Transportation Control Measures
On-Road Mobile Source Emissions Analysis

FINAL
December 1998
FINAL

SANTA BARBARA COUNTY
1998 CLEAN AIR PLAN

APPENDIX C

TRANSPORTATION CONTROL MEASURES
&
ON-ROAD MOBILE SOURCE EMISSIONS ANALYSIS

DECEMBER 1998

CONTRIBUTORS

Santa Barbara County Association of Governments
Jim Damkowitch, Transportation Planner - Principle Author
Michael G. Powers, Deputy Director
Bill Yim, Transportation Planner
Gerald R. Lorden, Executive Director

Santa Barbara County Air Pollution Control District
Tom Murphy, Planning and Technology Supervisor
Ron Tan, Air Quality Engineer III
Jim Fredrickson, Air Quality Specialist II
Bobbie Bratz, Supervising Air Quality Specialist
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GLOSSARY OF COMMONLY USED ACRONYMS AND TERMS

ADT Average Daily Travel - The average number of vehicles which traverse a given segment of roadway over a 24-hour period.

AADT Annual Average Daily Travel - The average number of vehicles which traverse a given segment of roadway over a 24-hour period averaged over 365 days.

AQAP Air Quality Attainment Plan - The comprehensive document, which is required under the 1977 Federal Clean Air Act (FCAA) and the 1987 California Clean Air Act (CCAA). The document details the programs and control measures needed to sufficiently reduce emissions to meet the National Ambient Air Quality Standards and the state standards respectively.

AVO Average Vehicle Occupancy - The average number of people per vehicle.

AVR Average Vehicle Ridership - The total number of employees working at a work site relative to the total number of motor vehicles used by the workforce (includes telecommuters).

MVEI7G Model developed by the California Air Resources Board to develop on-road mobile source emission inventories.

Caltrans California Department of Transportation - Agency responsible for state-wide transportation programs in California.

CAP Clean Air Plan - Santa Barbara County's federal ozone standard attainment demonstration plan. This State Implementation Plan submittal is required of Santa Barbara County by the 1990 Clean Air Act.

CARB California Air Resources Board - Agency responsible for state-wide air quality programs in California.

CCAA California Clean Air Act - A California law passed in 1988 which provides the basis for state air quality planning and regulation (independent of federal regulations). This Act directs local Air Pollution Control Districts (APCDs) which are non-attainment for the California Ambient Air Quality Standards, to achieve attainment of these standards by the earliest feasible date.

CNG Compressed Natural Gas - An alternative fuel currently being demonstrated in Santa Barbara County.
CMA Congestion Management Agency - SBCAG has been designated by the cities and the county as the agency responsible for the development and implementation of the countywide Congestion Management Program (CMP) required by Section 65088 of the California Government Code. SBCAG is responsible, in cooperation with local and state agencies for identifying and resolving traffic congestion problems within the county pursuant to specific legislative requirements.

CMAQ Congestion Mitigation and Air Quality Program - A new program created by the Intermodal Surface Transportation and Efficiency Act (ISTEA) which provides funds for areas classified as being nonattainment of the National Ambient Air Quality Standards (NAAQS). CMAQ-funded projects must contribute to the attainment of air quality standards by demonstrating a reduction in vehicular emissions.

CMP Congestion Management Program - The CMP is a comprehensive program designed to reduce auto-related congestion through provision of roadway improvements, travel demand management, and coordinated land use planning among all local jurisdictions. The program is required of every county in California with an urbanized area of at least 50,000 people. The CMP is updated biennially.

EMFAC Model developed by the California Air Resources Board to derive on-road mobile source emission factors for all on-road mobile source criteria pollutants (EMFAC7G is the most current model in the EMFAC series).

EPA Environmental Protection Agency - The United States agency charged with setting policies and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

FCAA/CAAA Federal Clean Air Act (Amendments) - Federal legislation that sets national air quality standards and requires each state with areas that have not met federal air quality standards to prepare a State Implementation Plan (SIP). The 1990 FCAA amendments established new air quality requirements for the development of metropolitan transportation plans and programs.

FHWA Federal Highway Administration - As an agency under the U.S. Department of Transportation (U.S.DOT), FHWA is responsible for all federal highway programs.

FTA Federal Transit Administration - Formally known as the Urban Mass Transportation Administration (UMTA), FTA is an agency under the U.S. Department of Transportation (U.S.DOT) responsible for all federal programs related to mass transit.
FTIP **Federal Transportation Improvement Program** - The FTIP is a multi-year program of transportation projects that are funded from primarily federal sources. The FTIP is developed and adopted by the Metropolitan Planning Organization (SBCAG) on a biennial basis. Once adopted, the FTIP is submitted to the California Transportation Commission (CTC) and the federal funding agencies.

HCM **Highway Capacity Manual (FHWA, 1995)** - Describes the relationships between roadway capacity and travel/flow characteristics.

HCS **Highway Capacity Software (FHWA, 1995)** - Computer software developed to analyze changes in travel/flow characteristics associated with changes in roadway capacity.

HOV **High Occupancy Vehicle** - A vehicle which is transporting more than one person. HOV lanes are segments of roadway which are restricted to HOV vehicles.

ISTEA **Intermodal Surface Transportation and Efficiency Act** - Federal legislation signed into law in December 1991, which proposes broad changes to the way transportation funding decisions are made. It emphasizes diversity, balance of modes, and the preservation of existing systems. ISTEA authorizes the expenditure of $151 billion over its six-year life.

LOS **Level of Service** - A measure of congestion on a highway facility or intersection based primarily on the comparison between the facility's capacity and its traffic volume. Increasing levels of congestion are designated along a scale from A to F.

Measure D **A 1/2 cent sales tax referendum approved by the voters in 1989 to fund transportation facility maintenance and improvements in Santa Barbara County over the next 20 years.**

NAAQS **National Ambient Air Quality Standards** - Standards set by the federal Environmental Protection Agency (EPA) for the maximum levels of air pollutants which can exist in the outdoor air without unacceptable effects on human health or the public welfare.

ROP **Rate of Progress (Plan)** - The 1990 CAAA requires moderate and above nonattainment areas to show progress towards attainment by demonstrating a 15 percent reduction in reactive organic gas emissions below 1990 levels. Santa Barbara County submitted its 1993 ROP Plan to EPA in November 1993 fulfilling this requirement.
RTIP Regional Transportation Improvement Program - Prepared and adopted biennially by Regional Transportation Planning Agency (SBCAG), the RTIP includes projects from the Regional Transportation Plan (RTP) Action Element nominated for state Flexible Congestion Relief Funds. The RTIP when adopted is submitted to the California Transportation Commission (CTC) for inclusion in the State Transportation Improvement Program (STIP).

RTP Regional Transportation Plan - The RTP is a long range plan to improve our region's state highways; local streets, roads, and bikeways; airports and marine facilities; transit, paratransit, and passenger rail services. A guide for the development of these facilities, the RTP describes the priorities for making investments in our region's transportation system.

SBAPCD Santa Barbara Air Pollution Control District - The local agency which governs air quality issues: proposes and adopts local air pollution rules, enforces those rules, responds to air pollution related complaints, issues permits to polluting sources, and inventories sources of air pollution emissions.

SBCAG Santa Barbara County Association of Governments - SBCAG is a voluntary council of governments formed under a joint powers agreement executed by each of the general purpose local governments in Santa Barbara County. SBCAG is an independent entity governed by a twelve-member board consisting of a city council representative from each of the seven cities in the county and the five members of the county board of supervisors. The city representatives are appointed by their respective city councils. SBCAG is the designated Regional Transportation Planning Agency (state planning mandate), the Metropolitan Planning Organization (federal planning mandate), the local Transportation Authority, and the Congestion Management Agency for Santa Barbara County.

SBMTD Santa Barbara Metropolitan Transit District - SBMTD is the provider of public transit services on the South Coast. SBMTD's fleet consists of heavy duty diesel buses and electric shuttle buses. Transit service consists of a combination of fixed route, express, and demand responsive service.

SIP State Implementation Plan - A document prepared by each state, with input from local Air Pollution Control Districts, describing the existing air quality conditions and measures which will be taken to attain and maintain national ambient air quality standards (NAAQS).

SMAT Santa Maria Area Transit - SMAT is the fixed route transit service provider in the Santa Maria/Orcutt Area.

SRTP Short Range Transit Plan - SRTP is a five-year comprehensive plan required of all public transit operators by federal and regional transportation funding agencies.
**STP**  
**Surface Transportation Program** - A new program created by the Intermodal Surface Transportation and Efficiency Act (ISTEA) which provides greater flexibility in how federal highway funds are spent. Many types of alternative transportation projects are eligible under this program.

**TAZ**  
**Traffic Analysis Zone** - A geographical area delineated for the purpose of transportation modeling. TAZs are the major units of transportation modeling analysis and are delimited on the basis of socio-economic, topographic, political, and transportation facilities information.

**TCM**  
**Transportation Control Measure** - Any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions.

**TDA**  
**Transportation Development Act** - As contained in Section 99200 of the Public Utilities Code, the TDA provides two major sources of funding for public transportation through regional planning and programming agencies: the county Local Transportation Fund (LTF), which is derived from 1/4 cent of the 6 cent retail sales tax collected statewide; and the State Transit Assistance (STA) funds, which are for transportation planning and mass transportation purposes as specified by the legislature.

**TDM**  
**Transportation Demand Management** - The implementation of measures which encourage people to change their mode of travel, or not to make a trip at all e.g., ridesharing, pricing incentives, parking management and telecommuting.

**VMT**  
**Vehicle Miles Traveled** - VMT is the sum of miles traveled by all vehicles during a fixed period of time on a fixed expanse of highways.

**VMT-SCD**  
**VMT By Speed Class Distribution** - A breakdown of regional VMT into 13 speed classes ranging between 0 - 65 mph in five mile increments produced by Caltrans and the California Air Resources Board. The VMT-SCD is an input to the on-road mobile source emissions model MVEI7G.
In June 1993, the boards of Santa Barbara County Association of Governments (SBCAG) and the Santa Barbara County Air Pollution Control District (APCD) jointly approved a Memorandum of Understanding (MOU) which effectively placed the responsibility for developing the transportation elements of the air quality plans with SBCAG. This MOU allows SBCAG to assist the APCD in a cooperative effort towards meeting the District’s responsibilities for developing the transportation elements of its state and federal air quality plans. Under the MOU, SBCAG is responsible for the development and analysis of the 1998 Clean Air Plan (CAP) transportation control measures (TCMs). SBCAG also provides the APCD with socio-economic projections, which formed the basis for many of the stationary and area source growth factor forecasts for the 1998 CAP.

TCMs are programs or activities that states and localities can implement to encourage the travelling public to rely less on the automobile or to use the automobile more efficiently. TCMs reduce emissions from on-road motor vehicles and trucks by: improving the existing transportation system to allow motor vehicles to operate more efficiently; inducing people to change their travel behavior to less polluting modes; or, ensuring emission control technology improvements in the motor vehicle fleet are fully and expeditiously realized. In addition, TCMs can have benefits beyond emissions reductions and can assist in reducing congestion and improving energy efficiency.

During the public participation process for the 1994 CAP, representatives of the business community emphasized the need for a broad emission control strategy that addresses stationary, area, and mobile sources (on-road and off-road) of pollution. Since on-road mobile sources comprise 49 percent, 55 percent, and 79 percent of total ROG, NOx, and CO emissions in Santa Barbara County respectively, vehicle emission controls and TCMs need to be seriously considered. TCMs address the need for the travelling public to: 1) carefully consider the implications of continued reliance on the single occupant vehicle as the major source of commute trips; 2) the need to provide and promote alternatives to single occupant vehicle travel; and, 3)
the need to consider regulating those factors which promote single occupant vehicle travel. While motor vehicle emission controls established by federal and state laws obtain the greatest emission reductions, TCMs should also be considered as they can help meet multiple objectives (i.e., congestion relief, energy efficiency, etc.).

In August, September, and December of 1997, SBCAG staff briefed its Technical Transportation Advisory Committee on the role of TCMs and attempted to solicit new candidate projects or programs for inclusion in the 1998 CAP. SBCAG initiated this process to ensure the timely development and incorporation of new TCMs in the 1998 CAP. With the very short SIP planning horizon of three years (1996-1999), combined with the uncertainty over when the federal transportation legislation would be reauthorized and what the program funding levels would be, development of new TCMs was limited. After careful consideration, staff concluded that the feasibility of having "new" or previously unprogrammed projects implemented by 1999 was questionable. Therefore, in order to achieve some emission reduction credit from on-road mobile sources in the SIP, SBCAG and the APCD chose to select previously programmed projects for inclusion in the plan.

Hence, differences between the on-road mobile source controls in the 1994 Clean Air Plan and the 1998 CAP are not the TCMs per say, but the specific projects relied upon to reduce emissions and promote the implementation of the established list of TCMs. Table 1 lists the thirteen TCM categories adopted as part of the 1994 CAP and the specific projects relied upon to implement the TCMs. The 1998 CAP will rely on the same TCMs but a new set of programmed projects and/or the continuation of existing programs (e.g., county rideshare program, city/county TDM program) for each measure. The 1998 CAP TCM projects are listed in Table 2.

As required by the Clean Air Act, nonattainment areas must include as part of their air quality plans a list of contingency measures that can be implemented if attainment does not occur by the mandated milestone date. An Enhanced Inspection and Maintenance Program (T-21) was adopted as a contingency measure in the 1994 CAP. Given implementation delays at the state level, this program is being retained as a contingency measure in the 1998 CAP. In addition, if by November 1999, Santa Barbara County still has not attained the federal 1-hour ozone standard,
EPA will be forced to "bump up" the area's nonattainment designation to "severe". This designation will trigger additional mandatory controls for Santa Barbara County, one of which is a mandatory employer trip reduction program. This measure requires all employers within the county with 100 employees or more to implement an employee trip reduction program consistent with the federal Employee Commute Option (ECO) requirements described in section 182 (d)(1)(B) of the Clean Air Act. In December 1995, Congress amended the ECO requirements of the Clean Air Act to allow affected employers to implement alternative measures that will achieve equivalent or greater emission reductions anticipated from the implementation of a ECO program. If pursued by affected employers, alternative emission reduction plans will be evaluated on a case by case basis. State law prohibiting government agencies from imposing employer trip reduction programs is superseded by this federal mandate. This 1998 Clean Air Plan contingency measure is scheduled for implementation in 1999 with full implementation by 2000 if the county does not attain the federal 1-hour ozone standard by November 1999.

Section 108(f) of the CAAA lists sixteen TCM categories advocated by EPA for controlling on-road mobile sources of pollution. These 16 TCMs are listed below.

1. Trip Reduction Ordinances
2. Employer-Based Transportation Demand Management Programs
3. Work Schedule Changes
4. Area-Wide Rideshare Incentives
5. Improve Public Transit
6. High Occupancy Vehicle Lanes
7. Traffic Flow Improvements
8. Parking Management
9. Park-n-Ride/Fringe Parking
10. Bicycle and Pedestrian Programs
11. Special Events
12. Vehicle Use Limitations/Restrictions
13. Accelerated Retirement of Vehicles
14. Activity Centers
15. Extended Vehicle Idling

The CAAA recognizes that given varying local conditions, all sixteen TCM types may not be appropriate for every nonattainment area. The CAAA also acknowledges that the Section 108(f) list of TCMs is not an exhaustive list and allows areas to develop and implement other measures,
which control on-road mobile sources of pollution.
<table>
<thead>
<tr>
<th>TCM Description</th>
<th>Project Sponsor</th>
<th>Project/Program Description</th>
<th>Implementation Status</th>
<th>SIP Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4 Travel Demand Management</td>
<td>Traffic Solutions</td>
<td>City-County TDM Program</td>
<td>Program On-Going</td>
<td>Yes</td>
</tr>
<tr>
<td>5 Public Transportation</td>
<td>SBMTD</td>
<td>Isla Vista - SBCC Express Service</td>
<td>Service On-Going</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>APCD</td>
<td>Clean Air Express Expansion</td>
<td>Service On-Going</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>City of Santa Maria</td>
<td>SMAT Expansion - 1/30 foot bus</td>
<td>Service On-Going</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>City of Solvang</td>
<td>SYVT Expansion - 1 van to establish fixed route service</td>
<td>Service On-Going</td>
<td>Yes</td>
</tr>
<tr>
<td>7 Traffic Flow Improvements</td>
<td>Caltrans</td>
<td>Crosstown Freeway Project</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
<td></td>
<td>County/Caltrans</td>
<td>Rte. 101/ Patterson Avenue I/C</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
<td></td>
<td>SBCAG/Caltrans</td>
<td>Rte. 101 / La Cumbre Road I/C</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
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<td>SBCAG/Caltrans</td>
<td>Rte. 101 / Storke Road I/C</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
<td></td>
<td>County/Caltrans</td>
<td>Rte. 101/Fairview Avenue I/C</td>
<td>Under Development</td>
<td>Yes</td>
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<tr>
<td></td>
<td>City of Santa Maria</td>
<td>Rte. 135/Betteravia Road Intersection</td>
<td>Completed</td>
<td>Yes</td>
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<td></td>
<td>County of Santa Barbara</td>
<td>Hollister Avenue/Fairview Avenue</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
<td></td>
<td>City of Santa Barbara</td>
<td>Castillo Street/Montecito Street</td>
<td>Completed</td>
<td>Yes</td>
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<tr>
<td>8 Parking Management</td>
<td>City of Santa Barbara</td>
<td>Residential Parking Program</td>
<td>On-going</td>
<td>No</td>
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<tr>
<td>10 Bicycle/Pedestrian</td>
<td>City of Santa Maria</td>
<td>Santa Maria Valley Railroad Bikeway</td>
<td>Partially Completed</td>
<td>Yes</td>
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<td></td>
<td>City of Santa Maria</td>
<td>Battles Road Bicycle and Pedestrian Project</td>
<td>Completed</td>
<td>Yes</td>
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<td></td>
<td>City of Solvang</td>
<td>Alamo Pintado Creek Bikeway/Pedestrian Bridge</td>
<td>Partially Completed</td>
<td>Yes</td>
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<td></td>
<td>City of Santa Barbara</td>
<td>SBCC - East Campus Bicycle and Pedestrian Project</td>
<td>Completed</td>
<td>Yes</td>
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<td></td>
<td>City of Santa Barbara</td>
<td>Crosstown East - West Bikeway Couplet</td>
<td>Completed</td>
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<td></td>
<td>County of Santa Barbara</td>
<td>Fairview Avenue Bicycle Lane</td>
<td>Under Development</td>
<td>Yes</td>
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<td></td>
<td>County of Santa Barbara</td>
<td>Bradley Road Bikeway</td>
<td>Completed</td>
<td>Yes</td>
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<td></td>
<td>County of Santa Barbara</td>
<td>El Capitan Ranch Bikeway</td>
<td>Under Development</td>
<td>No</td>
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<tr>
<td>13 Old Car Buyback</td>
<td>Parsons Inc. - APCD</td>
<td>Vehicle Buyback Program</td>
<td>Completed 1993-96</td>
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<tr>
<td>17 Telecommunication</td>
<td>County of SB - Probation</td>
<td>Expansion of Video Conferencing Network</td>
<td>Completed</td>
<td>Yes</td>
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<td>18 Alternative Fuel Program</td>
<td>APCD</td>
<td>ITG Program</td>
<td>On-Going</td>
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<td></td>
<td>APCD</td>
<td>Clean Air Express Expansion</td>
<td>Completed - On-Going</td>
<td>Yes - T-5</td>
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<td></td>
<td>SBMTD</td>
<td>Waterfront Shuttle Service Expansion</td>
<td>Completed - On-Going</td>
<td>Yes - T-5</td>
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<td></td>
<td>SBMTD</td>
<td>Easy Lift Conversion of 5 vans to CNG</td>
<td>Completed - On-Going</td>
<td>Yes</td>
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<td></td>
<td>SBMTD</td>
<td>Gillig Bus Refurbishment</td>
<td>Completed</td>
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<td></td>
<td>SBMTD</td>
<td>AMG Bus Refurbishment</td>
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<td>Yes</td>
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<td>19 Public Education</td>
<td>APCD</td>
<td>Overall Work Program</td>
<td>On-going</td>
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<td></td>
<td>SBMTG</td>
<td>Overall Work Program</td>
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</tbody>
</table>

**TABE 1**

**1994 CLEAN AIR PLAN - ON ROAD MOBILE SOURCE CONTROL MEASURES**

<table>
<thead>
<tr>
<th>TCM Description</th>
<th>Project Sponsor</th>
<th>Project/Program Description</th>
<th>Implementation Status</th>
<th>SIP Analysis</th>
</tr>
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<tbody>
<tr>
<td>21 Enhanced I/M Program</td>
<td>BAR</td>
<td>Enhanced I/M Program</td>
<td>Delayed by State-2000</td>
<td>Yes</td>
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### TABLE 2
1998 CLEAN AIR PLAN - ON ROAD MOBILE SOURCE CONTROL MEASURES

<table>
<thead>
<tr>
<th>TCM Description</th>
<th>Project Sponsor</th>
<th>Project/Program Description</th>
<th>Funding</th>
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<tr>
<td>1-4 Travel Demand Management</td>
<td>Traffic Solutions</td>
<td>City-County TDM Program</td>
<td>CMAQ</td>
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<tr>
<td>Aarea-wide Ridesharing</td>
<td>Traffic Solutions</td>
<td>County Rideshare Program</td>
<td>State</td>
</tr>
<tr>
<td>Work Schedule Changes</td>
<td>Traffic Solutions/Business</td>
<td>Flexible Work Hours - Guaranteed Ride Home</td>
<td>(see above)</td>
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<tr>
<td>5 Public Transportation</td>
<td>City of Santa Maria</td>
<td>CNG Trans Bus, expanded service to Guadalupe</td>
<td>CMAQ</td>
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<tr>
<td></td>
<td>County of Santa Barbara</td>
<td>Goleta Rail Platform - San Diegan Extension</td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>County of Guadalupe</td>
<td>Surf Rail Platform - San Diegan Extension</td>
<td>State</td>
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<td>7 Traffic Flow Improvements</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>8 Parking Management</td>
<td>City of Santa Barbara</td>
<td>Residential Parking Program</td>
<td>N/A</td>
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<tr>
<td>9 Park-n-Ride Lots</td>
<td>County of Santa Barbara</td>
<td>Lompoc Park-n-Ride Lot - Ocean Ave/7th Ave</td>
<td>CMAQ</td>
</tr>
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<td></td>
<td>County of Santa Barbara</td>
<td>Santa Maria Park-n-Ride Lot - Clark/HWY101</td>
<td>CMAQ</td>
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<tr>
<td>10 Bicycle/Pedestrian</td>
<td>City of Santa Maria</td>
<td>1 Bike Locker</td>
<td>DMV</td>
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<td>County of Santa Barbara</td>
<td>Class II Bikeway in Santa Ynez - Alamo Pinto Rd.</td>
<td>DMV</td>
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<td>County of Santa Barbara</td>
<td>Rufugio Road Class II Bikeway - Samantha Dr-SR246</td>
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<td>County of Santa Barbara</td>
<td>Via Real Class II Bikeway - Cravens Lane to Padaro</td>
<td>RSTP</td>
</tr>
<tr>
<td></td>
<td>County of Santa Barbara</td>
<td>Maria Ygnacia Creek Class I Bikeway</td>
<td>RSTP</td>
</tr>
<tr>
<td>13 Old Car Buyback</td>
<td>Parsons Inc. - APCD</td>
<td>Vehicle Buyback Program</td>
<td>ITG/Div/V</td>
</tr>
<tr>
<td>17 Telecommunication</td>
<td>County of SB - Probation</td>
<td>Expansion of Video Conferencing Network</td>
<td>DMV</td>
</tr>
<tr>
<td>18 Alternative Fuel Program</td>
<td>UCSB</td>
<td>2 CNG Truck Conversions/fuel maker</td>
<td>DMV</td>
</tr>
<tr>
<td></td>
<td>City of Lompoc</td>
<td>CNG Garbage Truck, roll-off bins, compactors</td>
<td>DMV</td>
</tr>
<tr>
<td></td>
<td>City of Santa Maria</td>
<td>Charging 1 CNG Bus</td>
<td>DMV</td>
</tr>
<tr>
<td></td>
<td>City of Santa Maria</td>
<td>Purchase Dual Fuel Van</td>
<td>CMAQ</td>
</tr>
<tr>
<td>19 Public Education</td>
<td>SB Bike Coalition</td>
<td>Bicycle Video</td>
<td>DMV</td>
</tr>
<tr>
<td></td>
<td>County of Santa Barbara</td>
<td>Local Regulations for Electric Vehicles</td>
<td>DMV</td>
</tr>
<tr>
<td></td>
<td>APCD</td>
<td>On-going Efforts</td>
<td>APCD</td>
</tr>
<tr>
<td></td>
<td>SBCAG</td>
<td>On-going Efforts (98-99 OWP)</td>
<td>APCD</td>
</tr>
</tbody>
</table>

**CONTINGENCY PLAN - FY 2000**

| 21                             | BAR                      | Enhanced I/M Program                                     | Pending(x) |
| 22                             | Local Businesses+APCD+   | Countwide Employer-Based                                 | Pending(x) |
| 23                             | Traffic Solutions        | Trip Reduction Ordinance 100+EMPLOYEES                    |           |

C - 6
Table 3 summarizes the implementation characteristics of all currently adopted TCMs in the county. Identified are: the type of TCM; the adopting agency/agencies; the agency/agencies responsible for implementing the TCM; the formal agreements between the adopting and implementing agencies; and, how TCM implementation will be monitored and by whom. All currently adopted TCMs except for T-13 (Accelerated Vehicle Retirement) and T-18 (Alternative Fuels) are listed as TCMs by EPA in Section 108(f) of the CAAA. All 1998 CAP TCMs must be implemented in an expeditious manner or federal transportation funds programmed for new road capacity could be withheld. The mechanism by which expeditious implementation of TCMs is demonstrated is through the federal conformity regulation. All future transportation plans and programs for Santa Barbara County are subject to the conformity provisions of the CAAA which ensures that they are consistent with the 1998 CAP (SIP).

In addition, SBCAG also evaluated all TCMs considered to be reasonably available control measures (RACM). All the RACM TCMs evaluated for the CAP were classified as either being:

- Currently Adopted
- Proposed for Further Study
- Proposed for Rejection
- Contingency Measures

All TCM's evaluated as part of the 1994 CAP and this 1998 CAP are listed below.

**Currently Adopted**

T-1  Trip Reduction Ordinance
T-2  Employer Based Transportation Demand Management Programs
T-3  Work Schedule Changes
T-4  Area-wide Ridesharing Incentives
T-5  Improve Commuter Public Transit Service
T-7  Traffic Flow Improvements
T-8  Parking Management
T-9  Park-and-Ride / Fringe Parking
T-10  Bicycle and Pedestrian Programs
T-13  Accelerated Retirement of Vehicles
T-17  Telecommunications
T-18  Alternative Fuels
T-19  Public Education
<table>
<thead>
<tr>
<th>TCM #</th>
<th>TCM Designation</th>
<th>Type of TCM</th>
<th>Adopting Agency(ies)</th>
<th>Implementing Agency(ies)</th>
<th>Commitments</th>
<th>Monitoring Mechanism (Agency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>Trip Reduction Ordinance</td>
<td>Voluntary; TDM Ordinance;</td>
<td>Tier 1: Guadalupe; Buelton; Solvang; County; SYV; Tier 2: Lompoc; Santa Maria; County Unincorporated; Carpinteria; Tier 3: Santa Barbara; County; Goleta</td>
<td>Tier 1 (County/Cities)</td>
<td>Tiers 1 &amp; 2: Resolution of Commitments from Affected jurisdictions;</td>
<td>CMP Conformity (SBCAG)</td>
</tr>
<tr>
<td>T-2</td>
<td>Employer-Based TDM Ordinance</td>
<td>State AQAP</td>
<td>Voluntary; TDM Ordinance;</td>
<td>Tier 2 (County/Cities)</td>
<td>Tier 3: City and County TDM Ordinance City of Santa Barbara and Goleta area</td>
<td>SIP Conformity (SBCAG)</td>
</tr>
<tr>
<td>T-3</td>
<td>Work Schedule Changes</td>
<td>Voluntary</td>
<td>County and Cities; County and Cities; Private Sector</td>
<td>Adopted Policy, County, 1988</td>
<td>Not Applicable (TDM)</td>
<td></td>
</tr>
<tr>
<td>T-4</td>
<td>Area Wide Ridesharing</td>
<td>Voluntary</td>
<td>County and Cities</td>
<td>SBCAG</td>
<td>Interagency Agreement</td>
<td>SIP Conformity (SBCAG)</td>
</tr>
<tr>
<td>T-5</td>
<td>Public Transportation</td>
<td>Programmed</td>
<td>County and Cities</td>
<td>SBMTD, SMAT; SBCAG; FTIP and RTIP</td>
<td>List of Programmed Projects Implemented by 1999 (SBCAG); SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-7</td>
<td>Traffic Flow Improvement</td>
<td>Programmed</td>
<td>County and Cities</td>
<td>County and Cities; Caltrans; SBMTD; SBCAG; FTIP and RTIP</td>
<td>List of Programmed Projects Implemented by 1999 (SBCAG); SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-8</td>
<td>Parking Management</td>
<td>Parking Ordinance</td>
<td>City of Santa Barbara</td>
<td>Not Applicable</td>
<td>City of Santa Barbara Parking Task Force; SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-9</td>
<td>Park-and-Ride Fringe Parking</td>
<td>Voluntary; Programmed</td>
<td>County and Cities</td>
<td>FTIP and RTIP</td>
<td>Caltrans, District 5; List of Programmed Projects Implemented by 1999 (SBCAG); SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-10</td>
<td>Bicycle/Pedestrian</td>
<td>Programmed</td>
<td>County and Cities</td>
<td>FTIP and RTIP; General Bikeway Elements; Bikeway Master Plans</td>
<td>List of Programmed Projects Implemented by 1999 (SBCAG); SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-13</td>
<td>Accelerated Retirement of Vehicle</td>
<td>Voluntary</td>
<td>APCD</td>
<td>Contract APCD/Engineering</td>
<td>APCD; SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-17</td>
<td>Telecommunication</td>
<td>Voluntary</td>
<td>County and Cities</td>
<td>Not Applicable</td>
<td>Not Applicable (TDM)</td>
<td></td>
</tr>
<tr>
<td>T-18</td>
<td>Alternative Fuel Program</td>
<td>Voluntary</td>
<td>APCD</td>
<td>Interagency Agreements Unnecessary</td>
<td>APCD; SIP Conformity (SBCAG)</td>
<td></td>
</tr>
<tr>
<td>T-19</td>
<td>Public Education</td>
<td>Communal, Voluntary</td>
<td>County and Cities</td>
<td>Interagency Agreements Unnecessary</td>
<td>Not Applicable; CMP Conformance (SBCAG); SIP Conformity (SBCAG);</td>
<td></td>
</tr>
</tbody>
</table>
Proposed For Further Study

T-6  High Occupancy Vehicle Lanes
T-12  Vehicle Use Limitations/Restrictions
T-14  Activity Centers (i.e., Indirect Source Review – Land use measures)
T-15  Extended Vehicle Idling
T-20  Parking Management to Reduce Non-commute Single Occupant Vehicle Use

Proposed For Rejection

T-11  Special Events
T-16  Extremely Low-Temperature Cold Starts

Proposed As Contingency Measures

T-21  Enhanced Inspection and Maintenance Program
T-22  County-wide TDM Ordinance Affecting All Employers with > 100 Employees

Currently adopted TCMs are discussed in Section C.2. Measures proposed for further study and those not considered appropriate for Santa Barbara County are listed in Sections C.3 and C.4 respectively. These measures are described in detail in Appendix C of the 1994 Clean Air Plan. Section C.5 discusses TCMs that are to be “reserved” as contingency measures. Contingency measures are to be implemented in the event Santa Barbara County fails to meet the National Ambient Air Quality Standard (NAAQS) by November 15, 1999. Sections C.6 and C.7 document information used to calculate the TCM VMT and trip reductions and emission reductions respectively.

C.2  TRANSPORTATION CONTROL EFFICIENCY CALCULATIONS

In order to compute the 1998 CAP TCM efficiencies, estimated changes to vehicle miles traveled, vehicle trips, and in some instances, direct tailpipe emissions were required. Various methods were used to analyze these variables including: the Santa Barbara Travel Model and various accounting procedures. For more detailed information on analysis procedures, refer to Appendix C of the 1994 CAP.
T-1 TRIP REDUCTION PROGRAM
T-2 EMPLOYER-BASED TDM PROGRAMS

Estimating VMT and trip reductions resulting from the voluntary Santa Barbara City/County TDM Program is based on the incremental improvement in average vehicle ridership (AVR) in the South Coast area between 1996 and 1999 and between 1999 and 2005.

All assumptions and parameter values used to analyze the effectiveness of the City/County TDM Program are described below.

- The TDM Program effectiveness is based on only home based work commute trips whose destination lies within the South Coast Market Area as defined in Forecast 94 (SBCAG). This does not include those north county employers who are now participating in the program since it became voluntary.

- Total jobs forecasted for the South Coast Market Area in 1999 and 2005 is 95,639 and 101,048 respectively (Source: Forecast 94, SBCAG).

- 90 percent of commute trips are made by vehicles (Source TDM Program 1993 Year End Report, Traffic Solutions).

- TDM Commuter AVR for base year 1996 is 1.3 (estimated as a 6 percent increase from 1990 base year AVR of 1.23: Source: TDM Program 1993 Year End Report, Traffic Solutions) and estimated to be 1.395 in 1999 (surveyed 1997 AVR = 1.395).

- The average work trip to and within the South Coast Market Area is 12.5 miles (Source: South Coast Commuter Survey, 1989).

- 66 percent of South Coast employees work at places which employ over 20 employees (TDM, Report on Implementation Issues and Options, SBCAG).

- Voluntary program is 70 percent as effective as the mandatory program.
The following equations were used to compute the VMT and trip reductions anticipated from the TDM Program.

Base 1996 = \((HBW \times \%TDM \times \%Auto \times AVRTDM \times TLen) + (HBW \times \%NONTDM \times \%Auto \times AVR \times TLen)\) +

1999 = \((HBW \times \%TDM \times \%Auto \times AVRTDM \times TLen) + (HBW \times \%NONTDM \times \%Auto \times AVR \times TLen)\) +

\[VMT\text{ Reduction} = \text{Base} - 1999 \times .70\]
\[\text{Trip Reduction} = \text{Base} - 1999 \text{ (excluding TLen)} \times .70\]

where:

- \(HBW\) = Jobs in the South Coast Market Area in 1999 (95,639) in 2005 (101,048)
- \(\%TDM\) = Percentage of Employees subject to TDM (.66)
- \(\%NONTDM\) = Percentage of Employees not subject to TDM (.34)
- \(\%Auto\) = Percentage of Commute Auto Trips (.90)
- \(AVR\) = Average Vehicle Ridership of NonTDM Trips: = 1.23 (.813)
- \(AVRTDM\) = Average Vehicle Ridership of TDM Trips: 1996 Base = 1.3 (.769); 1999 and 2005 = 1.395 (.717).
- \(TLen\) = Average HBW Trip Length (12.5).

Applying the above parameter values yields the following VMT and vehicle trip reductions:

- T-1.2 1996 DAILY VMT REDUCTION = 25,848
- T-1.2 1996 DAILY VEHICLE TRIP REDUCTION = 2,068
- T-1.2 2005 DAILY VMT REDUCTION = 30,525
- T-1.2 2005 DAILY VEHICLE TRIP REDUCTION = 2,442.

T-3. WORK SCHEDULE CHANGES
Control Efficiency Not Quantified.

T-4 AREAWIDE RIDESHARING
Control Efficiency Not Quantified.

T-5 IMPROVE PUBLIC TRANSIT
The following short range transit expansion projects have been implemented between 1996 and 1999:
Daily VMT and vehicle trip reductions estimated from these projects are based on the most recent service and ridership information available.

**Santa Maria Area Transit Expansion**

1 Additional CNG SMAT Bus for new fixed route service (Service to Guadalupe)
Projected ridership = 20 persons/per trip (SMAT)
5-Trip per Day Service Schedule (SMAT)
Percent of Non-Transit Captive Ridership = 50 percent (SMAT)
Avg. Person Trip Length = 12.5 miles (both trip ends)

\[
20 \times 5 \times 0.5 \times 2 \times 12.5 = 1,250 \text{ VMT/Day}
\]

\[
20 \times 5 \times 0.5 \times 2 = 100 \text{ Trips/Day}
\]

**Santa Barbara Rail Service Expansion**

Installation of rail platforms in Surf, Guadalupe, and Goleta. Stops at these locations will be included as part of the San Diegan service between San Diego and San Luis Obispo.

<table>
<thead>
<tr>
<th>Location</th>
<th>Estimated* Monthly Ridership</th>
<th>Daily Trip Reduction</th>
<th>Intra-County Miles</th>
<th>VMT Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goleta Platform</td>
<td>600</td>
<td>20</td>
<td>23</td>
<td>460</td>
</tr>
<tr>
<td>Guadalupe Platform</td>
<td>450</td>
<td>15</td>
<td>80</td>
<td>1,200</td>
</tr>
<tr>
<td>Surf Platform</td>
<td>300</td>
<td>10</td>
<td>60</td>
<td>600</td>
</tr>
<tr>
<td>Total</td>
<td>1,350</td>
<td>45</td>
<td>260</td>
<td>2,260</td>
</tr>
</tbody>
</table>

* Source: Caltrans, Division of Rail

T-5 1996 DAILY VMT REDUCTION = 3,510
T-5 1996 DAILY VEHICLE TRIP REDUCTION = 145

C - 11
T-7 TRAFFIC FLOW IMPROVEMENTS

Although no infrastructure improvements are identified as TCM projects as part of this Clean Air Plan, the following infrastructure improvements, completed between 1996 and 1999, were considered regionally significant, and were therefore analyzed as to their emission impacts:

Roadway Improvements

- Rte. 1; from Rte. 246 to El Jaro Creek - construct passing lanes
- Garden Street extension from Yannoli Street to Cabrillo Blvd.
- Salsipuedes Street extension from Cacique Street to Cabrillo Blvd.
- Blosser Road between Betteravia Rd. and Stowell Rd. - widen to four lanes
- Blosser Road between Main Street and Alvin Ave - widen to four lanes
- Miller Street Signal Interconnect - 12 existing signals - conduit/cable connection to City Hall
- Rte. 246 between Buellton and Solvang - add continuous shared left turn lane.

Intersection/Interchange Improvements

- Rte. 101/Rte. 154 South Interchange - reconstruct interchange & re-align ramps
- Rte. 101/Rte. 166 - revise interchange, reconstruct NB ramps
- Rte. 101/Betteravia Rd. - replace and widen overcrossing; re-align ramps & frontage roads
- Rte. 101NB/Earl Warren/Calle Real - add left turn lane to EB Calle Real.

The above improvements were coded on the Santa Barbara Travel Model network as part of the 1999 travel forecast (improvements completed between 1990 and 1996 were codified on to the model network as part of the 1994 CAP analysis, see Appendix C of the 1994 CAP). The resulting impact on trip diversion (i.e., VMT) and speeds are captured by extracting the model’s VMT by speed class distribution. The model’s VMT by speed class distribution is a direct input to the MVEI7G emission model (see On-Road Mobile Source Emissions Analysis section).
The reductions in VMT resulting from new park-and-ride lots constructed between 1996 and 1999 and between 1999 and 2005 are computed using the following equation:

\[ \text{VMT} = d(n - n \times c) \]

where:
- \(d\) = average two-way distance
- \(n\) = total number of vehicles using the lot
- \(c\) = average vehicle occupancy of carpools (inverse).

Values for \(d\), \(n\), and \(c\) are as follows:

- \(d\) = 140 miles (Ocean Ave./7th Ave. serving Santa Maria/Orcutt area)
- \(d\) = 110 miles (Rte.101/Clark Ave. serving Lompoc and VAFB area) (serves north county commutes to south coast jobs)
- \(n\) = capacity * utilization (difference between 1996 and 1999 & 1999 and 2005)
- \(c\) = 2.95 (.339)

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity</th>
<th>1999 % Utilization</th>
<th>2005 % Utilization</th>
<th>1999 Utilization</th>
<th>2005 Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean Ave/7th Ave.</td>
<td>165</td>
<td>0.50</td>
<td>0.70</td>
<td>82</td>
<td>115</td>
</tr>
<tr>
<td>Clark Ave/Rte. 101</td>
<td>100</td>
<td>0.50</td>
<td>0.70</td>
<td>50</td>
<td>70</td>
</tr>
</tbody>
</table>

Using the same equation as described in the previous section and accounting for TDM double counting at Rte.101/Clarke Ave and Ocean Ave/7th Ave lots (34 percent of total reduction), the following VMT reduction was computed.

- Daily VMT Reduction 1996-1999 = 3,628
- Daily VMT Reduction 1999-2005 = 5,032

\[ \text{T-9 1999 DAILY VMT REDUCTION} = 3,628 \]
\[ \text{T-9 1999 DAILY VEHICLE TRIP REDUCTION} = 0 \]
T-9 2005 DAILY VMT REDUCTION = 5,032
T-9 2005 DAILY VEHICLE TRIP REDUCTION = 0

T-10 BICYCLING

Several bikeway improvements occurred between 1996 and 1999. These improvements primarily entailed connecting missing links of the designated regional bike systems as defined in the Regional Bikeway Study for Santa Barbara County.

The number of person trip reductions resulting from a bikeway project was estimated by taking .1 percent of all “affected” person interzonal trip productions as reported in the local jurisdiction’s travel demand model or the regional Santa Barbara Travel Model. Intrazonal trip productions, if reported, were also assessed. Given the short distances of intrazonal trips, it was assumed that these trips would be more responsive to new bikeway facilities. A .2 percent shift was assumed for these trips. For special generators such as schools, a .3 percent diversion was assumed. If trip productions were reported as vehicle trips, .1 percent of all “affected” trip productions was used.

In this context, “affected” trip productions are those model trip productions which originate or end in traffic analysis zones (TAZ) which are traversed by the new bikeway facility. The vehicle trip and VMT reductions resulting from bikeway projects are shown below.

1999 Bikeway Project VMT and Trip Reductions

<table>
<thead>
<tr>
<th>Bikeway Projects</th>
<th>Model or Source</th>
<th>TAZs</th>
<th>Daily Trip Production</th>
<th>Trip Diversion</th>
<th>Trip Length</th>
<th>VMT/Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamo Pintado Rd. Class II</td>
<td>SBCAG</td>
<td>2</td>
<td>5,941 Inter 757 Intra</td>
<td>.001</td>
<td>.01</td>
<td>3.0</td>
</tr>
<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refugio Road Class II</td>
<td>SBCAG</td>
<td>3</td>
<td>14,025 Inter 2,165 Intra</td>
<td>.001</td>
<td>.01</td>
<td>3.0</td>
</tr>
<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phelps Road Class II</td>
<td>SBCAG</td>
<td>5</td>
<td>16,259 Inter 429 Intra</td>
<td>.001</td>
<td>.01</td>
<td>3.0</td>
</tr>
<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Via Real Bikeway</td>
<td>SBCAG</td>
<td>6</td>
<td>20,210 Inter 1,945 Intra</td>
<td>.001</td>
<td>.01</td>
<td>3.0</td>
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<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maria Ygnacia Creek Bikeway</td>
<td>SBCAG</td>
<td>4</td>
<td>26,829 Inter 739 Intra</td>
<td>.001</td>
<td>.01</td>
<td>3.0</td>
</tr>
<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2005 Bikeway Project VMT and Trip Reductions

<table>
<thead>
<tr>
<th>Bikeway Projects</th>
<th>Model or Source</th>
<th>TAZs</th>
<th>Daily Trip Production</th>
<th>Trip Diversion</th>
<th>Trip Length</th>
<th>VMT/Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamo Pintado Rd. Class II</td>
<td>SBCAG</td>
<td>2</td>
<td>6,164 Inter</td>
<td>.001</td>
<td>3.0</td>
<td>42 VMT</td>
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<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td>781 Intra</td>
<td>.01</td>
<td></td>
<td>14 Trips</td>
</tr>
<tr>
<td>Refugio Road Class II</td>
<td>SBCAG</td>
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<td>14,647 Inter</td>
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<td>3.0</td>
<td>111 VMT</td>
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<tr>
<td>County of Santa Barbara</td>
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<td>2,235 Intra</td>
<td>.01</td>
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<td>37 Trips</td>
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<tr>
<td>Phelps Road Class II</td>
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<td>16,841 Inter</td>
<td>.001</td>
<td>3.0</td>
<td>63 VMT</td>
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<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td>390 Intra</td>
<td>.01</td>
<td></td>
<td>21 Trips</td>
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<tr>
<td>Via Real Bikeway</td>
<td>SBCAG</td>
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<td>20,828 Inter</td>
<td>.001</td>
<td>3.0</td>
<td>123 VMT</td>
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<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td>2,011 Intra</td>
<td>.01</td>
<td></td>
<td>41 Trips</td>
</tr>
<tr>
<td>Maria Ygnacio Creek Bikeway</td>
<td>SBCAG</td>
<td>4</td>
<td>26,518 Inter</td>
<td>.001</td>
<td>3.0</td>
<td>102 VMT</td>
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<tr>
<td>County of Santa Barbara</td>
<td></td>
<td></td>
<td>707 Intra</td>
<td>.01</td>
<td></td>
<td>34 Trips</td>
</tr>
</tbody>
</table>

T-10 1999 DAILY VMT REDUCTION = 426  
T-10 1999 DAILY VEHICLE TRIP REDUCTION = 142  
T-10 2005 DAILY VMT REDUCTION = 441  
T-10 2005 DAILY VEHICLE TRIP REDUCTION = 147  

### T-13 ACCELERATED RETIREMENT OF VEHICLES

Given that the average remaining life of a removed car is assumed to be 3 years (ARB), this 1999 forecast analysis credits the last year of the 1993-1996 vehicle buyback program (see 1994 CAP TCMs) and the first year of the re-established vehicle buyback program which will run from 1999 to 2001. No credit is taken for this program as part of the 2005 emissions forecast.

**Accelerated Retirement of Vehicles**

- Program Funding (1999-2002) = $250,000
- Vehicle Reimbursement+Administration Costs = $800
- Total Number of Vehicles = 313
- Vehicles Credited (385/3) = 104
- Total Vehicle Buybacks between 1993-1996 = 1,200
- Vehicles Credited = 325
- Total Vehicles Credited = 429
Assumed Number of Pre-1972 Vehicles in 1999 = 242
Assumed Number of 1972-1974 Vehicles in 1999 = 187

Average Emission Rates and Mileage for Different Model Years*

<table>
<thead>
<tr>
<th>Model Year Group</th>
<th>ROG Exhaust Grams/mile</th>
<th>ROG Evap Grams/mile</th>
<th>NOx Exhaust Grams/mile</th>
<th>Daily Vehicle Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1972</td>
<td>9.6</td>
<td>2.8</td>
<td>4.0</td>
<td>13.5</td>
</tr>
<tr>
<td>1972-1974</td>
<td>7.6</td>
<td>2.1</td>
<td>3.8</td>
<td>14.5</td>
</tr>
<tr>
<td>1975-1981</td>
<td>2.6</td>
<td>1.3</td>
<td>3.0</td>
<td>17.5</td>
</tr>
<tr>
<td>Fleet Average</td>
<td>1.0</td>
<td>0.4</td>
<td>1.2</td>
<td>27.67</td>
</tr>
</tbody>
</table>

* Source: ARB, Mobile Source Emission Reduction Credits Document

Using ARB’s emission factor and vehicle use data above with the following equations yields the expected emission reduction anticipated from Santa Barbara County’s Old Vehicle Buyback Program in 1999.

**ROG Calculation**

\[
\text{Pre-72} + \text{Pre-72} - (\text{FleetAve}_\text{exhaust} + \text{FleetAve}_\text{evap} \cdot \text{FleetAve}_\text{mileage} / \text{Pre-72}_\text{mileage})] \cdot \text{Pre-72}_\text{mileage} \cdot 1 \text{ yrs} \cdot (1/453.6) / 2,000
\]

- 242 vehicles

\[
\text{72-74} + \text{FleetAve}_\text{exhaust} + \text{FleetAve}_\text{evap} \cdot \text{FleetAve}_\text{mileage} / \text{72-74}_\text{mileage})] \cdot \text{72-74}_\text{mileage} \cdot 1 \text{ yrs} \cdot (1/453.6) / 2,000
\]

- 187 vehicles

\[
[12.4 - (1.0 + (.4 \cdot (27.67/13.5))) \cdot 13.5 \cdot 1 \cdot 0.002203 / 2,000 = 0.0001565 \cdot 242 = 0.04 \text{ tons/day}
\]

\[
[9.7 - (1.0 + (.4 \cdot (27.67/14.5))) \cdot 14.5 \cdot 1 \cdot 0.002203 / 2,000 = 0.0000159 \cdot 187 = 0.024 \text{ tons/day}
\]

**NOx Calculation**

\[
(\text{Pre-72}_\text{exhaust} - \text{FleetAve}_\text{exhaust}) \cdot (\text{Pre-72}_\text{mileage} \cdot 1 \text{ yrs} \cdot (1/453.6) / 2,000)
\]

- 242 vehicles

\[
(\text{72-74}_\text{exhaust} - \text{FleetAve}_\text{exhaust}) \cdot (\text{72-74}_\text{mileage} \cdot 1 \text{ yrs} \cdot (1/453.6) / 2,000)
\]

- 187 vehicles

\[
(4.0 - 1.2) \cdot 13.5 \cdot 1 \cdot 0.002205 / 2,000 = 0.00000414 \cdot 242 = 0.011
\]

\[
(3.8 - 1.2) \cdot 14.5 \cdot 1 \cdot 0.002205 / 2,000 = 0.00000413 \cdot 187 = 0.008
\]

T-13 1999 DAILY ROG EMISSION REDUCTION = 0.06 Tons/Day
T-13 1999 DAILY NOx EMISSION REDUCTION = 0.02 Tons/Day

C - 16
T-17   TELECOMMUNICATIONS

Video Communications, County of Santa Barbara

This project augments the current video communication system currently in place within the County Probation and Public Defender’s Office. Two additional terminals will be purchased and installed at the Santa Maria, Lompoc, and Santa Barbara enforcement offices. The vehicle trips and VMT reduction estimates below are based on current workload and demand between the Probation and Public Defender’s Offices.

<table>
<thead>
<tr>
<th>Location</th>
<th>Daily Vehicle Trips Reduced</th>
<th>Trip Length (miles)</th>
<th>VMT Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Maria</td>
<td>20</td>
<td>69</td>
<td>1,380</td>
</tr>
<tr>
<td>Lompoc</td>
<td>20</td>
<td>54</td>
<td>1,080</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>20</td>
<td>15</td>
<td>300</td>
</tr>
</tbody>
</table>

T-17 1999 & 2005 DAILY VMT REDUCTION = 2,760
T-17 1999 & 2005 DAILY VEHICLE TRIP REDUCTION = 60

T-18   ALTERNATE FUELS

The following alternative fuel transit projects were implemented in Santa Barbara County between 1996 and 1999:

1) 2 CNG Light Duty Truck Conversions and 1 Fuel Maker (UCSB)
2) 1 CNG Garbage Truck – Roll-Off Bins and Compactor (City of Lompoc)
3) Purchase 1 Dual Fuel Van (City of Santa Maria)
4) Purchase 1 CNG Slow Fill Fuel Maker (City of Santa Maria)
5) Purchase 1 CNG Replacement Bus (City of Santa Maria)
For projects scheduled to be implemented between 1996 and 1999, service characteristics were assumed to remain constant. Direct tailpipe ROG and NOx emissions were computed from differences in ROG and NOx emission rates among the different vehicle technology groups. No emission benefits were credited towards new fueling facilities or equipment.

**CNG Light Duty Truck Conversions (UCSB)**

Number of Vehicles = 2  
Avg. Daily VMT per Vehicle = 24 miles  
Model Year of Vehicles to be Replaced = 1984 and 1987  
ROG Emission Rate of Replaced Vehicles + Evap. Emissions = .9 g/mile  
ROG Emission Rate of Converted Vehicles = .075  
NOx Emission Rate of Replaced Vehicles = .9 g/mile  
NOx Emission Rate of Converted Vehicles = .2 g/mile

\[
\begin{align*}
(2 \times 24 \times .9) - (2 \times 24 \times .075) &= 40 \text{ grams ROG/Day} \\
(2 \times 24 \times .9) - (2 \times 24 \times .2) &= 34 \text{ grams NOx/Day}
\end{align*}
\]

**CNG Garbage Truck**

Number of Vehicles = 1  
Avg. Daily VMT = 40 miles  
Reduction in Running ROG Emission Rate CNG vs. Diesel = 3.37 g/mile  
Reduction in Running NOx Emission Rate CNG vs. Diesel = 35.3 g/mile

\[
\begin{align*}
(1 \times 40 \times 3.37) &= 135 \text{ grams of ROG/Day} \\
(1 \times 40 \times 35.3) &= 1,412 \text{ grams of NOx/Day}
\end{align*}
\]

**1 Dual Fuel Van (City of Santa Maria)**

No Replacement of Vehicle – Emissions Not Quantified.

**1 CNG Replacement Bus (City of Santa Maria)**

Refer to T-5, Direct Emissions Not Quantified

C - 18
T-18 1999 & 2005 DAILY ROG EMISSION REDUCTION = 175 grams (0.0003 Tons/Day)
T-18 1999 & 2005 DAILY NOx EMISSION REDUCTION = 1,446 grams (0.002 Tons/Day)

**T-19 PUBLIC EDUCATION**

Control Efficiency Not Quantified.

**C.3 MEASURES PROPOSED FOR FURTHER STUDY**

Control efficiencies for the following measures were not computed given that these measures are still being investigated for their potential effectiveness and/or applicability in Santa Barbara County. For a description of these measures refer to Appendix C of the 1994 CAP.

**T-6 HIGH OCCUPANCY VEHICLE LANES**

Control Efficiency Not Quantified.

**T-12 VEHICLE USE LIMITATIONS/RESTRICTIONS**

Control Efficiency Not Quantified.

**T-14 ACTIVITY CENTERS**

(Land Use Measures - Indirect Source Review Program – See Chapter 8)

Control Efficiency Not Quantified.

**T-15 EXTENDED VEHICLE IDLING**

Control Efficiency Not Quantified.

**T-20 PARKING MANAGEMENT TO REDUCE NON-COMMUTE SINGLE OCCUPANT VEHICLE ACTIVITY**

Control Efficiency Not Quantified.

**C.4 MEASURES PROPOSED FOR REJECTION**

C - 19
Control efficiencies for the following measures were not computed given that these measures are not considered effective and/or applicable for Santa Barbara County. For a description of these measures refer to Appendix C of the 1994 CAP.

**T-11 SPECIAL EVENTS**

Control Efficiency Not Quantified.

**T-16 EXTREME LOW TEMPERATURE COLD STARTS**

Control Efficiency Not Quantified.

**C.5 MEASURES PROPOSED AS CONTINGENCY MEASURES**

Control efficiencies for the following measures were computed given that these measures may be relied upon in the event that Santa Barbara County does not attain the federal 1-hour ozone standard by November 1999.

**T-21 ENHANCED INSPECTION AND MAINTENANCE PROGRAM**

Emission reduction estimates from this measure were generated for Santa Barbara County directly with the MVEI7G model which does not reflect recent legislative changes to the Enhanced I/M Program. Some of the more substantive changes to the Enhanced I/M bill are as follows:

1) Eliminated the annual test requirement and unlimited repair costs for gross polluters;
2) Exempts vehicles from smog check for the first four model years;
3) Established a low-income repair assistance program and its funding;
4) Changes the existing exemption for vehicles from smog check from 1965 model year to 1973 model year vehicles;
5) Starting in 2003, vehicles 30 years or older will be exempt from smog check;
6) Requires that the emissions lost due to these changes must be “made up” from regulations on a source other than motor vehicles.

Given that the above changes represent a relaxation of the original program, the estimated reductions below should be considered optimistic.
Emission reduction estimates from this measure were generated for Santa Barbara County directly with the MVEI7G model which does not reflect recent legislative changes to the Enhanced I/M Program. Given that several elements of the Enhanced I/M Program have been relaxed, the estimated reductions below should be considered overly optimistic.

T-21 2005 DAILY ROG EMISSION REDUCTION = 4.29 Tons/Day
T-21 2005 DAILY NOx EMISSION REDUCTION = 3.07 Ton/Day

T-22 COUNTY-WIDE IMPLEMENTATION OF TIER III TDM PROGRAM

Approximately 47-53 additional establishments and 12,312 employees will be subject to this TCM, mostly located in northern Santa Barbara County. The following assumptions were made in order to estimate the efficiency of this measure.

\[(TDM \times %Auto \times AVO \times TLen) - (TDM \times %Auto \times AVO \times TLEN)\]

Number of Employees subject to TDM (TDM)
1999: 12,312
2000: 12,312

Mode Choice (%Auto):
1999: 85 percent of workers will commute by car (1990 Census)
2000: 85 percent of workers will commute by car

Average Vehicle Occupancy (AVO)
1999: 1.12 (.893) 1990 Census for Santa Barbara County
2000: 1.38 (.725) Expected TDM Effectiveness

Average Trip Length (TLen)
1999: 10 miles (both trip ends)
2000: 10 miles (both trip ends)

The following VMT and vehicle trip reductions were computed for the year 2000:

T-22 2000 DAILY VMT REDUCTION = 30,840
T-22 2000 DAILY VEHICLE TRIP REDUCTION = 5,140.
C.6 ON-ROAD MOBILE SOURCE EMISSIONS ANALYSIS

For the 1998 CAP, adjustments were made to the 1999 on-road mobile source activity data to reflect the estimated impact of each TCM on vehicle miles of travel (VMT) and vehicle trips. Changes in the county’s VMT by speed class distribution between 1996 and 1999 were derived directly from the Santa Barbara Travel Model. The adjusted activity data was input into the regional emissions model to generate a with-controls on-road mobile source emissions forecast. By taking the difference in total on-road mobile source emissions between the without-controls forecast and the with-controls forecast, the net emissions reduction expected in 1999 from Santa Barbara County’s TCMs could be ascertained. For informational purposes, the same set TCMs were also analyzed as part of a 2005 emission forecast.

Control measure efficiencies for TCMs have traditionally been based on a TCMs estimated emissions reduction. However, using the methodology described above, control efficiencies based on emission reductions would require a separate regional emissions estimate for each individual TCM. The latter approach would be unwieldy, and for many TCMs whose emission reduction potential is small, beyond the sensitivity of the emissions model (MVEI7G reports emissions in tons per day). Control measure efficiencies were therefore based on the VMT and/or trip reduction of each TCM rather than an estimate of emission reductions.

Attainment Demonstration Analysis

Based on photochemical modeling, the comprehensive control strategy of the 1998 CAP, of which on-road mobile source controls are a part, will enable Santa Barbara County to attain the federal 1-hour ozone standard by 1999. For a complete description of the attainment demonstration analysis, see Chapter 7 or Appendix D.
Regional Emissions Analysis

The on-road mobile source emissions estimates for the 1999 CAP were produced with the MVEI7G emission inventory model. MVEI7G calculates emission factors which are used as input to the activity module to produce an on-road mobile source emissions inventory. MVEI7G uses inputs on the types of vehicles in use, vehicle speeds, vehicle operating conditions (e.g., cold starts, hot starts, hot stabilized running etc...) and temperature corrections (for diurnal and hot soak evaporative processes) to generate on-road vehicle emission factors. These emission factors are applied to the appropriate on-road activity data (e.g., VMT, VMT by speed class, and number of trips for each vehicle type and technology group) stratified by time of day (to account for diurnal ambient temperature variations) to produce an on-road mobile source emissions inventory.

On-Road Activity Data Inputs

On-road activity data inputs (county-wide VMT, vehicle trips, and VMT by speed class distribution (SCD) were generated using the Santa Barbara Travel Model\(^1\). These inputs were then revised to reflect the results of the micro-scale and sketch planning analyses. These revised activity inputs were apportioned to the various vehicle types, technology groups, and speed groups based on ARB forecasts of vehicle fleet mix and speed class distribution characteristics for Santa Barbara County. For purposes of emissions modeling, all on-road activity data was stratified into six time periods: 12am - 6am; 6am - 9am; 9am - 12; 12pm - 3pm; 3pm - 6pm; and, 6pm - 12. Summer ozone temperatures for each MVEI7G time period were derived from the 10 worst episodic days monitored in Santa Barbara County.

MVEI7G will compute the emissions associated with the following emitting:

1) running exhaust emissions based on VMT;

---

\(^{1}\) In response to the need to update and continuously improve the performance of the Santa Barbara Travel Model, SBCAG completed a full recalibration of its regional model in 1997. The recalibration effort involved a review of the entire model structure, network, socioeconomic inputs, an update of the 1990 base year model, and the development of a new 1996 base year model (the 1994 CAP was based on the previous 1990 base year travel model). Validation of the 1990 and 1996 base year models met all federal and state criteria for assessing an acceptable level of accuracy for the use of transportation model data as input to developing emission inventory estimates. Approval to use the recalibrated models for such purposes was received by Caltrans’ Regional Travel Forecasting Branch in February 1998. SBCAG’s model update effort is fully described in the document entitled: 1990 and 1996 Recalibration of the SBCAB Travel Demand Model.
2) cold start incremental emissions and hot start incremental emissions based on the number of trips as a function of time after engine shutoff;
3) diurnal emissions based on numbers of vehicles;
4) hot soak emissions based on total numbers of trips;
5) evaporative running losses based on VMT; and,
6) resting loss emissions based on numbers of vehicles.

Depending on the activity data used, MVEI7G will produce two types of inventories, an annual average inventory or a planning inventory. As required by the CAAA for ozone non-attainment areas, the 1998 CAP for Santa Barbara County is based on a summer ozone season (June to October) average daily emissions planning inventory. The latter is based on meteorological and activity conditions which exist during peak episodic conditions for a given pollutant.

The percentage distribution of VMT into the six time periods were based on the hourly traffic count summary developed as part of the Santa Barbara Travel Model data collection effort. The hourly summary was derived from 24-hour traffic counts taken at 147 locations countywide in 1992-93. This data was aggregated into the six MVEI7G time periods and were used to distribute VMT for input into the MVEI7G model. ARB distributions were used to allocate vehicle trips by time period.

To compute running emissions, each time period's VMT total was stratified into 13 speed classes (0 - 65 in 5 mile increments). Hence, there are six VMT by Speed Class Distributions (SCD), one for each MVEI7G time period.

The emissions associated with vehicle starts are accounted for in the MVEI7G model based on the distribution of these trips by vehicle classification, vehicle technology class, and operating mode. This allows the model to compute emissions associated with vehicle starts and evaporative processes (for ROG). MVEI7G adds these emissions to running emissions to compute total on-road mobile source emissions.

As required by the MVEI7G model, vehicle trips were stratified into the following vehicle classifications: Light Duty Auto (LDA); Light Duty Truck (LDT); Medium Duty Truck (MDT); Urban Bus Diesel (UBD); Heavy Duty Gas Truck (HDG); Heavy Duty Diesel Truck (HDD); and, Motorcycle (MCY). The distribution of each vehicle by age (model year), operating mode (e.g.,
cold start, hot start), and technology class (e.g. catalytic, non-catalytic, diesel) was based on the most recent ARB distributions for Santa Barbara County. Vehicle age distributions for LDA and LDT were based on 1996 vehicle registration data for Santa Barbara County.

The MVEI7G activity data summaries are provided on the following pages.

1999 With Controls

To compute the ROG and NOx emission reductions resulting from the CAP TCMs, the TCM VMT, vehicle trip and vehicle speed change efficiencies were used to adjust the activity data inputs of the MVEI7G emissions model. Table 4 below shows the VMT and vehicle trip reductions estimates for each TCM evaluated for the 1998 CAP.

### Table 4
Vehicle Miles Traveled and Vehicle Trip Reductions

<table>
<thead>
<tr>
<th>TCM</th>
<th>1999 VMT Reduction</th>
<th>1999 Trip Reduction</th>
<th>2005 VMT Reduction</th>
<th>2005 Trip Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1,2</td>
<td>25,848</td>
<td>2,068</td>
<td>30,525</td>
<td>2,442</td>
</tr>
<tr>
<td>T-3</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
</tr>
<tr>
<td>T-4</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
</tr>
<tr>
<td>T-5</td>
<td>3,510</td>
<td>145</td>
<td>3,510</td>
<td>145</td>
</tr>
<tr>
<td>T-7</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>T-8</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
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<tr>
<td>T-9</td>
<td>3,628</td>
<td>0</td>
<td>5,032</td>
<td>0</td>
</tr>
<tr>
<td>T-10</td>
<td>396</td>
<td>132</td>
<td>441</td>
<td>147</td>
</tr>
<tr>
<td>T-13</td>
<td>D/E</td>
<td>D/E</td>
<td>D/E</td>
<td>D/E</td>
</tr>
<tr>
<td>T-17</td>
<td>2,760</td>
<td>60</td>
<td>2,760</td>
<td>60</td>
</tr>
<tr>
<td>T-18</td>
<td>D/E</td>
<td>D/E</td>
<td>D/E</td>
<td>D/E</td>
</tr>
<tr>
<td>T-19</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
<td>N/Q</td>
</tr>
<tr>
<td>Total</td>
<td>36,142</td>
<td>2,405</td>
<td>42,268</td>
<td>2,794</td>
</tr>
</tbody>
</table>

Contingency TCMs

| T-21  | D/E                 | D/E                  | D/E                 | D/E                  |
| T-22  | 30,840              | 5,140                | 30,840              | 5,140                |

N/A = not applicable; N/Q = not quantified; D/E = Direct Emissions
### MVEI7G1.0c ACTIVITY DATA INPUTS (1996 Baseline)

#### 1996 Baseline

<table>
<thead>
<tr>
<th></th>
<th>Vehicles</th>
<th>VMT</th>
<th>Trips</th>
<th>Avg. Trip Length</th>
<th>Trip-Start Factor</th>
<th>Starts</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDA</td>
<td>190596</td>
<td>5605868</td>
<td>821443</td>
<td>6.82</td>
<td>1.668</td>
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</tr>
<tr>
<td>LDT</td>
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<td>2464248</td>
<td>361096</td>
<td>6.82</td>
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<td>637696</td>
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<tr>
<td>MDT</td>
<td>10980</td>
<td>323042</td>
<td>47351</td>
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<td>HDGT</td>
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<td>HDDT</td>
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<tr>
<td>MCY</td>
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<td>63424</td>
<td>7446</td>
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<td><strong>Total</strong></td>
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<td>9100000</td>
<td>1281200</td>
<td></td>
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<td>2136355</td>
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</tbody>
</table>

#### Time Period Distribution

<table>
<thead>
<tr>
<th>Period</th>
<th>12-6am</th>
<th>6-9am</th>
<th>9-12noon</th>
<th>12-3pm</th>
<th>2-6pm</th>
<th>6-12mid</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT</td>
<td>3.62</td>
<td>13.03</td>
<td>18.03</td>
<td>21.28</td>
<td>23.47</td>
<td>20.57</td>
</tr>
<tr>
<td>Starts</td>
<td>1.2</td>
<td>15.37</td>
<td>19.99</td>
<td>22.01</td>
<td>25.01</td>
<td>16.42</td>
</tr>
</tbody>
</table>

#### VMT by Speed Class Distribution

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12-6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.4483</td>
<td>8.7451</td>
<td>17.9374</td>
<td>14.7868</td>
<td>22.309</td>
<td>3.8004</td>
<td>11.0608</td>
<td>5.9329</td>
</tr>
<tr>
<td>12-3</td>
<td>0.0924</td>
<td>0.5489</td>
<td>9.0342</td>
<td>0.9999</td>
<td>3.9547</td>
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<td>5.3216</td>
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<td>2-6</td>
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<td>1.4356</td>
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<td>9.5302</td>
<td>17.0187</td>
<td>16.963</td>
<td>3.9465</td>
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<td>6-12</td>
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<td>0</td>
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<td>14.2557</td>
<td>8.6145</td>
<td>5.8076</td>
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</table>
### Activity Data Inputs (1999 and 2005) Without Controls

<table>
<thead>
<tr>
<th></th>
<th>1999 Avg. Trip</th>
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<th></th>
<th></th>
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<th>2005 Avg. Trip</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>VMT</td>
<td>Trips</td>
<td>Length</td>
<td>Factor</td>
<td>Starts</td>
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**Total**

|        | 321837         | 9496020 | 1330070 |        |        | 2217516       |        |        |        |        |

### Time Period Distribution

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### VMT by Speed Class Distributions (1999/2005)

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The VMT and vehicle trip reductions were subtracted from the appropriate time periods of the 1999 and 2005 scenarios respectively. For each affected period, the VMT reductions were distributed among the 13 speed classes based on the current 1999 and 2005 speed class distributions. Hence, it was assumed that the speeds associated with the VMT reductions would mirror the original speed class distribution. The affected time period’s VMT and trip reductions for each scenario are shown in Table 5 below. The VMT and trip reductions were applied exclusively to the LDA and LDT vehicle classes.

Table 5. VMT and Vehicle Trip Reduction by Time Period

<table>
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<td>3pm-6pm</td>
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The MVEI7G activity data summaries for the 1999 and 2005 with control forecasts are provided on the following page.

The direct ROG and NOx emission reduction estimates for the Old Vehicle Buy-Back Program and the clean fuel vehicle conversion projects are shown in Table 6 below.

Table 6. Direct Emission Reduction Calculation

<table>
<thead>
<tr>
<th>Program</th>
<th>1999 Forecast ROG Reduction (tons/day)</th>
<th>1999 Forecast NOx Reduction (tons/day)</th>
<th>2005 Forecast ROG Reduction (tons/day)</th>
<th>2005 Forecast NOx Reduction (tons/day)</th>
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### MVEI7G1.0c ACTIVITY DATA INPUTS (1999 and 2005) WITH CONTROLS

#### 1999

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<th>VMT</th>
<th>Trips</th>
<th>Length</th>
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<th>Starts</th>
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### Time Period Distribution

#### VMT by Speed Class Distributions (1999/2005)

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<th>9-12noon</th>
<th>12-3pm</th>
<th>3-6pm</th>
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<td><strong>2005</strong></td>
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<td>20.31</td>
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| Speed    | 0-5    | 5-10   | 10-15   | 15-20   | 20-25   | 25-30   | 30-35   | 35-40   | 40-45   | 45-50   | 50-55   | 55-60   | 60-65   |
|----------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 12-6     | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 3.4482  | 9.1333  | 14.5909 | 19.2818 | 20.7724 | 8.3005  | 6.3279  | 10.6656 | 11.9793 |
| 3-6      | 0.8683 | 0.6988 | 19.3233 | 1.6961  | 4.5771  | 8.1825  | 9.2325  | 16.5662 | 16.9630 | 3.9465  | 5.6703  | 4.9356  |           |
| 6-12     | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 3.6962  | 8.8134  | 5.1191  | 17.7463 | 6.3718  | 8.7665  | 12.8128 | 5.8076  | 30.8462 |

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<td>14.2218</td>
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C.7.1 EMISSION RESULTS

In the calculation of emission reductions from the TCMs, all but two were analyzed, in aggregate, using the MVEI7G emissions model. The emissions reduction from measures T-13 (Old Vehicle Buyback) and T-18 (Alternative Fuels) were computed directly and subtracted from the MVEI7G results to yield the total 1999 and 2005 on-road mobile source emissions estimate.

The net ROG emission reduction from the 1996 base year is:

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<td>1996 ROG</td>
<td>20.38 tons/day</td>
</tr>
<tr>
<td>1999 ROG (with TCMs)</td>
<td>17.42 tons/day</td>
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<tr>
<td>Total On-Road Mobile Source Emissions Reduction</td>
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</table>

The total 1999 ROG emissions reduction resulting from TCMs is as follows:

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</thead>
<tbody>
<tr>
<td>1999 ROG (without TCMs)</td>
<td>17.52 tons/day</td>
</tr>
<tr>
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<td>17.42 tons/day</td>
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<td>Total ROG Reduction From CAP TCMs</td>
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The net NOx emission reduction from the 1999 base year is:

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</thead>
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<td>Total On-Road Mobile Source Emissions Reduction</td>
<td>3.17 tons/day</td>
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The total 1999 NOx emissions reduction resulting from TCMs is as follows:

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</thead>
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<td>1999 NOx (without TCMs)</td>
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</table>
The net ROG emission reduction in 2005 is:

<p>| | |</p>
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<tbody>
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<td>20.38 tons/day</td>
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<tr>
<td>2005 ROG (with TCMs)</td>
<td>11.64 tons/day</td>
</tr>
<tr>
<td>Total On-Road Mobile Source ROG Emissions Reduction</td>
<td>8.74 tons/day</td>
</tr>
</tbody>
</table>

The total 2005 ROG emissions reduction resulting from TCMs is as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2005 ROG (without TCMs)</td>
<td>11.68 tons/day</td>
</tr>
<tr>
<td>2005 ROG (with TCMs)</td>
<td>11.64 tons/day</td>
</tr>
<tr>
<td>Total ROG Reduction</td>
<td>.04 tons/day</td>
</tr>
<tr>
<td>From CAP TCMs</td>
<td></td>
</tr>
</tbody>
</table>

The net NOx emission reduction from the 2005 base year is:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1996 NOx</td>
<td>25.24 tons/day</td>
</tr>
<tr>
<td>2005 NOx (with TCMs)</td>
<td>16.64 tons/day</td>
</tr>
<tr>
<td>Total On-Road Mobile Source NOx Emissions Reduction</td>
<td>8.60 tons/day</td>
</tr>
</tbody>
</table>

The total 2005 NOx emissions reduction resulting from TCMs is as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2005 NOx (without TCMs)</td>
<td>16.68 tons/day</td>
</tr>
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<td>16.64 tons/day</td>
</tr>
<tr>
<td>Total NOx Reduction</td>
<td>.04 tons/day</td>
</tr>
<tr>
<td>From CAP TCMs</td>
<td></td>
</tr>
</tbody>
</table>

An implication of the cleaner fleet is that the relative emission reduction contribution from those TCMs designed to reduce VMT and trips will decrease with time. Conversely, if growth in vehicle trips and vehicle miles of travel occurs too quickly, the anticipated benefits from vehicle emission control technology improvements will be "outpaced" possibly offsetting progress towards attainment.

**Creditable ROG Emission Reduction**

Figure 1 illustrates the on-road mobile source emissions reduction resulting from the 1998 CAP Plan TCMs for ROG. A large percentage (76 percent) of the on-road mobile source ROG emission reduction is attributable to federal controls for which the county is not allowed to credit
towards the CAAA 15% ROG emission reduction requirement. The CAP was allowed to take credit for emissions reductions associated with "traditional" TCMs (e.g., transportation demand management strategies and transportation system management strategies), "non-traditional" TCMs such as Accelerated Retirement of Vehicles (T-13) and Alternative Fuels (T-18) (listed as Local Tailpipe), and emission reductions associated with the more stringent California motor vehicle controls (listed as State Tailpipe). The latter constitutes the greatest "creditable" ROG emission reduction with a contribution 85 percent (0.60 tons/day).

**Emission Budgets**

The ROG emission estimate of 17.41 tons/day and the NOx emission estimate of 22.07 tons/day establish the emissions budgets for these two ozone precursors. These budgets act as a "ceiling" for future on-road mobile source emissions. Exceeding either one of these emission budgets will jeopardize federal funding for transportation improvements and greatly restrict what transportation improvements may be pursued within the county. As required by the 1990 CAAA, a comparison of regional on-road mobile source emissions to these budgets will occur during updates of federal and state regional transportation plans and programs for Santa Barbara County.

**Monitoring**

To ensure that the emission reductions identified in the 1998 CAP Plan are realized, TCM effectiveness will be tracked by monitoring the implementation of projects and programs identified in the Federal Transportation Improvement Program (FTIP) and the Regional Transportation Improvement Program (RTIP) from which this TCM effectiveness analysis was based. Expeditious implementation of all 1998 CAP TCMs (and TCM related projects) will be determined during updates of Santa Barbara County's Regional Transportation Plan, the RTIP, and the FTIP as required by the 1990 CAAA transportation conformity provisions.

To ensure that the on-road activity data used to generate the 1999 on-road mobile source emissions forecast remains accurate, "ground truth" VMT data from Caltrans' Office of Travel Forecasting (OTF) will be annually monitored/tracked. VMT tracking is necessary to protect the integrity of the 1998 CAP emission forecasts. Figure 2 illustrates the VMT growth ceiling
between actual VMT as measured by Caltrans and SBCAG’s 1999 VMT forecast. If actual VMT exceeds this VMT ceiling, a revised 1999 forecast may be warranted (i.e., SIP revision).

Table 7 compares the 1998 CAP on-road mobile source emissions estimates and forecasts to emissions forecasts prepared in past air quality attainment plans for Santa Barbara County.

### TABLE 7

**AQAP TRACKING OF ON-ROAD MOBILE SOURCE EMISSIONS FORECASTS**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission Factor Model</td>
<td>EMFAC6C</td>
<td>EMFAC7D</td>
<td>EMFAC7D</td>
<td>EMFAC7F</td>
<td>EMFAC7F/1.1</td>
<td>MVEI7G1.0c</td>
</tr>
<tr>
<td>Baseline VMT</td>
<td>5,372,000</td>
<td>7,437,000</td>
<td>7,437,000</td>
<td>8,464,000</td>
<td>8,269,000</td>
<td>9,100,000</td>
</tr>
<tr>
<td>1990 VMT Forecast</td>
<td>7,237,000</td>
<td>8,019,000</td>
<td>8,019,000</td>
<td>8,464,000**</td>
<td>8,531,000**</td>
<td>9,085,500**</td>
</tr>
<tr>
<td>1996 VMT Forecast</td>
<td>8,150,000</td>
<td>8,899,000</td>
<td>8,899,000</td>
<td>8,915,000</td>
<td>8,586,000 TCM</td>
<td>8,345,000</td>
</tr>
<tr>
<td>1999 VMT Forecast</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>9,460,000</td>
</tr>
<tr>
<td>1990 ROG Emissions Forecast</td>
<td>10.64 t/d</td>
<td>16.58 t/d</td>
<td>16.58 t/d</td>
<td>18.39 t/d</td>
<td>20.34 t/d</td>
<td>43.82 t/d</td>
</tr>
<tr>
<td>1990 NOx Emissions Forecast</td>
<td>19.38 t/d</td>
<td>21.48 t/d</td>
<td>21.41 t/d TCM</td>
<td>18.91 t/d</td>
<td>15.75 t/d</td>
<td>25.24 t/d</td>
</tr>
<tr>
<td>1999 ROG Emissions Forecast</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>22.16 t/d</td>
</tr>
<tr>
<td>1999 NOx Emissions Forecast</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>22.07 t/d TCM</td>
</tr>
</tbody>
</table>

* 1990 Baseline VMT Estimate was a forecast based on the 1987 Baseline
** Baseline VMT Estimate (not a forecast).

TCM Analysis Results Provided if Documented

The disparate ROG and NOx on-road mobile source emission estimates between the 1998 CAP and prior air quality plans can be attributed to the following model enhancements:

<table>
<thead>
<tr>
<th>Model Enhancement</th>
<th>Effect of Emissions (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) New ARB Emissions Model (MVEI7G1.0c)</td>
<td>3.04</td>
</tr>
</tbody>
</table>

2 For a more detailed description of these modeling enhancements and their impact on the 1996 planning emission inventory see 1996 On-Road Emission Inventory Sensitivity Analysis, SBCAG, March 4th 1998.
In 1996/97, ARB updated its motor vehicle emission inventory model. MVEI7G1.0c included many state and federal control programs that were not accounted for in the previous model (e.g., reformulated gasoline, new heavy duty vehicle NOx standards, to name a few) as well as several model enhancements including: adjustments for high emitting vehicles; incorporation of real-world driving cycles; modified vehicle starts methodology for variable soak times (i.e., redefined cold and hot starts); and, incorporated an adjustment to convert vehicle trip ends to vehicle starts, to name just a few. EPA approved the use of MVEI7G1.0c for use in California in 1997.

<table>
<thead>
<tr>
<th>Model Enhancement</th>
<th>Effect of Emissions (tons per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) New SBCAG On-Road Activity Estimates (VMT &amp; Trips)</td>
<td>ROG: 0.78  NOx: 1.36</td>
</tr>
</tbody>
</table>

SBCAG completed a full recalibration of its regional model in 1997. The recalibration effort involved a review of the entire model structure, network, socioeconomic inputs, an update of the 1990 base year model, and the development of a new 1996 base year model (the 1994 CAP was based on the previous 1990 base year travel model). Validation of the 1990 and 1996 base year models met all federal and state criteria for assessing an acceptable level of accuracy for the use of transportation model data as input to developing emission inventory estimates. Approval to use the recalibrated models for such purposes was received by Caltrans’, Regional Travel Forecasting Branch in February 1998. Consequently, the revised 1996 base year model resulted in higher levels of vehicle activity (i.e., vehicle miles of travel) resulting in the above emission increases in ROG and NOx.

<table>
<thead>
<tr>
<th>Model Enhancement</th>
<th>Effect of Emissions (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3) Use of Model VMT by Speed Class Distribution vs. ARB Default</td>
<td>ROG: 1.31  NOx: 1.58</td>
</tr>
</tbody>
</table>
Prior to the 1998 Clean Air Plan, SBCAG had relied on ARB’s default VMT by speed class distribution for Santa Barbara County and made adjustments based on specific traffic flow improvement project analysis. This approach was limited given that ARB’s distribution was well over 15 years old, and more importantly, there was just one “static” distribution for all forecasts. This essentially precluded the effects of growth (i.e., vehicle growth due to increases in population and employment) from being reflected in future year speed class distributions. This was remedied by extracting data (vehicle trips, link speeds, link distances) from SBCAG’s travel model to generate a unique VMT by speed class distribution for each forecast.

ARB last updated its demographic profiles for the state’s light-duty vehicles (autos and trucks) in 1992/93 using vehicle registration data acquired from the Department of Motor Vehicles (DMV). For each air district in California, ARB used one statewide average distribution. For future years, ARB uses data from past statewide vehicle sales and assumptions on the natural attrition of older vehicles to forecast how the base year distribution will change (i.e., fleet turn over). Hence, the 1996 demographic profile used in the 1994 Clean Air Plan was an estimated fleet-mix applied to a statewide average. In 1997, SBCAG acquired the county’s 1996 vehicle registration data from the DMV to gauge the accuracy of ARB’s light-duty vehicle distribution. Analysis of this data revealed that ARB had over-estimated the market penetration of new “cleaner” vehicles in the county’s vehicle fleet, and had underestimated the number of older more polluting vehicles still being registered within the county. Upon request from the APCD and SBCAG, ARB authorized the use of Santa Barbara County’s specific vehicle age distribution for light-duty autos and trucks as part of this SIP update. ARB will be providing county specific vehicle age distributions in each air district as part of the next update to MVEI7G1.0c scheduled for release in 1999.

Changes to the 1996 on-road mobile source emission inventory resulting from these model improvements are graphically shown in Figure C-3.
Figure C-1

On-Road Mobile Source ROG Emission Reductions
Tons Per Day

Federal Measures
76% (2.25 tons)

CAP Measures
24% (0.71 tons)

State Tailpipe
85% (0.60 tons)

Local Tailpipe
9% (0.07 tons)

TDM/TSM
6% (0.04 tons)

Total ROG Emission Reduction = 2.96 tons per day

1999 Emission Forecast
Figure C – 2

Tracking Daily Vehicle Miles of Travel
Santa Barbara County – Santa Barbara Travel Model

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT Estimate</th>
<th>VMT Forecast</th>
<th>VMT Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>8269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>8201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>8227</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>8522</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>8591</td>
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<td></td>
</tr>
<tr>
<td>1995</td>
<td>8539</td>
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<td></td>
</tr>
<tr>
<td>1996</td>
<td>8582</td>
<td></td>
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<td>1997</td>
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<td>1998</td>
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<td>9744</td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td>9744</td>
</tr>
</tbody>
</table>

VMT Estimate: Office of Travel Forecasting (HPMS, Caltrans)
VMT Ceiling: Error Tolerance: 3%
Figure C-3.
Changes to the 1996 On-Road Mobile Source Emission Inventory

<table>
<thead>
<tr>
<th>Activity</th>
<th>SCD</th>
<th>Demo</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>3.34</td>
<td>1.36</td>
</tr>
<tr>
<td>ROG</td>
<td>3.04</td>
<td>0.78</td>
</tr>
</tbody>
</table>

1998 CAP Enhancements