2 Components
Evaluate Vehicle Mile Reduction Strategies

Requirements and Documentation
Analyze strategies sufficient to reduce per capita vehicle miles traveled in the corridor at least:
- 5% over the base year within five years from the start of project implementation;
- 10% over the base year within ten years from the start of project implementation;
- 20% over the base year within twenty years from the start of project implementation;
- 40% over the base year by 2050.

Strategies analyzed shall show a reduction in overall corridor VMT for each of the target years. Projects will be rewarded for evaluating strategies that reduce VMT more than the minimum thresholds above in one or more Design Years. Projects will be rewarded for investing in higher quality evaluation methodologies.

The project shall provide the following documentation:

- Base year and STARS Design Years corridor VMT
- For each strategy evaluated, the assumptions, methodology and outcomes for each STARS Design Year

STARS recognizes that once a project is completed, it may not achieve increasing VMT reductions over time on its own without changes occurring within the project corridor or elsewhere in the region subsequent to the project’s completion. STARS encourages and credits project applicants to continue to work with other transportation and land use agencies and private stakeholders to continue to move toward achieving area-wide VMT reduction goals over time, which can be reflected in the project application for this credit.

**Option B: Prescriptive Path**

The project shall include in the final project plan at least one strategy from each of the access evaluation credits (A2-A5): transportation demand management, transportation system management, transit service and land use, or commit to undertaking at least three of the strategies listed in the table below in the Resources section.

The transit and land use strategies may be dependent upon action by other agencies. Thus, the project must show they are working closely with the appropriate agency to implement expanded transit and/or land use actions.

**RESOURCES**

There are numerous strategies that contribute to VMT reduction. The *Growing Cooler* report also states that among the most effective of these are smart growth strategies; in fact, “with more compact development, people drive 20 to 40 percent less, at minimal or reduced cost, while reaping other fiscal and health benefits.”

*Moving Cooler* (2009) presents a number of strategies and actions to reduce emissions, many of which would reduce VMT. For CE2, the rating system focuses on the most appropriate project-level strategies to reduce VMT that project sponsors could feasibly implement, including those listed in the following table.

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29 Ibid.
<table>
<thead>
<tr>
<th>Strategy Category</th>
<th>Possible Applications</th>
<th>Resources</th>
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</table>
| Urban form/land use     | Smart growth, Transit Oriented Development (TOD), and mixed-use development are all land development patterns that “increase density and reduce the distance or need for vehicle travel.” Projects that are developed in areas that have smart growth strategies in place, or that are developed in concert with new smart growth strategies, are more likely to produce a project that will also reduce VMT. Projects can influence adoption of smart growth policies and development of smart growth projects through recommendations and incentives. | “Growing Cooler: The Evidence of Urban Development and Climate Change,” Reid Ewing, et al, 2008.  
[http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf](http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf).  
[http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf](http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf).  
Ibid.  
33 Ibid. |
| Parking management/pricing | Parking management encourages more efficient use of existing parking facilities and “is one of the most effective ways to reduce motor vehicle traffic” if used as part of a comprehensive Transportation Demand Management (TDM) program. A fee or surcharge on automobile parking instead of providing free parking is one mechanism that has shown a VMT reduction by shifting trips to non-automobile modes. In addition, establishment of parking maximums, such as those in the City of Portland, Oregon, can help to reduce travel and/or prevent the growth of travel within a project corridor. | Online TDM encyclopedia, Victoria Transport Policy Institute: [http://www.vtpi.org/tdm](http://www.vtpi.org/tdm).  
[http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf](http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf).  
Ibid. |
<table>
<thead>
<tr>
<th>Strategy Category</th>
<th>Possible Applications</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road or area pricing strategies</td>
<td>Pricing strategies can shift travel from single-occupancy-vehicles to other modes, like transit. However, pricing strategies should be implemented as part of a greater TDM program. Pricing strategies can be by time-of-day, based on congestion level, applicable to low- or single-occupant vehicles only (while high occupancy vehicles have reduced tolls or no tolls), etc.</td>
<td>Online TDM encyclopedia, Victoria Transport Policy Institute: <a href="http://www.vtpi.org/tdm">http://www.vtpi.org/tdm</a>. “A Review of the International Modeling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Traveled and Greenhouse Gas Emissions,” Caroline Rodier, 2009 TRB Annual Meeting, 2008. <a href="http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf">http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf</a>.</td>
</tr>
<tr>
<td>Increased transit and rideshare</td>
<td>Transit speed and reliability are two of the most significant attractions for the use of transit; conversely, reduced transit speed and reliability can be a great deterrent. Tools to increase transit share include: Exclusive guideway treatments such as bus or HOV lanes, light rail, bus rapid transit, etc. Priority treatments such as queue bypass lanes, transit signal priority, and close-in parking or stopping locations at major trip generators such as stadiums/arenas, shopping malls, and business parks.</td>
<td>“A Review of the International Modeling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Traveled and Greenhouse Gas Emissions,” Caroline Rodier, 2009 TRB Annual Meeting, 2008. <a href="http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf">http://tsrc.berkeley.edu/Projects/rodier_8-1-08_trb_paper.pdf</a>. Caltrans. Smart Mobility 2010: A call to Action for the New Decade. 2010. <a href="http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf">http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf</a>.</td>
</tr>
<tr>
<td>Car-sharing</td>
<td>Car-sharing programs such as Zipcar, where participants can check out a vehicle from a close-by location to their work or home site as needed, facilitate lower vehicle ownership and use. Participants can use transit or other non-vehicular modes most of the time, but have access to a personal vehicle when they need one.</td>
<td>Online TDM encyclopedia, Victoria Transport Policy Institute: <a href="http://www.vtpi.org/tdm">http://www.vtpi.org/tdm</a>. “The Impact of Carsharing on Household Vehicle Holdings: Results from a North American Shared-use Vehicle Survey,” Elliot Martin, et al, 2010. <a href="http://www.innovativemobility.org/publications/Impact_of_Carsharing_on_Household_Vehicle_Holdings.shtml">http://www.innovativemobility.org/publications/Impact_of_Carsharing_on_Household_Vehicle_Holdings.shtml</a>.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Strategy Category</th>
<th>Possible Applications</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer-based TDM programs</td>
<td>Whether encouraging use of programs already in place in the corridor or establishment of a new TDM program, employer-based TDM programs can be an effective VMT-reduction tool. Such programs encourage use of alternative modes of transportation by making information and incentives, such as subsidized transit passes, available to employees.</td>
<td>Online TDM encyclopedia, Victoria Transport Policy Institute: <a href="http://www.vtpi.org/tdm">http://www.vtpi.org/tdm</a>.</td>
</tr>
<tr>
<td>Other innovative strategies</td>
<td>Projects are also encouraged to introduce or rely on innovative and new strategies that are not described under this credit to reduce VMT.</td>
<td></td>
</tr>
</tbody>
</table>
CE3: Evaluate Improving Vehicle Flow

Intent

Determine which strategies are most likely to reduce net fossil fuel energy use and climate pollution from improving vehicle flow while eliminating or minimizing induced demand.

Purpose and Benefits

Improving traffic flow can reduce vehicle acceleration and deceleration, which in turn improves fuel efficiency, reduces greenhouse gas (GHG) emissions, and has the added benefit of potentially reducing crashes. While improving overall traffic flow and vehicle operations may reduce GHG emissions and generally improve safety, the “speed profile,” or variety of operating speeds at different locations in the corridor, or under different traffic conditions, can also increase or decrease GHG emissions and fossil fuel consumption.

Improving flow can also be a double-edged sword, by inducing more and longer trips. Thus, design considerations include:

- Reduce stop and go traffic to improve network flow and maintain consistent speeds which optimize overall vehicle fuel economy. Traffic calming measures (i.e. roundabouts, signal prioritization, etc.) that reduce stop and go traffic on local road networks can increase fuel economy, as might “Active Traffic Management” systems which modify traffic operations to maintain flow, while maintaining consistent speeds on highways can also achieve optimal fuel economy and lower levels of CO₂ emissions per mile;³⁵
- Build improvements that encourage use of alternative modes by improving travel time consistency for carpools, transit, and non-vehicular modes. Historically, when transit travel times for a given trip origin and destination are 10 minutes or 25 percent or more above driving alone, (all other factors being equal), transit mode shares tend to be low;
- Reducing the impact of crashes and other non-recurring congestion;
- Improve travel predictability without inducing additional or longer drive-alone vehicle trips.

STARS recognizes that once a project is completed, it may not achieve increasing vehicle flow improvements over time on its own without changes occurring within the project corridor or elsewhere in the region subsequent to the project’s completion. STARS encourages and credits project applicants to continue to work with other transportation and land use agencies and private stakeholders to continue to move toward achieving project corridor vehicle miles traveled (VMT) reductions, as well as undertake future projects to achieve additional vehicle flow improvements, over time, which can be reflected in the project application for this credit.

Related Credits

CE1 Establish Climate and Energy Goals and Objectives
IP1 Establish Project Framework and Goals
A1 Establish Access Goals and Objectives
A2 Evaluate Expanded Transportation Demand Management Strategies
A3 Evaluate Expanded Transportation System Management Strategies
A4 Evaluate Expanded Land Use Strategies
A5 Evaluate Expanded Transportation Supply and Service

Climate and Energy Credit 3 Components

1. Evaluate Improving Traffic Flow

Requirements and Documentation

Quantify the greenhouse gas and energy impacts of at least two strategies to improve vehicle flow, comparing base year flow with projected flow in the four STARS Design Years.

The project must quantify vehicle braking and acceleration (speed consistency), not simply average speed, which can provide inaccurate results. Quantification should occur for both recurring and non-recurring congestion. The project must also evaluate optimal vehicle speeds to minimize energy consumption and greenhouse gas emissions. The project may select a “worst case” peak period to analyze under this credit and submit documentation as to why this peak period was chosen for the analysis.

The projects must quantify the greenhouse gas and energy impacts of one or more strategies that primarily improve flow for multi-modal travel options. Examples include HOV queue bypass slip lanes and ramps, HOV lanes and transit signal prioritization.

Projects must also quantify the induced demand implications of potential strategies over the four STARS Design Years, using factors reflecting median values of a broad literature review, potentially modified to reflect project-specific conditions.

Quantify the net fossil fuel energy implications of vehicle flow changes in the four STARS Design Years.

Peak period microsimulation models are the best tool for quantifying a strategy’s vehicle flow implications.\(^\text{36}\) While measuring the defined peak period is optimal (in most regions the peak periods are at least two hours in duration), a peak hour simulation result is acceptable if that is the only option available.

STARS performance goals for improved traffic flow are at least:

\\(^{36}\text{Operational models can include: Synchro/SimTraffic (arterials), VISSIM (all types of roadways), CORSIM (all types of roadways), PARAMICS (all types).}
• 5% over the base year within five years from the start of project implementation;
• 10% over the base year within ten years from the start of project implementation;
• 20% over the base year within twenty years from the start of project implementation;
• 40% over the base year by 2050.

Using travel demand modeling, projects shall show that speeds in the corridor are consistently over 25 mph, but do not exceed 55 mph. Show travel speed profiles for each mode, based on common trip origins and destinations.

![Figure 8: Vehicle speed and fuel consumption](image)

**Resources**

According to AASHTO, potential GHG reductions of 10-20 percent can be achieved by improving the management of vehicle/system operations through vehicle flow improvement strategies such as: managing and enforcing speed, eliminating bottlenecks, improving signal timing, and incorporating roundabouts. Improving vehicle flow can be accomplished through the use of such intelligent transportation system (ITS) elements and, when combined, many of the strategies listed in the table below are more effective than if implemented alone.

---

Quantifying the reduction of VMT, GHG emissions, and fuel consumption depends on analytical tools that are evolving in their capability to estimate such reductions. The use of such tools must be done with careful consideration of the limitations and requirements in producing credible results.

<table>
<thead>
<tr>
<th>Example Traffic Operational Improvements and Strategies</th>
<th>Applications &amp; Descriptions</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Management</td>
<td>Incident Management: developing a system approach to managing</td>
<td>Safe Clear program – Houston: this is a program developed to reduce the</td>
</tr>
<tr>
<td>Example Traffic Operational Improvements and Strategies</td>
<td>Applications &amp; Descriptions</td>
<td>Resources</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
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<tr>
<td><strong>Incidents</strong> and removing them from the roadway as quickly as possible can help vehicle flow on high-crash corridors.</td>
<td>time vehicles involved in collisions remain on the roadside. Its purpose is to “save lives, reduce traffic congestion, cut down on the chaos of the previous system and ensure that citizens are treated fairly by wrecker drivers.”</td>
<td><strong>Incident Response Vehicles:</strong> designated vehicles intended for quick-response to incidents, accidents, stalls, etc. They can either be circulating within the corridor, or positioned at key locations where they can be dispatched.</td>
</tr>
<tr>
<td><strong>Example Traffic Operational Improvements and Strategies</strong></td>
<td><strong>Applications &amp; Descriptions</strong></td>
<td><strong>Resources</strong></td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
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</tr>
<tr>
<td>Roundabouts instead of signal-controlled intersections</td>
<td>Roundabouts improve intersection average speeds and capacity while reducing accidents.</td>
<td>FHWA and ITE roundabout guides.</td>
</tr>
<tr>
<td>Example Traffic Operational Improvements and Strategies</td>
<td>Applications &amp; Descriptions</td>
<td>Resources</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
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</tr>
<tr>
<td>Traveler information centers: known as “511” or web-based traveler information, gives updated information on travel conditions, speeds, congestion, etc. Active Traffic Management Systems (ATMS) can be applied on a continuous basis or during major construction projects. These are “real-time” strategies to manage traffic including displaying travel times along the corridor, variable speeds depending on conditions, adding capacity for priority vehicles, etc.</td>
<td>advance of the Alaskan Way Viaduct reconstruction project).</td>
<td></td>
</tr>
</tbody>
</table>

CE4: Evaluate Construction Methods and Materials

Intent
Determine which strategies are most likely to reduce energy use and climate pollution from construction materials (embodied and transport) and innovative construction practices, and quantify how much they could contribute to meeting project climate and energy goals.

Purpose and Benefits
Reducing construction impacts is one of the easiest and most visible strategies to reduce energy use and climate pollution. However, for many projects, the energy and climate pollution from construction materials and methods is a small fraction of the life cycle energy use of a project. In many cases the energy consumed by vehicles using a project will dwarf energy used in construction materials and methods. Still, reducing energy in materials and construction methods can play a valuable role in designing and implementing a more sustainable project.

Projects have many opportunities to reduce energy use and climate pollution in design, material selection and construction. For example:

- Reduce the amount of materials used;
- Specify materials with less embodied energy from material manufacturing and transport (e.g. locally-sourced materials, and materials moved by rail or ship, may reduce transport embodied energy);
- Reduce construction-related vehicle diversion and braking);
- Use materials produced more sustainably (meeting, for example, ISO 14021 standards);
- Use long-lasting materials needing less frequent replacement;
- Re-use materials on-site, recycle materials and dispose of fewer materials;
- Use more fuel-efficient construction vehicles and/or cleaner fuels in construction vehicles.

Related Credits
CE1 Establish Climate and Energy Goals and Objectives

Climate and Energy Credit 4 Components

Requirements and Documentation
To receive Credit CE4, quantify the energy and climate implications of utilizing at least three of the construction methods or materials strategies listed in the bullet points above. One of the three strategies analyzed must be reducing construction-related delay and/or diversion. Alternatively, quantify how the project could reduce construction phase energy and greenhouse gas emissions (GHG) by at least 20%, compared with traditional methods and materials.

At a minimum, quantify the excavation, manufacturing and transportation energy and greenhouse gas emissions from projected quantities of major materials such as concrete, asphalt, steel and wood.
Provide the energy and GHG analysis for each material and method evaluated, including assumptions and source for assumptions. For innovative materials and methods, provide independent verification of assumptions used.

**Option B: Prescriptive Path**

To receive Credit CE4 (Prescriptive Path), all actions below are required.

1. **Minimize Construction-Related Diversion and Braking**

   **Requirements and Documentation**
   Commit to not diverting traffic to routes that would increase vehicle miles traveled or additional braking during the busiest 16 hours/day. Acceleration following braking increasing energy consumption and greenhouse gas emissions.

2. **Source Sustainably Produced Construction Materials**

   **Requirements and Documentation**
   Commit to sourcing at least twenty percent of project materials (by volume or weight) from vendors who have certified (self-certification under ISO 14021 acceptable) that their product(s) support sustainable materials manufacturing practices and processes, including use of recycled or waste material, use of renewable energy in the production process, and other practices which minimize negative effects on human health and the environment while reducing project-related GHG emissions and energy consumption.

   Provide full project materials list by weight and/or volume, identifying those to be supplied by certified ISO 14021 vendors.

3. **Source Locally and/or Transport Sustainably**

   **Requirements and Documentation**
   Achieve at least three of the four thresholds shown in the table below. Materials can be moved longer distances by rail or ship, which have low carbon/energy footprints than truck or air. Project applicants are encouraged to review based on The Sustainable Sites Initiative\(^38\) for more information*:

   - At least 50% of pavement and aggregate transported 25 miles or less to the project site by truck.
   - At least 75% of soil and fill material transported 10 miles or less to the project site by truck.
   - At least 75% of landscaping materials transported 10 miles or less to the project site by truck.
   - At least 25% of steel, metals and lumber transported 50 miles or less to the project site by truck.

   *There will be instances where construction materials are not available due to the geology of the area. In these instances, the project sponsor should provide documentation of this condition and indicate how

they intend to minimize the vehicle miles of transport of construction materials. The STC may award partial credit in these instances.

Attach list of construction material sources and mileage by transport mode to project site, by weight and/or volume.

4. Maximize Re-use, Recycling and Waste Reduction

**Requirement**
Re-use on-site or recycle off-site at least 85% of the on-site and new materials normally disposed of.

**Documentation**
Provide full list of on-site and new materials normally disposed of, by weight or volume, and whether and how they were re-used or recycled.

**RESOURCES**

There are a number of agencies that already reuse or recycle discarded materials in construction; a few agencies also set goals as to the maximum allowable “waste” from a project’s construction materials. There are other companies which provide consulting for materials transportation logistics. For example, a number of municipalities and agency transportation departments reuse or recycle traffic signs and roadway delineators (in-pavement or roadside reflectors). Most agencies now have policies or specifications in place for asphalt recycling or reclaiming of asphalt pavement, either directly as part of a paving project, or through transfer to another project.

For any of the potential applications shown below, analysis and research is strongly recommended as part of the project’s design and specification process.

<table>
<thead>
<tr>
<th>Construction Materials &amp; Methods</th>
<th>Possible Applications</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable production methods of construction materials</td>
<td>International Organization for Standardization (ISO), Section 14021 “Environmental Labels and Declarations, Self-Reporting.” <a href="http://www.iso.org">www.iso.org</a></td>
<td></td>
</tr>
<tr>
<td>Construction Materials &amp; Methods</td>
<td>Possible Applications</td>
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<td>mt/index.cfm.</td>
</tr>
</tbody>
</table>
|                                  |                       | Good Company (Eugene, OR):  
CE5: Evaluate Renewable Energy and Energy Efficiency

Intent
Determine which strategies are most likely to reduce energy use and climate pollution by use of on-site renewable energy or by increasing energy efficiency.

Purpose and Benefits
Reducing a project’s long-term energy consumption by incorporating on-site renewable energy strategies or strategies that improve energy efficiency can help achieve the overall greenhouse gas (GHG) reduction goal of the project.

Related Credits
CE1 Establish Climate and Energy Project Goals and Objectives

Climate and Energy Credit 5 Components

Renewable Resources and Energy Efficiency

Requirements and Documentation
Quantify the potential benefits of at least two renewable energy and two energy efficiency strategies in the four STARS Design Years.

In order to qualify as “Renewable Energy” under this credit, the project must have or utilize on-site renewable energy components that include at least one of the following energy sources (based on US Energy Information Administration, list of renewable energy sources and generation by source):

- Landfill gases (including Methanol);
- Hydroelectric, wind, solar/photovoltaic, wave, geothermal, or,
- Recaptured inertial or kinetic energy (such as “power ramps” described in this section).

Methods
A power use or energy consumption study will be required to receive points under this credit. An energy impact analysis under NEPA or a state’s environmental policy act is acceptable provided that the analysis indicates the amount of energy the project requires or expends and includes an analysis or estimate of how much of that energy is offset by on-site renewable sources, with results for each of the STARS Design Years.

For the analysis, power consumption shall include the following (does not include construction equipment):

- [Continue with the remaining methods and requirements as described in the document.]
• Amount of power consumed from renewable sources as percentage of total power consumption needed (BTUs);
• Difference in overall energy consumption in the four STARS design years, and compared to existing conditions in the study area;
• Power needed to run equipment and facilities included in the project, including project-provided vehicles, such as light rail trains, commuter rail trains, buses, etc.; and
• Power needs for new signs, illumination, security systems, buildings and structures, etc. built as part of the project.

Special Allowance for this Credit
In certain circumstances where renewable power is generated on site and cannot be directly distributed to project infrastructure, that power can be distributed to the general electric “grid” and the agency or host of the generator receives credit for the power generated. An example of this case is Oregon’s “Solar Highway” project, whereby solar panels placed on Oregon DOT right-of-way collect solar energy and transfer it to the electric grid. In return, ODOT receives credits that offset the electricity they use for operations, which are then used to reduce the agency’s power bill from the utility. This is a form of “net metering” and is considered an acceptable method of generating renewable energy. Thus, projects that capture energy on-site and transfer it offsite are eligible to receive acknowledgement under this credit.

Option B: The Prescriptive Path
In lieu of a power or energy consumption analysis, the project sponsor may receive credit based on incorporating the renewable energy or increased energy efficiency measures as shown in the following table. Under the Prescriptive Path, the applicant shall incorporate at least one renewable energy measure and at least one energy efficiency measure to receive credit.

<table>
<thead>
<tr>
<th>Renewable Energy or Increased Energy Efficiency Measure Implemented by Project (Select at Least One Renewable Energy Measure and at Least One Energy Efficiency Measure)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Renewable Energy Measures</strong></td>
</tr>
<tr>
<td>Solar panels for lighted signs (i.e. stop signs, exit signs, accommodation signs, etc.)</td>
</tr>
<tr>
<td>On-site solar capture for traffic control devices</td>
</tr>
<tr>
<td>Solar power for illumination devices</td>
</tr>
<tr>
<td>Solar power for bus shelters and transit passenger facilities</td>
</tr>
<tr>
<td>Solar powered parking meters or ticket dispensers</td>
</tr>
</tbody>
</table>

Renewable Energy or Increased Energy Efficiency Measure Implemented by Project (Select at Least One Renewable Energy Measure and at Least One Energy Efficiency Measure)

<table>
<thead>
<tr>
<th>Renewable Energy Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site solar panels or wind turbines for general energy generation (off-site distribution acceptable)</td>
</tr>
<tr>
<td>Electro Kinetic Power Ramps</td>
</tr>
<tr>
<td>Commitment to purchase of power for the project corridor from renewable energy sources (at least 50% of total energy consumption)</td>
</tr>
<tr>
<td>Other (attach information to this credit application)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy Efficiency Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct new facility with preferential/priority treatment for low-energy, renewable energy or zero-emissions vehicles</td>
</tr>
<tr>
<td>Replacement of currently-illuminated signs with highly retro-reflective signs (must comply with new MUTCD retro-reflectivity standards)</td>
</tr>
<tr>
<td>Conversion of existing traffic control devices and illumination to “Green” energy-efficient devices</td>
</tr>
<tr>
<td>Conversion of other existing facilities to “Green” or more energy-efficient facilities</td>
</tr>
<tr>
<td>Other (attach information to this credit application)</td>
</tr>
</tbody>
</table>

RESOURCES

A number of on-site renewable energy or reduced-energy consumption strategies can be considered in project planning and development. While many strategies are typically applied to buildings or large power generation facilities, there are a number of transportation project-specific strategies that can be applied with the overall goal of reducing energy consumption in the project corridor to a level that helps achieve the overall GHG reduction goals for the CE credit category. The strategies listed in the table below are from existing, publicly available research and development documentation, based on strategies which have already been deployed and where case study analysis and recommendations have been made.

The project sponsor may also propose other energy consumption reduction strategies for consideration; however, where research is not available, the project sponsor shall submit documentation supporting the practical and safe application of the proposed strategy along with analysis to support estimated energy consumption reduction.

The following table lists practical strategies that a project sponsor can consider, along with reports and research documents they can use to determine if the strategy is appropriate for their project.
<table>
<thead>
<tr>
<th><strong>Renewable Energy or Increased Energy Efficiency Measure Implemented by Project</strong></th>
<th><strong>Possible Applications</strong></th>
<th><strong>Resources</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar panels for lighted signs</td>
<td>Solar panels placed on top of sign posts to collect solar energy into a battery which then powers the lighted sign (i.e. stop signs, exit signs, accommodation signs, etc.)</td>
<td><a href="http://www.westernsystems-inc.com/solar_applications.htm">www.westernsystems-inc.com/solar_applications.htm</a> Blinkersigns from TAPCO. 2010. <a href="http://www.blinkersign.com/index.htm">http://www.blinkersign.com/index.htm</a></td>
</tr>
<tr>
<td>On-site solar capture for traffic control devices</td>
<td>Solar panels placed on signal poles or on other features to capture solar power to run active devices such as traffic or railroad crossing signals, etc.</td>
<td><a href="http://www.westernsystems-inc.com/solar_applications.htm">www.westernsystems-inc.com/solar_applications.htm</a> Blinkersigns from TAPCO. 2010. <a href="http://www.blinkersign.com/index.htm">http://www.blinkersign.com/index.htm</a> <a href="http://www.starcomsolar.com/solar-sign-products.htm">www.starcomsolar.com/solar-sign-products.htm</a></td>
</tr>
<tr>
<td>On-site solar panels or wind turbines for general energy generation (off-site distribution acceptable)</td>
<td>Typically used on top of buildings, small wind turbines for wind energy capture for on-site illumination, heating, etc.</td>
<td>Oregon Solar Highway: <a href="http://www.oregon.gov/ODOT/HWY/OIPP/inn_solarhighway.shtml">http://www.oregon.gov/ODOT/HWY/OIPP/inn_solarhighway.shtml</a></td>
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<tr>
<td><strong>Renewable Energy or Increased Energy Efficiency Measure Implemented by Project</strong></td>
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<td>---</td>
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<td>---</td>
</tr>
</tbody>
</table>
| Preferential/priority treatment for low-energy, renewable energy or zero-emissions vehicles | Examples may include HOV lanes where low- or zero-emission vehicles, and possibly hybrids, are allowed even if their occupancy is below the HOV threshold | California: [http://www.dmv.ca.gov/pubs/vctop/d11/vc21655_9.htm](http://www.dmv.ca.gov/pubs/vctop/d11/vc21655_9.htm)  
<p>| Electro Kinetic Power Ramps | A ramp, patent pending, which captures kinetic energy from up and down movement caused by the weight of vehicles over a number of articulated plates placed in a roadway. Not yet implemented on a public facility in the US. | Highway Energy Systems LTD. 2008. <a href="http://www.hughesresearch.co.uk/">http://www.hughesresearch.co.uk/</a> |
| Commitment to purchase of power for operation of project corridor from renewable energy sources (at least 10% of total energy consumption) | Instead of on-site generation, agency commits to purchasing power for the project from “green” or renewable sources. | US Energy Administration, Independent Statistics and Analysis. Renewable and Alternative Fuels. <a href="http://www.eia.doe.gov/fuelrenewable.html">http://www.eia.doe.gov/fuelrenewable.html</a>. Accessed June 17, 2010. |</p>
<table>
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<tr>
<th><strong>Renewable Energy or Increased Energy Efficiency Measure Implemented by Project</strong></th>
<th><strong>Possible Applications</strong></th>
<th><strong>Resources</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion of existing traffic control devices and illumination to “Green” energy-efficient devices</td>
<td>Examples include: conversion of traffic signal or pedestrian crossing signal lights from incandescent to LED</td>
<td>Embedded LEDs in Signs. 2009. <a href="http://safety.fhwa.dot.gov/intersection/resources/techsum/fhwasa09006/">http://safety.fhwa.dot.gov/intersection/resources/techsum/fhwasa09006/</a></td>
</tr>
<tr>
<td>Conversion of other existing facilities to “Green” or more energy-efficient facilities</td>
<td>Examples include: replacement of existing incandescent or fluorescent lighting with compact fluorescent or more highly efficient lighting; wind turbines on agency-owned right-of-way within or in proximity to project; conversion to LED lighting in traffic control devices.</td>
<td><a href="http://www.casolarco.com/led_street_lighting">http://www.casolarco.com/led_street_lighting</a></td>
</tr>
</tbody>
</table>
Cost Effectiveness Analysis

Overview

STARS aspires to be a better way of evaluating and selecting transportation plans, projects, and programs (collectively, actions). Regarding the identification, measurement, and evaluation of the benefits and costs of those actions, what is different about STARS is not new theories, but its emphasis on certain impacts that current practices fail to measure well, if at all, and on specific techniques for measuring and evaluating those impacts.

The many objectives that STARS has for transportation investments are reflected in the other credits such as Integrated Process, Access, Climate and Energy, and Ecological Function. Each of those credits has multiple objectives, and they are further specified as measurements or estimates that applicants make to demonstrate the degree to which their proposed transportation investment meets the objectives. Among other things, the objectives reflect the overarching perspective of STARS that providing people attractive, affordable and more efficient travel by modes (e.g., transit, bicycle, walking) as options to driving alone is desired.

The STARS evaluation system already gives credits for addressing and achieving those objectives. But those objectives can potentially be achieved in various ways, some of which would be more efficient than others. Thus, the purpose of this cost-effectiveness analysis credit is to encourage applicants to achieve the requirements of the other credits (specifically, the requirements of the Access credit) cost effectively (i.e., so that the cost per unit of benefit for the proposed transportation investment is low relative to that cost for alternative transportation investments). Since the desired performance outputs of a transportation investment are measured as part of other credits, the technical focus of this credit is on cost: how it is defined, measured, and incorporated into a cost-effectiveness analysis credit.

Fundamental to the STARS philosophy and objectives is the belief that people making transportation investment decisions (1) should understand that current methods for evaluating and selecting transportation projects and program sometimes fail to consider well or entirely some important impacts of those projects, both positive ones (benefits) and negative ones (costs), and (2) should make better attempts to identify, measure, and consider those impacts. This cost-effectiveness analysis credit addresses all those issues by offering credit in two categories: (1) measurement of costs and benefits, and (2) evaluation of cost-effectiveness. A project will receive partial credit for attempting the hard work of gathering consistent data across multiple measures of impacts and multiple alternative transportation investment, even if it is unable to implement a cost-effectiveness analysis that fully addresses the many and difficult technical issues described in benefit-cost guidebooks, or even if it ultimately proposes an action that is not the one ranked highest on cost effectiveness.

The cost effectiveness analysis credits do not require quantifying all benefits or all costs.
For example, the benefits of protecting and/or enhancing ecological services may be quantified by a project, but are not required.

It should be noted that getting the best regional transportation system of facilities and programs is *not a cost-minimization problem*; it is an optimization problem that requires balancing user benefits against user costs. In making choices about behavior, and about the purchase and consumption of goods and services, people are rarely trying to minimize cost—they are trying to optimize value (the best mix of benefit and cost).
CEA1: Cost Estimation and Cost-Effectiveness Calculations

Intent
To estimate a fuller palette of life-cycle costs for a proposed transportation action, and to create measures of how cost-effectively access benefits are being achieved.

Purpose and Benefits
The credit for cost-effectiveness analysis tries to incorporate and be consistent with the principles of transportation benefit-cost analysis (BCA). Due to the data requirements and time necessary to complete a full benefit-cost analysis, STARS pursues a more modest approach of cost-effectiveness analysis (CEA). CEA is a subset and simplification of BCA. A CEA: 1) standardizes how costs are measured so the measurements are applied consistently across alternatives investments, and 2) deals with issues of scale by creating a measure of “bang for the buck” (for example, the amount of SOV trip reduction per $1 million cost (investment)).

Other credits in STARS are clear about what the bang should be: they specify objectives and measurements for improving certain aspects of access, energy use, and so on. In essence, those objectives and measurements could be the numerators of a cost-effectiveness measure. For the CEA credit, however, STARS has chosen to focus on access benefits (in the numerator). Since guidance about measurements for the Access credit is provided elsewhere, the technical effort for this CEA credit is mainly about costs – the denominator of a cost-effectiveness measure.

Related Credits
IP1 Establish Project Framework and Goals
A1 Establish an Access Goals and Objectives
CE1 Establish Climate and Energy Goals and Objectives
EF1 Identify and Quantify Ecological Resources
CEA2 Selecting Cost-Effective Projects and Programs

Cost Effectiveness Analysis Credit 1 Components

<table>
<thead>
<tr>
<th>Requirements and Documentation</th>
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</thead>
<tbody>
<tr>
<td>To complete the analysis for this credit, an applicant must:</td>
</tr>
<tr>
<td>1. Create the cost denominator for measures of cost effectiveness. For STARS the cost denominator has three components: (1) monetary life-cycle costs for the public sector (planning, design, construction, operation, maintenance, preservation, decommissioning), (2) out-of-pocket private costs for use of the facility (primarily vehicle, fuel, maintenance, and insurance for cars, trucks, and bikes, and fares for transit), and (3) the estimated monetized cost of changes in carbon dioxide (CO₂).</td>
</tr>
</tbody>
</table>
2. **Import the Access and Carbon numerators from work done on the STARS credits.** The guidance for the Access and Climate and Energy credits describe how to create the performance measures for these topics that can serve as the numerators of the cost-effectiveness measures.

3. **Create the cost-effectiveness measures.** Use the data from steps 1 and 2.

**Methods**

This section describes ways applicants can demonstrate quantitatively and in a standardized manor the extent to which they expect their strategies and alternatives to achieve the credit, which is to estimate life-cycle costs correctly and to calculate cost-effectiveness measures for access and CO₂ reduction.

**Overview**

The purpose of typical life-cycle cost analysis, or the calculation of costs for cost-effectiveness analysis, is to gather estimates of all the relevant agency costs associated with the proposed improvement and to then convert the stream of program outlays to their present value for the comparison of project and policy alternatives.

As the name implies, a full life-cycle cost analysis must consider the stream of future expenditures in addition to the initial capital construction or program development costs. While life-cycle cost analysis considers changes in the full agency costs and the user costs associated with the construction or implementation of the policy, it does not include changes in user and non-user costs like those associated with travel time, reliability, crashes, noise and environmental impacts (air emissions and water pollution). These user and non-user “costs” are actually changes in benefits in the traditional benefit-cost analysis framework.

Life-cycle cost analysis does include the user costs associated with work zones and project implementation. The introduction of user costs associated with work zones was a more controversial item in life-cycle cost analysis, but an important and necessary change precipitated by the way agencies now consider project delivery. Due to the often large costs borne by users during project construction, project design and delivery alternatives began to substantially reduce the work-zone impact on users, while only slightly increasing project construction costs (e.g., lane rental contracts, etc.). To recognize the reduction in user work zone delay it became necessary to include the user work zone costs as part of the project construction costs. The same idea might apply when considering operational improvements. Many operational improvements impose lower user work zone delay and safety costs than capacity improvements, but those user work zone cost savings must be included as part of the project cost to set the alternatives on equal footing.

Life-cycle cost analysis is relatively straightforward when one thinks about the summing of all the relevant agency project or policy costs that are incurred during the life of the project or policy. This guidance provides the general principles, techniques, and generic data sources that should be applied to earn this credit.

Most guidance on life-cycle cost analysis in the context of transportation has come from the Federal Highway Administration, Office of Asset Management, where the emphasis has traditionally focused on engineering economic analysis methods used to determine the capital costs and rehabilitation and maintenance costs for infrastructure projects. The FTA New Starts program is a non-highway example
of where cost effectiveness analysis has been applied to evaluate new public transit projects based on the dollar cost per new rider.

**Fundamental concepts for estimating and comparing costs**

Properly framing the analysis requires setting the analysis period, determining values for analysis parameters, and appropriately defining the transportation alternatives considered in the analysis. Some fundamental concepts for the comparison of life-cycle costs across project or policy alternatives include:

**Analysis period**
The project or program costs must be summed over a consistent analysis period for the project alternatives being compared. The analysis period is typically determined based on the service life of the investment or program. The analysis period for many transportation investments is 20 to 30 years, but may be shorter for other types of programs. STARS requires applicants to consider explicitly 5, 10, 20, and 40 years. The same calendar years and analysis period duration should be used when comparing project or policy alternatives--particularly when the projects are implemented or completed in different years. The Access Credits used in the numerator for the cost-effectiveness analysis must be summed over the same analysis period as the project or program costs.

**Definition of the Alternatives**
Properly defining the project or program alternatives is essential for identifying the differences in the costs across the alternatives. Properly defining the alternatives will also allow for some simplification of the cost estimation in cases where cost elements are identical across the alternatives. The timing of expenditures should be identified as the alternatives are defined.

**Nominal versus Real Dollars**
The analyst must decide whether the cost estimates will be estimated in nominal, or real dollars. Real dollars are expressed in constant year terms, reflecting the cost without inflation (e.g., also called inflation-adjusted dollars). Costs expressed in nominal dollars reflect inflation, such that costs increase over time, even if the real value or constant cost is not increasing. Because (1) inflation is an uncertain component of a nominal discount rate, and it effects, to a good approximation, all projects the same way; and (2) STARS is about project evaluation, not project budgeting, STARS requires applicants to work in real (constant) dollars (i.e., without inflation) and the discount using a real discount rate (which will be lower than a nominal discount rate).

**Present Value**
The present value of the stream of future year (plus current year) costs is determined through discounting of future year costs to current dollars. To compare alternatives where both the total cost and the timing of expenditures differ across alternatives, all costs must be converted to present value for proper comparison. The real (nominal) discount rate should be used when cost estimates are estimated in real (nominal) dollars.

The present value of the project life-cycle costs are, effectively, the denominator of any measure of cost effectiveness. Proper calculation of the life-cycle costs requires setting the analysis period equal to the service or effective life of the investment and identifying all of the relevant initial and future year costs. Any remaining value from the investment is calculated as a residual value credited to the alternative at the end of the analysis period.
It is clear and common practice that capital (construction) costs get included in the life-cycle cost analysis. But it is also common to ignore operation and maintenance costs, which are part of full life-cycle costs. For STARS, applicants must incorporate those O&M costs, and also the user costs associated with the project construction and operation.

The recommended steps for achieving the cost estimation credit follow the FHWA’s Life-Cycle Cost Analysis Primer (FHWA, 2002) suggested steps for performing life-cycle cost analysis:

1. Establish the design or policy alternatives
2. Determine the activity timing
3. Estimate costs
4. Compute the life-cycle costs (e.g., discount costs to present value)
5. Analyze the results and compare alternatives.

Cost categories
The traditional cost categories included in life-cycle cost analysis are agency costs and user costs associated with work zones. STARS includes in its definition of life-cycle costs user out-of-pocket costs and the costs of carbon emissions. This section just defines the costs; a later section provides more information about measurement.

Agency costs
- **Capital Cost**: Capital costs are those initial costs incurred in the planning and construction of the project. Capital costs include:
  - Design and engineering
  - Land acquisition (right-of-way)
  - Construction
  - Vehicles (purchased by agency)
- **Program Development and Implementation Costs**: For non-infrastructure programs, like many transportation demand management programs, the initial costs will be associated with the program development, and not investment in capital construction.
- **Operating and Maintenance**: Operation and maintenance includes the annual on-going costs to sustain the program or service and also the periodic maintenance and rehabilitation expenditures.
  - Reconstruction/Rehabilitation,
  - Preservation/Routine Maintenance,
  - Operations: vehicle operating costs, labor, overhead and administrative costs
- ** Decommissioning**: For some facilities there is a substantial costs of removing a them at the end of their useful lives. The best example is nuclear power plants. For transportation facilities do occasionally get decommissioned (e.g., the Embarcadero freeway in San Francisco; the Alaska Way Viaduct in Seattle), but it is much more common for facilities to be maintained and upgraded beyond their original design life. For STARS, including decommissioning costs is optional.
**User costs associated with work zones**

User costs associated with work zones from project construction often represent a significant cost. Since project design or delivery may affect the duration of the project construction, the user costs from work zones should be included when comparing alternatives. Work zones may affect users of all surface modes; all of these user costs associated with the work zone should be included. The three types of user costs associated with work zones are changes in:

- User travel time delay
- Crashes
- Vehicle operating costs

**User out-of-pocket costs**

User out-of-pocket costs include all private expenditures associated with transportation modes. Out-of-pocket costs can be generally categorized as either fixed costs typically associated with vehicle ownership and incremental, operating costs, which can typically be expressed as per mile or per trip costs.

**Carbon dioxide costs**

Transportation’s contribution to the anthropogenic production of CO₂ is well known, as is the relationship between greenhouse gases (GHG) and global climate change. Transportation is responsible for roughly a third of greenhouse gas emissions, with about 80% of transportation GHG emissions from highway vehicles. Thus, as governments focus on the ways to reduce CO₂ emissions to meet CO₂ reduction targets, automobile transportation is a logical and necessary area for policy analysis. STARS addresses transportation climate pollution in the Climate and Energy credits. But CO₂ is measured there in its natural units: changes (increases or decreases) in tons of CO₂. STARS also includes those CO₂ emissions as a monetized cost, and includes it in the denominator of the cost-effectiveness measures for access.

The benefits from GHG reduction, specifically reduction in metric tons of CO₂, can be monetized to express the benefit from CO₂ reduction in dollar terms using values for the social cost of carbon. There is a substantial and growing literature on the social cost of carbon, grounded in economic methods used to determine the optimal investment in activities where the benefits have a particularly long time horizon. In addition to the academic research on the social cost of carbon, federal guidance has been issued on the values that should be used in federal regulations for the valuation of carbon dioxide emissions.

**Data for cost estimation**

To the extent possible, cost estimates should be based on bottom up cost estimation techniques using costs based on local experience. Cost elements can be estimated from actual costs incurred for the recent construction and operation of similar facilities and programs, or by doing an engineering work-up specific to the facilities being evaluated. Engineering methods for cost estimating can be used to estimate the cost elements for infrastructure investment projects, as these methods are well developed and commonly used to develop rough estimates of the project costs.

Data can be gathered on the unit inputs for the project and then monetized using element cost or price index data, needed for the capital and estimate the individual cost elements for the project. Historic data
from similar projects, particularly estimates on the unit inputs (labor hours, materials, etc.) can be used with commodity price data and current commodity price index forecasts to determine the cost estimates for the project cost elements in constant year dollars.

STARS addresses transportation climate pollution in the Climate and Energy credits. But CO₂ is measured there in its natural units: changes (increases or decreases) in tons of CO₂. STARS also includes those CO₂ emissions as a monetized cost, and includes it in the denominator of the cost-effectiveness measures for access.

**Agency costs**

Planning and design are probably best estimated by getting actual cost data from other projects. Bottom-up estimates are much more likely to be low than high.⁴⁰ STARS requires an estimate of all agency costs, which include some that sometimes are not counted, like the costs of staff time for public, stakeholder, and interdepartmental involvement.

Right-of-way costs should be based on the fair market value of the land that must be acquired for the project, plus costs associated with land acquisition. County assessor records or regional property price indexes are two sources of data on the trend in the value of property. Estimating the right-of-way cost will require estimating the area and current land use of the property needed for the project.

Construction costs are typically estimated by estimating the itemized project elements. Major infrastructure commodity inputs include: concrete, aggregate, steel, labor, and machinery. The Bureau of Economic Analysis, U.S. Department of Commerce collects data on producer prices for various construction commodities. These indexes can be used to update historical expenditure data where current prices can not be collected.

Operation and maintenance costs are best estimated based on operational evidence for the same agency and the same type of facility. If such detail is not available, rules of thumb based on documented expert opinion can be used (e.g., average annual O&M at 3% of capital cost).

Labor costs for both construction and O&M should be based on the number of labor hours or full-time equivalent labor years and the prevailing labor wage rates by job category. In addition to the direct wages, the benefits and overhead expenses associated with the labor hours should also be estimated (benefits are typically in the range of 20% to 40% of direct wage; overhead percents vary based on the accounting practices of the agency). State agencies and the Bureau of Labor Statistics are two sources for data on labor costs. Local data sources should be used when available.

**User costs associated with work zones**

User travel time delay is best estimated from models (e.g., Synchro). In the absence of models, expert opinion can be used, but must be documented an tied specifically to the alternatives. Crash estimates probably start with actual data for crashes on existing facilities being improved or otherwise in the corridor. How alternatives may change the crash rate may be estimated from models, from adjustments to existing rates based on the characteristics of the alternatives, or from comparable projects.

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⁴⁰ See Flyvbjerg, footnote 2 above.
For estimating vehicle operating costs, see next. The point here is that there will be different costs during construction than before or after construction, they may be significant, and they must be addressed.

**User out-of-pocket costs**

For each of the alternatives being compared, the user out-of-pocket costs could be calculated by:

1. Summing the change in vehicle miles traveled or trips, by mode, in each analysis year
2. Multiplying the change in vehicle miles, bicycle miles, and transit trips by the cost per mile or per trip (e.g., transit fares typically per trip and vehicle miles traveled would be multiplied by a per-mile cost.) Cost per mile depends on several factors (e.g., vehicle type and age, speed, amount of congestion, amount of insurance). STARS does not require a disaggregated estimate by fleet characteristics: applicants may use broad averages. A key decision for applicants is whether to include just variable costs (e.g., fuel) or also fixed or semi-fixed costs (ones that do not vary as much based on amount of travel: e.g., vehicle purchase, insurance). If the applicant is taking a long-run view, the latter is probably appropriate. For automobiles, costs per mile are available for many sources (e.g., the American Automobile Association). Note that a comparison across modes requires that equivalent estimates of costs be made for transit (mainly fares paid) and bicycles (cost of vehicle and maintenance).41
3. Discounting the total user out-of-pocket expenditures to their present value to calculate the present value of all of the user out-of-pocket costs during the analysis period.

Vehicle operating costs, in addition to the driver salary and benefits, is needed for estimating the operating costs for transit services and carpool programs. Vehicle maintenance and replacement schedules should be estimated based on the utilization of the vehicle by the program. For example, the operating cost elements for a transit service include the following:

1. Cost of the drivers' wages and fringe benefits;
2. Cost of vehicle operation, including tires, fuel and lubricants;
3. Bus maintenance (labor and parts);
4. Insurance and administrative labor; the costs of vehicle rental or depreciation.

A cost analysis may require consideration of revenue. Revenues from polices that implement user charges or make changes to other revenue generating instruments are typically included as a change in the user generalized cost. If the agency implements a user charge where the revenues are used to pay down bonds used for the initial construction of the project, then those revenues may be treated as a negative cost (credit or revenue to the agency) in the years in which the revenues are generated. However, policies that implement charges, such as a carbon tax or parking pricing policy, where the revenues flow to the general fund are not to be included as a credit to the public agency.

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41 Two qualifications. First, STARS does not include one potentially large element of cost that private users contribute to travel: the cost of their time. Second, the fares paid for transit are really a transfer from private users to a transit agency cover the costs of transit already being countered as an agency cost. Both of these examples of things that would be handled differently in BCA.
Moreover, structures or vehicles from major investment projects may have remaining value at the end of the study period. Whereas residual value is particularly important for capital intensive programs, residual value can be ignored in the cost estimation of programs that do not require capital inputs. The residual value is treated as a negative cost (in other words, a credit) to the alternative at the end of the analysis period. Residual value can be estimated using the fair market value for the capital at the end of the analysis period.

**Cost of carbon dioxide emissions**

For the valuation of reductions in GHG emissions, estimates of the cost of an additional ton of carbon dioxide have been produced using ‘integrated assessment models’—models that combine the geophysical modeling of climate change with models of economic growth. Climate models determine the relationship between the additional output of CO₂ emissions, the accumulation of CO₂ over time, and also the relationships between carbon dioxide emissions rates and levels with the changes in temperatures and sea levels. The impacts and total damage of climate change under different climate-change scenarios are taken from consensus reports on emissions scenarios developed by the International Panel on Climate Change. Economic growth models that estimate the optimal, least-cost emissions reduction path, balancing current expenditures for CO₂ reduction with the future expected costs associated with the effects of climate change.

The primary impacts of climate change, to which the production of CO₂ in transportation is major contributor, include higher temperatures, rising sea levels, and increased weather variability and intensity. The net damages (costs) associated with climate changer are primarily due to changes in agricultural yields, the negative impact on human health (this is the major cost category, with the spread of tropical diseases a major contributing factor), and property damage due to flooding and storm damage and other damage to ecosystems.

The European Union Emissions Trading Scheme System is a market for the buying and selling of carbon credits in Europe. Some have suggested that the social cost of carbon reflect the price of CO₂ as determined under this cap-and-trade system, however, these markets reveal more about the cost of compliance with regulation (and current economic activity as we have witnessed the decline in the cost of carbon on the ETS in the past two years) than the actual social cost of the damage associated with CO₂ emissions.

In the discussion of the current and future value of the cost of carbon, there is often mention of a “climate-policy ramp” or an increase in the social cost of carbon over time. The current cost of carbon is relatively modest, compared to the cost of carbon projected in future years. By the middle of this century the cost per ton of CO₂ is expected to be more than double the current value, growing at rate of 2 to 4 percent per year.

The costs associated with climate change due to GHG emissions are global in nature and will occur many decades and centuries in the future. Since the present value of the cost of carbon must address damages that take place many decades in the future, future costs must be discounted to the present value. Studies that use low discount rates produce the highest estimates for the cost per ton of CO₂, while higher discount rates produce lower estimates of the cost per ton of CO₂ (see Table 2).
Table 2  Social cost of carbon dioxide, 2010-2050 ($/metric ton, in 2007 dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Discount Rate and Estimate</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>5%</td>
<td>3%</td>
<td>2.5%</td>
<td>3% 95th percentile</td>
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</tr>
<tr>
<td></td>
<td>Average</td>
<td>Average</td>
<td>Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>4.7</td>
<td>21.4</td>
<td>35.1</td>
<td>64.9</td>
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<tr>
<td>2015</td>
<td>5.7</td>
<td>23.8</td>
<td>38.4</td>
<td>72.8</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>6.8</td>
<td>26.3</td>
<td>41.7</td>
<td>80.7</td>
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<tr>
<td>2025</td>
<td>8.2</td>
<td>29.6</td>
<td>45.9</td>
<td>90.4</td>
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<tr>
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<td>14.2</td>
<td>42.1</td>
<td>61.7</td>
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<tr>
<td>2050</td>
<td>15.7</td>
<td>44.9</td>
<td>65.0</td>
<td>136.2</td>
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</tbody>
</table>


While choice of discount rate, and to a lesser extent the use of equity weights for the aggregation of impacts across different countries, have been identified as sources of variation in the range of estimates, uncertainty in the estimates of the cost of carbon arises from several sources. The first source of uncertainty is the modeling of global climate change and the understanding of climate change impacts on temperatures, sea-levels and weather variability. A second source of uncertainty lies in the ability to account for the local impacts and costs from climate change, particularly local impacts due to weather variability and differences in the assumptions used in studies that have quantified the cost of local impacts. A third source of uncertainty is due to extrapolation of impacts to high temperatures and also the limitations in capturing catastrophic impacts. A fourth source is the difficulty in modeling mitigation and adaptation (e.g., behavioral response, government policies, etc.), technological change, and other socio-economic trends, which will likely decrease the magnitude of the impacts.

Recently, federal guidance has been issued on value estimates for the social cost of carbon that should be used in federal regulatory impact assessments. A U.S. federal interagency working group (that included US DOT, EPA and US DOE) selected four estimates for the social cost of carbon dioxide (dollars per metric ton of CO2, 2007 dollars): $5, $21, $35, and $65.42 The first three estimates are based on the mean estimate from various integrated assessment models developed by academic and government researchers. The estimates differ in the discount rates used to produce the estimates (discount rates of 5, 3, and 2.5%, respectively). The fourth value of $65/tCO2 is based on the cost at the 95th percentile, using a discount rate of 3%. The higher value estimate for the per ton cost of CO2 is intended to reflect higher-than-expected costs from climate change and also reflects that fact that there is a long right-tail in the distribution of the estimates of cost of CO2. Table 2, taken from the federal

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42 Estimates of the cost of carbon are presented as the cost per metric ton of carbon dioxide emissions. The cost per metric ton of carbon dioxide can be converted to the cost per (metric) ton of carbon by multiplying the cost per ton of CO2 by the ratio of the molecular weights of CO2 and carbon, 44/12. A value of $35 per ton of carbon dioxide implies a value of $35 x (44/12) = $128 for carbon dioxide emissions.
guidance on the social cost of carbon, displays the per metric ton cost of CO₂ for years 2010 through 2050 for the four different selected estimates.

Given the underlying values of STARS, applicants should use at least mid-range values, and they may justify higher values. The key point, however, is that whatever values are used should be applied consistently across all alternatives.

**Discounting to determine the present value of costs**

Discounting of project or program costs to their *present value* represents the fact that due to a positive rate of time preference for money, a dollar spent today is worth more than a dollar spent in a future year. In accounting for the present value of the project or policy cost, we are not only concerned with differences in the total cost of the project or policy, but the years in which those dollars are spent that affect the present value of policy alternative.

Discounting project or program costs to the present value allows us to compare alternatives that not only may have different total costs, but alternatives that have different pattern of expenditures over the analysis period. For example, discounting allows us to consistently compare, in present value, a project with lower upfront costs, but higher annual operating and periodic maintenance costs to an alternative with higher initial costs, but a smaller stream of future annual costs.

The discount rate is a parameter, expressed as a percentage, which represents the opportunity cost of capital for an investment. The discount rate is used to convert period costs to the present value. To achieve the cost estimation credit, not only must all the upfront and annual costs be properly estimated, but the proper discounting methods and discount rates must be applied to covert the costs to the present value. Any guidebook on benefit-cost analysis will explain the theory and steps for discounting in further detail.

**Discount Rate**

Commonly, a real discount rate of three percent is used when cost estimates are expressed in constant year dollars (e.g., cost estimates do not include inflation). When cost estimates include inflation (e.g., when expressed in nominal terms) then the discount rate should equal three percent plus the assumed annual, future inflation rate used to produce the cost estimates.

Federal guidance on the discount rates that should be used in cost-effectiveness analysis for federal regulations are displayed in Table 3, where the rate used in the analysis should be selected based on the Treasury Notes and Bond Maturity that corresponds to the program duration.
Table 3. Suggested discount rates

<table>
<thead>
<tr>
<th>Maturity (Years)</th>
<th>Real Interest Rate on Treasury Notes and Bonds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Year</td>
<td>0.9</td>
</tr>
<tr>
<td>5-Year</td>
<td>1.6</td>
</tr>
<tr>
<td>7-Year</td>
<td>1.9</td>
</tr>
<tr>
<td>10-Year</td>
<td>2.2</td>
</tr>
<tr>
<td>20-Year</td>
<td>2.7</td>
</tr>
<tr>
<td>30-Year</td>
<td>2.7</td>
</tr>
</tbody>
</table>


**Discount rate formula**

With the constant year cost estimates for each year of the analysis period and the discount rate parameter, the present value of the alternative is a straightforward computation. The present value for an expenditure in year, t, is simply:

\[ C(t) = \frac{C}{(1+r)^t} \]

Where:
- \( C \) is the constant year cost
- \( r \) is the discount rate
- \( t \) is the analysis year for the constant year cost
- \( C(t) \) is the present value of the cost

This formula converts a cost incurred in a future year to the analysis period base year present dollars. Once the costs in each analysis year have been converted to their present value, the present value costs can be summed to determine the total present value cost. The combination of the various estimates of the project or program outcomes (e.g., metric tons of CO2 savings, new bike trips, etc.) and the present value of the project or policy allows creation of an estimate of cost-effectiveness across alternatives, which is key for Cost Effectiveness Analysis Credit 2.

**Incorporating performance measures into cost-effectiveness measures**

The previous section gave details about estimating costs for a cost-effectiveness measure (the denominator). This section discusses (1) the performance measures of access and CO2 reduction (the numerators), and (2) the combination of performance and cost measurement into a cost-effectiveness measure.

**Performance measures for access and CO2**

These measures come from the Access credit and the Climate and Energy credit. For Access, there are six possible categories of measures (goals); applicants are required to select there for evaluation and credit:

1. **Modal Access.** Increase convenient, affordable, quality access to more access options by more people.
2. **Mode Split.** Increase the non-drive alone mode splits (e.g., walk, bike, bus, rail, carpool and vanpool, trips not taken)).

3. **Vehicle Miles Reduced.** Reduce vehicle miles traveled.

4. **Modal Travel Time.** Reduce travel time for non-drive alone trips at least as much or more than for all trips.

5. **Travel Quality.** Improve travel quality for non-drive alone modes.

6. **Capacity.** Achieve the majority of new forecast person trips through non-drive alone strategies.

The guidance on the Access credit describes these performance goals in more detail: what they are, why they have been selected, and how they are to be measured. The key point for this cost-effectiveness analysis credit is a simple one. If an applicant has complied with the guidelines for the Access credit (i.e., use suggested data and techniques to create objectives for three or more project access goals, and to evaluate the access performance of at least three alternatives), then those are the measurements that should be in the numerator of a cost-effectiveness ratio.

For example, suppose an applicant chooses mode split (increase), VMT (reduce), and capacity (% increase that is non-SOV) as the access goals to address. The applicant would then need to do the specified research to measure each of those goals for at least four alternatives: the proposed action and three alternatives. That means the need for 12 measurements.

*Creating cost-effectiveness measures*

This step is also easy to describe. Take the previous example.

The applicant is comparing at least three possible alternatives.

For each of the three alternatives, the applicant has three access measures and one carbon measure, for a total 12 measurements of performance (the numerators).

For each of the three alternatives the applicant has calculated the required cost denominator as described above (for access: public cost, plus private O&M cost, plus carbon cost; for carbon: public cost, plus private O&M cost).

Now the applicant creates 12 cost effectiveness measures: 12 performance measures divided by the cost of the alternative for which that performance measure has been calculated.

**References**

The details for measuring life-cycle costs as defined for STARS follow. They draw from many sources, the most helpful of which are:


http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm

TRB Special Report 264—The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience, Chapter 4.
CEA2: Selecting Cost-Effective Projects and Programs

Intent
To encourage STARS users to evaluate the benefits and costs of utilizing transportation strategies.

Purpose and Benefits
Credit CEA1 creates the cost data to allow the calculation of measures of cost-effectiveness. It gives credit for creating those measurements, independent of how they are used in ultimately evaluating project alternatives. Credit CEA2, in contrast, is not about measurement at all—it gives credit entirely for how the measures in Credit CEA1 get used.

Related Credits
CEA1 Cost Estimation and Cost-Effectiveness Calculations

Cost Effectiveness Analysis Credit 2 Components

Requirements and Documentation
To complete the analysis for this credit, an applicant must:

1. Evaluate the cost-effectiveness measures created in Credit 1. In general, such an evaluation consists of comparing, measure by measure, the performance of the alternatives being considered.

2. Create an overall ranking of the alternatives on cost effectiveness. Such a ranking may be numeric, but it need not be: it may consist of a text description of how the applicant sees the alternatives stacking up overall given the multiple measures of cost-effectiveness.

3. Describe how the preferred alternative performs. Steps 1 and 2 provide all the information. Here the applicant is providing a justification for why the preferred alternative was chosen.

Methods
The data are the cost-effectiveness measures for that are created at the end of Credit 1 by dividing the performance measures (at least three access measures and at least one climate or energy measure for each of at least three transportation alternatives considered) by monetized costs (public sector costs, plus private sector O&M, plus the value of change in CO₂ emissions).

In the example at the end of Credit 1, there were 12 such cost-effectiveness measures. We stay with that example and ask the question, What is an applicant supposed to do with these 12 measures?

1. Create a matrix that shows the alternatives as columns and the performance measures as rows.
2. Fill in the blank cells with the cost-effectiveness measures calculated in Credit 1.
3. Proceed by row (i.e., by access measure). For each:
• Rank the alternatives on the performance measure: “1” = most cost effective, to “4” = least cost effective
• Do that for each performance measure

4. When the preferred alternative is selected, review the cost-effectiveness rankings for that alternative. If all the rankings are “1” the applicant gets full credit for this CEA Credit 2. If all the rankings are “4” the applicant gets no credit for this CEA Credit 2. Other combinations will get scaled appropriately.

5. Optional: provide text describing why the proposed alternative was chosen even though it did not rank first on all performance criteria. This is optional because the reasons should be evident from the other credits: the applicant would not be recommending the alternative if its performance was uniformly mediocre relative to the alternatives.
APPENDIX A

CLIMATE AND ENERGY FRAMEWORK

Background for Developing the CE Credits

Several transportation project rating systems for transportation projects are under development or are being testing. Each system has different focuses and characteristics, with most focusing on roadway design and construction methods. Unlike other systems, STARS – Project evaluates a project’s performance over its entire life cycle.

In addition to different rating systems, a number of federal, state and local climate change and greenhouse gas (GHG) reduction measures were considered in the development of STARS, including:

- H.R. 2454, the American Clean Energy and Security Act of 2009 (amended but not yet adopted or enacted) includes provisions that would amend the Clean Air Act to establish a cap-and-trade system designed to reduce U.S. GHG emissions 17 percent below 2005 levels by 2020 and 83 percent below 2005 levels by 2050. The bill addresses the availability of domestic and international offsets in helping to achieve these goals. While not enacted, it does seek to establish federal policy on GHG emissions reductions and, if it is enacted, may result in requirements of metropolitan transportation plans and federal-aid projects to include components that meet these goals.

- California’s AB 32 (2006) requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California’s GHG emissions to 1990 levels by 2020 and by 80 percent below 1990 levels by 2050. California’s SB 375 (2008) requires amendments to and redevelopment of regional transportation plans by the state’s 17 MPOs to include strategies, projects, and programs to meet regional GHG targets through the development of a “Sustainable Communities Strategy.”

- Oregon’s House Bill 3543 (codified at ORS 468A.205, 2007) declares “it is the policy of this state to reduce GHG emissions in Oregon pursuant to the following GHG emissions reduction goals: by 2010, stopping the growth and begin the reduction of Oregon’s GHG emissions; by 2020, achieve GHG levels that are 10 percent below 1990 levels; and by 2050, achieve GHG levels that are at least 75 percent below 1990 levels.” A subsequent bill (House Bill 2186) directs the Metropolitan Planning Organization (MPO) GHG Task Force to “study scenario planning and provide recommendations for legislation directing metropolitan areas to conduct land use and transportation scenario planning to aid in meeting state goals to significantly reduce greenhouse gas (GHG) emissions.”

- Washington State’s “Engrossed Second Substitute House Bill 2815” (2815-S2-PL, 2008) declared that “the state shall limit emissions of greenhouse gases to achieve the following emission reductions for Washington state… By 2020, reduce overall emissions of greenhouse gases in the state to 1990 levels … by 2035, reduce overall emissions of greenhouse gases in the
state to twenty-five percent below 1990 levels … (and) by 2050, the state will do its part to reach
global climate stabilization levels by reducing overall emissions to fifty percent below 1990
levels, or seventy percent below the state's expected emissions that year.”

- The City of Portland Oregon’s Climate Action Plan. The Plan’s “Urban Form and Mobility”
chapter establishes 5, 10, 20 and 40 year greenhouse gas reduction goals from the transportation
sector.

While a single project cannot by itself achieve statewide or even regional GHG reduction goals, the
cumulative impact of implemented projects can contribute to GHG emissions reduction over time by
incorporating strategies that reduce vehicular travel, reduce energy consumption, utilize technologies
that improve efficiencies and incorporate GHG-reducing construction and operations practices.

STARS can be applied to any project whether or not it is undergoing a federally mandated NEPA
process. It is likely that if a project’s purpose and need statement as required by NEPA includes freight
and/or safety considerations as well as mobility issues, it is possible that improvements to freight flow or
reductions in accidents may be byproducts of mobility improvements (i.e. fewer automobiles may
improve truck flow and reduce accidents). Performance measures such as delay, emissions reduction,
etc., may reflect improvements to freight under mobility alternatives that STARS would be assessing.
The CE credits here recognize that a STARS applicant may elect to analyze a project’s GHG emissions
and energy consumption reduction effects across all modes, or may elect to use air quality and energy
consumption tools that only evaluate light duty vehicles.

Limitations and Caveats
The project sponsor needs to keep a number of issues in mind. These include:

- **Areawide/Statewide GHG Reduction Goals and the Contribution of a Single Project:** GHG
  and fuel consumption reduction goals are commonly established jurisdiction-wide and/or by
  economic sector. While few, if any, individual projects could meet a jurisdiction’s reduction
  goals, the goals will only be reached when individual projects contribute to the larger reduction
  goals. Thus, individual transportation projects are a critical factor determining whether an area,
  or the transportation sector, meets adopted reduction goals.

- **Creative Tension:** the sustainability philosophy underlying STARS recognizes three important
  factors --environment, economy, and society. Historically, growth of vehicle miles traveled
  (VMT) has, in part, reflected economic growth, such as development of a new manufacturing
  plant. STARS encourages economic and social vitality while rewarding projects that develop
  innovative strategies to reduce unnecessary vehicle miles traveled and congestion. For example,
  locating new jobs along transit corridors, close to workers and services, could reduce VMT while
  achieving job growth.

- **Construction Methods & Operations:** Although the energy and GHG reduction gains
  described within CE4 could be significant for a given project, implementing these on an agency-
  wide (construction practices) or area wide (operations improvements) basis would be more
meaningful. It might be worthwhile to consider a future edition of STARS that would rate an agency as a whole with respect to Climate and Energy goals instead of individual projects.

Data and Methodology
One intent of STARS is to help make project sponsors and their stakeholders aware of potential GHG reduction and energy consumption savings benefits of a variety of transportation project components, strategies, and methods that discussed in the Climate and Energy section. We also recognize that the industry practices to assess the abilities of various transportation strategies to achieve fuel consumption and GHG emissions reduction is a continually-evolving field. While STARS provides guidance for assessing a project’s climate and energy performance, it also provides the project sponsor flexibility in choosing to use acceptable, performance-based tools of their choosing in order to provide the performance analysis required under STARS.

This section will provide an overall methodology on obtaining performance-based information to evaluate projects under the STARS CE credits 1 through 3.

Base Year
While several states have enacted, or are considering, climate-related legislation that establishes 1990 as the base year from which to measure GHG reduction goals, STARS realizes that the amount of information needed to set a 1990 base GHG target may be incomplete, especially for areas that may have been air quality attainment areas.

While some cities use 2008 as their base year, Federal legislation (H.R. 2454, described earlier) establishes 2005 as the base year. STARS recommends projects select 2005 or 2008 as the base year, depending on which has higher quality data available or reasonably acquirable.

Study Area
National legislation considered under H.R. 2454 establishes a GHG reduction target of 17 percent below 2005 levels by 2020 and 80 percent below 2005 levels by 2050. State policies or legislation already in place in California, Oregon and Washington also include an approximate 80 percent reduction goal, but from the year 1990. STARS uses the goal of reducing GHG emissions 80 percent below 2005 or 2008 levels by the year 2050. However, if a project has 1990 data, they are encouraged to use it as base year for GHG modeling.

STARS recognizes that some transportation-related GHG reduction in the study area will likely come via mandated increased fuel economy standards (Corporate Average Fuel Economy or CAFE), state- and federally-mandated vehicle emissions reductions, state- and federally-mandated fuel technology and use of low-carbon emissions fuels, region-wide adoption and implementation of land use/smart growth strategies, and regionally- or state-enacted pricing strategies.

STARS recognizes that the state-of-the-art for GHG and energy consumption performance analysis models (see Analysis Models discussion below) includes the influence of improved CAFE standards, increased technology standards to reduce emissions, growth management strategies, and other mandates and thus these cannot be removed without compromising the model.
GHG and Fuel Consumption Analysis Models
The FHWA/EPA “MOVES” model (nationally) and EMFAC model (California) are the latest available and sanctioned models for estimating transportation GHG emissions and fuel consumption. Another model, the Comprehensive Modal Emissions Model (CMEM, NCHRP 25-11, April 2000) is a mobile emissions model which focuses on light-duty vehicles only but does have the capability to receive data from traffic simulation models, which enables it to model speed variations and fluctuations. Another research document is A Comparison Of Real-World and Modeled Emissions Under Conditions of Variable Driver Aggressiveness (Edward K. Nam, Christine A. Gierczak, James W. Butler, Ford Scientific Research Laboratory, Dearborn, MI. August 1, 2002).

Most air pollutant emissions models currently available do not forecast fleet mix, emissions rates, and fuel consumption rates beyond the year 2020. Additionally, many areas may not have sufficient data to establish a year 2005 or 2008 baseline as STARS requires. The Oregon Department of Transportation has developed the Greenhouse Gas Statewide Transportation Emissions Planning (GreenSTEP) model, which provides emissions and fuel economy adjustment factors to backcast to 2005 as well as forecast to 2040. A simple extrapolation of the Greenstep factors from 2040 to 2050 is acceptable under STARS. For more information on GreenSTEP, contact Brian Gregor, P.E., Oregon Department of Transportation, at Brian.J.Gregor@odot.state.or.us or (503) 986-4120. On-line resources for Greenstep’s applications are found at the following links:


Non Mobile Source Energy Consumption Analysis
While there are a variety of analytical tools available to estimate energy consumption of non-mobile transportation projects (such as illumination, power for traffic signals and signs, etc.), STARS recognizes that this is an evolving field.

VMT Analysis Models
Most regional travel demand models have the capability to output VMT for each project alternative, based on assumptions for land use for each modeled year, as well as adjustments to the model to account for potential VMT-reducing strategies such as TDM/transit, compact growth (with more accessibility to transit), etc.

STARS will not prescribe specific travel demand model platforms (such as EMME, VISUM, TP+, etc.) but does prescribe that a project sponsor develop an acceptable travel demand model that has the ability to measure:

- Vehicle trip generation adjusted by land use type, household size and income level (or auto ownership or access to an auto), and employment type
- Trip distribution by at least three trip purposes: home-to-work, home-based non-work, and non-home-based, with distribution accounting for travel time and costs
- Mode choice to at least account for transit, carpooling, bicycling, walking and trips not taken (e.g. telecommute and compressed work week), with the ability to adjust transit use by the proximity of transit to land uses
- Trip assignment for at least three times-of-day: AM peak period, PM peak period, and non-peak period
- The capability to model the STARS Design Years (five, ten, twenty and forty years following the start of project implementation)
- The capability to model three or more of the six STARS Access goals (see credit A1).

Models that exceed these minimum requirements are encouraged. The project sponsor should submit a short “white paper” documenting the travel demand model, assumptions used for land use, how the model may have been used as input to the GHG/fuel consumption model, and how proposed project components or strategies were accounted for in measuring VMT reductions.

Traffic Flow Analysis Models

Most regional travel demand models have the capability to output the number of vehicles and average speeds by roadway segment, known in modeling terms as “links”. However, the output tends to be total vehicles, and average speed for the length of each link, which tends to ignore differences in vehicle classifications or fleet mix, driver behavior, speed profiles (acceleration and deceleration as well as slowing and stoppage due to queued traffic), or speed fluctuations within the time period modeled. While MOVES and other air quality models do allow the user to input vehicle fleet mix characteristics, and allow for different analysis periods (AM peak, PM peak, off-peak), the GHG and energy use outputs of these models is limited to the amount of speed information (or lack thereof) provided as input.

In order for the project applicant to receive credit for traffic flow improvements under STARS credit CE3, the applicant is encouraged to undertake traffic simulation analysis for one peak period (AM, PM, midday, or weekend, whichever is the “worst” peak period) for the project corridor. Traffic simulation models such as VISSIM, PARAMICS, and CORSIM/NETSIM (as well as other models) can report out different speed characteristics for each segment of the project corridor by time slice (15-minute segments or shorter are acceptable for STARS) for a multi-hour peak period, and the information fed into MOVES or other air quality models to measure changes in Greenhouse Gas emissions.
Carbon Offsets
Utilizing carbon offsets to attain emissions goals will not be recognized in the STARS rating system. The purchase of carbon offsets would not benefit the project’s immediate environment that experiences the impacts from vehicle emissions. A project sponsor may still opt to purchase carbon offsets but STARS will not recognize those offsets toward GHG emissions and energy consumption reduction goals.

Additional Considerations

Credit CE1
There may be unforeseen negative impacts or “pitfalls” from implementation of Climate and Energy credits. Project sponsors should ensure that they have undertaken a comprehensive investigation in their project development and alternatives analysis process before committing to these goals.

The project sponsor should avoid potential pitfalls by considering the following:

- Project costs could increase to meet target (i.e. for analysis or costs of equipment retrofits/more energy efficient or alternative fuel equipment);
- Innovative GHG reduction measures could potentially conflict with current state or federal design or construction standards;
- Achieving a challenging but realistic GHG reduction target may require the completion of other projects or a high level of coordination with other programs and services to achieve these goals;
- Without effective land use policies in place, future development patterns adjacent to or within the project study area may counteract a project’s VMT reduction goals; and

Project alternatives should balance the climate and energy impacts of vehicle speeds (on average 55-65 mph can attribute to higher fuel economy) with the need to reduce vehicle miles traveled and fuel consumption.

Credit CE2
The project should consider the following in relation to reducing vehicle miles traveled:

- Adding general purpose vehicle capacity to a roadway or highway may induce demand for the facility. There are arguments that adding capacity in a “mature urban area” or “built corridor” would have a have low induced growth.45
- Some projects may actually increase VMT in the “build” scenario while improving flow (see Credit CE4)

• Assuming VMT measures that rely on transit or employer programs, which may not be achievable due to lack of funding, agreement on the part of major employers and/or a significantly constrained implementation environment.

• Not considering appropriate land use strategies and,

• Simply shifting demand to off-peak periods rather than actually reduce demand.

The project sponsor should undertake a pricing analysis to ascertain whether the pricing strategy(ies) would simply divert traffic to other time periods or other travel corridors instead of reducing VMT.

Credit CE3
Unforeseen negative impacts from the types of strategies considered in Credit CE3 include:

• In some cases, increasing traffic speeds serves to discourage use of alternative modes that could reduce VMT. For instance, adding lanes, coordinating signal timing, facility upgrades or removing a barrier could induce drive alone demand for the improved facility due to more capacity.

• Implementing some of these strategies (road pricing, speed reduction, etc.) could shift traffic to other roadways. Credit CE 3 requires potential diversion to be evaluated and the greenhouse gas and energy impacts quantified.

Credit CE4
Potential pitfalls for sustainable construction materials that should be avoided include:

• Project Delivery
  o Design-Build may expedite project delivery but has the potential to add cost to the project based under aggressive project schedules which tend to require overtime labor.

• Construction Methods
  o Prescribing methods to contractors may add cost if contractor is not familiar with specific “innovative” methods.
  o Innovative construction methods or materials may need to be vetted with state DOT to ensure consistency or compliance with DOT standards and specifications.
• Construction Materials

• Prescribing sustainable production methods for certain materials may preclude some suppliers from being able to supply material. This may present a conflict with project goals for minority or women-owned business enterprises.

Credit CE5
There may be unforeseen negative impacts from implementation of Credit CE5. Research has identified the following impacts that should be considered:

• Conversion to electric power does not necessarily equate to an overall reduction in a project’s carbon footprint; achieving a reduction is dependent on the source of the electric power. Renewable power generation is preferable over coal or gas electrical generation in this case.

• Electro Kinetic Power Ramps were designed for “parts of the roadway where vehicles are having to slow down.”46 They would likely be most useful in combination with ramp metering which, as may be determined under Credit CE4, contributes more to pollution than it eliminates. At this time, there has only been one implementation of this type of system at a grocery store in Gloucester, England.47

• Producing wind or solar energy may not provide a continual source of power or fulfill a project’s total power needs. Thus, other forms of energy may need to supplement the power needs/demand of the project or use of a back-up generator may be required. These renewable sources will depend on the location and number of windy and sunny days throughout the year. Depending on size, design and material composition, other biological considerations may be required. For example, larger, slower wind turbines have been found safer for some bird species.

APPENDIX B
COST EFFECTIVENESS ANALYSIS FRAMEWORK

Fundamental to the cost-effectiveness analysis credit is the idea of cost-effective transportation investments. In simple terms, that means “bang for the buck.” In concept, applicants should be proposing for implementation and credit those transportation projects and programs whose total net benefits are positive, and delivering more positive impacts net of costs than all the relevant alternatives evaluated.

That idea is clear broadly and in concept, but that clarity diminishes as real complications of measurement and evaluation get introduced. The rest of this section gives an overview of some of the concepts and issues.

1. **Scope of the cost-effectiveness evaluation**

Critical to an understanding of this credit is a distinction between *benefit-cost analysis* (BCA) and *cost-effectiveness analysis* (CEA). BCA is more comprehensive, and subsumes CEA. Ideally, one would like to evaluate alternative transportation investments by comparing all their impacts (i.e., all the positives and negatives, the benefits and costs), on all people, over all time periods (long run and short run). Impacts would include ones not only transportation impacts, but also ones on the environment, economic development, land use, and more. They would include capital and operation and maintenance costs (including life-cycle O&M costs) that are relatively easy to measure in dollars (i.e., to monetize) and environmental and other costs (e.g., the cost of air pollution and increase in greenhouse gases) that are hard to monetize.

The previous paragraph is describing BCA: an attempt to consider all the impacts of alternative action. Set aside for a moment all the problems of measurement and analysis. If BCA were able to identify, measure, and monetize all impacts, on all people, over all time periods, for all reasonable transportation alternatives, then it could generate estimates of *net benefits* (benefits less costs) for all those alternatives. The alternative with the greatest net benefits would be the preferred alternative unless other considerations are introduced that are *not* in the BCA calculations and that suggest projects ranked lower on net benefits are actually preferable. For example, the net benefits calculation may be done for a region in the aggregate, but the distribution of the net benefits by subareas or subgroups may be judged to be unfair for the project with the most net benefits, so an alternative project with lesser net benefits but a preferable distribution of them gets selected.

BCA is based on the assumption that many critical impacts can be converted to dollar values (monetized), which then allows net impacts to be calculated because all the impacts are in the same units and can be summed. It does not specify in advance, for example, that a certain transportation investment must achieve a certain mode split. Instead, it (1) models and evaluates the investment to measure and estimate how it performs on things people care about (e.g., travel time, reliability, safety, construction and operating costs, the environment); (2) converts all those measurements of impacts, over time, to a present value in dollars; and (3) compares benefits and costs (now denominated in dollars) to get an estimate of *net benefits*. 


CEA is a subset and simplification of BCA. In CEA, certain objectives are specified in advance. For example, the objective might be to reduce by 5% the number of trips made by single-occupant vehicle (SOV). From a benefit-cost perspective, such a reduction may be a good idea (i.e., it generates net benefits) or not: it depends on what trips in particular are reduced, what was done to achieve the reduction, and other factors. If the question is about whether the goal of a 5% reduction is a good idea or not, CEA cannot help: one must use the concepts and tools of a full BCA to answer that question.

But if decision-makers are willing to agree—based on analysis, a literature review, expert opinion, intuition, etc.—that such a reduction will, in theory, generate net benefits, then the analysis gets much easier (not easy, just easier). Why? First, it is clear what has to be measured: SOV trips before and after the alternative transportation investments. Second, since there are potentially many ways that the 5% reduction might be achieved, and some of them are more costly than others, one would like some idea about costs before selecting an investment. If a public agency, for example, is considering investing $1 million in alternatives corridors, modes, projects, or programs, how do they perform on SOV reduction? This is where CEA comes in: it (1) standardizes how costs are measured so the measurements are applied consistently across alternative investments, and (2) deals with issues of scale by creating a measure of “bang for the buck” (in the example, that would be, for example, the amount of SOV trip reduction per $1 million of cost (investment)).

Other credits in STARS are clear about what the bang should be: they specify objectives and measurements for improving certain aspects of access, energy use, and so on. In essence, those objectives and measurements could be the numerators of a cost-effectiveness measure. For the CEA credit, however, STARS has chosen to focus on access benefits (in the numerator). Since guidance about measurements for the Access credit is provided elsewhere in the STARS documentation, the technical effort for this CEA credit is mainly about costs—about the denominator of a cost-effectiveness measure. On the one hand, the overall STARS rating system might appear to be giving credit for certain objectives twice: once under the credit headings of access, and again under the heading of cost-effectiveness, which is using these same access measures in its numerator. But (1) the cost-effectiveness measure really is addressing something different: the relative efficiency with which a proposed investment meets other objectives, and (2) it is ultimately a judgment call by the developers of the STARS system about how to define the relative importance of the cost-effectiveness credit: either by what it chooses to measure, how it choose to combine measurements, or how it establishes the relative score (points, credits) for what gets measured.48

2. Considerations for creating cost-effectiveness measures for transportation investments

Other STARS credits are grouped in categories that are consistent with what transportation professional might agree to as a comprehensive list of the impacts (positive and negative) of transportation projects and programs. As a first cut, those impacts can be divided into those that primarily affect users of the transportation system (travelers and shippers) and those that spillover to affect all members of a larger society, regardless of direct use of the transportation system.

User impacts. These are the ones that accrue directly to travelers and shippers as they use transportation facilities. They are benefited if trips are faster, more reliable, safer, more convenient, more comfortable, or cheaper. To get those new benefits, there are direct costs of new

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48 The draft version of this and other credits dose not address scoring and relative weights of required measurements. The scoring / weighting system will be developed after all of the categories and measurements have been defined.
facilities, vehicles, and programs. Some of those costs are paid via taxes and fees; others are paid privately (e.g., the purchase of vehicles; time spent driving). The direct costs may be up-front for capital construction, or paid over time for operation and maintenance. A key tradeoff here relates to life-cycle cost: does paying more now for a better facility payoff over the long-run with reduced maintenance?

**Non-user impacts.** The construction and operation of new facilities can affect people who do not use them. Those impacts may be benefits (e.g., better travel brings more customers to a retail store) or costs (e.g., highway noise and pollution). Critical to any benefit cost analysis the attempt to identify, describe, quantify, and monetize externalities (impacts that are external to normal market transactions), especially negative ones: for example, carbon emissions and the resulting impacts on climate and, ultimately, on human well-being.

STARS gives credit for evaluation of an important subset of user and non-user impacts. Its main category of user benefits is *Access*, and the measurements in that category focus on creating what it views as a more balanced transportation system by improving alternative modes of travel (transit, bicycle, walking) both absolutely and relative to SOV travel. Its main categories of non-user benefits are *Climate and Energy* and *Ecological Function*.

3. Transportation (user) benefits

STARS requires applicants to make a substantial effort to measure, at a minimum, certain benefits to users of the proposed transportation investments and the life-cycle monetary costs of those investments, for both proposed investments and a reasonable range of the alternative investments not being proposed. Regarding access benefits, applicants should refer to STARS guidance on the Access Credit. For any mid-sized city of metropolitan area (say, 50,000 people: the size at which federal funding requires the existence of a Metropolitan Planning Organization (MPO)) applicants should use, if possible, the output from travel-demand models for making estimates of how transportation investments will change access.

The recent spate of interest in the U.S. in “sustainability planning” has been accompanied by some exploration in transportation of “least-cost planning” methods. The methods were developed most extensively in the electric utilities of the Pacific Northwest in the 1980s. The idea was to deliver kilowatt hours at “least cost,” which required an examination of all alternatives (including, significantly, conservation) and of life-cycle costs. Many analysts and policymakers are now talking about applying that same idea in transportation: they state or imply that proper policy would be to minimize the cost of trip-making.

But getting the best regional transportation system of facilities and programs is not a cost-minimization problem; it is an optimization problem that requires balancing user benefits against user costs. Transportation infrastructure and services are consumed by a population of heterogeneous travelers who have different preferences, various levels of choice and access to substitutions (access to alternate modes or choice to not travel), and values of time (which can vary greatly by income, purpose, and time of day). The value of their trips and the costs they consider go beyond speed to include comfort, reliability, schedule convenience, flexibility in routing, trip chaining options, perceptions of safety, health and environmental considerations, and mode choice opportunities. They make complex responses to demand mitigation strategies (e.g., pricing, TDM programs) as well as short- and long-term responses to increased supply (e.g., induced demand and changes in urban development following roadway capacity
increases). Sophisticated tools are needed to estimate these effects with the proper feedbacks to avoid double counting.

In making choices about behavior, and about the purchase and consumption of goods and services, people are rarely trying to minimize cost—they are trying to optimize value (the best mix of benefit and cost). As applied to surface transportation, and given (a) the current public investments in highway, (b) private investments in vehicles, and (c) the substantial external costs that travelers do not have to incur as part of their mode choice, the car is demonstrably the travel mode of choice for most trips in the U.S. The obvious point for the Cost-Effectiveness Analysis credits is that both benefits and costs matter. One cannot presume to hold travel benefits constant and then just reduce cost. The reduction in cost is likely to be a reduction in expenditure, which is likely to change level of service and transportation benefits. To address that point, STARS ask applicants to create a ratio of access measurements to certain specified costs.

4. Other non-transportation benefits

Other non-transportation benefits derive from the transportation investment. The ones most talked about fall into three categories: land use, economic development, and the environment.

For land use, there are at least two main sub-categories of purported benefits. First, transportation improvements may raise property values, so measurements and estimations of change in property value have been used as a measure of benefit. But, as noted previously, transportation economists generally agree on the proper theory here: those changes in property value will be largely a capitalization and double-count of the transportation user benefits.

Second, advocates of smart growth believe that high-density, mixed-use land use patterns are inherently superior to low-density, segregated-use land use patterns and have supported that belief with research showing that such land-use patterns might reduce the cost of public services (including, notably but not only, transportation) and greenhouse gas emissions.

For economic development, the benefits of transportation investment now derive not only from the first-order effects on transportation (in metropolitan areas, primarily the reduction in congestion and travel time, and the increase in travel-time reliability), but also from the second-order effects on land use (allowing concentration of economic activities and what economists refer to as “agglomeration economies,” and providing other positive “amenity” effects). Ultimately that may lead to better products, more consumer satisfaction, more jobs, higher wages, more spending—in general, to more economic activity. Here again are the problems of specification (what are all the possible effects?), measurement, and double counting.

For the environment, it is well accepted in the economic theory that the foundation of benefit-cost analysis that some of the benefits and costs of human activity (including the construction and use of transportation facilities) are not incorporated into market prices. The current and much-debated example is the potential costs of climate change, to which the carbon emissions of motor vehicles contribute. These costs, because they are largely “external” to the decision-making calculus of travelers, are not in the consumer-surplus calculation of user benefits and are not double-counts. Economists have developed techniques to try to estimate the benefits of reducing these costs.
Given the decision to focus the STARS CEA on the Access credit (i.e., how effectively are the various components of access being provided?), these non-user benefits are not considered as part of this CEA credit, though many, like environmental effects, are considered under other STARS credits (Climate and Energy and Ecological Function). In other words, this CEA credit is specifically about the efficiency with which a proposed transportation action delivers what has typically been the main reason to undertake a transportation action: the benefit to users of better access to users of the transportation system.

5. Full and life-cycle costs

Getting good estimates of costs is the fundamental way to get points for the Cost-Effectiveness Analysis credit. At the most basic level, most evaluations of transportation investments consider the monetary capital costs of making those investments. While probably the bulk of the costs, those capital costs are not, however, all the costs. Moreover, there is ample evidence that even these clear costs often get poorly estimated.49

A key element of the concept of sustainability planning and analysis is life-cycle costing. Developing local estimates of full life-cycle costs is time consuming, and will be new work for many jurisdictions. It is clear that spending more money up-front on the quality of construction (capital) will, in many cases and if done effectively, reduce future operation and maintenance costs. Similarly, one can substitute demand management for capital and save money: that is what energy utilities do now as they implement cost-effective conservation measures before building new generating capacity. It is equally clear in the theory of benefit-cost analysis that a proper evaluation should consider the full stream of benefits and costs over the relevant time period (for transportation facilities that is probably 30 to 50 years).

Cost-effectiveness analysis is used to determine the most cost-effective alternative for delivering specific project outcomes when choosing among project alternatives. The professional literature suggests that life-cycle cost analysis and cost-effectiveness is best suited to situations where the decision to undertake the improvement has already been made. The cost-effectiveness analysis focuses on which alternative to select based on outcome per dollar, where the level of service is similar across all the alternatives being considered. Benefit-cost analysis is the appropriate type of economic analysis to evaluate project alternatives that produce different levels of service. Benefit-cost analysis is also the strongest economic analytical technique for informing decisions of whether to undertake a project: that is, whether a project produces net benefits to society.

Essential to the idea of life-cycle cost and full benefit-cost analysis are the concepts of present discounted value and discounting. Present values (e.g., in dollars) are more valuable than future values. Inflation is part of the reason, but so is the positive rate of time preference, which means that, in general, people would prefer a dollar now to the promise of a dollar five years from now. Without getting into the details, what can be said here is that a life-cycle analysis, because it is trying to compare alternative streams of benefits and costs over time, has to “discount to a present value” all future benefits and costs. References cited later explain the methods.

6 Alternative modes of travel

The discussion to this point has implicitly assumed an evaluation of a few alternatives to a project for a single mode. Trying to develop and implement a comprehensive and consistent scoring system for all potential investments in facilities or programs, by mode, makes a hard task overwhelming. Not even the most sophisticated MPOs can do that now. There are many overarching technical points to get straight before one even tries to do the measurement that would lead to numbers from which one could compute a cost-effectiveness ratio that would allow what various modal advocates would accept as a fair comparison across modes.50

A related problem: current and future benefits depend on prior expenditures. Advocates for alternative modes can argue that the cost-effectiveness (based primarily on user benefits) of new highway investment may be high because of past subsidies and unpriced externalities that are huge. The Federal Transit Authority recently changed its relatively long-standing policy of evaluating transit projects based primarily on the cost (capital and operation) per hour of travel-time savings (the inverse of a benefit-cost ratio) because of criticism from transit advocates that (1) transit has not had the same subsidies as highways and cannot be expected to be as effective in reducing travel times, and (2) other things besides travel-time savings are important (especially land use and GHG emissions).

Though it is the intent of STARS to be able to compare alternative modes and travel-demand management programs to highway projects, the reality is that the methods of benefit-cost evaluation are better developed for highway projects, and are weighted toward measuring improvements in travel time, which can be large in the aggregate. Evaluations of different modes using similar benefit-cost techniques and consistent metrics is not happening in most MPOs now. STARS recognizes the challenge and does not propose to hold applicants to standards that cannot be met without work far in excess of the state of the practice; it does hope, however, to move that practice forward a little.

7. Project portfolios and budget constraints

The discussion so far has implicitly addressed the evaluation of individual, isolated projects and programs. But the investments may be related not only as substitutes, but as complements. The benefits of a project may be higher, and its costs lower, if it is bundled with complementary projects: either proposed, or ones that are already funded and under development. Moreover, the idiosyncratic constraints of funding (the “fungibility constraint” issue) can create situations in which it is not the “best” project that gets selected, but the one that is best within a more narrow range of projects eligible for a certain funding source.

In the real-world setting where budgets are limited, calculating the ratio of benefits to life-cycle monetary costs can help select the subset of projects that gives the greatest net benefit for the limited budget. To construct such a benefit-cost ratio properly, and make proper use of it in ranking project alternatives under limited budgets, the denominator should only include costs that are constrained by budget restrictions—usually just the capital or development costs. Some other “costs” are really negative benefits and should be balanced against positive benefits in constructing the numerator of the ratio. To

50 At the time this guidance is being written (July 2010) the US Federal Highway Administration is trying to give guidance to applicants for its TIGER II grants about how to do the required benefit-cost analysis. In a full-day workshop in May 2010 it described the same kinds of principles contained in this guidance for highway and (to a much lesser extent) transit, but gave little guidance on how to do benefit-cost analysis for bicycle or pedestrian projects, or how it will evaluate grant applications for those types of projects. See http://mediasite.yorkcast.com/webcast/Viewer/?peid=48d006182cf5438680a75b7c6d6c2c9e
do otherwise can distort the calculation of a benefit-cost ratio and potentially lead to selecting investments that do not maximize net benefits. Moreover, if all those impacts are considered as part of this cost-effectiveness credit, than the ratio will double count many impacts that are the focus of other categories of credits.

Once one decides on how to define benefits and costs and does the work to create such a measurement for each relevant transportation project or program being evaluated, one can order alternative projects from the highest to lowest ratio, and then select them in order until the capital budget is exhausted. A high benefit-cost ratio, per se, is not the goal. It is maximization of the net of benefits and costs. The benefit-cost ratio is just a tool to achieve that end under a limited budget.

The discussion in this section to this point has been about benefit-cost analysis, but STARS is using cost-effectiveness analysis. While developing this credit for STARS there was a debate about whether to (1) adhere to the mainstream view of using in the denominator of a CEA the monetized budgetary costs of agencies making public investments (to get a measure of the effectiveness of their expenditures), or (2) to include other costs in the denominator as well. The key points and resolution of that discussion are covered in Section 3.

STARS does not require that applicants show an evaluation of every alternative project or program that they are not proposing. It asks applicants to evaluate the cost-effectiveness of at least three “packages” of strategies to achieve objectives.

8. Equity

Cutting across all the impact areas is the distribution of the impacts. These are often referred to under the heading of “Equity” or “Social Justice,” but those headings presume a normative judgment about what distributions are better than other distributions.

Economists generally agree that the benefits and costs of transportation investments will look different depending on where one stands, that it is impossible to consider those projects from every individuals point of view, and that distributional impacts need to be evaluated and rolled up into a few broad categories, which are typical some variation on (1) users of the transportation system, including travelers (commuters, shoppers, students, and so on) and businesses (e.g., freight shipment); (2) non-users (e.g., households that may not use a specific facility, but enjoy secondary benefits or incur primary or secondary costs (e.g., environmental and safety costs); (3) transportation system operators (especially transit agencies); (4) other government agencies; and (5) the businesses and the general economy.

But the simple, top-level categorization gets more complicated as one looks deeper. Transportation users, for example, have many different perspectives: they differ by (1) preferred mode, (2) household demographic and socioeconomic characteristics, (3) location, and so on. Each of these subdivisions potentially has a different idea about what a “fair” distribution of benefits and costs would be, and how well a proposed project does relative to alternatives.

Related distributional impacts and the idea of double counting is the idea of transfers. What looks like a benefit to one group may look like a cost to another. A project that is 80% funded by state money that would otherwise be spent in another city is a boon to the city receiving the money, but a cost to other cities that might be contributing to the pot of money that funds the project. Benefits have been
transferred, but they are offset by costs: there is no net economic benefit. Any analysis of performance must be clear about the actual use or creation of resources, as opposed to a transfer of resources.

Any analysis of equity has to be done within the impact being addressed: e.g., access, energy, environment. Thus, if STARS were to give a credit for equity, the analyses of equity would have to be conducted in each of those sections (i.e., showing how aggregate performance measures are similar or different when disaggregated by interest group or location) and then somehow rolled up into some type of overall score. Among the difficulties: estimating the distribution of impacts is an analytical exercise; judging the equity of that distribution is no longer a measurement issue. Equity requires a normative decision about what is fair. Thus, the CEA credit can deal with equity to the extent other categories of performance measures address it, but at this point STARS is not requiring that level of analysis from applicants.

Resources
Many books, reports, and websites address the concepts discussed in this section. Many of the recent ones listed here have bibliographies that will take applicants to whatever level of detail they seek.


Sustainable Transportation Access Rating System (STARS)

Pilot Project Application Manual

If you have questions about STARS, please contact the North American Sustainable Transportation Council. Please direct questions to Peter Hurley at 503.823.5007 peter.t.hurley@portlandoregon.gov.
TO: Regional Transportation Commission (RTC)
FROM: Rachel Moriconi, Senior Transportation Planner
REGARDING: Update on the Monterey Bay Area Regional Blueprint Plan and SB375 Implementation

RECOMMENDATION
Staff recommends that the Regional Transportation Commission (RTC) receive a presentation from John Doughty, Executive Director of the Association of Monterey Bay Area Governments (AMBAG) on the draft Blueprint Plan for the Monterey Bay Area.

BACKGROUND
Over the past two years the Association of Monterey Bay Area Governments (AMBAG) has been seeking input from the public and coordinating with staff from planning agencies throughout Santa Cruz, Monterey, and San Benito Counties to develop the 2035 Monterey Bay Area Regional Blueprint: Envisioning the Monterey Bay Area (Blueprint). In general, the blueprint planning process is a statewide, grant funded initiative. Blueprint plans typically incorporate assumptions regarding priorities, residential density, commercial intensity, the spatial relationship between jobs and housing, environmental constraints, economic growth, and the transportation system.

DISCUSSION
On November 10, 2010 AMBAG released the Monterey Bay Area Blueprint document for public review. The plan and technical appendix are available online at: www.ambag.org/programs/blueprint/index.html and can also be viewed at the Santa Cruz County Library’s Central Branch at 224 Church St in Santa Cruz. **John Doughty, Executive Director of the Association of Monterey Bay Area Governments (AMBAG), will make a presentation on the plan at this meeting.** Comments on the document are due to AMBAG by December 15, 2010. The AMBAG board is expected to adopt the final Blueprint plan at its February 2011 meeting. The RTC and members of the public are encouraged to review the Blueprint document.

The Blueprint describes how communities of the Monterey Bay Area might grow in a sustainable fashion over the next 25 years. The Blueprint describes growth challenges facing the area and recommends meeting those challenges through expanded housing and transportation choices, focusing growth in Priority Areas that can be served by fast, convenient transit and maximizing non-automobile trips. A brief summary of the Blueprint is attached (Attachment 1). Priority Areas identified for Santa Cruz County are shown in Attachment 2.

This Blueprint is considered a “fact-finding” document and will lay the foundation for the Senate Bill 375-mandated “Sustainable Communities Strategy” (SCS) for achieving regional greenhouse gas emissions targets.
SB 375 Implementation

The RTC is required by state regulations to prepare a long range Regional Transportation Plan (RTP) that includes transportation policies, projects, and funding projections for Santa Cruz County. Actions to allocate funds to specific projects must be consistent with the RTP. The RTPs for Santa Cruz, Monterey, and San Benito Counties are incorporated into the Metropolitan Transportation Plan (MTP) prepared by AMBAG pursuant to federal requirements. With passage of SB 375, future updates of the MTP must include a Sustainable Communities Strategy (SCS) for achieving regional greenhouse gas emissions (GHG) targets set by the state for each region. On September 23, 2010, the California Air Resources Board (CARB) adopted a transportation sector greenhouse gas target for the Monterey Bay Area of 0% increase in per capita emissions by 2020, and a 5% reduction in per capita emissions by 2035.

As such, for the next Regional/Metropolitan Transportation Plan updates the transportation network will be evaluated in relation to the Sustainable Communities Strategy, tying together GHG emissions, regional land use planning and transportation money in an effort to encourage growth in a way that reduces vehicle miles traveled. While RTP project lists may not change significantly given the multimodal focus of past project lists, they may include new bicycle, pedestrian, transit and roadway improvements needed to support the preferred growth strategy. The SCS will also be aligned with Regional Housing Needs Allocations (RHNA) prepared by AMBAG for county and city housing elements.

Influencing market forces to support a sustainable development pattern will require regional coordination in implementing innovative "carrot and stick" policies. Through funding from a Caltrans Community Based Transportation Planning Grant, AMBAG will produce an analysis of the development potential the Priority Areas using market research, local land use and general and specific plan data.

Public workshops and outreach will be undertaken over the course of 2011 and 2012 to develop the Sustainable Communities Strategy (SCS), as part of development of the next Regional Transportation Plan. AMBAG will also be working extensively with planning and redevelopment staff of all 21 jurisdictions to develop the SCS.

SUMMARY

The Association of Monterey Bay Area Governments (AMBAG) 2035 Monterey Bay Area Regional Blueprint: Envisioning the Monterey Bay Area is now available for public review. The document is online at: www.ambag.org/programs/blueprint/index.html.

Attachment:
   1. Summary of the 2035 Monterey Bay Area Regional Blueprint
   2. Priority Areas

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Summary

2035 Monterey Bay Area Regional Blueprint: Envisioning the Monterey Bay Area

For additional information, see the plan at: www.ambag.org/programs/blueprint/index.html

Blueprint Plan Goals:
1. Evaluate current trends regarding the distribution of population and employment in comparison with:
   - Improving mobility & accessibility
   - Reducing greenhouse gas emissions
   - Providing housing & employment opportunities
   - Protecting natural & cultural resources
2. Develop a preferred growth scenario that maximizes the achievement of these outcomes while retaining the autonomy of local jurisdictions
3. Use the preferred growth scenario as a basis for SB 375’s Sustainable Communities Strategy, which will be used to inform regional transportation plans and to be a platform for future regional housing needs and housing elements
4. Provide a forum for ongoing discussions and coordination of issues of regional significance

Projections for the next 25 years - Monterey Bay Area:
- Slow to moderate population growth with even slower job growth.
- Population is aging, increasing housing/transportation needs for seniors.
- Under current growth patterns, Vehicle Miles Traveled (VMT) will grow nearly three times as fast as population through 2035. This trend is largely influenced by an emerging potential sprawling growth pattern in which residential areas are developed far away from employment centers and other activities such as shopping, recreation and higher education.
- Sprawling growth threatens the region’s water supply, open space and agricultural land; results in congestion on our roadways, increased greenhouse gas emissions, a decline in public health and widened fiscal gaps between infrastructure needs and its provision.
  - Under current growth patterns:
    - over 40,000 acres of undeveloped land will be consumed
    - Per capita GHG emissions will increase from 14.1 to 16 pounds per day

Characteristics of Blueprint “Priority Areas”/Sustainable Growth Patterns:
- Cluster majority of the region’s forecasted growth:
  - near jobs/job-rich areas - focus future housing growth near jobs.
  - in higher density commercial and industrial areas
  - in areas with mix of different land uses
  - near neighborhood centers
  - in areas that are both walkable and transit accessible
    - within a quarter mile of bus stops or half mile of high quality transit corridors where the wait time is no more than 15 minutes
  - identified in City and County general plans as allowing 15 dwelling units/acre or higher.
    This density can be achieved with a mix of small lot single family homes, townhouses and mixed use rowhouses.
- Medium to high residential and employment densities in Blueprint Priority Areas
- Increase affordable/workforce housing units in cities with large employment bases
• Locate most employment growth within existing employment clusters
• Provide multimodal focused transportation and cluster development in areas that support biking, walking, transit use
• Avoid leapfrog development
• Fiscal variances are tempered by some tax base sharing
• By clustering housing and commercial development within Priority Areas, housing, neighborhood and transportation choices are increased consistent with preferences identified through Blueprint public participation efforts.

Best practices for achieving more sustainable growth patterns
The following policies provide a glimpse into the myriad of practices available to achieve sustainable objectives. They are not binding.
• Develop coordinated regional plan for sustainable growth
• Modify land use regulation to accommodate more compact and dense development/focus growth within Priority Areas
  o Support intensification of existing development
• Continue to accommodate higher density and intensity uses within the existing urbanized area of the region in local development regulations.
• Design higher density developments in an attractive and functional way
• Improve commercial area design: Reduce amount of space consumed by parking lots and driveways, improve pedestrian access, visual, and aesthetic design.
• Develop or redevelop priority areas more intensely before currently undeveloped land is developed.
• Increase private and public investment in priority areas
• Implement a graduated density bonus for infill projects
• Integrate affordable, workforce and market rate housing: Include rental apartments, condominiums, live/work buildings, rowhouses, etc inorder to provide opportunities for all market levels, including the increasingly aging population.
• Center develop around schools or locate schools in denser areas
• Conserve natural resources:
  o Conserve rural land, agricultural land and open space
  o Implement water conservation policies
• Adopt a “fix it first” policy for infrastructure and keep growth within existing service areas, rather than extend infrastructure to new areas which would expand maintenance needs - applies to water, sewer, transportation and other infrastructure
• Establish a Regionally Coordinated Housing + Transportation Investment Policy: Adjust Regional Housing Needs Allocations (RHNA) to focus growth in Priority Areas, give priority for transportation funds to priority areas that take on a higher housing allocation
• Defiscalization of land use: could include revenue sharing and restructuring property and State sales tax allocations
• Pursue common legislative goals at the State and federal levels: increase state and federal funding for transit, push for smart Infrastructure strategy by state – to address greenhouse gas emissions, incentivize growth in places that limit additional expenditures
• Meet thresholds for housing that support a thriving, high quality transit system: 3,300 housing units within a half mile radius of a light rail stop and 2,750 of a bus rapid transit stop.
• Ensure ongoing public involvement and education directly addressing public anxiety related to more compact development and the mutual benefits of a more compact urban footprint.

Transportation:
• Provide a balanced transportation system within Priority Areas
• Invest in transportation improvements that make neighborhoods walkable:
• Construct walkways, curb ramps, lighting to provide access to transit stops and destinations.
• Design streets to facilitate walking
• Build safe walkways to schools (safe routes to schools)

- Provide high quality transit service within Priority Areas
- Redevelop Main Streets to act as public plazas where pedestrians take precedence over vehicles
- Use Intelligent Transportation Systems (ITS) to re-route congested traffic to less congested roads, meter onramps, and inform drivers of expected travel times to destinations, inform transit users when the next bus or train is coming
- Encourage telecommuting and alternative work schedules
- Implement and coordinate use of employee vehicle sharing programs and alternative modes (e.g., vanpools)
- Expand vanpooling for agricultural workers
- Improve employer parking management: reducing parking subsidies, encourage alternatives
- Implement vehicle sharing programs: reduce the amount of vehicles that are individually owned
- Reduce Minimum Parking Requirements

**Benefits of Sustainable Growth Patterns**

- Daily average vehicle miles traveled per adult drops to 21 miles by 2035, 3 miles less than under Current Growth Patterns
  - Even as the majority of drivers continue to drive their own cars, the overall distances they have to drive will be shorter than Current Growth Patterns because destinations are more accessible when developments are located closer together.
- Urban footprint to accommodate region’s forecasted housing growth of 70,000 new units between 2005 and 2035 occurs in 20,000 acres, as compared to 40,000 acres of undeveloped land under current growth patterns
- Under Current Growth Patterns, per capita greenhouse gas emissions from cars and light trucks will increase 13.7%; with Sustainable Growth patterns GHG increases only 1% from 2005 levels.
- Sustainable Growth Patterns minimizes the amount of agricultural land lost to urbanization, while limiting the urban footprint even more significantly - 20,000 acres smaller than Current Growth Patterns
- Improvements in the physical health of Monterey Bay Area residents as well as the environmental health of the region.
- Taking public transit versus driving alone equates to an average of 8.3 more minutes a day of walking.
  - If 8.3 minutes of walking are added each day, the obesity rate in 2035 in CA could drop from 50% to 28% and people would experience an average lifetime savings of $5,500 per person in obesity medical related costs.
- Under Sustainable Growth Patterns, up to 280,000 employees and 180,000 households will be located within a comfortable walk of a high quality transit corridor or mixed use center by 2035.
- Clustered development supports an increase in transportation choices as well as housing choices.
- Fewer people drive alone in their cars.
- More people out on the streets walking, biking and taking transit to work, school and play.
- More active neighborhood centers where one can easily walk or bike from home to restaurants, work, school, community centers and parks.
- Rural beauty and natural resources of the Monterey Bay Area conserved and more efficiently utilized.

Summary prepared by RTC staff, pulling excerpts from the Blueprint plan.
Attachment 2
Blueprint Priority Areas Identified for Santa Cruz County

LEGEND
- Blueprint Priority Areas
- Major Development Nodes & Corridors
- Proposed Local Projects
- Agricultural Land
- Urbanized Land
- City Boundaries
- Spheres of Influence
- State Highway
- Interstate Highway
- Passenger Rail - Amtrak

Scotts Valley
Capitola
City of Santa Cruz
Watsonville
TO: Regional Transportation Commission  
FROM: Rachel Moriconi, Senior Transportation Planner  
REGARDING: Draft 2011 State and Federal Legislative Programs and Legislative Update

RECOMMENDATIONS

Staff recommends that the Regional Transportation Commission:

1. Adopt the 2011 State and Federal Legislative Programs (Attachments 1 & 2, respectively).

BACKGROUND

Every year the Regional Transportation Commission (RTC) adopts a legislative program to guide its support and opposition of state and federal legislative or administrative actions. Working with its legislative assistants and transportation entities statewide, the RTC develops and implements the RTC legislative program, notifying state representatives of the RTC’s positions on key issues, and monitoring bills and other federal and state actions that could impact transportation in Santa Cruz County.

DISCUSSION

2011 Legislative Program

The recommended 2011 State and Federal Legislative Programs for the RTC are attached (Attachments 1 & 2, respectively). With the November 2, 2010 election and impacts it may have on transportation funding, as well as the fact that transportation revenues continue to fall far below the needs of the system, staff recommends that the RTC continue to focus on preserving and increasing revenues for transportation. Key legislative issues for the RTC in 2011 include:

- Ensure there is a stable funding source for the State Transportation Improvement Program (STIP), transit, & local streets and roads, especially in light of Proposition 26, which may invalidate the “gas tax swap” which eliminated the sales tax on gasoline (Proposition 42), increased the per gallon excise tax on gasoline, and dedicated the state sales tax on diesel to transit.

- Expand the RTC’s options to raise revenues, specifically through clean up of SB83 which inappropriately restricted the definition of county transportation agencies to Congestion Management Agencies; and increase the Service Authority for Freeway Emergencies (SAFE) vehicle registration fee by $1 in order to provide a variety motorist aid services, including the Freeway Service Patrol.

- Ensure there is flexibility to fund transit projects in the STIP, by ensuring there is budget authority allowing a variety of funding sources (not just Public Transit Account) to be
used; as well as continuing to push for local road projects and any other projects prioritized by the RTC to be programmed and allocated in the STIP.

- Oppose efforts to require local agencies to pay for Caltrans oversight on state highway projects that locals take the lead on.

Staff and advisory committee members recommend very few changes from the 2010 Legislative Programs. New or deleted items are shown in underline and strikeout. Changes include removal of items that were addressed last year, are unlikely to be addressed by the legislature in 2011, or are no longer relevant. The draft programs include input provided by members of the Commission’s advisory committees through November 19. Staff may recommend additional changes to the Legislative Programs at this meeting if any subsequent comments are received. **Staff recommends that the RTC review the draft 2011 Legislative Programs, identify any additional issues the RTC should monitor or pursue in 2011, and adopt the 2011 Legislative Programs (Attachments 1 & 2).**

**Effects of November 2010 Ballot Measures on Transportation and the State Budget**

Three major budget-related measures were approved by voters at the November 2, 2010 general election. Proposition 22 restricts the Legislature’s ability to use certain local funds to help balance the budget. Proposition 26 raises the vote threshold for passing certain fees and taxes from a simple majority to two-thirds. Proposition 25 changes the vote threshold needed to send a budget bill to the Governor from two-thirds to a simple majority of each house of the Legislature. This may make it easier for the Legislature to pass a budget on time each year.

There is a significant level of uncertainty and disagreement statewide regarding the impact of Propositions 22 and 26 on the state budget and transportation funding. Proposition 22 closes loopholes and prevents the State from borrowing, raiding or otherwise redirecting local government revenues (local taxes, property taxes, redevelopment) and transportation funds. The measure is meant to prevent State borrowing, taking or redirecting revenues, such as Highway User Tax on gasoline (HUTA) funds, and transit funds that are dedicated to transportation. The California Legislative Analyst's Office (LAO) estimates that Proposition 22 will increase the General Fund deficit by $800 million in FY10/11 by prohibiting $400 million of loans not yet executed (as of November 3, 2010) from the HUTA and prohibiting use of $400 million in transportation funds to pay bond debt service.

Proposition 26 fully reverses the “fuel tax swap” adopted by the Legislature in March 2010, beginning November 2011 (one year after voter approval). The LAO believes state sales taxes on gasoline will resume at that time, however many other entities suggests that reinstatement of Proposition 42 is not guaranteed. If Proposition 42 is reinstated, additional funds dedicated to transit, the STIP, and local streets and roads would be protected, per Proposition 22.

A major focus of the RTC’s draft 2011 Legislative Program is to ensure there is a stable funding source for the State Transportation Improvement Program (STIP), transit, & local streets and roads, given these uncertainties.

**State Budget Updates**

On October 8, 2010, Governor Schwarzenegger signed the 2010/11 State Budget into law. The current 2010/11 State Budget includes staffing reductions to Caltrans’ Capital Outlay Support
(COS) program and the Planning Program which is responsible for development of project initiation documents (such as Project Study Reports - PSR). Caltrans has indicated that as a result of these cuts they will have limited staff available to provide oversight on project initiation documents prepared by local agencies for state highway projects. As a result it will be the responsibility of the local agency to provide more extensive quality control. While not included in the current State Budget, there has been a push to charge local agencies for any Caltrans review time. The recommended State Legislative Program includes opposition to efforts to charge locals for Caltrans oversight on local-lead highway projects.

On November 10, 2010, the LAO released a new forecast of California’s General Fund revenues and expenditures. It shows that the state must address a budget problem of $25.4 billion between now and the time the Legislature enacts a 2011-12 state budget plan. The budget problem consists of a $6 billion projected deficit for 2010-11 ($800 million resulting from Proposition 22, as described above) and a $19 billion gap between projected revenues and spending in 2011-12. The LAO projects annual budget problems of about $20 billion each year through 2015-16 and recommends that the Legislature initiate a multiyear approach to addressing California’s recurring structural budget deficit.

**Federal Legislation**

Development of the new federal transportation act, the FY2011 appropriations bills, and climate change legislation will continue to be priorities for the 2011 Federal Legislative Program (Attachment 2). As reported at past meetings, the Federal Transportation Act, SAFETEA-LU expired in September 2009 and has been extended through continuing resolutions. Reauthorization is not expected to be a priority for Republicans in 2011, especially with the larger question of how the bill will be funded still unresolved. In the event that new special federal funding opportunities arise, such as earmarks in the annual appropriations bill or federal transportation act, the RTC’s Federal Legislative Program includes a list of projects to prioritize for special funding opportunities that may become available (Item 2.c. of the Federal Legislative Program).

**SUMMARY**

Staff recommends that the RTC adopt the 2011 State and Federal Legislative Programs, which guide its support and opposition of state and federal legislative or administrative actions. The 2011 Legislative Programs continue to focus on preserving and increasing funding for transportation projects in Santa Cruz County.

Attachments:
1. Draft 2011 State Legislative Program
2. Draft 2011 Federal Legislative Program
FOCUS AREAS FOR 2011:

1. **Funding Priority Projects:** Seek and preserve funding for priority transportation projects and programs in Santa Cruz County, including:
   - Highway 1 Soquel-Morrissey Auxiliary Lanes
   - Highway 1 HOV Lanes
   - Santa Cruz Branch Rail Line
   - Santa Cruz Metropolitan Transit District projects
   - Local Street and Roadway Preservation
   - Bicycle and Pedestrian facilities

2. **Expand revenue-raising opportunities** and innovative financing options beyond the traditional gas tax.
   - **Sponsor legislation** to authorize Service Authorities for Freeway Emergencies (including the RTC) to increase SAFE vehicle registration fees by $1 in order to support motorist aid programs.
   - **Sponsor legislation** to expand the authority of the RTC and local jurisdictions to increase taxes and fees for transportation projects, including new vehicle registration fees.

3. **Protect and Augment Transportation Funding:** Pursue policy and/or legislative changes to restore, preserve and augment funding for all modes of transportation:
   - Support legislation and other efforts to provide stable funding for transit, local streets and roads, and STIP projects - especially in light of potential impacts of Proposition 22 (2010) and Proposition 26 (2010) on the “gas tax swap”, may include reinstatement of the state sales tax on gasoline (Proposition 42, 2004).
   - Index the gas tax and other revenues to inflation.
   - Seek early allocation of Proposition 1B bonds for projects in Santa Cruz County.
   - Ensure State Transportation Improvement Program (STIP) funds are programmed and allocated to regions based on SB 45 formulas and the region’s priorities. Ensure the State Budget allows flexibility to fund transit projects in the STIP.
   - Increase funding for Safe Routes to Schools, Bicycle Transportation Account and other bicycle and pedestrian programs.
   - Support increased funding for local streets and roads, as highlighted in the statewide Local Streets and Roads Needs Assessment.

4. **Address Air Quality/Climate Change:**
   - Support legislation to provide funding to reduce greenhouse gas emissions, including funds needed to implement SB375 and AB32.

*Underline = New items since 2010 Legislative Program
Strikeout = Items from 2010, recommended for removal; not under consideration for 2011.*
General Legislative Platform

1. **Preserve Existing Transportation Funding and Formulas.**
   Preserve and protect against deferral, borrowing or taking of state funding designated for the transportation system. Retain and enhance California's funding formulas based on the increased costs to maintain and address deficiencies to the existing transportation system. Specifically:
   - **a)** Support legislation and other efforts to ensure stable funding for transit, local streets and roads, and State Transportation Improvement Program (STIP) projects - especially in light of potential impacts of Proposition 22 (2010) and Proposition 26 (2010) on the “gas tax swap”. Could include reinstatement of the per gallon excise tax increase or state sales tax on gasoline (Proposition 42, 2004) dedicated to transportation. **(Focus area for 2011)**
   - **b)** Support early and timely sale of bonds for transportation, including allocation of Proposition 1B and Proposition 116 bond funds for projects in Santa Cruz County. Support extension of legislative deadlines previously established for bond programs to coincide with the state’s bonding ability. **(Focus area for 2011)**
   - **c)** Oppose proposals to shift transportation funds to non-transportation purposes and the State General Fund
     - Protect existing highway and transit funds, including Highway Users Tax Revenue (gas tax), sales taxes for transportation, Public Transportation Account (PTA) and “spillover” revenues, against suspension, transfer or expenditure for non-transportation uses.
     - Support legislation that expedites repayment of transportation funds previously diverted to the State General Fund.
   - **d)** Support State Budget Reform that will bring fiscal discipline and predictability to the state budget. Reforms could include reducing two-thirds vote requirement to pass the state budget, preventing the diversion of additional funding sources to the State General Fund. **(Addressed by Prop 25 - 2010)**
   - **e)** Ensure that transportation planning funds are available to agencies throughout the year and are not withheld due to delays in enacting the state budget.
   - **f)** Support the continuation of state transportation funding programs dedicated to projects such as transit, Safe Routes to Schools, Bicycle Transportation Account, paratransit and Freeway Service Patrol.
   - **g)** STIP Modernization
     - Ensure State Transportation Improvement Program (STIP) funds are equitably programmed and allocated to regions, based on SB 45 (1998) formulas and regions’ priorities, which may include local road rehabilitation and transit projects.
     - Ensure the State Budget and STIP Fund Estimate allow flexibility to fund all modes of projects in the STIP, include a combination of Federal and State funding sources in the STIP, in order to ensure the STIP is not wholly dependent on Proposition 42 revenues or Proposition 1B bond sales, increase flexibility for funding STIP projects, and allow STIP projects to access GARVEE bonds.
     - Ensure that transit projects remain eligible for regional STIP funds, even if the STIP does not include Public Transit Account funds.

2. **Support New Transportation Funding.** Support countywide and statewide efforts to raise needed funds to maintain and enhance the transportation system, including:
   - **a)** Increase and index state gas and fuel taxes and other sources of transportation revenues so that transportation revenues keep pace with inflation/increased cost. Dedicate revenues to transportation projects and programs.
b) Support efforts to address and expand revenue-raising opportunities and innovative financing options beyond the traditional gas tax, especially in recognition of the fact that vehicle miles traveled increasingly exceed fuel consumption. *(Focus area for 2011)*

c) Support the development of a steady stream of new transportation funds dedicated to local road rehabilitation and maintenance, especially for roadways utilized by bicyclists.

d) Support legislative efforts to expand the authority of the RTC and local jurisdictions to increase taxes and fees for transportation projects, including gas taxes and fees, vehicle registration fees, congestion pricing, and fees relating to the reduction of greenhouse gas emissions. *(Focus area for 2011)*
   - Seek amendment to SB 83 (2009) to ensure all regional transportation agencies, not just Congestion Management Agencies (CMA), are authorized to seek voter approval to increase vehicle registration fees by up to $10 to fund transportation programs and projects. *(Focus area for 2011)*
   - Support legislation that would allow the County of Santa Cruz to pursue a sales tax measure for transportation improvements.

e) Work with local elected officials, local agencies and interest groups to address continuing gaps in funding for local transportation projects and pursue new local funding sources.

f) Support legislation that lowers the voter threshold for local transportation funding measures, including lower the voter threshold for local transportation sales tax ballot measures from the 2/3 supermajority to a simple majority, 55% or 60% majority vote.

g) Work to assure that state transportation programs provide the maximum amount of revenues for the Santa Cruz County region. If special state funding programs are developed, support funding of projects in Santa Cruz County.

h) Advocate that any new state revenues created for transportation be locally controlled and include safeguards to prevent diversion to the State General Fund.

3. **Support Efforts that Improve Government Efficiency and Expedite Project Delivery.**
   a) Support organizational reform efforts that streamline and otherwise improve transportation funding, programming or project delivery processes and eliminate unnecessarily and/or duplicative requirements.

b) Support greater flexibility in contracting methods.

c) Support initiatives that increase opportunities to trade federal funds for state funds, as currently exists for Santa Cruz County’s share of Regional Surface Transportation Program (RSTP) funds.

d) Grant preaward spending authority for transit projects, especially those funded by STIP.

e) Support efforts to streamline Project Initiation Documents (PIDs) for projects on the State Route System in order to lower the overall cost of PID development. Oppose efforts to transfer the State costs of PID development and oversight to local entities that take the lead on highway projects. *(Focus area for 2011)*

f) Oppose unfunded mandates on local and regional government.
4. **Air Quality/ Climate Change (Focus area for 2011)**
   a) Support efforts to reduce the number of vehicle miles traveled and encourage smart-growth practices, which also preserve the authority and flexibility of local agencies. Ensure the region’s needs are incorporated in emerging climate change and sustainability programs, legislation, and regulations, including meeting the goals of AB 32 - the California Global Warming Solutions Act of 2006, and SB375.
   b) Ensure adequate funding is made available to fulfill the requirements of AB 32 and SB 375, including funds for transit, bicycle, pedestrian, and other projects that reduce greenhouse gas emissions and resources to prepare plans in compliance with SB 375.
   c) Oppose efforts that make regional blueprints a conditioned or required factor in the allocation of funds. *Deleted since region now has a Blueprint.*

5. **Specifics**
   a) **Transit:**
      - Support efforts to restore, protect, and enhance funding for public transit, especially in light of AB32 goals to reduce greenhouse gases (GHG).
      - Support introduction and passage of legislation designed to preserve and enact additional sources of transit operating and capital assistance, including legislation aimed at reducing greenhouse gas emissions.
      - Support funding programs that promote transit-oriented development and transit villages. Ensure that state-supported housing projects near transit facilities provide safe and convenient access for disabled persons from the housing to transit and are available to smaller regions.
      - Support measures to allow the use of gas taxes for transit capital purposes, including purchases of rolling stock.
      - Support development of the Coast Daylight train and Transportation Agency for Monterey County’s CalTrain extension projects.
      - Increase flexibility to use state transit funds on both operations and capital expenses.
   b) **Bicycling & Walking**
      - Support legislative initiatives and modifications to the California Vehicle Code that would improve conditions for bicyclists and pedestrians, including safety and access.
        o Support legislation and local ordinances prohibiting parking in designated bicycle lanes, to allow law enforcement to ticket vehicles parked in bicycle lanes even if specific “no parking” signage is absent.
        o Support measures that would require bicycle and pedestrian facilities as a part of newly constructed roads and streets.
      - Support increased funding for bicycle and pedestrian projects and programs, including education and awareness programs, the Bicycle Transportation Account, Safe Routes to Schools, Complete Streets programs, audible pedestrian signals, and programs that educate enforcement personnel regarding best practices.
      - Support the inclusion and expansion of bicycle education programs (e.g. helmet laws, how to ride safely, etc.) in public and private schools, including high schools.
      - Seek and support legislation to create a “Share the Road” license plate, with proceeds dedicated to bicycling-related activities. *Not being pursued in 2011.*
• Support Incentive Programs for Bicycle and Pedestrian Commuters. Support efforts to extend the transportation fringe benefits in the state tax code to bicycle and pedestrian commuters.
• Support efforts to include bicycle projects within General Plans and land use policies. Now mandated starting January 1, 2011, per AB 1358 (Leno)

c) Transportation for Seniors and People with Disabilities
• Support transportation programs that are beneficial to communities with limited means.
• Increase funding levels for elderly and disabled transportation.
• Support continuation of a competitive process, rather than formula distribution, of FTA5310 funds.
• Support efforts to obtain operating and capital funds for ADA paratransit service and vehicles.
• Advocate for funding transportation to dialysis and other medically necessary appointments; Support Medicaid funding for transit and paratransit and oppose reductions in Medi-Cal funding for transportation.
• Support funding to ensure universal access, including access for paratransit vehicles within new developments, fully accessible transit stops and safe travel paths (accessible pedestrian facilities, including audible pedestrian signals), especially between senior and/or disabled living areas, medical facilities, educational facilities, employment locations, and bus stops.

d) Transportation Demand Management/ Carpooling:
• Oppose measures to remove existing or restrict future High Occupancy Vehicle lanes.
• Support legislation to provide incentives for both employers and employees, to encourage use of alternatives to driving alone, such as state tax incentives.
• Support efforts to secure new funding for regional rideshare programs.
• Support programs that would provide incentives for students to use transit and support revision of state laws that restrict Community Colleges’ ability to implement transportation fees for transit.

e) SAFE Callbox and Freeway Service Patrol
• Support proposals to increase state funding of Freeway Service Patrol programs.
• Support increased flexibility for compatible expenditures of SAFE funds.
• Seek authorization to increase SAFE vehicle registration fees by $1.00 to fund Freeway Service Patrol and other motorist aid programs. (Focus area for 2011)

f) Safety
• Support legislative initiatives to improve safety for motorists, bicyclists and pedestrians.
  • Authorize local jurisdictions to reduce speed limits, based on what that jurisdiction determines is most appropriate for their facility.

6. Coordinate with Local, Regional and State Agencies and Organizations on legislative principles of mutual interest.

Please contact us at 831-460-3200 with any questions about the RTC Legislative Program.
Santa Cruz County
Regional Transportation Commission

2011 Federal Legislative Program

1. **Next Federal Transportation Act:** *(Focus Area for 2011)*
   The RTC will work with local entities, regional agencies, the State of California and the Federal Government to advance SCCRTC’s Regional Transportation Plan (RTP) policy priorities in development of the next Federal Transportation Act.
   
   **a)** Advocate for increased funding levels for all modes, as needed to bring transportation infrastructure up to a good state of repair and meet the growing transportation needs in Santa Cruz County. Give top priority to preservation and maintenance of the existing system of roads, highways, bridges, sidewalks, and transit.
   
   **b)** Support legislation which allows agencies in Santa Cruz County to replace crumbling infrastructure, minimize traffic congestion, reduce greenhouse gas emissions, improve safety, and expand travel options available to citizens and visitors.
   
   **c)** Increase direct subventions to counties and Metropolitan Planning Organizations *(MPO)*. Combined with 1d.
   
   **d)** Ensure equitable distribution of funds to California and Santa Cruz County, which may include direct subventions to counties and Metropolitan Planning Organizations. Oppose proposals which restrict or otherwise disproportional direct funds to large metropolitan areas or megaregions.
   
   **e)** Support extension of the Small Transit Intensive Cities Program (STIC).
   
   **f)** Support development of new funding mechanisms for transportation to ensure the financial integrity of the Highway Trust Fund and Mass Transportation Account. Given that current per-gallon gasoline fees are insufficient to address transportation infrastructure needs, this may include raising and indexing gas taxes and fees and collecting fees based on vehicle miles traveled.
   
   **g)** Streamline project delivery. Support regulations to streamline federal project delivery requirements and integrate planning, project development, review, permitting, and environmental processes to reduce project costs and delays.
   
   **h)** Provide procurement preference for building and paving materials that have a lower emissions footprint than conventional materials but demonstrate comparable performance. *(New)*

2. **Maximize Funding for Local Area Projects.** Support increased revenues for transportation projects in the Santa Cruz County region. Oppose any efforts to reduce transportation funding to California or the region. Work with congressional representatives to obtain additional funding for Santa Cruz County highway projects, rail corridor, transit operations and capital projects, paratransit service, local streets and roads, and pedestrian and bicycle facilities and programs.

   **a)** Promote inclusion of funding for transportation infrastructure and transit operations in any new national funding programs, including climate change, cap and trade, economic stimulus, or infrastructure investment legislation. Advocate that those
funds be available to deliver state, regional, and local projects. Advocate for flexibility to use the funds to accelerate delivery of existing projects.

b) Support timely annual allocations at the maximum levels allowed for programs authorized by the federal transportation act in order to meet growing transportation needs for local streets and roads, improving transit, relieving traffic congestion, encouraging alternative modes of transportation, and meeting increased paratransit demands. Advocate for flexibility to use Federal Transit Administration urban and non-urban funds for both capital and operations.

c) Seek federal funds for high priority projects in Santa Cruz County through the next federal transportation authorization, annual appropriations, stimulus, or other special funding bills or programs. Priority projects include (not shown in priority order):
- Projects on Highway 1
- Infrastructure improvements to the Santa Cruz Branch Rail Line
- Local road repair and sidewalk projects
- Intelligent Transportation System (ITS)/511 program
- Santa Cruz Metropolitan Transit District’s priority transit projects
- Monterey Bay Sanctuary Scenic Trail (MBSST)
- Watsonville/Pajaro Rail Station
- Projects otherwise delayed due to state funding shortfalls

d) Oppose unfunded mandates on local and regional governments, reducing project costs and maximizing funding for infrastructure projects.

e) Oppose proposals that would combine Santa Cruz, Watsonville, and Salinas into one urbanized area, given that they are not one continuous urban area, but rather separated by large rural areas. This reclassification could otherwise significantly reduce funding available for transit in the region.

3. **Job Creation**: Support efforts to include increased federal highway and transit funding in any federal proposals designed to reduce unemployment. The transportation infrastructure needs of the Santa Cruz region are great, and there are a number of local projects covering all modes of transportation (such as those listed in Section 1) that could be undertaken in a relatively short period of time and would result in significant local job creation. **Addressed under #2a**

4. **Air Quality and Climate Change:**
   a) Advocate for federal action on climate change and energy policy to ensure that any legislation to reduce greenhouse gas emissions be structured in such a way as to assist the region and the state in achieving greenhouse gas reduction and mobility goals, not dilute state efforts. Ensure that any new environmental requirements are accompanied by additional funding necessary to implement those requirements.
   b) Support research and development of renewable energy sources that reduce the amount of emissions from the combustion of fossil fuels and development of more fuel efficient vehicles.
   c) Support a multi-pronged approach to addressing global warming, including carbon taxes or cap-and-trade systems and direct revenues to transportation projects that reduce reliance on automobiles, including but not limited to public transit, bicycle and pedestrian facilities.

5. **Support Legislative and Administrative Proposals to Streamline the Process for Federally Funded Projects.** Support regulations to streamline federal project
delivery requirements (including cooperative agreements, pre-award audits, disadvantaged business enterprise regulations and duplicative federal environmental review laws) while maintaining the substance of environmental laws, either through regulatory or statutory changes. Support provisions that better integrate state and federal environmental laws.

6. **Support Improved Elderly and Disabled Transportation.**
   a) Support increased funding for transportation services required by the Americans with Disabilities Act (ADA), as well as services beyond those required by ADA.
   b) Require that all interstate transportation providers comply with ADA provisions, including wheelchair accessibility requirements.
   c) Advocate for federal rule changes to reimburse non-emergency medical transportation through Medicare as a less costly alternative to ambulances and provide funding for medical dialysis transportation.

7. **Support Expansion of Incentive Programs for Bicycle, Pedestrian, and Carpool Commuters and Funding for Improvements.** In an effort to reduce congestion, pollution, and wear and tear on roads, expand grant programs to decrease single-occupancy vehicle trips and expand transportation fringe benefits in the tax code (Commuter Choice Tax Benefit) to permanently increase pre-tax transit benefits to at least the level allowed for parking expenses.

8. **Assist Local Efforts to Secure Federal Emergency Management Agency Funds for storm damage repair projects.** Require full reimbursement, within one calendar year, for the completion of Disaster Aide Federal (DAF) projects. *While something the RTC will do when needed, not a focus for the Leg Program.*

9. **Freight and Passenger Rail**
   a) Support measures that will provide sufficient funding for AMTRAK and that will facilitate the shared use of tracks by passenger and freight rail.
   b) Support full funding for the combined Federal and State funding program for rail capital projects in which federal funds are used for 80% of the project’s cost and state funds for the remaining 20% similar to highway capital projects.
   c) Support federal funding for the California High Speed Rail project.
   d) Support the ongoing extension of Section 45G Railroad Track Maintenance Credit that provides 50 percent tax credit to short line railroads conducting qualified railroad track maintenance.
   e) Support funding and incentives for freight and passenger railroad capacity expansion and safety improvement projects.

*Please contact us at 831-460-3200 with any questions about the RTC Legislative Program.*
TO: Regional Transportation Commission (RTC)
FROM: Rachel Moriconi, Senior Planner and Caltrans District 5 Planning
RE: State Route 1 Corridor System Management Plan

RECOMMENDATION
Staff recommends that the Regional Transportation Commission (RTC) receive a presentation from Caltrans, District 5 on the draft State Route 1 & 183 Corridor System Management Plan (CSMP) and provide input on the plan (enclosed separately for Commissioners only).

BACKGROUND
Caltrans is required to prepare Corridor System Management Plans for corridors associated with projects funded from the Corridor Mobility Improvement Account (CMIA) of Proposition 1B: the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act. Whereas the Regional Transportation Plan (RTP) covers the entire transportation network, the CSMP focuses on a specific corridor. A Corridor System Management Plan (CSMP) is a planning tool meant to maximize investments and mobility in a corridor through integrated management of various travel modes (transit, cars, trucks, bicycles) and infrastructure (roads, highways, information systems, bike routes).

DISCUSSION
Caltrans District 5 is currently circulating the draft State Route 1 and 183 Corridor System Management Plan (CSMP) for review and comment. The document is enclosed separately with this staff report for Commissioners and is available online at: http://www.dot.ca.gov/dist05/planning/pdf/draftplan_sr1_Oct%202010.pdf.

The CSMP for State Route 1 aims to maximize benefits from two Proposition 1B Corridor Mobility Improvement Account (CMIA) funded projects in the region: construction of auxiliary lanes from Soquel Drive to Morrissey Boulevard and the Salinas Road interchange. The goal is to maximize throughput on the mainline (Highway 1) and provide local connectivity in order to prolong the life of capital investments along the corridor. The limits for the State Route 1 and 183 CSMP extend from the junction of State Route 68 West in Monterey to King Street in the City of Santa Cruz, and include State Route 183 (see map, Attachment 1).

The CSMP is based on technical information that is divided into three chapters:

- **Chapter 1**: Provides an overview of the corridor system management planning process and a definition of the CSMP transportation network, including rationale for the selection of the specific corridor limits and modes to be included in the corridor planning process.
• **Chapter 2**: Describes existing corridor management activities, including all facilities and services currently in use to maximize mobility within and through the corridor, such as traffic operations system elements, traveler information services, and transportation demand management programs.

• **Chapter 3**: Provides an assessment of current corridor performance by identifying the major problems inhibiting efficient corridor operations for each element (mode) of the CSMP transportation network.

This CSMP is the “first generation CSMP,” to be followed by updates as information is collected over time. Questions on the document should be directed to Adam Fukushima at Caltrans, adam_fukushima@dot.ca.gov. The draft document was reviewed by the Interagency Technical Advisory Committee (ITAC) last month and is currently being reviewed by RTC staff.

**Caltrans planning staff will make a presentation on the plan at this meeting. Staff recommends that the RTC review and provide input to Caltrans or RTC staff on the draft State Route 1 and 183 CSMP.**

RTC staff will forward Commissioners’ comments to Caltrans. Once the State Route 1 and 183 CSMP is finalized, Caltrans would like the RTC to accept the document as part of the regional transportation planning process and authorize the RTC Executive Director to sign it as accepted by the RTC. Caltrans will return to the RTC in the future for consideration of acceptance of the final document.

**SUMMARY**

Caltrans District 5 has prepared a draft State Route 1 and 183 Corridor System Management Plan (CSMP). Staff recommends that the RTC review and provide input on the document. Caltrans will return to the RTC in the future for consideration of acceptance of the final document.

**Attachments:**
1. Map of SR 1 CSMP Segmentation
2. Draft State Route 1 CSMP (enclosed separately for Commissioners only)
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Executive Summary

Caltrans and our partners are taking a new direction in transportation planning with the creation of Corridor System Management Plans (CSMPs) for corridors associated with the Corridor Mobility Improvement Account (CMIA) funds. CSMP development recognizes the importance of multi-jurisdictional collaboration, to best support and manage multi-modal transportation services and facilities for the traveling public. Californians rely on transportation facilities and services to get to business, recreational, and service destinations, regardless of which agency may operate or fund a facility or service.

The CSMP approach is consistent with the goals and objectives of the Governor’s Strategic Growth Plan, including public accountability for bond funded projects. Approved by voters in 2006, Proposition 1B created a funding mechanism for large transportation infrastructure projects. The CSMP outlines a foundation to support partnership based, integrated corridor management of various travel modes (passenger rail, transit, cars, trucks, bicycles) and infrastructure (railroad tracks, stations, roads, highways, information systems, bike routes), to provide mobility in the most efficient and effective manner possible. This approach brings facility operations and transportation service provision together with capital projects into a coordinated system management strategy that focuses on high demand travel corridors such as State Routes 1 & 183. This CSMP directly supports the implementation of two projects in the corridor: 1) a new interchange construction at the intersection of Salinas Road and State Route 1 in Monterey County and 2) auxiliary lane construction in Santa Cruz County between the Morrissey and Soquel interchanges. Additionally, proposed extension and station improvement to the Cal Train system along the SR 183 corridor will facilitate coordination between modes.

The objectives of the CSMP are to reduce travel time or delay on all modes, reduce traffic congestion, improve connectivity between modes and facilities, and expand mobility options along the corridor in a cost effective manner. The CSMP identifies key stakeholders, the managed network, current management strategies, existing travel conditions, major challenges to maintaining and improving mobility, and potential future management strategies and capital improvements. The managed transportation network for this SR 1 & SR183 CSMP includes the segment of SR 1 between the junction of SR 68 West in Monterey County and King Street in the City of Santa Cruz. It also includes SR 183 from Lincoln Street to the junction of SR 1, as well as select parallel and connecting roadways, transit facilities that include express and regional bus services, and bike routes that are located roughly parallel to the corridor.
Figure E.1  State Route 1 / 183 CSMP in District 5
Corridor Characteristics

The Monterey Bay region is one of the largest generators of economic activity in California and the nation with robust sectors in tourism, agricultural production, education, and high technology.

The SR 1 & SR 183 corridor has a mixed urban and rural character. SR 1 serves as the main connection between the communities of Santa Cruz and Monterey counties. Employment is concentrated near the cities of Santa Cruz, Monterey and Salinas to the east. As a result, in Santa Cruz there is more commute period traffic congestion northbound in the morning and southbound in the evening. In Monterey there is more commute period traffic congestion southbound in the morning and northbound in the evening.

The corridor is also the primary coastal route between the San Francisco Bay Area and the Big Sur Coast and is an important transportation link for long-distance travel for both business and leisure. In addition, it is an important route for freight movement by truck and rail. Truck traffic ranges from 10-15%.

SR 1 and many of the major parallel streets in each county are at or near capacity during some part of the peak commute periods. Even small variations in traffic volume or incidents can greatly increase congestion and delay. Because of the scenic beauty in the corridor and the attraction of the corridor beaches, the traffic on the weekends, during the summer, or for special events can be much more congested.

There have been significant efforts to provide alternative modes of travel for commute and non-commute travel in the two counties. These include local and express bus service, demand-responsive paratransit services, bicycle routes, multi-use trails, ridesharing services, employer-based flexible work schedules, and other trip reduction programs. Passenger rail service is also provided by Amtrak (the Coast Starlight service between Los Angeles to Seattle via Salinas), but the existing intercity service schedule does not offer a meaningful option for commute travel. Along the SR 183 corridor significant efforts are underway by the Transportation Association of Monterey County (TAMC) to develop and expand the existing Caltrain system from the southern terminus at Gilroy to the City of Salinas rail station with a new station planned in Pajaro.

Corridor Performance

Traffic congestion on SR 1 in Monterey County is concentrated by time of day with many southbound commuters traveling from Santa Cruz County to work on the Monterey Peninsula during the morning peak and returning home in the northbound afternoon peak. Within Monterey County, the Transportation Agency of Monterey County (TAMC) in its 2010 Regional Transportation Plan (RTP) and the 2008 Regional Development Impact Fee identifies projects that will significantly help to decrease the amount and frequency of projected corridor delay.

Morning congestion northbound along SR 1 in Santa Cruz County is caused mainly by the commute north to jobs in the Santa Cruz urban area and the San Francisco Bay Area via SR 17. Southbound morning traffic is affected by commute travel to the Monterey Peninsula and
Salinas. The improvements recently constructed, anticipated for construction, or planned in Santa Cruz County include the SR1/SR17 Interchange Improvements and the Morrissey to Soquel Auxiliary Lanes Project. In addition, the Santa Cruz County Regional Transportation Commission (SCCRTC) has programmed the addition of high-occupancy vehicle lanes which will reduce the congestion. These projects will decrease the amount and frequency of delay within the corridor.

**Recommendations**

The primary purpose of SR 1 & SR 183 CSMP is to develop strategies to manage the corridor and sustain existing transportation investments. The following management strategies will be used to manage SR 1 & 183 over the next 20 years:

**Maintenance and Preservation:** Continue cost-effective maintenance of the roadway to ensure safe and comfortable use of the corridor. This would include maintenance and preservation designed to get full return on system investments, as well as reduce traveler costs and delay. Work in this area would include continued identification of pavement needs through the pavement condition survey and addressing those needs through the State Highway Operation and Protection Program (SHOPP).

**Transit/Rail:** The stakeholder agencies in the corridor should continue to support the improvement of transit service. Adding new express bus service and/or frequency could take advantage of the new high occupancy vehicle (HOV) lanes planned for the Santa Cruz corridor. Stakeholder agencies should also consider enhancing the attractiveness and convenience of the passenger rail service between the San Francisco Bay Area and the Monterey Peninsula.

**Land Use & Transportation Connection:** The way communities are planned and designed has an impact on travel behavior. Land use and transportation must be more closely linked. To achieve this strategy, Caltrans will partner with local agencies and participate in the development review process. This process has two main elements: general plans and development projects. An additional opportunity to partner and facilitate a connection between land use and transportation is the Regional Blueprint Program: **AMBAG Blueprint Planning.** The program was designed to integrate long-range planning for transportation, land use, housing, environmental resources, and infrastructure. The ultimate goal of blueprint planning is to facilitate consensus around a regional vision and preferred land use scenario that will enable the region to accommodate future growth while minimizing adverse impacts. The emphasis of the land use and transportation planning connection is becoming a priority for the State and new legislation such as SB 375 is implemented in the MPO areas.

**Transportation Demand Management:** The focus is to reduce congestion by encouraging programs that increase the use of transit, improve bicycle and pedestrian access and encourage programs such as carpools, ridesharing, telecommuting, and park-and-ride facilities to reduce the demand.

**Intelligent Transportation Systems (ITS) /Traveler Information / Traffic Management / Incident Management:** Collisions and incidents can be a major source of delay along a corridor. Reducing the time required to clear these collisions and incidents and restore full flow
within the corridor reduces delay and reduces diversion of traffic onto the local arterials. The need for Freeway Service Patrol (FSP) is determined by congestion in an area. Improving system monitoring could provide the necessary information to determine a need for FSP. Local agencies can consider FSP as an option once the need has been identified. In addition, it is recommended to upgrade communication and enable deployment of advanced transportation systems, to improve safety, incident response, and traveler information. Real time traveler information allows travelers to make more informed decisions regarding trip planning, route choices and mode selection. Traffic management reduces congestion through the use of technologies such as collision warning systems and advanced traffic management systems. Incidents are the primary cause of unexpected and variable delay. By improving incident management and response time, reductions occur in congestion and travel delay.

**Modal Options:** The focus is to provide viable transportation options for all users. Greater opportunity to use other transportation modes will reduce demand on SR 1 & SR 183. Continued effort that supports the development of the Cal Train system will provide connection to a multi-modal option within the corridor. This includes facilitating and supporting the integration of transit, bicycle, and pedestrian transportation into a coordinated multimodal transportation system.

**Ramp Metering:** Ramp metering has the potential to maximize the productivity of the freeway. When combined with other recommended strategies, ramp metering accommodates greater vehicle throughput on the freeway and local arterials. A ramp metering plan should identify the capacity of on-ramps and install ramp-metering hardware on appropriate ramps.

**Operational Improvements:** The focus is to add auxiliary lanes, intersection improvements, and other system refinements in order to reduce delay, preserve and enhance existing services.

**IntersectionUpgrades:** Traffic studies demonstrate that the existing intersections are projected to provide lower level of service. The focus is to redesign and modernize the intersections to reduce delay, which would maximize State Highway throughput. These upgrades may include improving the parallel local road network, adding turn-movement storage, deceleration and/or acceleration lanes to the intersection, and converting at-grade intersections to grade-separated interchanges.

**Parallel Road Network Development:** The focus is to increase the capacity and connection on the parallel road network to reduce local traffic demand on SR 1. Emphasis on east-west connections that have bearing on the SR-1 north-south congestion should be closely monitored through increased detection. East-west connectors, such as SR 68, SR 156, SR 129, and County Road G-12 in Monterey County will need detection and system monitoring to understand the causality of bottlenecks in the region.

**Facility Expansion:** The focus is to improve mobility and reliability, reduce congestion, improve safety and facilitate goods movement by expanding and managing the existing system. Existing studies have demonstrated that SR 1 and SR 183 will need to be widened to improve capacity and accommodate future anticipated growth in the region.
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Chapter 1 Introduction to the State Routes 1 and 183 Corridor System Management Plan

1.1 What is a Corridor System Management Plan?

A Corridor System Management Plan (CSMP) is a planning tool that analyzes the existing transportation system and maximizes efficient and effective mobility in a corridor. It is partnership-based and integrates management of various travel modes (transit, cars, trucks, bicycles) and infrastructure (roads, highways, information systems, bike routes). The CSMP establishes a process to manage a set of transportation components within a corridor to be managed as a system rather than as independent units. As California shifts towards more performance-based transportation system management, CSMPs will become an essential tool for protecting current and future infrastructure investments as well as coordinating a multi-modal approach to corridor improvements. The CSMP will evolve with changing development patterns, travel demands, and technological innovations. This CSMP is the “first generation CSMP,” to be followed by updates as information is collected over time.

The CSMP focuses on strengthening partnerships, gathering and analyzing data, monitoring the transportation system performance, implementing operational strategies, and identifying strategic capital investment. The objectives of the CSMP are to identify strategies that would reduce travel time or delay on all modes, reduce traffic congestion, improve connectivity, and expand mobility options along the corridor in a cost effective manner. The CSMP identifies key stakeholders, the transportation network, current management strategies, existing travel conditions, major challenges to maintaining and improving mobility, and potential future management strategies and capital improvements.

The CSMP is consistent with the Association of Monterey Bay Area Governments’ (AMBAG) Metropolitan Transportation Plan (MTP) and should act as a tool for AMBAG’s current blueprint effort. The CSMP is also consistent with the Regional Transportation Plans (RTP) of the Transportation Agency for Monterey County (TAMC) and the Santa Cruz County Regional Transportation Commission (SCCRTC). The CSMP includes all projects listed in the current RTPs. CSMPs will assist in fulfilling the goals recently enacted by legislation such as Assembly Bill 32 that addressed air quality and greenhouse gas emissions and Senate Bill 375 that addresses land use. The CSMP is also consistent with Caltrans policy such as Deputy Directive (DD) 64, Complete Streets.

CSMPs are in preparation for corridors associated with Corridor Mobility Improvement Account (CMIA)-projected funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, Proposition 1B. The locations of each of the CSMP corridors within the Caltrans District 5 area are depicted in Table 1.1 and in Figure 1.1. The CSMP for State Route 1, Figure 1.1, shows the Proposition 1B funds that have been allocated for the construction of auxiliary lanes from Soquel Drive to Morrissey Boulevard and the Salinas Road interchange. Maximizing the throughput on the mainline and providing local connectivity will
prolong the need for capital investments along the corridor. The total bond funding in the corridor project is $45.4 million.

This CSMP is based on technical information that is divided into three chapters:

- **Chapter 1**: Provide an overview of the corridor system management planning process and CSMPs relate to other state, regional, and local planning documents.

- **Chapter 2**: Describe existing corridor management activities, including all facilities and services currently in use to maximize mobility within and through the corridor, such as traffic operations system elements, traveler information services, and transportation demand management programs.

- **Chapter 3**: Provide an assessment of current corridor performance by identifying the major deficiencies inhibiting efficient corridor operations for each element (mode) of the CSMP transportation network. In addition, it provides an assessment of strategies that when implemented would further the current investment within the corridor.

### 1.2 The Importance of the Corridor for Economic Development

The Monterey Bay region is a key player in the California and national economies with most of the economic activity in the area depending in one way or another on State Route 1 & 183 corridor. The region sits at the northern end of the Salinas Valley, which is home to a $2.3 billion agricultural industry, making it the number one vegetable-producing region in the nation. The area supplies 80 percent of the nation’s lettuces and nearly the same percentage of artichokes. Grape production for wine is also a large cash crop.

Tourism is the Monterey Bay region’s other large industry. In addition to serving as the northern gateway to the scenic Big Sur coastline, Monterey’s tourist attractions include Cannery Row, scenic 17-mile drive, and the Monterey Bay Aquarium, which has an average of almost 1.7 million visitors every year. In Santa Cruz, tourist attractions include the area’s beaches, boardwalk, and redwood state parks.
Other notable economic drivers in the Monterey Bay region include education and high
technology. The largest educational institution is the University of California, Santa Cruz, which
has over 16,000 students and employs over 2,500 workers. Other educational institutions include
the California State University Monterey Bay, the Monterey Institute of International Studies, the
Defense Language Institute Foreign Language Center (DLIFLC) and the Naval Postgraduate
School. Due to its close proximity to neighboring Silicon Valley, several major high technology
companies are based in the Monterey Bay region including Seagate Technology and Plantronics,
among others.

1.3 Need, Purpose, Goal and Objectives

The RTPs, the MPO blueprint effort, and local general plans address large geographic areas
within a region. Transportation Concept Reports (TCR), transit plans and capital improvement
programs do not typically mix operational strategies and capital projects across agencies,
inclusive of all modes, along a corridor that extends many miles.

There is a need for a planning approach that coordinates transportation facility operations and
service with capital projects to produce a seamless transportation system focusing on high-
demand corridors, such as SR 1. The purpose of the CSMP is to create a partnership planning
process and resulting guidance document that focuses on system management strategies that
coordinate all the individual transportation modes and that includes performance measures to
track the effectiveness of the strategies and projects. The goal of the CSMP is to improve
mobility along the SR 1 corridor by the integrated management of the transportation network
including the selected highway, parallel/connector roadways, transit, bicycle, and travel demand
management components of the corridor. Managing the facilities in a multi-modal approach will
ensure that the benefits from investments made in the corridor can be sustained over time. The
objective of the CSMP is to identify strategies that would improve safety, reduce travel time
delay, improve connectivity, and expand mobility options along the corridor in a cost effective
manner. Implementation of the CSMP will improve safety on the transportation system and
improve connectivity to jobs, housing, and commerce.
1.4 **Relationship to Other Plans**

1.4.1 **State Planning**

The CSMP approach is consistent with the goals and objectives of the Governor’s Strategic Growth Plan (approved 2006), which among other things commits to minimizing increases in traffic congestion. Key elements of the strategy are illustrated in Figure 1.2.

![Strategic Growth Plan Mobility Pyramid](image)

**Figure 1.1  Strategic Growth Plan Mobility Pyramid**

At the base of the pyramid, and the foundation of transportation system management, is system monitoring and evaluation. It is essential to understand what is happening on the transportation system so that the best decisions can be made based on reliable data. The next few layers up the pyramid are focused on making the best use of existing resources and reducing the demand for new transportation facilities, particularly for peak hour travel. The top layer of the pyramid is system expansion. This layer assumes that all the underlying components are being addressed and that system capacity expansion investments are necessary. As a performance-based approach, the CSMP compliments the goals of the Strategic Growth Plan and establishes a process for managing transportation components within the corridor as a system rather than as independent units.

In addition to the Governor’s Strategic Growth Plan, there are a number of state planning documents that have been used as the foundation for the preparation of this CSMP. Baseline analysis and state system components were identified and defined using planning documents prepared by Caltrans, which include the *2006 California Transportation Plan*, the *1998 Interregional Transportation Strategic Plan* (ITSP), and several Caltrans District 5 plans that include the *2005 District System Management Plan* (DSMP), the *2006 State Route 1*.
Transportation Concept Report. The CSMP is a more comprehensive partnership based approach to corridor analysis.

1.4.2 Regional Planning

At the metropolitan planning level, AMBAG is currently in the process of developing its 2035 Regional Blueprint: Envisioning the Monterey Bay Area, a collaborative effort to develop a regional growth and conservation strategy. The Blueprint focuses on improved mobility, accessibility, and coordinated transportation and local land use that accommodate the region’s future population but also preserve the most important agricultural lands and conservation areas. The Blueprint builds upon the existing transportation system and the major projects and programs in progress, while looking toward the future and identifying needs and priorities. The Blueprint is currently in progress and is expected to be completed in early 2011.

At the regional level for Monterey County, TAMP updated its Regional Transportation Plan (RTP) in May of 2010. The RTP provides a basis for the planning and programming of local, state, and federal transportation funds to transportation projects in Monterey County for the next 25 years according to state and federal requirements. The RTP identifies existing and future transportation related needs, considers all modes of travel, and identifies what can be completed with anticipated available funding for projects and programs.

At the regional level for Santa Cruz County, SCCRTC updated its RTP in July of 2010. The RTP for Santa Cruz County will coordinate land use and transportation decisions to ensure that the region’s social, cultural, and economic vitality is sustained for current and future generations.

The CSMP is consistent with AMBAG’s existing Metropolitan Transportation Plan (MTP) and the Regional Transportation Plans (RTP) of SCCRTC and TAMP. In addition, Caltrans will continue to work collaboratively with AMBAG, SCCRTC, and TAMP to ensure that subsequent updates are incorporated and consistent with Caltrans planning efforts.

In Santa Cruz County, SR 1 runs through the unincorporated community planning areas of Aptos, Aptos Hills, La Selva, Live Oak, Pajaro Valley, San Andreas, and Soquel. In Monterey County, SR 1 runs through the unincorporated community planning areas of North County Coastal, Greater Salinas, Greater Monterey Peninsula, Fort Ord, Castroville, and Moss Landing (See Figure 1.2). Development of these community area plans identifies improvements to adjacent highways to address local access, reduce demand and improve local circulation. Table 1.1 and 1.2 identify recommended improvements to SR 1 and SR 183, however traffic analysis for the listed projects has not been completed. To identify need and/or benefits from implementing the proposed improvements in the general plans and community plans, detailed traffic analysis would be required.
State Routes 1 and 183 Corridor System Management Plan

Figure 1.2 Planning Areas in Monterey and Santa Cruz counties
### Table 1.1 Monterey County Area Plan Circulation Recommendations to SR 1 / 183

<table>
<thead>
<tr>
<th>Area Plan</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>North County Land Use Plan, 1999 *</td>
<td>Upgrade SR 1 to a four-lane divided scenic highway and limit access points to Jetty Road, Dolan Road, Moss Landing, and Portero Road.</td>
</tr>
</tbody>
</table>
| Castroville Community Plan, 2007                    | • Construct Artichoke Avenue (Phase I) at the SR 1 / Merritt Street (Highway 183) intersection to Mead Street including an off ramp from southbound SR 1 and right turn acceleration from northbound Merritt Street (SR 183) to northbound SR 1  
  • Lengthen the second northbound and southbound through lanes on Merritt Street (SR 183) at the SR 156 interchange  
  • Lengthen the second through lanes on Merritt Street (SR 183) and add another northbound right turn lane onto the eastbound SR 156 on ramp at Merritt Street. |
| Greater Salinas Area Plan, 1995                     | No proposed recommendation to SR 1 or SR 183                                                            |
| Greater Monterey Peninsula Plan, 1995                | No proposed recommendation to SR 1 or SR 183                                                            |
| Ford Ord Master Plan, 1997                          | No proposed recommendation to SR 1 or SR 183                                                            |

*Note: Monterey County is currently updating its Moss Landing Community Plan within the North County Land Use Plan. Recommendations are derived from the approved 1999 North County Land Use Plan.

### Table 1.2 Santa Cruz County Area Plan Circulation Recommendations to SR 1 / 183

<table>
<thead>
<tr>
<th>Area Plan</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonera Area Plan, 1993</td>
<td>Reconstruct SR 17 / SR 1 interchange</td>
</tr>
<tr>
<td>Live Oak Area Plan, 1993</td>
<td>Realign Soquel Ave interchange and add HOV lanes to SR 1</td>
</tr>
<tr>
<td>Soquel Planning Area, 1993</td>
<td>Add HOV lanes to SR 1</td>
</tr>
<tr>
<td>Aptos Planning Area, 1993</td>
<td>Widen Rio Del Mar overpass and add HOV lanes to SR 1</td>
</tr>
<tr>
<td>Pajaro Valley Planning Area, 1993</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
</tbody>
</table>
1.4.3 Local Planning

The following cities are located along State Routes 1 and 183: Monterey, Del Rey Oaks, Seaside, Sand City, Salinas, Watsonville, Capitola, and Santa Cruz. The following table identifies planned improvements to the corridor as listed in their respective RTPs as constrained or unconstrained projects. Table 1.3 identifies recommended improvements to SR 1 and SR 183, however traffic analysis for the listed projects has not been completed. To identify need and/or benefits from implementing the proposed improvements in the city general plans, detailed traffic analysis would be required.

<table>
<thead>
<tr>
<th>Area Plan</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monterey</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
<tr>
<td>Del Rey Oaks</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
<tr>
<td>Seaside</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
<tr>
<td>Sand City</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
<tr>
<td>Marina</td>
<td>Reconstruct SR 1/12th Interchange</td>
</tr>
<tr>
<td>Salinas</td>
<td>No proposed recommendation to SR 1 or SR 183</td>
</tr>
<tr>
<td>Watsonville</td>
<td>Reconstruct current half interchange at Harkins Slough Road to add on and off ramps to the northern side of the interchange in order to relieve congestion at Main Street (Hwy 152)/Green Valley Road intersection. Widen bridge, add bike lanes and sidewalks.</td>
</tr>
<tr>
<td>Capitola</td>
<td>Widen Hwy 1 overpass to 3 lanes in each direction, bike lanes, addition of stacking lanes to SB and NB off-ramps, ramp improvements, ramp metering</td>
</tr>
</tbody>
</table>
| Santa Cruz | • Install sound wall on Hwy 1: River to Chestnut  
• SR 1 / SR 9 Intersection modifications including new turn lanes, bike lanes/shoulders  
• SR 1 / King signalized intersection design modification  
• Install a Class 1 bicycle facility on freeway overpass at Morrissey |

1.4.4 Air Quality Planning

The Monterey County Air Pollution Control District was created by the Monterey County Board of Supervisors in 1965. In 1968 Santa Cruz County joined Monterey County to form a unified district. In 1969 the State designated the counties of Monterey, San Benito, and Santa Cruz as the North Central Coast Air Basin. On July 1, 1974 the Monterey and Santa Cruz County Unified Air Pollution Control District merged with the San Benito County Air Pollution Control District to form the Monterey Bay Unified Air Pollution Control District. The District is governed by a Board of Directors appointed from the elected governing bodies of the member jurisdictions. The Board of Directors appoints citizens to the District's advisory committee as well as to the hearing board.
As required by the California Clean Air Act and Amendments (HSC Section 40910 et seq.) and the Federal Clean Air Act and Amendments (42 U.S.C. Section 7401 et seq.) the District is responsible for air monitoring, permitting, enforcement, long-range air quality planning, regulatory development, education and public information activities related to air pollution. California Health and Safety Code Sections 39002, et seq. and 40000, et seq. require local districts to be the primary enforcement mechanism for air pollution control. Districts must have rules and regulations for the implementation and enforcement for the attainment and maintenance of federal and state ambient air standards. Corridor System Management seeks to create conditions where vehicle flow on state highways and roads occurs at a steady pace and travelers have a range of mobility options that enable them to travel other than by single occupant vehicle. System expansion is focused only where needed when travel demand exceeds the capacity of a well-managed existing system.

1.5 Stakeholder Participation

To achieve the goal of consistency among planning documents, coordination with agencies that have land use authority or funding authority is important. The jurisdictions with decision-making authority for transportation, land use and funding planning were comprised of representatives from the following agencies:

- Municipalities along the corridor
- Counties of Santa Cruz and Monterey
- Transportation Agency for Monterey County and Santa Cruz County Regional Transportation Commission
- Association of Monterey Bay Area Governments
- Caltrans District 5
Chapter 2 Corridor & Transportation System Characteristics

2.1 State Highway System Characteristics

The SR 1 corridor operates as a route along the crescent of Monterey Bay with both north/south and east/west movement. It begins at the junction of SR 68 West in Monterey County and extends approximately 45 miles to the junction of King Street in the city of Santa Cruz. Due to the mutual transportation needs of the corridor, this corridor system management plan also includes SR 183 from Lincoln Avenue in the city of Salinas to the junction of SR 1. These limits capture major inter-regional flows on the Monterey Peninsula and the Santa Cruz urban area. The SR 1 and SR 183 corridor serves as the primary connection between cities surrounding the Monterey Bay and the greater Central Coast area. Accommodation includes interregional, regional, rural, and urban commute traffic.

2.1.1 Route Segments

To better understand and analyze the corridor, it was necessary to divide the corridor into five segments based on roadway characteristics, operations, or geographic features, the routes were divided into five segments. Segment Three was further divided into subsegments. The SR 1 and SR 183 CSMP is comprised of the following segments:

<table>
<thead>
<tr>
<th>Segment</th>
<th>PM Begin</th>
<th>PM End</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75.14</td>
<td>R91.02</td>
<td>Junction SR 68 West to Junction SR 156</td>
</tr>
<tr>
<td>2</td>
<td>R91.02</td>
<td>R102.03</td>
<td>Junction SR 156 to Santa Cruz County / Monterey County Line</td>
</tr>
<tr>
<td>3A</td>
<td>R0.00</td>
<td>R7.67</td>
<td>Santa Cruz / Monterey County Line to Larkin Valley Road Undercrossing</td>
</tr>
<tr>
<td>3B</td>
<td>R7.67</td>
<td>16.43</td>
<td>Larkin Valley Road Undercrossing to Branciforte Creek Bridge</td>
</tr>
<tr>
<td>4</td>
<td>16.43</td>
<td>18.26</td>
<td>Branciforte Creek Bridge to King Street</td>
</tr>
<tr>
<td>5 (SR 183)</td>
<td>0.86</td>
<td>9.98</td>
<td>Lincoln Ave to Junction with SR 1</td>
</tr>
</tbody>
</table>
Figure 2.1  State Route 1/183 CSMP in California
State Route 1

Segment 1

Segment 1 begins at the junction of SR 68 West in the city of Monterey. It runs along the Pacific Ocean and heads through the dunes of Marina State Beach and the cities of Seaside and Marina, which bring commercial uses to the corridor including large shopping centers. Public lands of the decommissioned Fort Ord U.S. Army post and the California State University Monterey Bay dot the landscape as the corridor makes its way along the Monterey Bay Sanctuary Scenic Trail. The corridor then turns slightly inland as it winds its way north adjacent to the Salinas River National Wildlife Refuge. The segment continues through prime agricultural lands and concludes at the junction of SR 156.

This segment is 15.89 miles in length and is designated a freeway with lanes ranging from four to six. Outside shoulders for the entire segment range from six to 13 feet. The segment has four lanes for most of the segment. Between the Fremont Boulevard and Del Monte Boulevard undercrossing the highway expands to six lanes.

The segment includes the following interchanges:

- Junction SR 68 West
- Munras Avenue
- Soledad Drive
- Aguajito Road
- Junction SR 68 East
- Casa Verde Way
- Del Monte Boulevard
- Canyon Del Rey Boulevard (SR 218)
- Fremont Boulevard
- Light Fighter Drive
- Imjin Parkway (12th Street)
- Del Monte Boulevard
- Reservation Road
- Del Monte Boulevard
- Molera Road / Nashua Road
- Junction SR 156
Segment 1: SR 68 (West) to SR 156

Figure 2.2 Segment 1 – Interchanges & Intersections
Segment 2

Segment 2 begins at the junction of SR 156 near the community of Castroville. It then bends back toward the Pacific Ocean, where it encounters the estuary of the Elkhorn Slough, which is located in the Elkhorn Slough State Marine Conservation Area, and the maritime community of Moss Landing. The segment then stretches through rich agricultural fields before reaching an end at the Santa Cruz/Monterey County line.

Segment 2 is 11.01 miles in length and is an undivided 2-lane conventional highway for most of the segment. From Salinas Road to the Monterey / Santa Cruz County line the segment extends to 4 lanes. In this segment, outside shoulders range from 7 to 13 feet.

The segment includes the following intersections:

- Junction SR 183
- Moss Landing Road
- Dolan Road
- Jetty Road
- Struve Road
- Jensen Road
- Salinas Road
Figure 2.3  Segment 2 – Interchanges & Intersections

Segment 3

Segment 3 begins at the Santa Cruz/Monterey county line, landmarked by the overcrossing of the Pajaro River. The corridor quickly encounters Watsonville, where several major shopping complexes and residential lots are in close proximity to SR 1. As it leaves Watsonville, the corridor is dotted with rich landscape and agricultural lands and passes by the Ellicott Slough National Wildlife Refuge. As the Monterey Bay bends northwestward, the corridor leads through several unincorporated communities including Aptos, Soquel, and Live Oak. As it approaches the city of Santa Cruz, land uses along SR 1 turn mostly residential, school, hospital, and light
commercial. The segment features mountainous landscape features to the north and views of the Pacific Ocean to the south.

Segment 3A extends from the Santa Cruz / Monterey County line to the Larkin Valley Road undercrossing, a distance of approximately 7.7 miles. This segment is a freeway with mostly two lanes in each direction and outside shoulders for the entire segment ranging from eight to 10 feet.

The segment includes the following interchanges:

- Junction SR 129 (Riverside Drive)
- Harkin Slough Road
- Junction SR 152 (Main Street)
- Airport Boulevard
- Buena Vista Drive
-Mar Monte Avenue
- Larkin Valley Road (San Andreas Road)

Segment 3B extends from the Larkin Valley Road (San Andreas Road) interchange in the south to just south of the SR 17 interchange in the north (Branciforte Creek bridge), a distance of approximately 9.2 miles. This segment of SR 1 is a freeway with two travel lanes in each direction and auxiliary lanes at the following locations:

- In the northbound direction, between the Porter Street on-ramp and the 41st Avenue off-ramp
- In the southbound direction, between the 41st Avenue on-ramp and the Bay Street off-ramp

Lanes in this segment are 12 feet wide, with outer shoulders at 10 feet.

The segment includes the following interchanges:

- San Andreas Road/Larkin Valley Road
- Freedom Boulevard
- Rio Del Mar Boulevard
- State Park Drive
- Park Avenue
- Bay/Porter Streets
- 41st Avenue
- Soquel Drive
- Morrissey Boulevard
- SR 17 off-ramp
Figure 2.4  Segment 3 – Interchanges & Intersections

Segment 4

Segment 4 begins just south of the SR 1/SR 17 interchange (Branciforte Creek bridge) to King Street. Beyond the SR 17 interchange, Segment 4 continues as a four-lane freeway to the San Lorenzo River Bridge, where it becomes a conventional highway. A complex, frequently congested, at-grade intersection with SR 9 (north) and River Street (south) lies less than one-tenth mile from the end of the freeway. SR 9 leads to several mountain communities including Felton, Scotts Valley, Ben Lomond, and Boulder Creek while SR 17 is the mountain gateway to San Jose and the San Francisco Bay Area. The Pacific Railway tracks cross the highway approximately one-tenth mile beyond the intersection. Segment 4 continues to the intersection of Chestnut and Mission Streets, where Route 1 veers right along the Mission Street alignment. At Mission Street, the corridor becomes dense with residential and light commercial land uses. Segment 4 carries heavy traffic bound for the UC Santa Cruz campus, regional traffic, and local traffic between downtown Santa Cruz and residential areas to the west. From the Chestnut/Mission Streets intersection SR 1 continues as a four-lane conventional highway to the King Street intersection. The segment is 1.83 miles in length.

Lanes in this segment are 12 feet wide, with outer shoulders at eight to 10 feet.
The segment includes the following interchanges and intersections:

- Emeline Ave
- Junction SR 17
- Ocean Street
- River Street
- Mission Street

![Segment 4: Branciforte Creek to King Street](image)

**Figure 2.5  Segment 4 – Interchanges & Intersections**

**State Route 183**

*Segment 5*

The segment of SR 183 for the corridor plan begins at Lincoln Avenue in the city of Salinas, where it is lined by residential and light commercial use including the Salinas Railroad Station. As the corridor leaves the city, it parallels a railroad line where it leads through agricultural fields, most notably of artichokes. Heading northwestward, the corridor runs through the small community of Castroville, where it functions as a main street through the downtown area. The segment terminates at the junction of SR 1.
For most of Segment 5, SR 183 is a two-lane conventional highway. Lanes in this segment are 12 feet wide with outer shoulders at eight to 10 feet. Segment 5 is 9.13 miles in length.

The segment includes the following interchanges and major intersections:

- Market Street / Lincoln Avenue
- Davis Road
- Blackie Road
- Junction SR 156
- Pajaro Street
- Junction SR 1

*Figure 2.6  Segment 5 – Interchanges & Intersections*
2.1.2 Route Designations

The following designations and classifications provide information regarding the facility itself and its intended use. They also indicate the availability of special purpose funding related to the designation.

The Federal functional classification of SR 1 within the scope of the plan is Principal Arterial and for SR 183 is Principal Arterial and Major Collector. SR 1 within Monterey and Santa Cruz counties is also part of the National Highway System (NHS). The NHS is comprised of the Interstate System and other urban and rural principal arterials that are essential for interstate and regional commerce and travel, national defense, intermodal transfer facilities, and trade.

SR 1 is one of 87 statutorily identified routes on the State’s Interregional Road System (IRRS). The section of Route 1 extending from the Carmel Bridge in Monterey County to SR 17 in Santa Cruz County is additionally one of 34 High Emphasis Routes identified in Caltrans’ Interregional Transportation Strategic Plan (ITSP). In 1997, California Senate Bill 45 created an Interregional Improvement Program (IIP) for which Caltrans submits projects in specified categories. The IIP funds project components that provide for interregional movement of people and goods, including state highway projects on the IRRS.

Several segments of SR 1 lie within the California Coastal Zone. Development within the zone is subject to compliance with the local coastal program certified under the California Coastal Act, which provides long-term environmental protection for California’s 1,100-mile coastline for the benefit of current and future generations.
Figure 2.7  State Route 1 / 183 Biophysical Setting
2.1.3 Goods Movement

Caltrans District 5 lies within the Central Coast region of California’s four Goods Movement Regions. SR 1 and 183 are primary corridors that link the Monterey Bay to the San Francisco Bay Area and beyond California to national and international markets. Agricultural commodities, raw materials, and manufactured goods are transported to, from and through the Central Coast predominately by heavy trucks in which inbound and outbound travel by tonnage is almost evenly split. The local and regional economies depend on these highway linkages for the shipment of goods. It should also be noted that SR 1 serves as an alternative route for traffic in the event of a non-recurring incident, such as a collision or due to weather conditions, which results in a closure on US 101. Depending on the location, a closure on US 101 could redirect north/south travel to SR 1.

Union Pacific Railroad provides rail freight service on the Coast Line, which parallels the corridor along SR 183 from Salinas through Castroville. It continues northward through the Elkhorn Slough before turning east, where it parallels US 101, connecting with the city of Gilroy. Rail freight shipments often include farm products, clays, concrete, stone, scrap, waste, recyclables, paper, lumber, and military implements. The Union Pacific Railroad operates four through freight trains a day, two northbound and two southbound. The two northbound trains operate with a combined average payload of 6,667 tons per day and the two southbound trains carry a combined average payload of 5,948 tons per day, according to the TAMC 2005 Regional Transportation Plan.

As the Monterey Bay region continues to grow, it will be faced with the challenge of providing mobility for people and goods throughout the region. Growth in population will bring with it increased freight transportation demand that will create issues that need to be addressed in the transportation and land use planning process. The Salinas Valley is promoted as the nation’s “Salad Bowl”, where 80% of the nation’s lettuce is produced, according to the Salinas Valley Chamber of Commerce. SR 1 and SR 183 serve as the primary farm-to-market connectors within the transportation network and provide produce to domestic and international markets. Monterey and Santa Cruz counties have also become premium grape growing regions in California. In the future, both corridors will serve an ever growing range of purposes. In order to accommodate the projected growth in population and goods movement, additional investment in these facilities will be required.

While goods movement brings economic benefits to the region, it also has an adverse impact on air quality, noise, congestion, and public health. Goods movement transportation contributes to higher percentages of nitrogen oxide (NOx) emissions and particulate matter 2.5 (PM2.5) emissions than passenger vehicles. With legislation such as Assembly Bill (AB) 32, known as the Global Warming Solutions Act, and Senate Bill (SB) 375, transportation and land use planning will need to examine the impacts that goods movement has on air quality. Several initiatives are underway that will have a major influence on the options for reducing truck emissions over the next decade. The California Air Resources Board (CARB) is in the process of adopting in-use truck rules that would apply to heavy vehicles already on the road. As currently envisioned, the rules would be phased in to require that all truck engines meet the 2007 U.S. EPA emission standard by 2013, and all truck engines meet the 2010 U.S. EPA emission
standards by 2021. It is essential that transportation planning along our highway corridors take into consideration strategies that are consistent with the intent of AB 32 and SB 375.

Addressing goods movement issues requires examining all the components of the goods movement system including streets, highways, rail, ports as well as the underlying commodity flows and freight generators. The Association of Monterey Bay Area Governments (AMBAG), in partnership with Caltrans and the regional transportation agencies of Santa Barbara County, San Luis Obispo County, San Benito County and Santa Cruz County, have embarked on a commodity flow study to analyze commodity flows within the Central Coast region. The AMBAG study is scheduled for completion in winter 2010.

2.2 Corridor Characteristics

2.2.1 Environmental Setting
To ensure a proper analysis of a corridor and provide strategies for the future, planning must take into account the scenic, aesthetic, and cultural resources of an area along with air quality needs.

Scenic and Aesthetic Resources
SR 1 is designated as a California Scenic Highway from the San Luis Obispo / Monterey County line to the junction of SR 68W. The corridor study area lies within the California Coastal Zone except for an area near the City of Santa Cruz and the southern portion of SR 183 (see Figure 2.7). Monterey and Santa Cruz counties enjoy beautiful landscapes along the SR 1 and 183 corridor. From the City of Monterey to the Monterey / Santa Cruz County line, the coast is dotted with cypress groves, sandy beaches, and sand dunes as it makes its way north and traverses through the Moro Coho and Elkhorn Sloughs. North of the county line, the corridor encounters the Ellicott Slough before reaching several coastal communities such as Aptos, Capitola, and finally, the city of Santa Cruz, which feature views of the ocean on one side and forest-lined hillsides on the other.

Most of SR 183 features agricultural views with the exception of the southern portion where it encounters the more urban context of the City of Salinas.

Cultural Resources
The Ohlone, otherwise known as the Costanoan people, were early inhabitants of the corridor. They designate a linguistic family of eight languages and are known to have occupied the region for several thousand years. It is believed that their range extended along a narrow strip of coastal territory from what is now known as San Francisco Bay in the north to Big Sur and the Salinas River in the south. Areas of cultural sensitivity have been identified at numerous locations along the SR 1 and 183 corridor.

Biological Resources
Projects on SR 1 and SR 183 have the potential to impact biological resources and habitats within the project limits. In addition, there is potential to disrupt landscape-level connectivity that affects movement and dispersal patterns of animals and plants.
Air Quality
The three counties of Monterey, Santa Cruz, and San Benito are designated as the North Central Coast Air Basin, a single region sharing mutual air pollution problems. The air basin is a nonattainment area for the State Ambient Air Quality Standards for both ozone and inhalable particulate matter (PM10). The Monterey Bay Unified Air Pollution Control District has prepared an air quality attainment plan as required under the California Clean Air Act (CAA). Transportation plans, programs and projects must conform to the attainment plan.

2.2.2 Community Demographics

To ensure a proper analysis of a corridor and provide strategies for the future, planning must take into account the setting and context of the area including information on where jobs and industry are located and the nexus to housing and services.

Demographics
The communities that are adjacent to the SR 1 and 183 corridor are comprised of the coastal portion of Santa Cruz county and northern Monterey county.

Santa Cruz County – The planning areas of SR 1 in Santa Cruz County include San Andreas, Aptos Hills, Aptos, La Selva, Soquel, and Live Oak.

For the 2000 census, Santa Cruz County had a population of 256,695 and Monterey County had a population of 404,031. Santa Cruz County has a slower rate of growth than Monterey County, with an estimated population increase of just below 19 percent, adding approximately 47,770 residents over a 30 year forecast period. Decreases are anticipated in young children and school-age populations, comprising a five percent loss by 2035. Population growth among working-age residents is also slow at about eight percent. According to the Watsonville Land Use Element of 2006, from 1980 to 2000 Watsonville grew at a faster rate than the other cities in the county with a population of 46,468 in 2000. According to U.S. Census data, Santa Cruz is the largest city in the county and had a population of 54,593 (2000) while the population of Santa Cruz County had 256,695 (2000). Santa Cruz is the county seat and is also home to the University of California, Santa Cruz. Incorporated communities along the SR 1 corridor in the Santa Cruz County region include the cities of Capitola, Watsonville, Capitola, and Santa Cruz.

Monterey County – SR 1 lies within the Greater Monterey Peninsula and North County planning areas as well as the North County Land Use Plan, and the Moss Landing Community Plan. SR 183 lies within the North County and Greater Salinas planning areas.

Monterey County’s population is projected to increase by over 30 percent by 2030. While ages 85 years and older will only make up two percent of the county’s total population, the Monterey Bay Area 2008 Regional Forecast anticipates a doubling of the 85+ population between 2005 and 2035. The 64-84 year old population will also double to about 70,700 residents by 2035. Working-age and school-age populations are both expected to decrease in their share of the county’s total population, with school-age children showing a decline by three percent.
Several municipalities are clustered around the Monterey Peninsula area. Along SR 1, the cities of Del Rey Oaks, Seaside, Marina, and Sand City have undergone significant growth due to the closure of the Fort Ord military base and the establishment of California State University Monterey Bay.

Along SR 183 sits the unincorporated community of Castroville, where the highway serves as a main street in a downtown context. Castroville had a population of 6,724 as of the 2000 Census and is the self-proclaimed Artichoke Capitol of the World, producing 80 percent of the country’s supply of the commodity. The southern terminus of SR 183 lies in the City of Salinas with a 2000 population of 143,920, which serves as the county seat and agricultural hub for the rich Salinas Valley.

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<th>Table 2.2 Growth Projection Comparison</th>
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<td>Year</td>
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*Population projections from the California Department of Finance*

According to data from the 2007 U.S. Economic Census, Monterey and Santa Cruz Counties share both similarities and differences in categories of occupation. Both counties rank “educational services, and health care and social assistance” as the largest sector. However, “agriculture, forestry, fishing and hunting, and mining” rank second in Monterey County at 14 percent, while in Santa Cruz County “professional, scientific, and management, and administrative and waste management services” take the second position at 11 percent. Santa Cruz ranks higher in “manufacturing” although both counties show similar rankings in “retail trade”.

The 1999 median household income according to the 2000 U.S. Census is $48,305 in Monterey County and $53,998 in Santa Cruz County. Both counties are higher than the state median household income of $47,493.

SR 1 and SR 183 is a major corridor between jobs and housing. Traditionally, the Salinas Valley has been based in agriculture but is now growing as a place for housing. The trend has been affected by the growing jobs and housing imbalance in communities surrounding the City of Monterey, Santa Cruz, and Santa Clara County. According to the Monterey Bay Area 2008 Regional Forecast, the city of Watsonville and many cities in the Salinas Valley are growing in population, while the cities of Monterey, Pacific Grove, Seaside, and Carmel-by-the-Sea are undergoing a stabilizing or downward trend. Future planning along the SR 1 and SR 183 corridor will need to account for more mobility to and from these growing cities.
2.3 Regional & Local Transportation Characteristics

2.3.1 Parallel Routes and Local Connections

As a primary component of the State Highway System, SR 1 and 183 serve critical roles in providing regional and interregional mobility and accommodating many aspects of travel including: job and education commuting, tourism, retail shopping, goods movement, business, and emergency services.

Within the region, there are few comparable parallel north-south routes that can serve as an alternative to help alleviate traffic congestion along the corridor or in case of a natural disaster or national security emergency. The most significant parallel route is US 101. Connections to US 101 include SR 68 through Salinas, SR 156 and County Road G-12 through the community of Prunedale, SR 129 near San Juan Bautista, SR 152 through Gilroy, and SR 17 through San Jose via SR 880. West-east parallel routes include SR 68 and Reservation Road in Monterey County and Soquel Drive and Water Street in Santa Cruz County.

Utilizing local road connections that intersect the SR 1 and 183 corridor can also serve as a method for reducing traffic demand on the highway. Primary local roads are indicated in Figures 2.3 and 2.4. Enhancements to these local facilities may result in improved circulation and alleviate congestion along the entire SR 1 and 183 corridor by providing options to the local and regional traveler.

[Map of Parallel and Local Routes in Monterey County]

Figure 2.8 Parallel and Local Routes in Monterey County
Figure 2.9  Parallel and Local Routes in Santa Cruz County
Figure 2.10  Parallel and Local Routes in Watsonville
2.3.2 Bicycle Access

In California, bicycles are defined as vehicles and as such may operate on any street, road, or highway where they are not specifically prohibited. Bicycle access is prohibited on SR 1 within the limits of the corridor except between Molera Road and Salinas Road in northern Monterey County. Bicycles are not prohibited on SR 183.

The Monterey Bay Sanctuary Scenic Trail runs parallel to SR 1 and is a tourism and commuter bikeway that will link existing and new trail segments into a continuous coastal trail around the Monterey Bay from Wilder Ranch in the County of Santa Cruz to Lovers Point in the City of Pacific Grove.

The 2005 TAMC General Bikeways Plan identifies connections to SR 1 that would provide connectivity within the corridor:

- Proposed Class II facility on Dolan Road between SR 1 (near Moss Landing) and San Miguel Canyon Road
- Proposed Class III facility in northern Monterey County on Bluff Road at SR1, heading west where the facility continues on Trafton Road and loops back to intersect with SR 1.
- Proposed Class II facility on SR 183 between Davis Street in Salinas and SR 1.
- Proposed Class I facility along SR 183 from Salinas city limits to SR 1.

The 2008 Monterey County General Bikeways Plan proposes the following improvement to the corridor:

- Install Monterey Bay Coastal Trail between South and North County Lines (not including completed trails).

The corridor plan also parallels the Pacific Coast Bike Route and the California Coastal Trail, which are officially designated state routes.

Other public agencies along the corridor with bicycle transportation plans include the City and County of Santa Cruz, and the cities of Monterey, Capitola, and Scotts Valley.

2.3.3 Transit

Local Transit

Both Santa Cruz and Monterey have relatively high transit ridership, with a combined total of about 10 million annual trips, but this constitutes roughly 2-3% of trips on all modes of transportation. While a majority of riders are transit dependent, about a third have household
incomes over $50,000/year—a good indicator of ridership that chooses to use transit over another mode.

Monterey – Salinas Transit (MST) serves a 280 square-mile area of Monterey County and southern Santa Cruz County. Thirty-seven routes serve an estimated population of 352,000 based upon an area of within 0.75 mile of established routes within the county with a focus chiefly in the Monterey Peninsula and the Salinas Valley. Intercity service is provided via SR 68 and SR 1.

Two major public transit systems operate on the SR 1 Comprehensive System Management Corridor. These are the Santa Cruz Metropolitan Transit District (METRO) and the Monterey-Salinas Transit (MST). This service may be part of the fixed route systems including both regional and inter-regional buses, special programs for disabled persons, or special interest shuttling.

**Santa Cruz Metropolitan Transit District (METRO).**
The Santa Cruz Metropolitan Transit District provides fixed route and Dial a Ride service for all members of the general public in Santa Cruz County. Ridership on the fixed route service was 5,479,858 during 2005/06, which translates to about 14,000 rides a day on eight inter-city routes. Transit centers exist in Felton, Scotts Valley, Santa Cruz, Capitola and Watsonville. See Figure 2.5. Connecting buses between Santa Cruz, Capitola, and Watsonville impact SR 1 most directly. In all, METRO offers service on 39 routes, with 8 that use SR 1 and 16 that serve the same corridor without entering onto the freeway. The impact of the service that uses local streets is considerable and possibly indicative of the congestion factor that limits on-time reliability on SR 1 during peak periods.
Figure 2.11  Transit Centers in Santa Cruz County
Students attending University of California Santa Cruz are responsible for about 5,000 trips daily, while Cabrillo College, east of Capitola, is a secondary student attractor. The UCSC Comprehensive Transit Study (2003) reported an expected 36-63 percent increase in internal peak hour demand transit ridership and an increase of 10-20 percent external peak hour transit demand by 2020. Most of this increase will not directly affect transit lines on SR 1. Cabrillo College has a student population of 13,000, with many who use METRO for access. Student ridership and its growth will play a role in corridor planning. Continuing attention to student bus use should be a part of managing the load on the SR 1 Corridor.

Monterey-Salinas Transit (MST)

Monterey-Salinas Transit provides service throughout Monterey County and includes the Line 55 Monterey to San Jose Express. The bus route travels on SR 1 from Monterey to the SR 156 junction, running three times each day from downtown Monterey to San Jose Diridon Station. Line 55 stops at the park-and-ride lot adjacent to the US 101/SR 156 West junction in Prunedale and connects with Caltrain in Gilroy and Morgan Hill. It also serves as the Amtrak Thruway bus for the San Jose-Monterey route when making a train connection with the Capitol Corridor intercity passenger rail service (San Jose to Sacramento and Auburn).

By far the most significant runs occur on Route 20, which carried 627,080 passengers in 2004. It connects Salinas, Marina, Sand City and Monterey. The service is primarily along parallel routes to SR 1, such as Del Monte Avenue, but it uses SR 1 for a short time just north of Sand City. The ridership provides some relief to SR 1 traffic, allowing residents to choose transit rather than drive. Thirty four trips run each way on weekdays and on Saturday.

Other key routes include 9 and 10, connecting Monterey, Seaside and Sand City, providing 396,215 and 556,903 rides respectively for 2004. Route 27 serves Watsonville, Moss Landing, Castroville and Salinas, serving 161,296 passenger trips in 2004. Four other routes directly use SR 1, for a total daily ridership on some portion of SR 1 of just over 6,000 passengers.

The heavy usage in the Marina/Monterey corridor has prompted MST to plan for a Bus Rapid Transit service for this segment. Ten minute headways would be provided by buses, with signal priority, operating between Sand City, Seaside and Monterey. A 6.75-mile corridor is envisioned, with 24 stations (12 each direction) about one-half mile apart. Some of the system attributes are:

- Low floor, clean diesel transit vehicles that are branded to reflect the BRT system image.
- Station facilities with increased passenger amenities including shelter, real-time route and scheduling information, security features, and a designated BRT image.
- Signal priority to reduce travel time.
- Mixed-flow travel lanes with queue jump lanes at signalized intersections.
- Stations target major trip generators and attractors, and the corridor is located along transit-supported, mixed-use land uses.
The BRT service is under development to complement plans for long-term, major investment fixed guideway projects currently under investigation by TAMC. The corridor segment is currently served by a number of different MST routes, with a combined daily ridership of nearly 4,000 passengers. Initial cost projections are about $3 million for capital costs, less buses, and about $1.6 million annually for operations. It would cut the trip time roughly in half, and build capacity for future growth of the area.

Paratransit
The MST Rides program provides curbside-to-curbside paratransit transportation services for eligible persons whose physical or cognitive disability prevents them from using MST’s fixed route bus service. The service is available whenever MST’s regular fixed route bus service is in operation and is provided either in lift-equipped mini-vans, mini-buses, sedans, or by local taxicab through a reimbursement program.

The MST Rides service is provided within a service corridor that extends 3/4 of a mile from any of MST’s regular bus routes. Both the point of departure and the destination of each trip must be within the service corridor.

Intercity Transit / Rail
Amtrak’s “Coast Starlight” links Los Angeles and Seattle with daily northbound and southbound trains with bus connections to San Francisco from Oakland and to Monterey from Salinas.
Service can be obtained directly from the Salinas Amtrak station or indirectly from Gilroy, by way of Caltrain service, making a connection with Amtrak in San Jose. Caltrain is an interregional commuter rail service serving San Francisco, the San Francisco peninsula as well as the southern reaches of the San Francisco Bay Area. New rail service is planned for an Amtrak service named the “Coast Daylight” which will offer service between Los Angeles and San Francisco. The Coast Rail Coordinating Council is a major proponent for this service and is made up of Union Pacific, Amtrak, Caltrans, the RTPAs and the MPO.

TAMC has conducted a number of studies on train service options between San Francisco and Monterey using the Monterey Branch rail line. The San Francisco-Monterey Intercity Rail Service Implementation Plan was completed in 1998. In 2003, TAMC completed the Monterey Intercity Rail Project Study, which included conceptual engineering, initial cost estimates, and environmental screening for the project. Caltrans discontinued “Capitol Corridor” feeder bus service from San Jose to Monterey in June 2005 due to low ridership. The following year, Monterey-Salinas Transit (MST) took over the former feeder bus connection and created Line 55, the “Monterey to San Jose Express.” Also, an Amtrak feeder bus service is available connecting the Central Coast to Merced for rail passengers riding on the “San Joaquins.” The service offers two daily round trips from Merced to Salinas with stops in Hollister and San Juan Bautista using State Routes 152 and 156.

In the near term, TAMC is planning a new service to link Monterey to San Francisco through a combination of local service and Caltrain commuter rail service. Starting in 2014, local light rail or bus rapid transit service is planned to connect Monterey and Marina, and later extend to Castroville and possibly Salinas. TAMC is working to ensure that the local service on the Monterey Branch Rail Line will connect with the Caltrain service via cross-platform transfers in Castroville. Bus connections to work and visitor destinations as well as transit oriented developments are planned at key locations along the way in Monterey County to maximize the usage of both services. In the longer term, TAMC is planning intercity rail service between Monterey and San Francisco. The intercity service would have stops in Monterey, Marina, Castroville, Pajaro, San Jose, San Francisco Airport, and downtown San Francisco, with a possible stop in Palo Alto. TAMC envisions two roundtrips on weekdays and three on weekends. No funding for this service is included in the Department’s ten-year operating plan, as the start date of this route is uncertain at this time.

TAMC is concurrently working to extend commuter rail service from Gilroy to Salinas in 2013. The extension of commuter rail service to Monterey County would also serve new stations in Pajaro/Watsonville and Castroville. This service would use the existing Class I Union Pacific Railroad (UPRR) rail line. In order for this service to exist, interagency agreements between TAMC and the UPRR must be forged, the construction of a Salinas layover facility and upgrades to the Salinas Amtrak station must be completed, and the acquisition of rolling stock must be finalized.

UPRR operates as one of two Class I railroads in California with 3,708 miles of track. In Monterey County, freight rail utilizes the main north-south rail-line connecting Oakland and Los Angeles. Most of the rail traffic is throughput; that is, there are no regular significant operations in Monterey County.
In November 2008 a state ballot initiative was passed by the voters for High Speed Rail. The proposed system would eventually extend from Sacramento to San Diego and allow trains to go 220 mph. The first segment, from San Francisco to Los Angeles, could in theory allow for a travel time of two-and-a-half hours between the two cities. Recently, a preferred route through the San Francisco Bay Area was chosen that would put the tracks through the Pacheco Pass into the South Bay. The proposal also includes a high level of integration with local and regional transit and rail services, and $950 million of the bond measure would go toward improvements to commuter rail systems. Re-establishing the Monterey branch line will require significant investment to renovate the infrastructure. Freight rail and the interrelated usage of UPRR main lines and spur lines is also an issue of concern for transportation planners. Interregional freight operations are provided by the UPRR on the same main rail line as passenger rail, i.e., generally within the US 101-SR 1 north-south corridor.

Since 1999, the Santa Cruz Regional Transportation Commission (SCCRTC) has been acting to study and acquire a 31.8 mile length of railroad known as the Santa Cruz branch line, stretching along the coast from Pajaro in Monterey County to Davenport in north Santa Cruz County. The line travels through the urban core of Santa Cruz County and is immediately adjacent to Watsonville, Aptos Village, Capitola Village and the Santa Cruz Beach area. Potential future transportation uses include passenger service and a bicycle pedestrian path adjacent to the rail. As such, this rail segment could relieve some of the SR 1 corridor congestion.

The SCCRTC and Union Pacific signed a letter of intent to purchase the entire branch line property for $19 million, subject to a conditions assessment and final negotiations. Multiple funding sources have provided funding for the pre-purchase planning and acquisition funding, including Proposition 116 (State bonding), STIP funds, Coastal Conservancy and federal earmarked funds. Once acquired, projects that could go forward include passenger service in the Capitola/Aptos area, trails paralleling the rail for bicyclists and walkers, and eventually the connection of bicycle paths from Davenport to Monterey (Monterey Bay Sanctuary Scenic Trail Network). Each of these improvements would provide choices for commuters within the corridor.

The Monterey Branch Line Light Rail
The Monterey Peninsula Fixed Guideway Service will provide light rail transit service using the existing Monterey Branch Line alignment, which was purchased by the TAMC in 2003 for $9.3 million. The 16 mile corridor extends between Monterey and Castroville on the publicly owned tracks adjacent to SR 1. The first phase of the project will run between Monterey and north Marina with key stations in Monterey, Seaside, Sand City, Marina/CSUMB, and with connecting bus service to Pacific Grove and Carmel to the south and Salinas to the east. Later phases will extend service to the planned commuter rail station in Castroville and increase the frequency of trains. TAMC is currently in the environmental review process for this project.

Amtrak
Amtrak provides the only regular rail passenger service in the region, known as the Coast Starlight, and is the most popular long distance passenger train in the United States. Amtrak’s service to the region in Salinas is limited to only one train daily in each direction (northbound in
early evening; southbound in early afternoon) running between Los Angeles and Seattle. Out of 83 Amtrak stations in California, the Salinas station is ranked 26th in ridership. MST operates a transit center approximately two blocks from the Amtrak station and provides both scheduled connections and on-call service to the Salinas Amtrak station. Rail passengers in Watsonville, Salinas, California State University Monterey Bay, and four locations within the City of Monterey can ride the Amtrak bus to connect to the Capitol Corridor train service, which runs daily between San Jose and Sacramento.

Greyhound
Greyhound offers several bus lines per day to destinations throughout California. In the Monterey Bay region, Greyhound has stops in Salinas, Watsonville, and the city of Santa Cruz.

2.3.4 Aviation
The Monterey Bay has four publicly owned civil airports: the Monterey Peninsula, the Salinas Municipal, the Marina Municipal, and the Watsonville Municipal. Of these four, only the Monterey Peninsula Airport (MPA) has scheduled air carrier service and is a major regional airport, serving commercial freight, passenger, military, and general aviation needs. The facility is located north of SR 68 east of the City of Monterey. SR 1 and SR 68 provide the primary ground access to MPA for both people and freight. Transit service to the airport from Monterey and Salinas is provided by Monterey-Salinas Transit as well as limousine, taxi, and shuttle services from the local hospitality industry.
Figure 2.13  Multi-Modal Facilities State Routes 1 / 183
2.3.5 Transportation Demand Management

Transportation Demand Management (TDM) is the application of strategies and policies to reduce single-occupancy automobile travel demand and facilitate diversified transportation options. It will be necessary to both propose new TDM programs and enhance existing programs, such as transit facilities, ridesharing programs, and park and ride lots, to reduce demand on SR 1 and 183. New TDM strategies such as bike/pedestrian facilities and employer-based programs would need to be developed concurrently with identified funding sources.

Commuter Programs

Monterey County’s Commute Alternatives and Santa Cruz County’s Commute Solutions manage the TDM services of the Monterey Bay area. Both agencies work in tandem with local employers, the media, non-profit organizations such as Ecology Action, and other public agencies in promoting more diverse transportation options. Partner agencies have included the Monterey Bay Unified Air Pollution Control District, which has funded regional outreach efforts and special events. Some of the TDM services provided include:

- **The Rideshare Rewards Club**: An incentive program that rewards commuters for using other options to get to and from work besides driving alone. For each day of using carpool, vanpool, bicycle, walking, riding the bus or telecommuting instead of driving alone, the participant is eligible to win monthly cash prizes.
- **Emergency Guaranteed Ride Home Program**: Provides a free, emergency ride home to commuters who are committed to other transportation choices than driving alone. To be eligible for this service, employees must register and commute to work some way other than driving alone at least one day per week.
- **511 Ridematching**: Through www.ridematch.511.org, provides an instant online service to help commuters find carpool or vanpool partners.
- **Bicycle Loan Program**: Allows qualified participants to borrow up to $750 interest-free for one year to purchase a bicycle and related equipment.
- **Bike Week, Clean Air Month, Rideshare Week**: Increase awareness about the benefits of using diversified transportation options such as carpooling, vanpooling, riding the bus, bicycling, walking, and telecommuting. Commuters are asked to make a commitment to using these forms of transportation and often receive prizes, free breakfast, peer encouragement, and other incentives.
Park and Ride Lots

Park and ride lots encourage commuters to take advantage of ridesharing, transit, and bicycling for short trips, to combine trips, and reduce the distance of driving alone. Increasing the number of park and ride lots has the potential to reduce single-occupant vehicle trips along the corridor. The following table shows the locations of Park and Ride lots along the corridor.

<table>
<thead>
<tr>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messiah Lutheran Church, High St./Spring St. Intersection</td>
</tr>
<tr>
<td>SR 17 &amp; Pasatiempo Dr., west side of interchange</td>
</tr>
<tr>
<td>Quaker Meeting House Church on Rooney Ave., near Morrissey Ave. and SR 1</td>
</tr>
<tr>
<td>SR 1/Soquel Dr. at Paul Sweet Rd., near Dominican Hospital</td>
</tr>
<tr>
<td>K-Mart, SR 1 and 41st Ave</td>
</tr>
<tr>
<td>McGregor Drive Beach Shuttle, Capitola</td>
</tr>
<tr>
<td>Resurrection Church, SR 1 and Seacliff/State Park Drive exit</td>
</tr>
<tr>
<td>Salinas Rd. and SR 1</td>
</tr>
<tr>
<td>Dolon Road and US 101</td>
</tr>
</tbody>
</table>

Future Park and Ride lots will be a collaborative planning effort with local partners to assess the best locations that can ensure maximum use along commuter routes.

2.3.6 Intelligent Transportation System (ITS) Strategies

Intelligent Transportation Systems (ITS) are a broad range of diverse technologies which, when applied to the current transportation system, can help improve safety, reduce congestion, enhance mobility, minimize environmental impacts, save energy, and promote economic productivity. ITS technologies are varied and include information processing, communications, control, and electronics. Examples of ITS technologies include changeable message signs and closed-circuit television.

Traffic Management Center

The cornerstone of the Central Coast ITS Implementation Plan is the Traffic Management Center (TMC) operated since October 2001 from the Caltrans District 5 offices in San Luis Obispo. The TMC operates Monday through Friday, 6:00 A.M. to 6:00 P.M. Both Caltrans and CHP personnel staff monitor real time traffic conditions, provide pre-trip and en route information to travelers, coordinate emergency response efforts, and manage traffic flow.

The TMC coordinates the following district-wide ITS components:

1. **Closed-Circuit Television (CCTV)**: Is used to continuously monitor road conditions, verify changeable message sign function, and detect/verify incidents for more effective...
response. CCTV will improve online communications with motorists about freeway conditions in order to allow them to make routing choices before they enter a congested zone.

2. **Incident Management System:** Directly links regional TMCs with emergency service agencies and resources. The incident management system employs a computer-aided dispatch system to alert local resources to incidents. The TMC dispatches an appropriate response in coordination with emergency management and other incident response personnel to confirmed incidents.

3. **Synchronized Signals:** Operate in a similar way as ramp meters, however the focus is on local road intersections adjacent to State highways.

4. **Changeable Message Signs (CMS):** Convey important information to motorists in a timely manner pertaining to road conditions, weather, traffic incidents, etc. They are controlled from the TMC or remote locations.

5. **Microwave Vehicle Detection System (MVDS):** These systems monitor roadways, providing the most accurate, real-time vehicle volume, occupancy and speed data needed for traveler information systems.
### Existing ITS Elements

The following tables describe existing ITS features along the corridor.

<table>
<thead>
<tr>
<th>Type of ITS</th>
<th>Location</th>
<th>Postmile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Santa Cruz County – SR 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of Riverside Drive &amp; SR 129/SR 152</td>
<td>R0.47</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Riverside Drive &amp; SR 129</td>
<td>R1.00</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of Green Valley &amp; Harkins Slough Roads</td>
<td>R2.05</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of Airport Boulevard</td>
<td>R3.03</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Buena Vista Drive</td>
<td>R4.13</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Buena Vista Drive</td>
<td>R4.92</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of Mar Monte Avenue</td>
<td>R6.30</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Mar Monte Avenue</td>
<td>R7.19</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of San Andreas &amp; Larkin Valley Roads</td>
<td>R7.63</td>
</tr>
<tr>
<td>MVDS</td>
<td>Freedom Boulevard</td>
<td>8.12</td>
</tr>
<tr>
<td>CCTV</td>
<td>Freedom Boulevard</td>
<td>8.36</td>
</tr>
<tr>
<td>MVDS</td>
<td>Freedom Boulevard</td>
<td>8.73</td>
</tr>
<tr>
<td>MVDS</td>
<td>Rio Del Mar</td>
<td>9.01</td>
</tr>
<tr>
<td>CCTV</td>
<td>Rio Del Mar</td>
<td>9.15</td>
</tr>
<tr>
<td>MVDS</td>
<td>Rio Del Mar</td>
<td>9.56</td>
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<tr>
<td>MVDS</td>
<td>State Park Drive</td>
<td>10.32</td>
</tr>
<tr>
<td>CCTV</td>
<td>State Park Drive</td>
<td>10.54</td>
</tr>
<tr>
<td>MVDS</td>
<td>State Park Drive</td>
<td>10.86</td>
</tr>
<tr>
<td>MVDS</td>
<td>Mar Vista Drive</td>
<td>11.50</td>
</tr>
<tr>
<td>MVDS</td>
<td>Park Avenue</td>
<td>11.90</td>
</tr>
<tr>
<td>CCTV</td>
<td>Park Avenue</td>
<td>12.09</td>
</tr>
<tr>
<td>MVDS</td>
<td>Park Avenue</td>
<td>12.49</td>
</tr>
<tr>
<td>MVDS</td>
<td>Bay Avenue</td>
<td>13.05</td>
</tr>
<tr>
<td>CCTV</td>
<td>Bay Avenue</td>
<td>13.20</td>
</tr>
<tr>
<td>MVDS</td>
<td>Bay Avenue</td>
<td>13.37</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>41st Avenue</td>
<td>13.57</td>
</tr>
<tr>
<td>CCTV</td>
<td>41st Avenue</td>
<td>13.92</td>
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<tr>
<td>MVDS</td>
<td>41st Avenue</td>
<td>13.98</td>
</tr>
<tr>
<td>CMS</td>
<td>41st Street</td>
<td>14.15</td>
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<td>CCTV</td>
<td>Soquel Avenue</td>
<td>14.86</td>
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<td>MVDS</td>
<td>Soquel Avenue</td>
<td>15.06</td>
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<tr>
<td>CCTV and MVDS</td>
<td>Morrissey Boulevard</td>
<td>15.66</td>
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<td>CCTV and MVDS</td>
<td>Morrissey Boulevard</td>
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<td>MVDS</td>
<td>N Branciforte Avenue</td>
<td>16.35</td>
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<td>CCTV and MVDS</td>
<td>Emeline Avenue</td>
<td>16.73</td>
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<td>MVDS</td>
<td>Ocean Street</td>
<td>17.09</td>
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## Existing ITS Features

<table>
<thead>
<tr>
<th>Type of ITS</th>
<th>Location</th>
<th>Postmile</th>
</tr>
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<tbody>
<tr>
<td><strong>Monterey County – SR 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Carpenter Street (SR 68)</td>
<td>75.00</td>
</tr>
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<td>MVDS</td>
<td>South of Munras Avenue</td>
<td>R75.60</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Munras Avenue</td>
<td>R76.23</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of Aquajito Road</td>
<td>R76.98</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>Aquajito Road</td>
<td>R77.63</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>South of Fremont Street</td>
<td>R78.05</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of Casa Verde Way</td>
<td>R78.38</td>
</tr>
<tr>
<td>MVDS</td>
<td>North of Casa Verde Way</td>
<td>R78.63</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>North of Del Monte Avenue</td>
<td>R79.03</td>
</tr>
<tr>
<td>MVDS</td>
<td>North of Auto Center Parkway (SR 218)</td>
<td>R79.55</td>
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<td>MVDS</td>
<td>South of Fremont Boulevard</td>
<td>R80.53</td>
</tr>
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<td>MVDS</td>
<td>North of Fremont Boulevard</td>
<td>R80.92</td>
</tr>
<tr>
<td>MVDS</td>
<td>North of Fremont Boulevard</td>
<td>R81.60</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of Fort Ord Main Entrance Road (Light Fighter Drive)</td>
<td>R82.81</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of 12th Street</td>
<td>R84.36</td>
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<td>MVDS</td>
<td>South of Reservation Road</td>
<td>R85.00</td>
</tr>
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<td>North of Reservation Road</td>
<td>R86.73</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of Del Monte Boulevard</td>
<td>R88.60</td>
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<td>CMS</td>
<td>Salinas River Bridge</td>
<td>R89.45</td>
</tr>
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<td>MVDS</td>
<td>South of Nashua Road</td>
<td>R90.38</td>
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<td>CMS</td>
<td>Molera Rd</td>
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<td>SR 156</td>
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<td>CCTV and MVDS</td>
<td>SR 156</td>
<td>R90.98</td>
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<td>CCTV and MVDS</td>
<td>South of SR 183</td>
<td>T92.16</td>
</tr>
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<td>Molera Road</td>
<td>94.21</td>
</tr>
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<td>MVDS</td>
<td>Potero Rd/Moss Landing Road</td>
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<td>South of Moss Landing Road</td>
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</tr>
<tr>
<td>MVDS</td>
<td>North end of Elkhorn Slough Bridge</td>
<td>96.55</td>
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<tr>
<td>MVDS</td>
<td>North Struve Road</td>
<td>98.17</td>
</tr>
<tr>
<td>MVDS</td>
<td>South of Jensen Road</td>
<td>99.30</td>
</tr>
<tr>
<td>CCTV and MVDS</td>
<td>Salinas Road</td>
<td>T101.01</td>
</tr>
<tr>
<td>MVDS</td>
<td>North of Trafon Road</td>
<td>R101.56</td>
</tr>
</tbody>
</table>
Chapter 3  Comprehensive Corridor Performance Assessment

The Comprehensive Corridor Performance Assessment (CCPA) is an analysis of the existing conditions, future conditions, and deficiencies based on measurable performance within the corridor. Performance measures are basic to corridor management and improvements. To identify the current and projected deficiencies within the corridor, identify locations for investment, and develop a range of solutions, Caltrans and the partners have identified Mobility and Traffic Safety as performance measures to analyze the corridor. Performance measures such as Reliability and Productivity require detection and/or extensive count data. The SR 1 and SR 183 corridor currently has numerous detection projects in planning, design, or construction. However, currently the data are not available for inclusion in this document. It was determined that reliability and productivity were not performance measures that could be estimated for this corridor. Described below are the performance measures that were used to analyze the existing and future conditions of SR1 and SR 183:

**Mobility:** Describes how well people and freight move along the corridor. Mobility is easily forecast, which is useful for future comparisons.

**Traffic Safety:** Provides an overview of collisions along the corridor and highlights locations of high concentrations of collisions or readily apparent patterns. California State TASAS (Traffic Accident Surveillance Analysis System) data can be used to determine the number of collisions, collision rates and locations for collisions along a corridor.
3.1 Mobility

Mobility performance measures indicate if a transportation facility is operating well to move traffic either along the mainline or through an intersection. These measures take into account the traffic volumes, the queues created due to congestion, and the time and money lost due to delay within the system. One mobility performance measure is Level of Service (LOS). LOS considers the flow of traffic, roadway geometrics (for example, number of lanes), capacity, and other characteristics to describe operating conditions a typical driver will experience on a typical day. Like a report card, LOS is defined in categories ranging from A to F and is illustrated in Figure 3.1. LOS A represents the best traffic flow while LOS F represents the worst congestion. Table 3.8 identifies LOS associated with each segment of the corridor for existing conditions and projected future conditions. Table 3.1 summarizes the Average Annual Daily Traffic (AADT) per segment.

![Levels of Service](image)

**Figure 3.1  Levels of Service Summary for Freeways**
### Table 3.1 SR 1 Level of Service (LOS) Summary

<table>
<thead>
<tr>
<th>Segment</th>
<th>Segment Limits</th>
<th>Peak LOS Data</th>
<th>2007</th>
<th>Future</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Junction 68 to Junction 156</td>
<td>Existing</td>
<td>C - F</td>
<td>Future</td>
<td>C - F</td>
</tr>
<tr>
<td>2</td>
<td>Junction 156 to Santa Cruz County / Monterey County Line</td>
<td>Existing</td>
<td>C - F</td>
<td>Future</td>
<td>C - F</td>
</tr>
<tr>
<td>3A</td>
<td>Santa Cruz / Monterey County Line Larkin Valley Road</td>
<td>Existing</td>
<td>B – D</td>
<td>Future</td>
<td>C - E</td>
</tr>
<tr>
<td>3B</td>
<td>Larkin Valley Road to Branciforte Creek Bridge</td>
<td>Existing</td>
<td>E – F*</td>
<td>Future</td>
<td>F*</td>
</tr>
<tr>
<td>4</td>
<td>Branciforte Creek Bridge to King Street</td>
<td>Existing</td>
<td>D – E</td>
<td>Future</td>
<td>E - F</td>
</tr>
<tr>
<td>5</td>
<td>Lincoln Ave to Junction with SR 1 (SR 183)</td>
<td>Existing</td>
<td>E</td>
<td>Future</td>
<td>E</td>
</tr>
</tbody>
</table>

*LOS for Years 2003 and 2035

### Table 3.2 Average Annual Daily Travel (AADT) Summary

<table>
<thead>
<tr>
<th>Segment</th>
<th>Segment Limits</th>
<th>2007 (Existing)</th>
<th>2030 (Future)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Junction 68 to Junction 156</td>
<td>24,500-86,000</td>
<td>56,000-104,000</td>
</tr>
<tr>
<td>2</td>
<td>Junction 156 to Santa Cruz County / Monterey County Line</td>
<td>24,000-38,000</td>
<td>38,000-45,500</td>
</tr>
<tr>
<td>3A</td>
<td>Santa Cruz / Monterey County Line Larkin Valley Road</td>
<td>32,500-63,000</td>
<td>45,000-90,000</td>
</tr>
<tr>
<td>3B</td>
<td>Larkin Valley Road to Branciforte Creek Bridge</td>
<td>68,000-108,000</td>
<td>98,000-158,000**</td>
</tr>
<tr>
<td>4</td>
<td>Branciforte Creek Bridge to King Street</td>
<td>54,000 (2008)</td>
<td>60,000 (2025)</td>
</tr>
<tr>
<td>5</td>
<td>Lincoln Ave to Junction with SR 1 (SR 183)</td>
<td>12,000-27,500</td>
<td>12,000-33,021</td>
</tr>
</tbody>
</table>

** For Year 2035
3.1.1 Methodology
In preparing the SR 1 CSMP, Caltrans District 5 staff drew on multiple resources and methodologies. For Segments 1, 2, 3A, 4, and 5, 2007 daily and peak hour count data were obtained from the Traffic Data Branch at Caltrans headquarters. Future year volumes were projected using growth rates from the Association of Monterey Bay Area Governments (AMBAG) regional travel demand model, version April 2007, applied to 2007 counts. Terrain, roadway geometrics, and peak hour factor inputs were obtained from Caltrans’ 2000 Highway Segment Inventory. Level of Service was analyzed using Highway Capacity Software version 2000 (HCS) based on Highway Capacity Manual 2000 methodology. Freeway and Multi-lane Highway modules from HCS were used for the corresponding segments. Assumptions in the analysis include a constant flow of traffic, no weaving, and no signal interference. More detailed traffic data, such as specific turn movements and 15-minute increment speed and volume data would be needed for more detailed analysis. Caltrans District 5 currently has projects programmed or in construction for system detection in the corridor. Future placement of loop detectors and remote monitoring systems will provide significant data for future versions of CSMPs in the corridor. Segment 4 summarizes results from the 2006 State Route 1 Transportation Concept Report, prepared by Caltrans District 5 Planning staff. Additional counts and tachometer runs were conducted for Segment 1 to support northbound FREQ macrosimulation modeling for current conditions. Counts conducted in the southbound direction were not sufficient to calibrate the FREQ model. Future CSMPs will include southbound FREQ results.

For Segment 3B, which extends from Larkin Valley Road in the south to the Branciforte Creek Bridge just south of the SR17/SR 1 interchange in the north, the primary source of information was the State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared for the Santa Cruz County Regional Transportation Commission by Wilbur Smith Associates, July 2007. Traffic counts and tachometer runs were conducted in spring 2001, summer 2001, and fall 2003 and formed the basis of a FREQ macrosimulation analysis of the segment. In addition, intersection operations analyses were performed using Synchro/SimTraffic microsimulation software. The AMBAG regional travel demand model (version 1.1, April 2005) provided growth projections to evaluate travel conditions in 2035 with and without improvements. The simulation tools provided various measures of effectiveness to evaluate future traffic operations along Segment 3B including average travel time, travel speed, vehicle volume and delay, vehicle and person trips, total travel distance, queue length, and Level of Service (LOS). While the discussion below focuses on LOS and travel time, all measures are reported in Appendix B.

Over the past year, a hybrid meso-microsimulation model has been under development for the entire SR 1 CSMP corridor. The model not only includes the corridor itself but also a large area surrounding the corridor in order to capture the parallel arterials and possible diversion routes. Within the time frame of the SR 1 CSMP, the calibration issues faced during hybrid model development could not be resolved. These issues are
described in Appendix C. As new detection, an updated AMBAG model, and other resources become available, Caltrans District 5 staff plans to continue work on the hybrid model for use in future, updated CSMPs and other project evaluation.

3.1.2 Corridor Analysis

Segment 1

**Segment 1 (PM 75.14 / R81.20)**
Segment 1 operates as a divided four-lane freeway from the junction of SR 68 West (PM 75.14) to just north of Freemont Boulevard. (PM R81.20) and then as a divided six-lane freeway to Del Monte Boulevard (PM R85.27), after which it operates as a divided four-lane freeway to SR 156 (PM R91.02). The Route Concept for this segment of SR 1 is a six-lane Freeway.

Trucks along Segment 1 vary from 3-4% but increase to 9% from just north of Reservation Road (PM R87.00) to SR 156. Terrain is rolling. The posted speed limit is 65 mph. The entirety of Segment 1 has 12 ft lanes and 8+ ft outside shoulders. There are fifteen interchanges along Segment 1, all of which are listed in Chapter 2.

**Operational Analysis**

Segment 1 experiences heavy traffic during the peak hours. Most of the traffic is concentrated by time of day, with commuters traveling from Santa Cruz County to work on the Monterey Peninsula during the morning peak period, and vice versa during the afternoon peak period. 2007 traffic volume ranges between 24,500 and 86,000. This concentration of traffic makes Segment 1 operate mostly at LOS E. Future volumes are projected to reach between 56,000 to 104,000 with LOS mostly at E and F by 2030. The Measures of Effectiveness for Segment 1 are summarized below in Tables 3.3 and 3.4.

Since congestion exists in the northbound direction of Segment 1 in the PM peak period between SR 68 West and Reservation Road, an analysis of existing conditions using FREQ and travel time studies was undertaken to determine the duration, extent and causality of this congestion. Based on these studies, traffic operations of this segment can be described as follows.

Beginning at the junction of SR 1 and SR 68 West, the mainline facility is two lanes. SR 68 West enters the flow of northbound SR 1 as an un-metered loop on-ramp with a heavy flow during the peak period. This appears to be commuters leaving jobs in Pacific Grove and the Pebble Beach area to head to shopping and housing somewhere in the north. Moving north, SR 1 meets the on- and off-ramp for Soledad/Munras and the off-ramp for Aguajito. These seem to have little effect on the overall flow of the mainline with the on-ramp traffic being well tolerated by the mainline flow. Then the mainline facility widens to four lanes to accommodate both the heavy flow of traffic entering the roadway via the two-lane on-ramp at Aguajito and the traffic preparing to exit SR 1 for SR 68 East and Freemont Street in Monterey. There is a lot of traffic weaving going on in the weave area, with traffic moving right to get off the freeway to connect to SR 68 East and Freemont.
Street and traffic merging left from the heavy two-lane on-ramp at Aguajito to continue north on SR 1. However, this weave area seems to work until about 5:30 PM when mainline traffic backs up into this area from congestion further north, discussed in the next stretch. At that time, traffic flow north becomes stop-and-go until the congestion begins to clear around 5:45 PM and the queue moves north. A weaving analysis should be completed to further evaluate operation of this weave area.

The next stretch of SR 1 continues north from the SR 68/SR1 interchange to Freemont Boulevard (Seaside) and is the stretch of roadway with the most congestion during the PM peak period. Congestion was found to start around 3:30 PM and builds till 5:30 PM, when it starts to slowly decrease, achieving free flow around 6:30 PM. This segment has two through lanes and auxiliary lanes between on- and off-ramps. The distance between interchanges is short thus making the weave areas short. The heavy traffic that is continuing north past the interchange of SR 68 is joined by on-ramp traffic at Casa Verde and at Del Monte which further loads the system. When traffic reaches the SR 218 interchange, traffic exiting the SR 218 off-ramp allows mainline speed to pick up slightly only to encounter the weave section between the SR 218 on-ramp and Freemont Boulevard off-ramp. The total demand of the northbound through traffic combined with the addition of the SR 218 on-ramp traffic exceeds the capacity of the two-lane section of SR 1 between the Freemont Boulevard off- and on-ramps. At the same time traffic slows as weaving conflicts occur. This combination of weave area effects and mainline capacity constraints seems to be the cause of the bottleneck. The Freemont Boulevard off-ramp does not cause a problem itself as the off-ramp traffic does not back up onto the freeway. Once the mainline breaks down, congestion continues to extend upstream till it reaches the SR 68 East interchange. At times, the end of the queue and slowing for the end of queue can extend into or affect the weaving area between the Aguajito two-lane on-ramp and SR 68 East, the four-lane section discussed earlier.

Since the cause of congestion in this area appears to be a combination of a lack of mainline capacity coupled with heavy weave sections, recommended analyses could include the effects of ramp metering and of adding a lane to achieve greater capacity for mainline traffic. A weaving analysis would also contribute to further evaluation of the weave areas.

Moving north of the Freemont interchange, the last stretch of SR 1 in Segment 1 widens to three lanes and remains so until the off-ramp to Del Monte at Marina, when it returns to two lanes for the rest of Segment 1. There are no traffic problems in this stretch at this time. However, the lane drop at Del Monte in Marina could be a potential bottleneck should the volume of traffic headed north increase in the future. The FREQ study ended at Reservation Road as there are no known existing issues in the remainder of Segment 1 from Reservation Road to SR 156.

In response to growing congestion and operational deficiencies, portions of this segment have been the focus of special studies:

- AMBAG’s 1990 State Route 1 Corridor Study through Monterey and Seaside
• Sand City’s 1998 Traffic Operation Study – Route 1 Corridor
• 2008 Nexus Study for a Regional Development Impact Fee prepared for the Transportation Agency of Monterey County (TAMC).

TAMC’s 2010 Regional Transportation Plan and Regional Development Impact Fee include projects to widen the highway between Fremont Street and Del Monte Avenue; construct improvements at the Fremont Street and Del Monte Avenue; and construct a new Monterey Road interchange between Fremont Street and Light Fighter Drive. In addition, the City of Marina proposes in conjunction with TAMC and Caltrans to study modifications to the interchange at Imjin Parkway (12th Street) to accommodate future demand. Based on a Project Study Report of SR 1 from Canyon Del Rey to Light Fighter Drive from 2002, average annual daily traffic (AADT) volumes from Canyon Del Rey to Fremont Boulevard to Light Fighter Drive are 71,000-83,000. This study identifies traffic congestion during the weekday afternoon period beginning at about 3 p.m. and continuing to about 6 p.m. The congestion is primarily due to close proximity of California Avenue and Fremont Boulevard and inadequate storage capacity.
### Table 3.3 Segment 1 Existing Measures of Effectiveness (2007)

<table>
<thead>
<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location Description</th>
<th>2007 VMT</th>
<th>2007 Peak Hour</th>
<th>2007 ADT</th>
<th>2007 Speed mph</th>
<th>2007 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>74.92</td>
<td>R75.73</td>
<td>NB Off To Rte 68W - Monterey SCL</td>
<td>4,480</td>
<td>5,600</td>
<td>61,000</td>
<td>57</td>
<td>D</td>
</tr>
<tr>
<td>R75.73</td>
<td>R77.38</td>
<td>Monterey SCL - Aguajito Rd UC</td>
<td>9,075</td>
<td>5,500</td>
<td>59,000</td>
<td>57</td>
<td>D</td>
</tr>
<tr>
<td>R77.38</td>
<td>R78.12</td>
<td>Aguajito Rd UC - Jct 68,E</td>
<td>5,920</td>
<td>8,000</td>
<td>86,000</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>R78.12</td>
<td>R78.88</td>
<td>Jct 68,E - Del Monte OH</td>
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<td>5,900</td>
<td>61,750</td>
<td>56</td>
<td>D</td>
</tr>
<tr>
<td>R78.88</td>
<td>R79.10</td>
<td>Del Monte OH - N of Del Monte Ave IC</td>
<td>1,474</td>
<td>6,700</td>
<td>72,000</td>
<td>52</td>
<td>E</td>
</tr>
<tr>
<td>R79.10</td>
<td>R80.68</td>
<td>N of Del Monte Ave IC – Fremont Blvd OH</td>
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<td>6,600</td>
<td>71,250</td>
<td>53</td>
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<tr>
<td>R80.68</td>
<td>R81.20</td>
<td>Fremont Blvd OH – N of Fremont Blvd IC</td>
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<tr>
<td>R81.20</td>
<td>R82.89</td>
<td>N of Fremont Blvd IC - Light Fighter Dr OC</td>
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<td>86,000</td>
<td>55</td>
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<tr>
<td>R82.89</td>
<td>R84.48</td>
<td>Light Fighter Dr OC – 12th St OC</td>
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<td>83,000</td>
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<tr>
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<td>R85.14</td>
<td>12 Street OC - Del Monte Blvd OH</td>
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<td>71,000</td>
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<td>R85.27</td>
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<td>R85.27</td>
<td>R86.48</td>
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<tr>
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<td>Salinas River Bridge - Molera Rd OC</td>
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<td>3,800</td>
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</tr>
<tr>
<td>R90.39</td>
<td>R90.98</td>
<td>Molera Road OC -Jct SR 156</td>
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<td>49,000</td>
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</tr>
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<td>R90.98</td>
<td>R91.02</td>
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<td>2,750</td>
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### Table 3.4 Segment 1 Projected Measures of Effectiveness (2030)

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<th>PM Begin</th>
<th>PM End</th>
<th>Location Description</th>
<th>2030 VMT</th>
<th>2030 Peak Hour</th>
<th>2030 ADT</th>
<th>2030 Speed</th>
<th>2030 LOS</th>
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<tr>
<td>74.93</td>
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<td>65,008</td>
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<td>E</td>
</tr>
<tr>
<td>R75.73</td>
<td>R77.38</td>
<td>Monterey SCL to Aquajito Rd UC</td>
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<td>5,938</td>
<td>63,668</td>
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<td>D</td>
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<td>R77.38</td>
<td>R78.12</td>
<td>Aquajito Rd UC to Junction 68E</td>
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<td>R78.88</td>
<td>Junction 68E to Del Monte Overcrossing</td>
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<td>6,003</td>
<td>63,191</td>
<td>56</td>
<td>E</td>
</tr>
<tr>
<td>R78.88</td>
<td>R79.10</td>
<td>Del Monte Overcrossing to North of Del Monte Ave IC</td>
<td>1,515</td>
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<td>73,319</td>
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<td>R79.10</td>
<td>R80.68</td>
<td>North of Del Monte Ave IC to Fremont Blvd Overcrossing</td>
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<td>79,479</td>
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<td>F</td>
</tr>
<tr>
<td>R80.68</td>
<td>R81.2</td>
<td>Fremont Blvd Overcrossing to North of Fremont Blvd IC</td>
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<td>103,962</td>
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<td>F</td>
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<td>R81.2</td>
<td>R82.89</td>
<td>N of Fremont Blvd IC to Light Fighter Dr Overcrossing</td>
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<td>Light Fighter Dr OC – 12th St OC</td>
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<td>E</td>
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<td>R84.48</td>
<td>R85.14</td>
<td>12 Street OC - Del Monte Blvd OH</td>
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<tr>
<td>R85.14</td>
<td>R85.27</td>
<td>Del Monte Blvd OH – N of Del Monte Blvd IC</td>
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<tr>
<td>R85.27</td>
<td>R86.48</td>
<td>N of Del Monte Blvd Interchange to Reservation Rd UC</td>
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<td>6,556</td>
<td>55,396</td>
<td>&lt;35</td>
<td>F</td>
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<tr>
<td>R86.48</td>
<td>R87.00</td>
<td>Reservation Rd UC – 1/2 mile N of Res. Rd IC</td>
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<td>6,591</td>
<td>55,956</td>
<td>&lt;35</td>
<td>F</td>
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<tr>
<td>R87.00</td>
<td>R88.64</td>
<td>1/2 mile N of Res. Rd IC – Del Monte Blvd OC</td>
<td>10,810</td>
<td>6,591</td>
<td>55,956</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>R88.64</td>
<td>R89.18</td>
<td>Del Monte Blvd OC - Salinas River Bridge</td>
<td>3,110</td>
<td>5,791</td>
<td>55,285</td>
<td>&lt;35</td>
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<tr>
<td>R89.18</td>
<td>R90.39</td>
<td>Salinas River Bridge - Molera Rd OC</td>
<td>6,558</td>
<td>5,406</td>
<td>56,996</td>
<td>53</td>
<td>E</td>
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<td>R90.39</td>
<td>R90.98</td>
<td>Molera Road OC - Jct SR 156</td>
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<td>58,996</td>
<td>&lt;35</td>
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<td>R91.02</td>
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<td>136</td>
<td>3,410</td>
<td>33,890</td>
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</table>
Segment 2

Segment 2 (Mon SR-1 PM R91.02/R102.03)

Segment 2 transverses Moss Landing and functions as a two-lane divided conventional highway between SR 156 (PM R91.02) and Molera Road (PM 94.40) and then as a two-lane undivided conventional highway to Salinas Road (PM T101.04.), after which it becomes a four-lane freeway up to the Monterey/Santa Cruz county line (PM R102.03.). The route concept for this segment is a four-lane expressway.

Trucks are 9% of total traffic, and increase to 10% between Jensen Road and the Santa Cruz County line. Terrain is mostly rolling but flattens out after Jensen Road. The posted speed limit is between 45 mph and 55 mph. The entirety of Segment 2 has 12 ft lanes and 7+ foot outside shoulders. Access is limited with around one access point per mile from SR-156 to Molera Road, and from Molera Road to Jensen Road, access increases to approximately six access points per mile. There are seven intersections along Segment 2, all of which are listed in Chapter 2.

Operational Analysis

Segment 2 is classified as a rural highway. However, the demand is mostly urban commute in nature with commuters traveling southbound from Santa Cruz County to work on the Monterey Peninsula during the morning peak period, and vice versa during the afternoon peak period. In addition, a high percentage of trucks travel along this facility, and there are seven at-grade intersections that cause additional delay and conflict. Total Daily Traffic is high and ranges between 24,500 and 38,000. Segment 2 is classified as a rural principal arterial. Future volumes are projected to reach 38,800 to 45,500 with mostly LOS F by 2030.

The section of Segment 2 between PM T101.04 and PM R102.03 experiences LOS C, with average speeds of 66 mph. This section performs better than the two-lane section because of its increased capacity. The Salinas Road Interchange project (PM 100.5 to PM R101.5) is currently under construction and will help mitigate southbound congestion and address safety concentrations at this location. The measures of effectiveness for Segment 2 are summarized in Table 3.5 and Table 3.6.
### Table 3.5 Segment 2 Existing Measures of Effectiveness (2007)

<table>
<thead>
<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location</th>
<th>2007 VMT</th>
<th>2007 Peak Hour</th>
<th>2007 ADT</th>
<th>2007 Speed mph</th>
<th>2007 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R91.02</td>
<td>T92.21</td>
<td>North of Junction SR 156 to Junction SR 183</td>
<td>3,273</td>
<td>2,750</td>
<td>24,500</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>T92.21</td>
<td>93.70</td>
<td>Junction SR 183 to 0.08 PM North of Junction SR 183</td>
<td>307</td>
<td>3,700</td>
<td>32,000</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>93.70</td>
<td>94.40</td>
<td>0.08 PM North of Junction SR 183 to Molera Rd</td>
<td>2,590</td>
<td>3,700</td>
<td>32,000</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>94.40</td>
<td>96.10</td>
<td>Molera Rd to Dolan Rd</td>
<td>6,502</td>
<td>3,825</td>
<td>33,000</td>
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</tr>
<tr>
<td>96.10</td>
<td>99.92</td>
<td>Dolan Rd. to Jensen Rd.</td>
<td>16,808</td>
<td>4,400</td>
<td>38,000</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>99.92</td>
<td>T101.04</td>
<td>Jensen Rd to Begin 4 Lane Section north of Salinas Rd.</td>
<td>5,550</td>
<td>3,750</td>
<td>35,000</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>T101.04</td>
<td>R102.03</td>
<td>Begin 4 Lane Section North. of Salinas Rd. to Mon Co. Line</td>
<td>2,110</td>
<td>3,350</td>
<td>35,000</td>
<td>66</td>
<td>C</td>
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### Table 3.6 Segment 2 Projected Measures of Effectiveness (2030)

<table>
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<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location</th>
<th>2030 VMT</th>
<th>2030 Peak Hour</th>
<th>2030 ADT</th>
<th>2030 Speed mph</th>
<th>2030 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R91.02</td>
<td>T92.21</td>
<td>North of Junction SR 156 to Junction SR 183</td>
<td>4,057</td>
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<td>43,820</td>
<td>&lt;35</td>
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<td>T92.21</td>
<td>93.70</td>
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<td>&lt;35</td>
<td>F</td>
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<td>93.70</td>
<td>94.40</td>
<td>0.08 PM North of Junction SR 183 to Molera Rd</td>
<td>2,758</td>
<td>3,940</td>
<td>38,774</td>
<td>&lt;35</td>
<td>F</td>
</tr>
<tr>
<td>94.40</td>
<td>96.10</td>
<td>Molera Rd to Dolan Rd</td>
<td>6,820</td>
<td>4,012</td>
<td>38,812</td>
<td>&lt;35</td>
<td>F</td>
</tr>
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<td>96.10</td>
<td>99.92</td>
<td>Dolan Rd. to Jensen Rd.</td>
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<td>4,518</td>
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<td>99.92</td>
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<tr>
<td>T101.04</td>
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<td>Begin 4 Lane Section North. of Salinas Rd. to Mon Co. Line</td>
<td>2,264</td>
<td>3,594</td>
<td>45,468</td>
<td>66</td>
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Segment 3A & 3B

Segment 3A (SCr SR-1 PM R0.00/ R7.67)
Segment 3A extends from the Santa Cruz and Monterey County line (SCr PM R0.00) to the Larkin Valley Road undercrossing (PM R7.67) in Santa Cruz County. Between the Santa Cruz-Monterey County line and SR 152 (PM R2.68) Segment 3A functions as a four-lane freeway. From SR 152 to Mar Monte Avenue (PM R6.69) the route functions as a five-lane freeway with three lanes in the northbound direction and two lanes in the southbound direction. The route then returns to a four-lane freeway between Mar Monte Avenue to Larkin Valley Road. This segment of SR 1 has a Route Concept as a six-lane freeway.

Trucks are 8-9% of total traffic, and decrease to 5% from SR 152 to Larkin Valley Road. The posted speed limit is 65 mph. Terrain is flat from the county line to SR 152 and from there it becomes rolling to Larkin Valley Road, with a steep 5% northbound three-lane upgrade (including one truck climbing lane) just south of Larkin Valley Road (PM 4.10 to PM 4.80.) The entirety of Segment 3A has 12 foot lanes and 8+ foot outside shoulders. Access is controlled by interchanges separated at least one mile apart from each other. There are seven interchanges along Segment 3A, all of which are listed in Chapter 2.

Operational Analysis
Morning congestion northbound along Segment 3A is affected mainly by Santa Cruz County residents commuting north to the Santa Cruz urban area and to San Jose and the San Francisco Bay Area via Highway 17. Morning congestion southbound is affected by commute travel to the Monterey Peninsula. The transition from a four-lane to a two-lane highway in Segment 2 just north of Salinas Road is the source of a bottleneck which is amplified by the Salinas Road intersection (PM R101.50.) A 5% northbound incline just south of Larkin Valley Road (PM R4.10 to PM R4.80) with heavy truck traffic slows traffic down at this location. Currently there are three lanes (including one truck climbing lane) traveling in the northbound direction. This segment is operating at near capacity. The Measures of Effectiveness for Segment 3A are summarized in Table 3.7 and Table 3.8.
Figure 3.2  Segment 3A Map
### Table 3.7 Segment 3A Existing Measures of Effectiveness (2007)

<table>
<thead>
<tr>
<th>PM Begin</th>
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<th>2007 VMT</th>
<th>2007 Peak Hour</th>
<th>2007 ADT</th>
<th>2007 Speed mph</th>
<th>2007 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0.00</td>
<td>R0.44</td>
<td>SCR Co. Line – Jct SR 129</td>
<td>1,474</td>
<td>3,350</td>
<td>35,000</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R0.44</td>
<td>R0.62</td>
<td>Jct SR 129 - 0.176 N of Jct SR 129</td>
<td>590</td>
<td>3,350</td>
<td>35,000</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R0.62</td>
<td>R2.27</td>
<td>0.176 N Jct SR 129 - Harkins Slough OC</td>
<td>6,161</td>
<td>3,725</td>
<td>41,750</td>
<td>59</td>
<td>C</td>
</tr>
<tr>
<td>R2.27</td>
<td>R2.68</td>
<td>Harkins Slough OC – Jct. SR 152</td>
<td>1,218</td>
<td>2,950</td>
<td>32,500</td>
<td>63</td>
<td>B</td>
</tr>
<tr>
<td>R2.68</td>
<td>R3.18</td>
<td>Jct. SR 152 – Jct Airport Blvd</td>
<td>2,410</td>
<td>4,850</td>
<td>56,000</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R3.18</td>
<td>R4.07</td>
<td>Jct Airport Blvd – Buena Vista Dr UC</td>
<td>5,073</td>
<td>5,700</td>
<td>63,000</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R4.07</td>
<td>R4.39</td>
<td>Jct Buena Vista - SB Off To Buena Vista Dr</td>
<td>1,760</td>
<td>5,500</td>
<td>61,000</td>
<td>60</td>
<td>D</td>
</tr>
<tr>
<td>R4.39</td>
<td>R6.69</td>
<td>SB Off To Buena Vista Dr – Jct Mar Monte Ave</td>
<td>12,650</td>
<td>5,500</td>
<td>61,000</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R6.69</td>
<td>R7.67</td>
<td>Jct Mar Monte Ave – Jct Larkin Valley Rd</td>
<td>5,432</td>
<td>5,600</td>
<td>62,000</td>
<td>62</td>
<td>D</td>
</tr>
</tbody>
</table>

### Table 3.8 Segment 3A Projected Measures of Effectiveness (2030)

<table>
<thead>
<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location</th>
<th>2030 VMT</th>
<th>2030 Peak Hour</th>
<th>2030 ADT</th>
<th>2030 Speed mph</th>
<th>2030 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0.00</td>
<td>R0.44</td>
<td>SCR Co. Line – Jct SR 129</td>
<td>1,581</td>
<td>3,594</td>
<td>45,468</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R0.44</td>
<td>R0.62</td>
<td>Jct SR 129 - 0.176 N of Jct SR 129</td>
<td>632</td>
<td>3,594</td>
<td>45,468</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R0.612</td>
<td>R2.27</td>
<td>0.176 N Jct SR 129 - Harkins Slough OC</td>
<td>7,320</td>
<td>4,425</td>
<td>59,592</td>
<td>59</td>
<td>C</td>
</tr>
<tr>
<td>R2.27</td>
<td>R2.68</td>
<td>Harkins Slough OC – Jct. SR 152</td>
<td>1,607</td>
<td>3,892</td>
<td>53,109</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R2.68</td>
<td>R3.18</td>
<td>Jct. SR 152 – Jct Airport Blvd</td>
<td>2,803</td>
<td>5,640</td>
<td>75,803</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R3.18</td>
<td>R4.07</td>
<td>Jct Airport Blvd – Buena Vista Dr UC</td>
<td>5,785</td>
<td>6,500</td>
<td>83,719</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R4.07</td>
<td>R4.39</td>
<td>Jct Buena Vista - SB Off To Buena Vista Dr</td>
<td>2,091</td>
<td>6,535</td>
<td>86,870</td>
<td>62</td>
<td>C</td>
</tr>
<tr>
<td>R4.39</td>
<td>R6.69</td>
<td>SB Off To Buena Vista Dr – Jct Mar Monte Ave</td>
<td>15,030</td>
<td>6,535</td>
<td>86,870</td>
<td>63</td>
<td>C</td>
</tr>
<tr>
<td>R6.69</td>
<td>R7.67</td>
<td>Jct Mar Monte Ave – Jct Larkin Valley Rd</td>
<td>6,510</td>
<td>6,711</td>
<td>89,572</td>
<td>55</td>
<td>E</td>
</tr>
</tbody>
</table>
Segment 3B (PM R7.67 /16.43)

Segment 3B extends from the Larkin Valley Road interchange (PM R7.67) in the south to the Branciforte Creek Bridge (PM 16.43) just south of the SR 17 interchange in the north (a distance of approximately 9.0 miles). This section of SR 1 is a freeway with two travel lanes in each direction and auxiliary lanes at the following locations:

- In the northbound direction, between the Porter Street on-ramp and the 41st Avenue off-ramp
- In the southbound direction, between the 41st Avenue on-ramp and the Bay Street off-ramp.

![Segment 3B Map](image)

**Figure 3.3  Segment 3B Map**

In 2007, trucks represented 4.7% of total traffic at the southern end of the segment, decreasing to 2.3% of total traffic at the northern end of the segment. The facility passes through flat to gently rolling terrain, with posted speeds of 65 mph. Lane and shoulder widths meet current standards, with lanes at 12 feet and outer shoulders at eight feet.

There are nine interchanges in Segment 3B, with the following spacing:

- San Andreas Road/Larkin Valley Road and Freedom Boulevard – 0.7 mile
- Freedom Boulevard and Rio Del Mar Boulevard – 0.8 mile
- Rio Del Mar Boulevard and State Park Drive – 1.4 miles
State Routes 1 and 183 Corridor System Management Plan

- State Park Drive and Park Avenue – 1.5 miles
- Park Avenue and Bay/Porter Streets – 1.1 miles
- Bay/Porter Streets and 41st Avenue – 0.4 mile
- 41st Avenue and Soquel Drive – 1.2 miles
- Soquel Drive and Morrissey Boulevard – 1.0 mile
- Morrissey Boulevard and SR 17 off-ramp – 1.0 mile.

Operational Analysis
This section reports results from the State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared by Wilbur Smith Associates for the Santa Cruz County Regional Transportation Commission, July 2007.

Existing Year 2003 Conditions

Mainline: In 2003, annual average daily traffic (AADT) along Segment 3B ranged from 66,000 to 114,000.1 AADT was lower in the southern portion of Segment 3B than in the northern portion, which is home to more attractions (e.g., jobs, recreational facilities, and retail) and is a gateway via SR 17 to San Jose and the San Francisco Bay area. Seasonally, average daily traffic volumes are generally higher in the summer than in other seasons due to tourist travel. Segment 3B is currently highly congested and operating below optimal conditions. Figure 3.2 shows Level of Service (LOS) in the 2003 AM and PM peak hours along the segment.

In 2003, the AM peak hour was characterized by heavy northbound traffic, with volumes ranging from approximately 3,100 to 4,600 vehicles per hour. As shown in Figure 3.4, the facility operated at LOS F along almost the entire segment, with high levels of congestion between the SR 17/SR 1 interchange in the north and the Freedom Boulevard interchange in the south. Note that the SR 17/SR 1 merge lane project is not included in the existing year 2003 analysis but is included in future year analyses. In the southbound direction, AM peak hour volumes ranged from 3,000 to 3,400 vehicles per hour, with LOS varying from C to D. The directional nature of the AM peak hour traffic reflects the greater number of jobs, schools, and other attractions in the Santa Cruz urban area and the San Jose/San Francisco Bay Area.

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1 Caltrans Traffic Ops web site: http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/
Figure 3.4  Segment 3B Level of Service (LOS) in 2003 AM Peak Hour

Figure 3.5  Segment 3B Level of Service (LOS) in 2003 PM Peak Hour
Figure 3.6  Segment 3B Level of Service (LOS) in 2003 AM Peak Hour

Figure 3.7  Segment 3B Level of Service (LOS) in 2003 PM Peak Hour
In the afternoon, 2003 peak hour volumes were relatively high in both directions, with more congestion in the southbound direction. The northern end of the segment continued to attract trips, including commuters returning home from jobs in the Monterey Peninsula. The southbound direction reflected the commute home from jobs in the Santa Cruz urban area and the San Jose/San Francisco Bay Area. In the northbound direction, volumes ranged from 3,100 to 4,000 vehicles per hour, while in the southbound direction, volumes ranged from 3,300 to 4,400 vehicles per hour. In both directions, LOS was in the E to F range at the northern end of Segment 3B. As traffic eased between State Park and Larkin Valley Road, LOS improved to the C to D range.

Further, in 2003, the afternoon was already characterized by a peak period in the southbound direction, with congestion beginning at about 3 PM and continuing till 7 PM. LOS was below targeted levels and was at E in the 2 PM to 8 PM peak period used for the analysis.

**Intersections:** Of 25 studied locations at or near ramp and local street intersections, intersections in the AM and PM peak hours operated at acceptable levels of service. Similarly, most ramps had available storage. Figure 3.8 shows locations with possible deficiencies.

![Figure 3.8 Intersections at LOS E or F in 2003 Peak Hours](image)

Those intersections operating at LOS E or F in the AM peak hour were:
Fairmount Avenue/SR 1 southbound ramps
Park Avenue/SR 1 northbound ramps
Park Avenue/Kennedy Drive/McGregor Drive
State Park Drive/McGregor Drive
Rio Del Mar Boulevard/Soquel Drive
Freedom Boulevard/SR 1 northbound ramps
Freedom Boulevard/SR 1 southbound ramps

In the PM peak hour, most intersections also operated at an acceptable LOS. Intersections operating at LOS E or F were:

- Fairmount Avenue/SR 1 southbound ramps
- Park Avenue/Kennedy Drive/McGregor Drive
- State Park Drive/McGregor Drive
- Rio Del Mar Boulevard/Soquel Drive
- Freedom Boulevard/SR 1 southbound ramps

Most of the studied off-ramps also operated adequately under existing year conditions. The SR 1 HOV report evaluated 18 off-ramps. In the AM peak hour, 16 of the 18 off-ramps had enough storage to accommodate traffic. Two ramps were near capacity (the Porter Street/Bay Avenue SB off-ramp and the Park Avenue SB off-ramp).

In the PM peak hour, 17 of the 18 off-ramps could accommodate existing traffic. Only the Porter Street/Bay Avenue SB off-ramp operated near capacity.

**Future Year 2035 No Build Conditions**

**Mainline.** Without improvements to the corridor, traffic conditions are expected to worsen considerably by 2035. AADT is projected to increase and range from 97,600 to 158,000.

In the AM and PM peak hours, throughput is expected to decrease as traffic experiences stop-and-go conditions. This will add to the peak spreading that is already occurring. With this additional peak spreading and with increased future demand, the total number of trips in the peak periods is expected to increase. However, demand is forecasted to be so high compared to the available capacity that peak spreading is not expected to alleviate congestion. On average, LOS will be E or F in both the peak hours and peak periods.

Given the above, the average time it takes to travel from one end of the corridor to the other is therefore expected to increase in both directions. Travel times in the peak periods are shown in Figure 3.9.
In the AM peak period, comparing the 2035 No Build case with existing conditions, average travel time along Segment 3B is expected to increase from 16 minutes to 39 minutes in the northbound direction and from 10 minutes to 18 minutes in the southbound direction. In the PM peak period, average travel time is expected to increase from 12 minutes to 22 minutes in the northbound direction and from 18 minutes to 47 minutes in the southbound direction. This and other comparisons of segment performance between 2003 and 2035 are shown in Figure 3.10 below and in Appendix B. The performance measures indicate a considerable worsening of congestion and performance by 2035.

**Figure 3.9  Segment 3B Average Travel Times in Peak Period**
Table 3.9 Segment 3B Selected Measures of Effectiveness

<table>
<thead>
<tr>
<th>Measures of Effectiveness*</th>
<th>Peak Period</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing AM</td>
<td>2035 AM</td>
</tr>
<tr>
<td></td>
<td>NB</td>
<td>SB</td>
</tr>
<tr>
<td>Average Travel Time (minutes)</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>44</td>
<td>61</td>
</tr>
<tr>
<td>Average Delay (minutes per vehicle)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>LOS</td>
<td>D</td>
<td>C</td>
</tr>
</tbody>
</table>

*Source: State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared by Wilbur Smith Associates for the Santa Cruz County Regional Transportation Commission, July 2007. Note that the 2035 No Build scenario includes the SR 17/SR 1 merge lane project and the Soquel-Morrissey auxiliary lane project.

Intersections: Intersections along the segment are also expected to be impacted by the high demand in 2035. Most intersections are projected to operate at LOS F, and all studied intersections are expected to operate below desired levels, operating at LOS D or below. As traffic attempts to divert onto local streets to avoid freeway congestion, nearby ramps, intersections, and local streets are expected to be impacted.

Segment 4

Segment 4 (PM 16.43 / 18.26)

Segment 4 extends from the SR 1/SR 17 interchange to the King Street/SR 1 Intersection. Beyond the fishhook interchange, Segment 4 continues as a four-lane freeway to the San Lorenzo River Bridge, where it becomes a conventional highway. An at-grade intersection with SR 9 (north) and River Street (south) lies less than one-tenth mile from the end of the freeway. The Pacific Railroad tracks cross the highway approximately one-tenth mile beyond the intersection. Segment 4 continues to the intersection of Chestnut and Mission Streets, where Route 1 veers right along the Mission Street alignment. Segment 4 carries heavy traffic bound for the UC Santa Cruz campus, regional traffic, and local traffic between downtown Santa Cruz and residential areas to the west. From the Chestnut/Mission Streets intersection SR 1 continues as a four-lane conventional highway. Segment 4 is presently operating at peak LOS D/E and is projected to fall to LOS E/F by the year 2025. See Table 3.10
Table 3.10  SR 1 Level of Service (LOS)* Segment 4 Intersections

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Projected Peak LOS Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2002</td>
</tr>
<tr>
<td>SR 9</td>
<td>D</td>
</tr>
<tr>
<td>Chestnut</td>
<td>-</td>
</tr>
<tr>
<td>King</td>
<td>-</td>
</tr>
</tbody>
</table>

*Source 2006 SR 1 Transportation Concept Report

Operational Analysis
Currently there are two projects that are analyzing traffic congestion and safety in this segment of SR 1:

San Lorenzo Bridge Project – This project proposes to improve safety and to address the heavy congestion caused by traffic weaving on the bridge during peak hours of most weekdays. The project proposes to widen the SR 1 bridge over the San Lorenzo River by adding two lanes on the bridge in the northbound direction and one lane to the bridge in the southbound direction to. Currently, the San Lorenzo Bridge widening project is in the scoping phase (PID Project Initiation Document). The project is in the conceptual stage with no secure funding. The PSR (Project Study Report) will be completed, and the project will await funding to move forward.

SR 1/9 Intersection Improvement Project – Currently in the Environmental Clearance phase (PA&ED), the project proposes to relieve this heavily congested intersection. The existing signal at SR 1/SR 9 is causing queues to back up beyond the left-turn pockets, blocking access to the left turn lanes in all directions. The existing left-turn lanes cannot accommodate the number of vehicles making these movements. The alternative being studied for the project consists of adding a southbound left-turn lane to SR 1 and a through lane and a shoulder to accommodate cyclists on northbound SR 9 from SR 1 to Encinal Street. The intersection of SR 9 and Fern Street would be signalized. A raised median would be extended to Coral Street on NB SR 9.

Segment 5
Segment 5 (Mon SR-183 PM 0.86/9.98)
SR 183 is an important commuter route that connects Santa Cruz travelers to Salinas, but it is also a goods movement route for agricultural products coming to and from processing facilities in Castroville and Salinas for distribution throughout the world. As a commuter route, residents living in Santa Cruz and Monterey Counties use SR 183 to go to and from work in Salinas. It also connects multi-modal travelers from Santa Cruz and Monterey Counties to the rail station in Salinas.

Segment 5 extends from Lincoln Avenue (PM 0.86) in Salinas to Junction SR1/SR183 (PM 9.98) near Castroville. Segment 5 is considered a four-lane conventional highway from Lincoln Avenue to the North Davis Road southbound off-ramp (PM 2.06) and has approximately 50 access points, making it an urban facility through Salinas. Starting at
Davis Road SR 183 is a two-lane conventional highway with access limited to six access points. SR 183 enters Castroville at Jackson Street (PM R8.61) and continues to the SR 1/SR 183 Junction, and access points increase again to approximately 50 access points. This segment has a Route Concept as a four-lane Expressway.

While trucks are 1% of total traffic between Jackson Street and SR 156 (PM R8.96) in Castroville, they range between 10% and 17% between Lincoln Avenue in Salinas and Jackson Street in Castroville and again in Castroville between SR 156 and the junction of SR 1/SR 183. Terrain is flat throughout the segment. There are two interchanges and many intersections along Segment 5, all of which are listed in Chapter 2.

**Operational Analysis**
Segment 5 is mostly a two-lane conventional highway with limited capacity. The junction of SR 1/SR 183 and Davis Road in Salinas are the only two interchanges along Segment 5. We suspect that the many at-grade intersections, particularly in the urban environments of Salinas and Castroville, cause Segment 5 to operate almost exclusively at LOS E or F. The rural sections of Segment 5 between PM R2.06 and PM R8.61 operate at LOS E. LOS was not calculated for the urban section of Segment 5 due to a lack of turning counts. By expanding the capacity of Segment 5 and limiting access to SR 183, LOS could be improved considerably. The Measures of Effectiveness for Segment 5 are summarized in Table 3.11 and Table 3.12.
### Table 3.11 Segment 5 Existing Measures of Effectiveness (2007)

<table>
<thead>
<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location</th>
<th>2007 VMT</th>
<th>2007 Peak Hour</th>
<th>2007 ADT</th>
<th>2007 Speed mph</th>
<th>2007 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22</td>
<td>R1.82</td>
<td>Junction at Casentini St to NB Davis Rd Ramp</td>
<td>4,203</td>
<td>2,625</td>
<td>27,500</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1.82</td>
<td>2.06</td>
<td>NB Davis Rd Ramp to SB Davis Rd Ramp</td>
<td>430</td>
<td>1,800</td>
<td>17,000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2.06</td>
<td>R7.63</td>
<td>SB Davis Rd Ramp to Espinosa Rd</td>
<td>10,062</td>
<td>1,800</td>
<td>17,000</td>
<td>38</td>
<td>E</td>
</tr>
<tr>
<td>R7.63</td>
<td>R8.61</td>
<td>Espinosa Rd to Jackson St</td>
<td>1,824</td>
<td>1,900</td>
<td>19,500</td>
<td>31</td>
<td>E</td>
</tr>
<tr>
<td>R8.61</td>
<td>R8.95</td>
<td>San Miguel St. / Blackie Rd. to Haro St.</td>
<td>682</td>
<td>1,900</td>
<td>19,500</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>R8.95</td>
<td>9.00</td>
<td>Haro St. to Jct. Rte. 156/183 Ramps</td>
<td>67</td>
<td>1,350</td>
<td>12,000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>9.00</td>
<td>9.81</td>
<td>Jct. Rte. 156/183 to Washington St</td>
<td>1,107</td>
<td>1,350</td>
<td>12,000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>9.81</td>
<td>9.98</td>
<td>Washington St to Jct. Rte 1/183</td>
<td>203</td>
<td>1,350</td>
<td>12,000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Table 3.12 Segment 5 Projected Measures of Effectiveness (2030)

<table>
<thead>
<tr>
<th>PM Begin</th>
<th>PM End</th>
<th>Location</th>
<th>2030 VMT</th>
<th>2030 Peak Hour</th>
<th>2030 ADT</th>
<th>2030 Speed mph</th>
<th>2030 LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22</td>
<td>1.82</td>
<td>Junction at Casentini St to NB Davis Rd Ramp</td>
<td>5362</td>
<td>3349</td>
<td>33021</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1.82</td>
<td>2.06</td>
<td>NB Davis Rd Ramp to SB Davis Rd Ramp</td>
<td>603</td>
<td>2524</td>
<td>22521</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>R2.06</td>
<td>R7.63</td>
<td>SB Davis Rd Ramp to Espinosa Rd</td>
<td>14111</td>
<td>2524</td>
<td>22521</td>
<td>31</td>
<td>E</td>
</tr>
<tr>
<td>R7.63</td>
<td>R8.61</td>
<td>Espinosa Rd to San Miguel St./Blackie Rd.</td>
<td>2221</td>
<td>2313</td>
<td>23654</td>
<td>33</td>
<td>E</td>
</tr>
<tr>
<td>R8.61</td>
<td>R8.95</td>
<td>San Miguel St./Blackie Rd. to Haro St.</td>
<td>830</td>
<td>2313</td>
<td>23654</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>R8.95</td>
<td>9.00</td>
<td>Haro St. to Jct. Rte. 156/183</td>
<td>76</td>
<td>1527</td>
<td>13201</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>9.00</td>
<td>9.81</td>
<td>Jct. Rte. 156/183 to Washington St</td>
<td>1107</td>
<td>1350</td>
<td>12000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>9.81</td>
<td>9.98</td>
<td>Washington St to Jct. Rte. 1/183</td>
<td>203</td>
<td>1350</td>
<td>12000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
3.2 Bottlenecks

Bottlenecks appear at several locations along the SR 1 corridor as shown in Table 3.13. The bottlenecks are discussed in detail below.

A bottleneck reflects a condition where traffic demand exceeds the capacity of the roadway. Bottlenecks can be caused by a number of factors, e.g., increased demand due to merging traffic from an on-ramp, decreased carrying capacity due to a lane drop, or a combination of demand and capacity such as merging and weaving.

The locations and causality of the bottlenecks along the SR 1 corridor were identified by various methods. For Segment 1 in the northbound direction and Segment 3B, congestion plots from FREQ analyses identified bottleneck locations, which were then verified by local knowledge. For Segments 2, 3A, and 4, bottlenecks were verified through a combination of local knowledge and the mobility analyses above. For Segment 5, tools were not available to identify bottlenecks. Recommended next steps include moving forward with a more thorough study of bottleneck locations based on more detailed count and speed data and improved modeling tools.

Segment 1

As shown by FREQ model runs and field observations, a bottleneck occurs on northbound SR 1 at the Fremont Boulevard off-ramp. The cause of congestion in this area appears to be a combination of a lack of mainline capacity coupled with a heavy weave section from the SR 218 on-ramp to the Fremont Boulevard off-ramp. For a full description of the operation of this bottleneck, see the Operational Analysis section for Segment 1.

A potential bottleneck exists at the lane drop at Del Monte Boulevard in the city of Marina. In the future, increasing volumes that exceed capacity would cause congestion at this point.

Segment 3B

The primary cause of high levels of congestion along Segment 3B is demand that is higher than available capacity. In addition, in the northbound direction, the SR17/SR 1 interchange is a bottleneck location. With few alternate routes, especially in the northern portion of Segment 3B, SR 1 is the only viable travel route to reach SR 17. This leads to high volumes and congestion that extend south to Freedom Boulevard in the peak period. It is likely that hidden bottlenecks exist upstream of the SR 17/SR 1 interchange and that these will be revealed with future analyses.

On the other hand, for the southbound portion of Segment 3B, options exist for using parallel arterials to avoid the congestion beginning north of the SR 17/SR 1 interchange. Thus, bottlenecks are more likely to occur in the mid- to southern ends of the segment in
the PM peak hour and period. With the Porter Street/Bay Avenue SB off-ramp operating near capacity in the PM peak hour, the primary bottleneck in the southbound direction is at the Porter Street/Bay Avenue interchange, leading to congestion that extends upstream to north of the SR 17/SR 1 interchange.\footnote{Caltrans, Project Study Report (Project Development Support), Widening on Route 1 in Santa Cruz County in and near Capitola and Santa Cruz, June 2002.}

In the future and without improvements, additional bottlenecks may appear along Segment 3B as nearby intersections reach low levels of service, storage capacity on the ramps is unable to handle demand, and weaving causes additional delays. Future studies are recommended to identify such bottlenecks and to look at improvements that will reduce the length of the peak period and/or reduce delay in the segment.

Segment 4

This segment is also characterized by congestion due to heavy demand that exceeds the capacity of the roadway. Two major bottlenecks occur in Segment 4.

At the San Lorenzo River Bridge, SR 1 transitions from freeway to conventional highway. In addition, less than one-tenth mile from the end of the freeway, SR 1 meets SR 9 at an at-grade intersection. As northbound traffic maneuvers to get to the desired lane at the intersection, heavy weaving results on the bridge, causing a bottleneck.

The second bottleneck occurs at the SR 9/SR 1 intersection. The existing left-turn pockets cannot accommodate the number of vehicles wishing to make these movements. This leads to queues backing up beyond the left-turn pockets, blocking access to the left-turn lanes in all directions and thus causing bottlenecks on SR 1 in both directions.

For more detail, see Section 3.1, Segment 4.
### Table 3.13 Bottlenecks along the SR 1 Corridor

<table>
<thead>
<tr>
<th>Segment</th>
<th>Bottleneck Location</th>
<th>Causality</th>
<th>Period AM</th>
<th>Period PM</th>
<th>Location Postmile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Between SR 218 On-ramp and Fremont Blvd Off-ramp</td>
<td>High demand combined with heavy weaving and merging</td>
<td>x</td>
<td></td>
<td>80.55</td>
</tr>
<tr>
<td>3B</td>
<td>SR 17/SR 1 Interchange</td>
<td>Heavy merge</td>
<td>x</td>
<td>x</td>
<td>16.80</td>
</tr>
<tr>
<td>4</td>
<td>San Lorenzo River Bridge</td>
<td>High demand combined with heavy weaving due to the close spacing with the SR 9/SR 1 intersection</td>
<td>x</td>
<td>x</td>
<td>17.41</td>
</tr>
<tr>
<td>4</td>
<td>SR 9/SR 1 Intersection</td>
<td>Left-turn pockets unable to accommodate all demand</td>
<td>x</td>
<td>x</td>
<td>17.56</td>
</tr>
<tr>
<td>Southbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>North of Salinas Road</td>
<td>Capacity reduction due to lane drop from four to two lanes</td>
<td>x</td>
<td></td>
<td>T101.04</td>
</tr>
<tr>
<td>3B</td>
<td>Porter Street/Bay Avenue Interchange</td>
<td>SB Off-ramp near capacity; mainline demand greater than capacity</td>
<td>x</td>
<td></td>
<td>13.20</td>
</tr>
<tr>
<td>4</td>
<td>San Lorenzo River Bridge</td>
<td>Demand greater than capacity</td>
<td>x</td>
<td></td>
<td>17.41</td>
</tr>
<tr>
<td>4</td>
<td>SR 9/SR 1 Intersection</td>
<td>Left-turn pockets unable to accommodate all demand; close spacing to nearby intersections</td>
<td>x</td>
<td>x</td>
<td>17.56</td>
</tr>
</tbody>
</table>

### 3.3 Safety

The collision history for the corridor was derived from the most recent three years of data available (January 1, 2006 to December 31, 2009). The actual collision rates are those that are recorded based on data for a specific route and then compared to the statewide average collision rates for similar facilities. Table 3.14 and Figure 3.10 summarize the SR 1 and SR 183 mainline rates.

### Table 3.14 Mainline Collision Data for SR 1 & SR 183

<table>
<thead>
<tr>
<th>Segment</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.66</td>
<td>0.71</td>
</tr>
<tr>
<td>2</td>
<td>0.76</td>
<td>0.74</td>
</tr>
<tr>
<td>3A</td>
<td>0.47</td>
<td>0.61</td>
</tr>
<tr>
<td>3B</td>
<td>1.15</td>
<td>1.12</td>
</tr>
<tr>
<td>4</td>
<td>1.40</td>
<td>1.24</td>
</tr>
<tr>
<td>5 (SR 183)</td>
<td>1.25</td>
<td>1.38</td>
</tr>
</tbody>
</table>
* Rates are incidents per million vehicle miles for 3-year period from: 1/01/2006 to 12/31/2009

Figure 3.10  Mainline Collision Data for SR 1 and SR 183

Several of the actual rates for the five segments are less than the statewide average; however the following segments exceed the statewide average:

- Segment 2, from the junction of SR 156 to the Monterey / Santa Cruz County line
- Segment 3B, from the Larkin Valley Road undercrossing to the Branciforte Creek bridge
- Segment 4, from the Branciforte Creek bridge to King Street
Figure 3.11  Collision Rates SR 1 & 183 Corridor
**Intersections & Ramps**

The following table identifies the locations where intersection collision data is near or exceeds the statewide average along Segment 1.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Bound On-ramp @ SR 1 / 68 W Interchange</td>
<td>1.01</td>
<td>1.00</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Munras / Soledad</td>
<td>3.18</td>
<td>1.20</td>
</tr>
<tr>
<td>North Bound On-ramp @ Munras / Soledad</td>
<td>0.71</td>
<td>0.75</td>
</tr>
<tr>
<td>North Bound On-ramp @ Aguajito</td>
<td>1.49</td>
<td>0.75</td>
</tr>
<tr>
<td>South Bound Off-ramp @ SR 68 E</td>
<td>1.26</td>
<td>0.75</td>
</tr>
<tr>
<td>North Bound On-ramp @ SR 68 E</td>
<td>2.48</td>
<td>0.35</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Casa Verde</td>
<td>1.46</td>
<td>1.20</td>
</tr>
<tr>
<td>North Bound Off-ramp @ English / Del Monte</td>
<td>1.19</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ Del Monte</td>
<td>1.59</td>
<td>0.75</td>
</tr>
<tr>
<td>South Bound On-ramp @ Fort Ord Main Entrance</td>
<td>0.42</td>
<td>0.45</td>
</tr>
<tr>
<td>North Bound On-ramp @ Fort Ord North Entrance</td>
<td>4.58</td>
<td>0.75</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Fort Ord North Entrance</td>
<td>3.42</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ Reservation</td>
<td>1.08</td>
<td>0.75</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Neponset</td>
<td>1.32</td>
<td>1.20</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Molera</td>
<td>2.49</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ Molera</td>
<td>2.11</td>
<td>0.60</td>
</tr>
<tr>
<td>North Bound On-ramp @ Molera Loop</td>
<td>0.67</td>
<td>0.55</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Molera</td>
<td>2.40</td>
<td>1.60</td>
</tr>
</tbody>
</table>
The following table identifies the locations where intersection collision data is near or exceeds the statewide average along Segment 2.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction at SR 1 and SR 183</td>
<td>0.78</td>
<td>0.20</td>
</tr>
<tr>
<td>Molera</td>
<td>0.18</td>
<td>0.20</td>
</tr>
<tr>
<td>Dolan</td>
<td>0.66</td>
<td>0.20</td>
</tr>
<tr>
<td>Struve (South, Left turn)</td>
<td>0.19</td>
<td>0.20</td>
</tr>
<tr>
<td>Struve (North)</td>
<td>0.37</td>
<td>0.20</td>
</tr>
<tr>
<td>Jensen</td>
<td>0.29</td>
<td>0.20</td>
</tr>
<tr>
<td>Salinas</td>
<td>0.70</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Figure 3.12  Intersection and Ramp Collision Data for Segment 1
The following table identifies the locations where intersection collision data is near or exceeds the statewide average along Segment 3A.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Bound On-ramp @ Riverside / Junction SR 129</td>
<td>0.22</td>
<td>0.20</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Riverside / Junction SR 129</td>
<td>1.72</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Buena Vista</td>
<td>1.24</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ Roadside Rest Stop</td>
<td>2.88</td>
<td>0.55</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Frontage</td>
<td>1.77</td>
<td>1.50</td>
</tr>
</tbody>
</table>
Figure 3.14 Intersection and Ramp Collision Data for Segment 3A

The following table identifies the locations where intersection collision data is near or exceeds the statewide average along Segment 3B.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bound Off-ramp @ Freedom</td>
<td>3.87</td>
<td>1.20</td>
</tr>
<tr>
<td>North Bound On-ramp @ Rio Del Mar</td>
<td>1.17</td>
<td>0.75</td>
</tr>
<tr>
<td>South Bound On-ramp @ State Park</td>
<td>1.17</td>
<td>0.65</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Park</td>
<td>1.27</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Bay / Porter</td>
<td>1.16</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ 41st</td>
<td>1.07</td>
<td>0.70</td>
</tr>
<tr>
<td>South Bound Off-ramp @ 41st</td>
<td>1.28</td>
<td>1.20</td>
</tr>
<tr>
<td>South Bound On-ramp @ Soquel</td>
<td>0.87</td>
<td>0.55</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Soquel</td>
<td>1.15</td>
<td>0.95</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Morrissey</td>
<td>0.70</td>
<td>0.60</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Morrissey</td>
<td>1.76</td>
<td>0.95</td>
</tr>
</tbody>
</table>
The following table identifies the locations where intersection collision data is near or exceeds the statewide average along Segment 4.

### Table 3.19 Intersection and Ramp Collision Data for Segment 4

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Bound On-ramp @ Ocean / Plymouth</td>
<td>0.53</td>
<td>0.45</td>
</tr>
<tr>
<td>North Bound Off-ramp @ Ocean</td>
<td>0.93</td>
<td>0.60</td>
</tr>
<tr>
<td>North Bound On-ramp @ Ocean</td>
<td>1.08</td>
<td>0.75</td>
</tr>
<tr>
<td>South Bound Off-ramp @ Ocean</td>
<td>1.73</td>
<td>1.20</td>
</tr>
<tr>
<td>Junction SR 9 / River</td>
<td>0.67</td>
<td>0.35</td>
</tr>
<tr>
<td>Mission</td>
<td>0.35</td>
<td>0.35</td>
</tr>
</tbody>
</table>
The following table identifies the locations where intersection collision data exceeds the statewide average along Segment 5.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Actual Collision Rate*</th>
<th>Statewide Average Collision Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menke</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td>Clark</td>
<td>0.23</td>
<td>0.15</td>
</tr>
<tr>
<td>Davis (Ramp intersection left turn)</td>
<td>0.69</td>
<td>0.55</td>
</tr>
<tr>
<td>Espinosa (Right turn)</td>
<td>0.40</td>
<td>0.20</td>
</tr>
<tr>
<td>Oak (Left turn) and Blackie / Jackson (Right turn)</td>
<td>0.64</td>
<td>0.30</td>
</tr>
<tr>
<td>Walsh</td>
<td>0.18</td>
<td>0.15</td>
</tr>
<tr>
<td>Wood / Haro</td>
<td>0.38</td>
<td>0.30</td>
</tr>
<tr>
<td>Junction SR 156 (Eastbound)</td>
<td>0.57</td>
<td>0.55</td>
</tr>
<tr>
<td>Salinas</td>
<td>0.65</td>
<td>0.30</td>
</tr>
<tr>
<td>Pajaro</td>
<td>1.59</td>
<td>0.15</td>
</tr>
<tr>
<td>Pool</td>
<td>0.37</td>
<td>0.15</td>
</tr>
<tr>
<td>Crane</td>
<td>1.22</td>
<td>0.30</td>
</tr>
<tr>
<td>Preston</td>
<td>0.67</td>
<td>0.30</td>
</tr>
<tr>
<td>Junction SR 1</td>
<td>0.78</td>
<td>0.20</td>
</tr>
</tbody>
</table>
3.4 Incident Management

The Transportation Management Center is dedicated to improving response time to clear incidents on all state highways within District 5, including SR 1 & SR 183. A recent California Highway Incident Management Summit was held with various agency partners to discuss a goal of clearing highway incidents within 90 minutes. Some top solutions were to implement technical interoperable (systems that operate between more than one agency) communication systems, establish Caltrans/CHP communication centers, train with consistent terminology within the departments, and revise laws to allow quick clearing activities. Integrating a communication strategy that notifies the agencies responding to the incident and providing accurate information to the public is a priority in District 5.

The Santa Cruz County Regional Transportation Commission and the Transportation Agency for Monterey County, both designated as the Service Authority for Freeway Emergencies (SAFE) in their respective counties, own and operate a roadside network along SR 1. The call box program provides assistance to motorists who find themselves in need while on the highway. Motorists simply pick up the handset to be automatically connected to an operator. The operator may call an auto club, such as AAA, a tow truck company, a relative or a friend to ensure assistance for a motorist whose vehicle has broken down. The call boxes may also be used to report collisions or other highway incidents and obtain the necessary services.
Additionally this corridor has a “511” program activated to assist motorists. The 511 program is a one-stop phone and web source for up-to-the-minute traffic, transit, rideshare, and bicycling information. Users simply call 511 or visit: www.511.org.

3.5 Recommendations

The primary purpose of SR 1 & SR 183 CSMP is to develop strategies to manage the corridor and sustain existing transportation investments. The following management strategies will be used to manage SR 1 & 183 over the next 20 years:

**Maintenance and Preservation:** Continue cost-effective maintenance of the roadway to ensure safe and comfortable use of the corridor. This would include maintenance and preservation designed to get full return on system investments, as well as reduce traveler costs and delay. Work in this area would include continued identification of pavement needs through the pavement condition survey and addressing those needs through the State Highway Operation and Protection Program (SHOPP).

**Transit/Rail:** The stakeholder agencies in the corridor should continue to support the improvement of transit service. Adding new express bus service and/or frequency could take advantage of the new high occupancy vehicle (HOV) lanes planned for the Santa Cruz corridor. Stakeholder agencies should also consider enhancing the attractiveness and convenience of the passenger rail service between the San Francisco Bay Area and the Monterey Peninsula.

**Land Use & Transportation Connection:** The way communities are planned and designed has an impact on travel behavior. Land use and transportation must be more closely linked. To achieve this strategy, Caltrans will partner with local agencies and participate in the development review process. This process has two main elements: general plans and development projects. An additional opportunity to partner and facilitate a connection between land use and transportation is the Regional Blueprint Program: AMBAG Blueprint Planning. The program was designed to integrate long-range planning for transportation, land use, housing, environmental resources, and infrastructure. The ultimate goal of blueprint planning is to facilitate consensus around a regional vision and preferred land use scenario that will enable the region to accommodate future growth while minimizing adverse impacts. The emphasis of the land use and transportation planning connection is becoming a priority for the State and new legislation such as SB 375 is implemented in the MPO areas.

**Transportation Demand Management:** The focus is to reduce congestion by encouraging programs that increase the use of transit, improve bicycle and pedestrian access and encourage programs such as carpools, ridesharing, telecommuting, and park-and-ride facilities to reduce the demand.

**Intelligent Transportation Systems (ITS) /Traveler Information / Traffic Management / Incident Management:** Collisions and incidents can be a major source of delay along a corridor. Reducing the time required to clear these collisions and incidents and restore full flow within the corridor reduces delay and reduces diversion of
traffic onto the local arterials. The need for Freeway Service Patrol (FSP) is determined by congestion in an area. Improving system monitoring could provide the necessary information to determine a need for FSP. Local agencies can consider FSP as an option once the need has been identified. In addition, it is recommended to upgrade communication and enable deployment of advanced transportation systems, to improve safety, incident response, and traveler information. Real time traveler information allows travelers to make more informed decisions regarding trip planning, route choices and mode selection. Traffic management reduces congestion through the use of technologies such as collision warning systems and advanced traffic management systems. Incidents are the primary cause of unexpected and variable delay. By improving incident management and response time, reductions occur in congestion and travel delay.

**Modal Options:** The focus is to provide viable transportation options for all users. Greater opportunity to use other transportation modes will reduce demand on SR 1 & SR 183. Continued effort that supports the development of the Cal Train system will provide connection to a multi-modal option within the corridor. This includes facilitating and supporting the integration of transit, bicycle, and pedestrian transportation into a coordinated multimodal transportation system.

**Ramp Metering:** Ramp metering has the potential to maximize the productivity of the freeway. When combined with other recommended strategies, ramp metering accommodates greater vehicle through put on the freeway and local arterials. A ramp metering plan should identify the capacity of on-ramps and install ramp-metering hardware on appropriate ramps.

**Operational Improvements:** The focus is to add auxiliary lanes, intersection improvements, and other system refinements in order to reduce delay, preserve and enhance existing services.

**Intersection Upgrades:** Traffic studies demonstrate that the existing intersections are projected to provide lower level of service. The focus is to redesign and modernize the intersections to reduce delay, which would maximize State Highway throughput. These upgrades may include improving the parallel local road network, adding turn-movement storage, deceleration and/or acceleration lanes to the intersection, and converting at-grade intersections to grade-separated interchanges.

**Parallel Road Network Development:** The focus is to increase the capacity and connection on the parallel road network to reduce local traffic demand on SR 1. Emphasis on east-west connections that have bearing on the SR-1 north-south congestion should be closely monitored through increased detection. East-west connectors, such as SR 68, SR 156, SR 129, and County Road G-12 in Monterey County will need detection and system monitoring to understand the causality of bottlenecks in the region.

**Facility Expansion:** The focus is to improve mobility and reliability, reduce congestion, improve safety and facilitate goods movement by expanding and managing the existing
system. Existing studies have demonstrated that SR 1 and SR 183 will need to be widened to improve capacity and accommodate future anticipated growth in the region.
### Table 3.21 Programmed Highway Projects on the SR 1 & SR 183 Corridor

<table>
<thead>
<tr>
<th>Segment</th>
<th>Location</th>
<th>Project Description</th>
<th>Phase</th>
<th>Project Begin Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carmel River to Monterey / Santa Cruz County line</td>
<td>Construct TMS</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>1-2</td>
<td>Various locations in Monterey County</td>
<td>Install changeable message signs and CCTV cameras</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>1</td>
<td>Various locations in Monterey County</td>
<td>Beautification &amp; modernization</td>
<td>Project Initiation Document</td>
<td>2021</td>
</tr>
<tr>
<td>1-2</td>
<td>Junction SR 68 W to Castroville</td>
<td>Guardrail upgrade</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>2</td>
<td>Salinas Road</td>
<td>Construct interchange</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>2</td>
<td>Junction of SR 1/SR 183</td>
<td>New road</td>
<td>Candidate</td>
<td>TBD</td>
</tr>
<tr>
<td>1-2</td>
<td>Monterey County line to Salinas Road</td>
<td>Construct median barrier</td>
<td>Environmental Review / Preliminary Design</td>
<td>2012</td>
</tr>
<tr>
<td>3A</td>
<td>Harkins Slough</td>
<td>Revise interchange</td>
<td>Environmental Review / Preliminary Design</td>
<td>TBD</td>
</tr>
<tr>
<td>3A-3B</td>
<td>Pajaro River to North Aptos</td>
<td>Pavement rehabilitation</td>
<td>Project Initiation Document (shelved)</td>
<td>TBD</td>
</tr>
<tr>
<td>3A-3B</td>
<td>Monterey County line to Freedom Boulevard</td>
<td>Construct TMS</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>3A</td>
<td>Beach Road undercrossing to Watsonville Slough bridge</td>
<td>Reconstruction embankment</td>
<td>Project Initiation Document (shelved)</td>
<td>TBD</td>
</tr>
<tr>
<td>3A</td>
<td>Buena Vista Road</td>
<td>Replace culvert storm sewer</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>3B-4</td>
<td>Freedom Boulevard to Ocean Street</td>
<td>Install CCTV and signs</td>
<td>Environmental Review / Preliminary Design</td>
<td>2015</td>
</tr>
<tr>
<td>Region</td>
<td>Description</td>
<td>Work</td>
<td>Documents</td>
<td>Completion</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>3B-4</td>
<td>State Park Drive to Morrissey Boulevard</td>
<td>Congestion Management Study (install HOV lane in each direction)</td>
<td>Environmental Review / Preliminary Design</td>
<td>2016</td>
</tr>
<tr>
<td>3B-4</td>
<td>Soquel Avenue to Morrissey Boulevard</td>
<td>Operational improvements</td>
<td>Environmental Review / Preliminary Design</td>
<td>2014</td>
</tr>
<tr>
<td>4</td>
<td>Junction of SR 17</td>
<td>Install merge lanes landscaping</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>4</td>
<td>San Lorenzo River</td>
<td>Construct bridge widening</td>
<td>Candidate</td>
<td>TBD</td>
</tr>
<tr>
<td>4</td>
<td>Junction of SR 9</td>
<td>Interchange improvements</td>
<td>Environmental Review / Preliminary Design</td>
<td>2013</td>
</tr>
<tr>
<td>4</td>
<td>San Lorenzo River to Laguna Road</td>
<td>Install guardrail and crash cushions</td>
<td>Environmental Review / Preliminary Design</td>
<td>2014</td>
</tr>
<tr>
<td>4</td>
<td>SR 9 to Mission Street</td>
<td>Construct concrete median barrier</td>
<td>Environmental Review / Preliminary Design</td>
<td>2013</td>
</tr>
<tr>
<td>3A-4</td>
<td>From Santa Cruz / Monterey County line to Junction of SR 17</td>
<td>Construct guardrail upgrades</td>
<td>Environmental Review / Preliminary Design</td>
<td>2014</td>
</tr>
<tr>
<td>5 (SR183)</td>
<td>Salinas Street to Clark Street</td>
<td>Constructing landscaping and planting</td>
<td>Construction</td>
<td>Under construction</td>
</tr>
<tr>
<td>5</td>
<td>Salinas city limit to Del Monte Avenue</td>
<td>Install asphalt / concrete overlay</td>
<td>Project Initiation Document</td>
<td>TBD</td>
</tr>
</tbody>
</table>
## Appendix A  Glossary

<table>
<thead>
<tr>
<th>Arterial</th>
<th>A general term denoting a highway primarily for through traffic usually on a continuous route.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector</td>
<td>Surface street providing land access and traffic circulation within residential, commercial, and industrial areas.</td>
</tr>
<tr>
<td>Expressway</td>
<td>An arterial highway with at least partial control of access, which may or may not be divided or have grade separations at intersections.</td>
</tr>
<tr>
<td>Freeway</td>
<td>A divided arterial highway with full control of access and with grade separations at intersections.</td>
</tr>
<tr>
<td>Functional Classifications</td>
<td>A grouping of streets and highways sorted as to the character of service they are intended to provide.</td>
</tr>
<tr>
<td>Level of Service (LOS)</td>
<td>Term used to describe the quality of operation of a highway facility. It is a qualitative measure of the effect of such factors as speed, travel time, traffic interruptions, freedom to maneuver, driving comfort, convenience, safety and operation cost. In this report, LOS is based on peak traffic hours. On urban street systems, the quality of flow is most frequently controlled by traffic conditions at signalized intersections. The flow characteristics are defined in six levels of service.</td>
</tr>
<tr>
<td>LOS A</td>
<td>Describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions.</td>
</tr>
<tr>
<td>LOS B</td>
<td>Is in the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speeds and lanes of operation.</td>
</tr>
<tr>
<td>LOS C</td>
<td>Is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass.</td>
</tr>
<tr>
<td>LOS D</td>
<td>Approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volumes and temporary restrictions to flow may cause substantial drops in operating speeds.</td>
</tr>
<tr>
<td>LOS E</td>
<td>Is not described by speed alone but represents operations at even lower operating speeds than in level D, with volumes at or near the capacity of the highway. Flow is unstable, and there may be stoppages for brief periods of time.</td>
</tr>
<tr>
<td>LOS F</td>
<td>Describes forced flow operation at low speeds, where volumes are below capacity. These conditions usually result from vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion. In the extreme, both speed and volume can drop to zero.</td>
</tr>
<tr>
<td>Rural</td>
<td>An area of under 5,000 population</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Local</td>
<td>Serves primarily to provide access to adjacent land; and provides service to travel over relatively short distances as compared to collectors or other highway systems.</td>
</tr>
</tbody>
</table>
| **Major Collector** | 1. Provides service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators of equivalent intra-county importance, nearby larger towns or cities, or with routes of higher classification.  
2. Serves the more important intra-county travel corridors. |
| **Minor Arterial** | 1. Links cities and larger towns with major traffic generators that are capable of attracting travel over similarly long distances and forms an integrated network providing interstate and inter-county service.  
2. Are spaced at such intervals, consistent with population density, so that all developed areas of the state are within a reasonable distance of an arterial highway.  
3. Provides service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. These routes should be expected to provide for relatively high overall travel speeds, with minimum interference to through movement. |
| **Minor Collector** | 1. Is spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.  
2. Provides service to the remaining smaller communities.  
3. Links the locally important traffic generators with their rural hinterland. |
| **Principal Arterial** | All non-Interstate Principal Arterials.  
1. Serves corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.  
2. Serves all urban areas of 50,000 and over population and a large majority of those with populations of 25,000 and over.  
3. Provides an integrated network without stub connections except where unusual geographic or traffic flow conditions dictate otherwise. |
| **Principal Arterial – Interstate** | The Interstate system consists of all presently designated routes of the federally-designated Interstate System. |
| Urban | An area of 5,000 to 50,000 population. |
| Urbanized | An area with population greater than 50,000. |
Appendix B  Technical Analysis

Segment 3B: Larkin Valley Road to Branciforte Creek Bridge to SR 17-SR 1 Interchange

This appendix provides more detailed technical information to Chapter 3.

Segment 3B up to the SR17/SR 1 interchange extends from the Larkin Valley Road – SR 1 interchange (PM R7.67) in the south to the SR 17 / SR 1 interchange (PM 16.80) in the north, a distance of approximately 9.3 miles. This section of SR 1 is a freeway with two travel lanes in each direction and auxiliary lanes in each direction between Bay/Porter Streets and 41st Avenue.

Figure B-1 illustrates this section of the SR 1 study corridor.

There are nine interchanges in Segment 3B, with the following spacing:

- San Andreas Road/Larkin Valley Road and Freedom Boulevard – 0.7 mile
- Freedom Boulevard and Rio Del Mar Boulevard – 0.8 mile
- Rio Del Mar Boulevard and State Park Drive – 1.4 miles
- State Park Drive and Park Avenue – 1.5 miles
- Park Avenue and Bay/Porter Streets – 1.1 miles
- Bay/Porter Streets and 41st Avenue – 0.4 mile
- 41st Avenue and Soquel Drive – 1.2 miles
- Soquel Drive and Morrissey Boulevard – 1.0 mile
- Morrissey Boulevard and SR 17 off-ramp – 1.0 mile

Current Conditions – Volumes

In 2008, annual average daily traffic (AADT) along Segment 3B ranged from 67,000 to 100,000 according to the Caltrans Traffic Ops website. AADT is lower in the southern portion of Segment 3B, with increasing volumes moving north. At the northern end of the corridor, SR 1 provides a gateway to jobs, housing, and recreation in the Santa Cruz urban area, thus attracting more traffic than the southern end. The northern end also connects with SR 17 and is a gateway to San Jose and the San Francisco Bay Area. Seasonally, average daily traffic volumes are generally higher in the summer than in other seasons due to tourist travel.

Figure B-2 shows the pattern of AADT in Segment 3B from 1995 to 2008. AADT along Segment 3B increased in the period 1995 to 2005. Average annual growth rates in AADT in this period were about 2% per annum (p.a.), with the auxiliary lane section growing at about 3.5% p.a. From 2005 to 2008, AADT decreased along many sub-sections of this segment. The decline in the economy played a role as did construction of the SR 17-SR 1 merge lane project at the northern end of Segment 3B. AADT in the southern sections of Segment 3B decreased at average annual growth rates of about -1% p.a. between 2005 and 2008, with the auxiliary lane section decreasing at -3% p.a., the Soquel Drive and Morrissey Avenue section decreasing at about -4% p.a., and the Morrissey Avenue and SR 17 section decreasing at about -6% p.a.

Figure B-2 also shows that the heaviest traffic volumes in Segment 3B have been between Soquel Drive and Morrissey Boulevard. This is the location of the CMIA auxiliary lane project.

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3 http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/
Only limited count data for Segment 3B have been available for the SR 1 CSMP. One source has been the Caltrans Traffic Census Program count stations. Counts are available from stations near Rio Del Mar Boulevard, between the off- and on-ramps at 41st Avenue, and on SR 1 south of Park Avenue. This latter station is expected to represent Segment 3B better than the other two stations. However, once the new detection projects are in place along the entire SR 1 corridor in Santa Cruz, Segment 3B descriptions and conclusions will have to be re-visited.

Based on Census Program counts for 2002, 2005, and 2008, on SR 1 south of Park Avenue, volumes show the expected seasonal tendency. Volumes are slightly higher in the spring and summer than in the fall and winter, though there is less seasonal difference in 2008. This variation is likely the result of increased recreational traffic in the summer months.

The highest volumes tend to occur on Fridays, followed by the next highest volumes on the commute days of Tuesday, Wednesday, and Thursday. Based on averages of Tuesday-Wednesday-Thursday volumes, the morning peak occurs between 7 and 8 AM.
in the northbound (NB) direction. Approximately 3500 vehicles travel on NB SR 1 south of Park Avenue in the morning peak hour, representing about 55-60% of total traffic.

The afternoon is characterized by a peak period rather than a peak hour and reflects the congested, urban nature of traffic in the area. The peak period is generally from 3 PM to 6 PM, with slightly heavier traffic in the southbound (SB) direction. SB afternoon peak period volumes are in the 3,400-3,800 vehicles per hour range, representing about 50-55% of total traffic. There is thus also heavy traffic in the NB direction. While the SB direction clearly shows an afternoon peak with a minor peak in the AM peak hour, the NB direction has two peaks of similar size, one in the morning and one in the afternoon. This is illustrated in Figure B-3.

In addition, in the summer, there is also heavy midday traffic, particularly in the NB direction. As mentioned above, recreational traffic may explain this traffic pattern.

Figure B-3  Typical Weekday Hourly Volume Profiles on SR 1 South of Park Avenue
Operating Conditions – Existing Year – Mainline⁴

Table B-1 summarizes the existing operating conditions for Segment 3B. Measures of effectiveness (MOE) are presented for both the peak hours and the peak periods. The long peak periods were determined based on existing and future year conditions.

<table>
<thead>
<tr>
<th>Measure of Effectiveness</th>
<th>AM Peak Hour (8-9 AM)</th>
<th>PM Peak Hour (5-6 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Travel Time (minutes)</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>30</td>
<td>39</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
<td>2,932</td>
<td>3,235</td>
</tr>
<tr>
<td>Number of Person Trips per Hour</td>
<td>3,308</td>
<td>4,024</td>
</tr>
<tr>
<td>Freeway Travel Time (VHT)</td>
<td>1,274</td>
<td>823</td>
</tr>
<tr>
<td>Travel Distance (VMT)</td>
<td>38,517</td>
<td>32,349</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure of Effectiveness – average per hour</th>
<th>AM Peak Period (6 AM – 12 PM)</th>
<th>PM Peak Period (2 – 8 PM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Travel Time (minutes)</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>44</td>
<td>52</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
<td>3,045</td>
<td>2,805</td>
</tr>
<tr>
<td>Number of Person Trips per Hour</td>
<td>3,447</td>
<td>3,489</td>
</tr>
<tr>
<td>Freeway Travel Time (VHT)</td>
<td>821</td>
<td>544</td>
</tr>
<tr>
<td>Travel Distance (VMT)</td>
<td>35,933</td>
<td>28,045</td>
</tr>
<tr>
<td>LOS</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

Operating Conditions – Future Year 2035

An estimate of volumes for the future year 2035 is necessary to understand how the SR 1 facility might operate in the future. The basis for estimating this volume growth was the

⁴ These and the following tables are reformatted tables from the *State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report*, prepared for Santa Cruz County Regional Transportation Commission by Wilbur Smith Associates, July 2007.
count data sets used for the existing year analysis and the AMBAG regional travel demand model (TDM), April 2005, version 1.1. This version provided models for daily, AM peak hour, and PM peak hour traffic, with changes between the baseline year 2000 and future year 2030 volumes reflecting underlying changes in land use, demographics, and regional travel patterns. The AMBAG TDM was assessed for its ability to reflect baseline conditions in the study area, the difference between year 2000 model volumes and counts was applied to model outputs for 2030, and the resulting volumes were extrapolated to 2035. Since demand was expected to outpace capacity in the future year, a “bottleneck” analysis was also performed. Where the travel forecasts exceeded capacity on the corridor, traffic was either shifted to time periods outside of the peak hour or to arterials where additional capacity was available. Finally, intersection volumes were estimated based on AMBAG model volumes and a balancing routine that ensured consistency with on- and off-ramp volumes.

The future year AMBAG model was run twice: once to reflect No Build conditions and once to reflect Build conditions. The No Build conditions consisted of existing year conditions and programmed projects such as the SR 17 – SR 1 merge lane project and the Soquel Drive – Morrissey Boulevard auxiliary lane project. The Build conditions consisted of the No Build conditions plus ramp metering, auxiliary lane and intersection improvements, and High Occupancy Vehicle (HOV) construction. The No Build and Build scenarios will be discussed in more detail below.

The average annual daily traffic (AADT) mainline forecasts for the 2035 Build and No Build conditions are shown in Figure B-4. For the No Build case, AADT in the northbound direction is expected to range from 50,700 north of Larkin Valley Road to 84,500 between Soquel Drive and Morrissey Boulevard to 64,400 just south of SR 17. In the southbound direction, volumes are expected to range from about 66,300 north of Fairmount Avenue to 74,800 between 41st Avenue and Bay/Porter Streets to 46,900 north of Larkin Valley Road.

Forecasted AADT for the Build case is also shown in Figure B-4. In the northbound direction, future volumes are expected to be higher than in the No Build case and range from 59,900 north of Larkin Valley Road to 92,000 between Bay/Porter Streets and 41st Avenue to 66,300 just south of SR 17. In the southbound direction, volumes are expected to range from 68,800 just north of Fairmount Avenue to 84,500 between 41st Avenue and Bay/Porter Streets to 56,400 north of Larkin Valley Road. Addition of the HOV lanes in the Build case will accommodate greater flows through the corridor.
Figure B-4  Existing and 2035 AADT
Operating Conditions – 2035 No Build

Without improvements to the corridor, traffic conditions are expected to worsen considerably by 2035. For all peak hours and all directions, the facility would operate at LOS F. For all peak periods and directions, the facility would also be unable to serve the higher future demand and would operate at LOS E or F on average. Table B-2 displays the MOEs for the future No Build condition and provides a comparison with the Existing Conditions case.

Except for the southbound AM peak hour, peak hour throughput decreases in 2035 compared to existing conditions. Volumes decline about 5% in the AM peak hour, 4% in the northbound PM peak hour, and 20% in the southbound PM peak hour. The facility serves fewer vehicles in the peak hours as demand exceeds capacity and vehicles travel at stop-and-go conditions. This inability to serve the higher future demand during the peak hour leads to peak spreading, and Table B-2 shows that peak period throughput in fact increases.

However, even with peak spreading, demand remains high relative to capacity, and the facility operates below its optimal levels of performance. In the AM peak period, comparing the 2035 No Build case with existing conditions, average travel times increase from 16 minutes to 39 minutes in the northbound (NB) direction and from 10 minutes to 18 minutes in the southbound (SB) direction as average speeds decrease from 44 mph to 18 mph and from 61 mph to 35 mph in the NB and SB directions, respectively. In the PM peak period, the corresponding changes are:

- Travel times NB: from 12 minutes to 22 minutes
- Travel times SB: from 18 minutes to 47 minutes
- Average travel speed NB: from 52 mph to 28 mph
- Average travel speed SB: from 39 mph to 15 mph.

Travel times through the corridor thus increase as does the corresponding delay. As seen from Table B-2, serious congestion characterizes the 2035 No Build condition in the peak hours and in the peak periods.

Intersections. Intersections in the study area are also impacted by the high demand. Most intersections are expected to operate at LOS F, and all studied intersections operate below acceptable levels (LOS D or below). As traffic attempts to divert onto local streets to avoid freeway congestion, nearby ramps, intersections, and local streets would be impacted.
<table>
<thead>
<tr>
<th>Table B-2  Measures of Effectiveness – Existing Year and Year 2035 No Build</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak Hour</strong></td>
</tr>
<tr>
<td>Measure of Effectiveness</td>
</tr>
<tr>
<td>Average Travel Time (minutes)</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
</tr>
<tr>
<td>Number of Person Trips per Hour</td>
</tr>
<tr>
<td>Freeway Travel Time (VHT)</td>
</tr>
<tr>
<td>Travel Distance (VMT)</td>
</tr>
<tr>
<td>LOS</td>
</tr>
</tbody>
</table>

| **Peak Period** | **Existing Year AM Peak Period** | **Year 2035 No Build AM Peak Period** | **Existing Year PM Peak Period** | **Year 2035 No Build PM Peak Period** |
| Measure of Effectiveness – average per hour | NB | SB | NB | SB | NB | SB | NB | SB |
| Average Travel Time (minutes) | 16 | 10 | 39 | 18 | 12 | 18 | 22 | 47 |
| Average Speed (mph) | 44 | 61 | 18 | 35 | 52 | 39 | 28 | 15 |
| Delay (minutes per vehicle) | 4 | 0 | 28 | 8 | 2 | 6 | 12 | 35 |
| Number of Vehicle Trips per Hour | 3,045 | 2,332 | 3,129 | 2,968 | 2,805 | 2,885 | 3,157 | 2,696 |
| Number of Person Trips per Hour | 3,447 | 2,705 | 3,542 | 3,443 | 3,489 | 3,405 | 3,927 | 3,168 |
| Freeway Travel Time (VHT) | 821 | 400 | 2,053 | 884 | 544 | 858 | 1,138 | 2,101 |
| Travel Distance (VMT) | 35,933 | 24,251 | 36,922 | 30,863 | 28,045 | 33,182 | 31,568 | 31,544 |
| LOS | D | C | F | E | D | E | F | F |

Note: Year 2035 No Build includes the SR17/SR1 merge lane project and the Soquel-Morrissey auxiliary lane project.

Source: State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared for Santa Cruz County Regional Transportation Commission by Wilbur Smith Associates, July 2007.
Operating Conditions – 2035 Transportation System Management (TSM) Build

The Transportation System Management (TSM) Build scenario was proposed and analyzed to determine its effect on alleviating the congestion expected to occur under the No Build conditions described above. The TSM scenario consisted of ramp metering to control the flow of traffic onto the SR 1 facility, geometric improvements, and the addition of auxiliary lanes at the following locations:

In the northbound direction, between:

- Soquel Drive and Morrissey Boulevard
- 41st Avenue and Soquel Drive
- State Park Road and Park Avenue

In the southbound direction, between:

- 41st Avenue and Bay/Porter Streets
- State Park Road and Park Avenue

Table B-3 shows the effects of the proposed changes. While overall freeway operations improve, the high demand and accompanying densities leave the freeway mostly operating at highly congested levels.

In both the peak hours and peak periods, throughput on Segment 3B increases with the TSM improvements except for the SB AM peak period, where throughput remains about the same compared to the existing conditions case. Combined with ramp metering, the extra capacity provided by the auxiliary lanes allows the facility to serve more traffic.

Measured by decreased travel times, decreased delay, and increased average travel speeds, overall freeway operations improve under the TSM scenario, with the exception of the SB PM peak hour. In the AM peak hour, travel times decrease from 59 minutes to 34 minutes in the NB direction and from 29 minutes to 12 minutes in the SB direction. In the PM peak hour, travel times decrease from 34 minutes to 29 minutes in the NB direction but increase from 61 minutes to 62 minutes in the SB direction. Peak period travel times show improvements in all periods and all directions.

In the SB PM peak hour, the TSM improvements allow additional traffic to travel on the corridor. However, since conditions are already congested along the entire corridor, with few alternate route choices at the southern end, the additional traffic causes operations to worsen slightly. In contrast to other directions and peak periods, average travel speed for the SB PM peak hour decreases slightly from 11 mph to 10 mph and delay increases from 49 minutes per vehicle to 50 minutes per vehicle.
Table B-3  Measures of Effectiveness – Year 2035 No Build and Year 2035 TSM Build Scenarios

<table>
<thead>
<tr>
<th>Measure of Effectiveness</th>
<th>2035 No Build AM Peak Hour</th>
<th>Year 2035 TSM Build AM Peak Hour</th>
<th>2035 No Build PM Peak Hour</th>
<th>Year 2035 TSM Build PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NB</td>
<td>SB</td>
<td>NB</td>
<td>SB</td>
</tr>
<tr>
<td>Average Travel Time (minutes)</td>
<td>59</td>
<td>29</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>12</td>
<td>22</td>
<td>21</td>
<td>54</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
<td>48</td>
<td>19</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
<td>2,767</td>
<td>3,101</td>
<td>3,986</td>
<td>3,873</td>
</tr>
<tr>
<td>Number of Person Trips per Hour</td>
<td>3,132</td>
<td>3,597</td>
<td>4,847</td>
<td>4,623</td>
</tr>
<tr>
<td>Freeway Travel Time (VHT)</td>
<td>2,749</td>
<td>1,498</td>
<td>2,260</td>
<td>756</td>
</tr>
<tr>
<td>Travel Distance (VMT)</td>
<td>32,646</td>
<td>32,248</td>
<td>47,030</td>
<td>40,278</td>
</tr>
<tr>
<td>LOS</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure of Effectiveness – average per hour</th>
<th>2035 No Build AM Peak Period</th>
<th>Year 2035 TSM Build AM Peak Period</th>
<th>2035 No Build PM Peak Period</th>
<th>Year 2035 TSM Build PM Peak Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NB</td>
<td>SB</td>
<td>NB</td>
<td>SB</td>
</tr>
<tr>
<td>Average Travel Time (minutes)</td>
<td>39</td>
<td>18</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>18</td>
<td>35</td>
<td>27</td>
<td>59</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
<td>28</td>
<td>8</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
<td>3,129</td>
<td>2,968</td>
<td>3,645</td>
<td>3,050</td>
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<tr>
<td>Number of Person Trips per Hour</td>
<td>3,542</td>
<td>3,443</td>
<td>4,441</td>
<td>3,638</td>
</tr>
<tr>
<td>Freeway Travel Time (VHT)</td>
<td>2,053</td>
<td>884</td>
<td>1,612</td>
<td>540</td>
</tr>
<tr>
<td>Travel Distance (VMT)</td>
<td>36,922</td>
<td>30,863</td>
<td>43,009</td>
<td>31,715</td>
</tr>
<tr>
<td>LOS</td>
<td>F</td>
<td>E</td>
<td>F</td>
<td>C</td>
</tr>
</tbody>
</table>

Note: Year 2035 No Build includes the SR17/SR1 merge lane project and the Soquel-Morrissey auxiliary lane project.

Source: State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared for Santa Cruz County Regional Transportation Commission by Wilbur Smith Associates, July 2007
In all cases, even though densities improve slightly, they still remain high. LOS on the facility remains at F for the peak hours except for the SB AM peak hour, where LOS improves to D compared to the No Build case. For the peak periods, the facility also operates at sub-optimal LOS E or F levels except for the SB AM peak period, which improves to LOS D.

Overall, TSM measures are not expected to substantially improve traffic operations in Segment 3B. Since the 2035 traffic demand is so much greater than available supply, the TSM strategies do not relieve congestion on the corridor.

Intersections. All studied intersections operate at LOS E or F for both the AM and PM peak hours. Traffic operations would worsen marginally as ramp metering leads to increases in delay on the ramps and at corresponding intersections.

**Operating Conditions – 2035 HOV Build**

The High Occupancy Vehicle (HOV) Build scenario was proposed and analyzed to determine its effect on alleviating the congestion expected to occur under the No Build conditions described above. The HOV scenario consisted of ramp metering to control the flow of traffic onto the SR 1 facility, geometric improvements at interchanges, and the addition of auxiliary and acceleration lanes at the following locations:

In the northbound direction:

- Auxiliary lane between Freedom Boulevard and Rio Del Mar Boulevard
- Auxiliary lane between Rio Del Mar Boulevard and State Park Road
- Acceleration lane at State Park Road On-ramp
- Deceleration Lane at Park Avenue Off-ramp
- Extension of the proposed HOV lane to terminate at Branciforte Avenue

In the southbound direction:

- Auxiliary lane between State Park Road and Rio Del Mar Boulevard
- Auxiliary lane between Soquel Avenue and 41st Avenue

Table B-4 shows the effects of the proposed HOV scenario changes. Overall, the proposed improvements enhance the ability of the facility to accommodate future travel demand mainly due to the addition of the HOV lanes. However, while Segment 3B operating conditions would generally improve, the demand would still be high compared to available capacity, and the facility would remain very congested in the peak hours and in the southbound PM peak period.

The addition of capacity to Segment 3B in the form of auxiliary and HOV lanes draws vehicles from parallel arterials onto SR 1, thus increasing throughput on the facility. In addition, the HOV lanes encourage commuters to carpool, increasing the average vehicle occupancy and person throughput in the study area. In the AM peak hour, person trips would increase by 83 percent from 3,132 to 5,742 persons per hour in the northbound peak direction. In the PM peak hour, person trips would almost double from 2,911 to 5,684 persons per hour in the southbound peak direction. To a lesser degree, the reverse commutes and the peak periods also experience increases in vehicle and person throughput. The exception is the southbound PM peak period, which experiences a 72 percent increase in person trips, from 3,168 to 5,443.
The addition of the HOV lanes and other measures improves facility operations substantially, especially on the HOV lanes. Even during peak hours, the vehicles on the HOV lanes would operate at or near free-flow speeds. Carpool commuters traveling at speeds as low as 11 mph under the 2035 No Build Scenario would be able to travel at free-flow speeds (approximately 60 mph) on the HOV lanes. Overall, considering both HOV and mixed-flow lanes, average travel times on the corridor would range from 12 minutes to 19 minutes in the peak hours and from 10 minutes to 15 minutes in the peak periods, a considerable decrease from 2035 No Build conditions.

Despite these improvements in operating conditions, the facility will continue to experience heavy congestion. While the HOV lanes will operate at LOS A to LOS C, the mixed-flow lanes will not fare as well. In the northbound AM peak hour and for both directions in the PM peak hour, the mixed-flow lanes will operate at LOS E or F, reflecting highly congested conditions. Only the southbound AM peak hour mixed-flow lanes will improve to an acceptable level, namely LOS D. For the peak periods, the mixed-flow lanes operate at LOS C or D except for the southbound PM peak period, when they operate at LOS E. Because demand is so high relative to available capacity, even with the HOV and auxiliary lanes, congestion remains considerable.

Intersections. Under the HOV Build scenario, improvements in intersection geometries and better throughput on the freeway, i.e. less congestion on the parallel arterials, lead to better intersection operation. Whereas all intersections are expected to operate below acceptable levels (per the presiding jurisdiction) in the 2035 No Build case, many intersections show improvements in the 2035 HOV Build scenario. However, the following intersections are expected to operate at LOS E or F in the 2035 HOV Build scenario.

In the AM peak hour:

- Soquel Drive/Paul Sweet Road/SR 1 NB Ramps
- 41st Avenue/SR 1 NB Ramps
- Park Avenue/SR 1 NB and SB Ramps
- Park Avenue/Kennedy Drive/McGregor Drive
- State Park Drive/McGregor Drive
- Rio Del Mar Boulevard/SR 1 NB Ramps
- Rio Del Mar Boulevard/Soquel Drive
- Soquel Drive/Soquel Avenue/SR 1 SB Off-ramp

In the PM peak hour:

- Morrissey Boulevard/Pacheco Avenue/SR 1 NB Ramps
- Morrissey Boulevard/Fairmount Avenue
- Soquel Drive/Paul Sweet Road/SR 1 NB Ramps
- 41st Avenue/SR 1 NB and SB Ramps
- Porter Street/SR 1 NB Ramps
- Park Avenue/SR 1 NB and SB Ramps
- Park Avenue/Kennedy Drive/McGregor Drive
- State Park Drive/SR 1 SB Ramps
- State Park Drive/McGregor Drive
• Rio Del Mar Boulevard/SR 1 NB Ramps
• Rio Del Mar Boulevard/Soquel Drive
• Soquel Drive/Soquel Avenue/SR 1 SB Off-ramp

A queuing analysis of 16 off-ramps indicates that in the AM peak hour, eight of the off-ramps would have 95th percentile queue lengths within their storage lengths. The other eight off-ramps would have queues extending onto the freeway mainline. These off-ramps are:

• Morrissey Boulevard Northbound Off-ramp
• Soquel Drive Northbound Off-ramp
• 41st Avenue/Porter Street/Bay Avenue Southbound Off-ramp
• Park Avenue Northbound Off-ramp
• Park Avenue Southbound Off-ramp
• State Park Drive Northbound Off-ramp
• State Park Drive Southbound Off-ramp
• Rio Del Mar Boulevard Northbound Off-ramp

In the PM peak hour, 10 off-ramps would have queues extending on the freeway mainline. These off-ramps include the eight off-ramps listed above and:

• Soquel Drive Southbound Off-ramp
• Freedom Boulevard Southbound Off-ramp

The SR 1 HOV report recommends monitoring these off-ramps and conducting separate studies when spillback is observed. Also, the report recommends modifying the appropriate signal timing plans to provide additional green time to the off-ramp traffic.
### Table B-4 Measures of Effectiveness – Year 2035 No Build and Year 2035 HOV Build Scenarios

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>2035 No Build AM Peak Hour</th>
<th>Year 2035 HOV Build AM Peak Hour</th>
<th>2035 No Build PM Peak Hour</th>
<th>Year 2035 HOV Build PM Peak Hour</th>
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</thead>
<tbody>
<tr>
<td>Measure of Effectiveness</td>
<td>NB</td>
<td>SB</td>
<td>NB</td>
<td>SB</td>
</tr>
<tr>
<td>Average Travel Time (minutes)</td>
<td>59</td>
<td>29</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>12</td>
<td>22</td>
<td>39</td>
<td>52</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
<td>48</td>
<td>19</td>
<td>6</td>
<td>2</td>
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<tr>
<td>Number of Vehicle Trips per Hour</td>
<td>2,767</td>
<td>3,101</td>
<td>4,510</td>
<td>4,253</td>
</tr>
<tr>
<td>Number of Person Trips per Hour</td>
<td>3,132</td>
<td>3,597</td>
<td>5,742</td>
<td>5,181</td>
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<tr>
<td>Freeway Travel Time (VHT)</td>
<td>2,749</td>
<td>1,498</td>
<td>1,285</td>
<td>834</td>
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<tr>
<td>Travel Distance (VMT)</td>
<td>32,646</td>
<td>32,248</td>
<td>50,360</td>
<td>43,081</td>
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<tr>
<td>LOS</td>
<td>F</td>
<td>F</td>
<td>E (B)</td>
<td>D (A)</td>
</tr>
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</table>

#### Peak Period

<table>
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<tr>
<th>Measure of Effectiveness – average per hour</th>
<th>NB</th>
<th>SB</th>
<th>NB</th>
<th>SB</th>
<th>NB</th>
<th>SB</th>
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<tbody>
<tr>
<td>Average Travel Time (minutes)</td>
<td>39</td>
<td>18</td>
<td>13</td>
<td>10</td>
<td>22</td>
<td>47</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Average Speed (mph)</td>
<td>18</td>
<td>35</td>
<td>46</td>
<td>59</td>
<td>28</td>
<td>15</td>
<td>52</td>
<td>42</td>
</tr>
<tr>
<td>Delay (minutes per vehicle)</td>
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<td>8</td>
<td>3</td>
<td>1</td>
<td>12</td>
<td>35</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Number of Vehicle Trips per Hour</td>
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<td>2,968</td>
<td>4,213</td>
<td>3,369</td>
<td>3,157</td>
<td>2,696</td>
<td>4,118</td>
<td>4,294</td>
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<tr>
<td>Number of Person Trips per Hour</td>
<td>3,542</td>
<td>3,443</td>
<td>5,271</td>
<td>4,090</td>
<td>3,927</td>
<td>3,168</td>
<td>5,271</td>
<td>5,443</td>
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<tr>
<td>Freeway Travel Time (VHT)</td>
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<td>884</td>
<td>1,025</td>
<td>584</td>
<td>1,138</td>
<td>2,101</td>
<td>773</td>
<td>1,144</td>
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<tr>
<td>Travel Distance (VMT)</td>
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<td>30,863</td>
<td>47,269</td>
<td>34,179</td>
<td>31,568</td>
<td>31,544</td>
<td>40,048</td>
<td>47,692</td>
</tr>
<tr>
<td>LOS</td>
<td>F</td>
<td>E</td>
<td>D (B)</td>
<td>C (A)</td>
<td>F</td>
<td>F</td>
<td>D (B)</td>
<td>E (B)</td>
</tr>
</tbody>
</table>

Note: LOS for the HOV Build Scenario is shown as LOS for the mixed-flow lanes and (LOS for the HOV lanes). Year 2035 No Build includes the SR17/SR1 merge lane project and the Soquel-Morrissey auxiliary lane project.

Source: State Route 1 HOV Lane Widening Project (from Morrissey Boulevard to San Andreas Road), Traffic Operations Report, prepared for Santa Cruz County Regional Transportation Commission by Wilbur Smith Associates, July 2007.
Summary

The SR 1 freeway from Larkin Valley Road in the south to the SR 17 ramps in the north is currently highly congested and operating below optimal conditions. The 2003 AM peak hour is characterized by heavy northbound traffic, with volumes ranging from approximately 3,100 to 4,600 vehicles per hour, and the facility operates at LOS F. In the afternoon, the 2003 peak is characterized by a peak period as high demand has already led to peak spreading. Volumes range from 3,100 to 4,000 in the northbound direction and from 2,900 to 4,400 in the southbound direction. In the PM peak period, the facility operates at LOS D in the northbound direction and LOS E in the southbound direction.

Without improvements to the corridor, traffic conditions are expected to worsen considerably by 2035. For all peak hours and all directions, the facility would operate at LOS F. For all peak periods and all directions, the facility would also be unable to serve the higher future demand and would operate at LOS E or F.

Throughput is expected to decrease in the peak hours as traffic experiences stop-and-go conditions. This will lead to further peak spreading. However, even with peak spreading, congestion will remain high throughout the peak periods. In the AM peak period, comparing the 2035 No Build case with existing conditions, average travel time along the corridor is expected to increase from 16 minutes to 39 minutes in the northbound direction and from 10 minutes to 18 minutes in the southbound direction. In the PM peak period, average travel time is expected to increase from 12 minutes to 22 minutes in the northbound direction and from 18 minutes to 47 minutes in the southbound direction.

Two improvement scenarios were analyzed to determine their ability to alleviate congestion along Segment 3B. The Traffic System Management (TSM) Build scenario included ramp metering, geometric improvements, and the addition of auxiliary lanes at three locations in the northbound direction and two locations in the southbound direction. With TSM improvements, additional capacity increases the throughput in both the peak hours and the peak periods compared to a No Build scenario. Except for the southbound AM peak hour, travel times through the corridor also improve. This is displayed in Figures B-5 through B-8. In the AM peak period, average travel time along the corridor improves from 39 minutes to 27 minutes in the northbound direction and from 18 minutes to 11 minutes in the southbound direction. In the PM peak period, average travel time improves from 22 minutes to 18 minutes in the northbound direction and from 47 minutes to 33 minutes in the southbound direction. However, despite these improvements, demand outpaces capacity, and the facility is expected to experience heavy congestion and to operate at LOS E or F in both the peak hours and periods, except for the southbound direction in the AM peak period, when the facility is expected to operate at LOS C.

The second scenario, HOV Build scenario, added auxiliary lanes, acceleration and deceleration lanes, geometric improvements, and HOV lanes to the existing facility. Overall, the proposed improvements enhanced the ability of the facility to accommodate
future travel demand mainly due to the addition of the HOV lanes. However, while operating conditions generally improve, demand would still be high compared to available capacity, and the facility would remain very congested in the peak hours and in the southbound PM peak period.

Under HOV Build conditions, throughput would increase in both the peak hours and peak periods. In particular, the combination of high demand and HOV lane availability would encourage carpooling, and person trips increase significantly under this scenario. Average travel times along the corridor also improve compared to the No Build condition. In the AM peak period, average travel time is expected to decrease from 39 minutes to 13 minutes in the northbound direction and from 18 minutes to 10 minutes in the southbound direction. In the PM peak period, average travel time is expected to decrease from 22 minutes to 11 minutes in the northbound direction and from 47 minutes to 15 minutes in the southbound direction.

While the HOV Build scenario provides significantly greater operational improvements compared to the TSM Build scenario, the facility will continue to experience heavy congestion, and the mixed-flow lanes will continue to operate at low LOS. In the peak hours, the mixed-flows lanes will operate at LOS E or F except for the southbound AM peak hour, where LOS D is expected. In the peak periods, LOS improves compared to the No Build case, with the mixed-flow lanes operating at LOS D in the northbound direction, LOS C in the southbound AM peak period, and LOS E in the southbound PM peak period.
Figure B-5  Vehicle Trips per Hour

AM Peak Hour  PM Peak Hour

Table: Vehicle Trips per Hour

<table>
<thead>
<tr>
<th></th>
<th>NB</th>
<th>SB</th>
<th>NB</th>
<th>SB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2035 No Build</td>
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</tr>
<tr>
<td>2035 HOV</td>
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<td></td>
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</tr>
<tr>
<td>2035 TSM</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Figure B-6  Average Travel Time (Minutes)
AM Peak Period  

PM Peak Period

![Bar chart showing average vehicle trips per hour for AM and PM peak periods with options: Existing, 2035 No Build, 2035 TSM, 2035 HOV.]

**Figure B-7**  
Average Vehicle Trips per Hour

AM Peak Period  
PM Peak Period

![Bar chart showing average travel time (minutes) for AM and PM peak periods with options: Existing, 2035 No Build, 2035 TSM, 2035 HOV.]

**Figure B-8**  
Average Travel Time (Minutes)
Appendix C  Modeling

FREQ Analysis:

Current conditions for Segment 1 –Delay and Bottlenecks

A FREQ analysis completed for northbound SR 1 from the junction of State Route 68 West to Reservation Road in the afternoon/evening peak period showed that congestion is present from the junction of State Route 68 East to the Fremont Off-ramp. The congestion starts around 3:30 p.m., builds to a peak around 5:30 p.m., and then tapers off quickly to free-flow at sometime after 6:00 p.m. During this period LOS drops from Level B-C to Level F starting at the Fremont Interchange and working its way back to SR 68 East by 5:30 p.m.

Delay:

Total Vehicle Hours of delay is estimated at 670 hours of delay for the period 3:30 p.m. to 6:00 p.m. with a maximum delay of 2 minutes per individual driver. Refer to Table C-1.

Bottlenecks:

Congestion that is the result of a reduction or constraint in a roadway’s capacity, such as a lane drop or where an additional lane is needed, is called a bottleneck. A “potential” or “hidden” bottleneck has the potential to result in congestion if traffic volumes increase. Two bottlenecks exist in Segment 1 in the northbound direction.

The first is within the two-lane section of SR 1 between the Junction of SR 1/SR 68 East and the Fremont interchange. This area experiences congestion in the afternoon/evening peak period due to the volume of commuter traffic that is leaving work in the Monterey peninsula and heading north to go home. Also a contributing factor is traffic heading to major shopping centers off of SR 218 and Fremont Boulevard. This segment of SR 1 is also used by commuters using Fremont Boulevard and SR 218 as routes to bypass congestion on SR 68 East. The congestion starts at 3:30 p.m. at the Fremont Interchange when the traffic volumes start to exceed the capacity of the two through lanes. Congestion continues to back up till it reaches SR 68 East around 5:30 p.m. as traffic volumes remain high. Once northbound traffic reaches the three lane section north of the Fremont Interchange the added capacity allows congestion to clear and traffic speed increases.

The second bottleneck is a potential bottleneck that is located at the Del Monte Off-ramp to the City of Marina. At this location, one of the three through lanes becomes an off-ramp lane and exits the roadway, thus narrowing the roadway to two through lanes. At present traffic volumes, congestion does not exist at this potential bottleneck as there is enough traffic exiting the freeway at the Light Fighter, 12th Street and Del Monte
interchanges upstream. However, a future increase in traffic volumes might cause congestion at this location.

Recommendations to address deficiencies:

Possible actions to address deficiencies include an increase in capacity by adding a lane along SR 1 between the Junction of SR 1/68 East and the Fremont interchange or a reduction in traffic volumes during the peak period by a traffic management method such as ramp metering. These and other possible improvements will be evaluated at a later date when sufficient volume and speed data and modeling tools are available.

Methodology

Caltrans District 5 staff used FREQ12 Version 3.01 to model existing conditions. FREQ12 is a macroscopic deterministic simulation model based on demand-supply relationships. The model was used to simulate traffic for a typical weekday between 3:00 p.m. to 6:00 p.m.

The model network was developed to accurately reflect SR 1 geometrics. Lengths were determined by using the post mile sequence listing from the TASAS (Traffic Accident Surveillance and Analysis System) highway data base. Roadway cross-section was determined using data from aerials and the California State Highway Log. The network limits were SR 68 West in the south to Reservation Road Interchange in the north.

Demands were modeled based on traffic counts collected by Caltrans District 5 staff especially for this project. Data were collected at every on- and off-ramp between SR 68E and SR 156. The data were collected using either Hi-Star “Card” counters or hose counters on freeway on- and off-ramps and hoses or loop stations on the mainline freeway. Data used for the model were from Wednesday, May 14, 2008.

The model was calibrated using tachometer runs collected by Caltrans District 5 staff. Tachometer runs were made using the “floating car method” from 3:15 p.m. to 5:15 p.m. at half hour increments. Modeled speeds were compared against field speed data, and the model was adjusted until both modeled and observed speeds were within an acceptable range.
Figure C-1  FREQ Model Results