

SACRAMENTO METROPOLITAN



AIR QUALITY  
MANAGEMENT DISTRICT

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Recommended Guidance for  
Land Use Emission Reductions  
Version 3.2  
*(for Operational Emissions)*

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April 1, 2015

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# Introduction

The Sacramento Metropolitan Air Quality Management District (SMAQMD or the District) utilizes the most recent version of the California Emissions Estimator Model (CalEEMod) to determine the operational emissions of a project. Projects that generate a significant impact for ozone precursors should create an Operational Air Quality Mitigation Plan (AQMP) to minimize impacts, while projects that generate a significant impact for greenhouse gases (GHG) should create a Greenhouse Gas Reduction Plan (GHGRP). Both plans consist of feasible measures that reduce operational emissions associated with the project and are incorporated as mitigation into the project's environmental document and the implementation is enforced by the local jurisdiction. The AQMP or GHGRP can be a standalone document or incorporated into a project's environmental document. This guidance document instructs proponents of projects within the District how to quantify, apply, and comply with various mitigation measures.

There are two types of measures: those that are included in CalEEMod (known as on-model measures) and those not included in CalEEMod but accepted by the SMAQMD (called off-model measures). Regardless of the type of measure, each requires a narrative demonstrating that the measure is being met, as well as an enforceable mechanism to ensure it is implemented for the life of the project.

As measures may have different reduction values in different circumstances, the point values herein are for illustrative purposes only and actual reduction credit assigned to the project for a specific measure will vary across projects, pollutants, and places and can be calculated using CalEEMod. Reduction value ranges for on-model measures were reported in the California Air Pollution Control Officers Association Quantifying Greenhouse Gas Mitigation Measures document (CAPCOA Measures) and based on the research conducted to develop those measures.

Measures are numbered by their category and source. The alpha-numeric measures can be found in the [CAPCOA Measures](#), with the letters representing the category of the measure. For example, measure LUT-9 can be found as the ninth measure in the Land Use / Location category in the CAPCOA Measures document. The alpha-alpha measures are not found in the CAPCOA Measures document, with the first letters representing the category of the measure. For example, measure T-a is the first measure in the Transportation Category for off-model measures. NOTE: PS is a special pre-requisite that must be implemented for any project utilizing CAPCOA Measures in the Transportation Category, while TS contains instructions on how to integrate a traffic study into CalEEMod.

It is recommended that proponents consult this guide's companion documents, SMAQMD's [CEQA Guide to Air Quality Assessment](#) and [SMAQMD's Tips for Using CalEEMod](#) to create a successful AQMP or GHGRP. Any questions about this guide should be directed to SMAQMD [Land Use and Transportation Staff](#).

# Protocol for Ozone Precursors

Projects that are anticipated to emit 65 pounds or more of NO<sub>x</sub> or 65 pounds or more of ROG per day are considered operationally significant for CEQA purposes and should apply feasible mitigation. For projects that are included in the current State Implementation Plan (SIP), the District recommends a 15 percent reduction of mobile source emissions. For projects not considered in the SIP, the District recommends a 35 percent reduction. These reductions are considered feasible mitigation, and should be included in an AQMP. If a project is partially included in the SIP, proponents should contact District staff to discuss the appropriate mitigation percent reduction to apply to the project. Additional discussion of the different reduction levels is available in Section 4.4 of [Chapter 4](#) of the District's [CEQA Guide to Air Quality Assessment](#). Lead agencies and proponents should work with the District and SACOG to determine if the project is included in the SIP.

## **Determining if a project requires an Air Quality Mitigation Plan**

To determine if a project exceeds SMAQMD ozone precursor thresholds (65 lbs/day of NO<sub>x</sub> or ROG) and thus, requires an AQMP, enter all project land uses into CalEEMod and run the project with default settings. Check the estimated total daily emissions for Summer NO<sub>x</sub>, Summer ROG, Winter NO<sub>x</sub>, and Winter ROG in the full build-out year<sup>1</sup>. If any of these values are 65 lbs/day or higher, the project is considered operationally significant and should prepare an AQMP as described below.

## **Setting a reduction target**

To determine the amount of emissions a project must mitigate, the first step is to determine the total mass emissions of ozone precursors released by the project's mobile sector.

On a ton for ton basis, NO<sub>x</sub> reductions provide greater ozone benefits than VOC/ROG reductions.<sup>2</sup> As such, the District recommends normalizing ozone precursors based on their ozone creation potential in units of Equivalent Oxides of Nitrogen (NO<sub>x</sub>e). The conversion rate recommended by the Land Use and Transportation staff is as follows:

Ozone Precursor	Equivalent Oxides of Nitrogen
1 NO <sub>x</sub>	1 NO <sub>x</sub> e
1 VOC or ROG	$\frac{1}{3}$ NO <sub>x</sub> e

Using the CalEEMod run from the previous step, determine which season (Winter or Summer) has higher total emissions. Utilizing the higher season, review the detailed output and convert the NO<sub>x</sub> and ROG from the mobile sector into NO<sub>x</sub>e. Divide the mobile ROG by three and add the resulting quotient

<sup>1</sup> [Chapter 4](#) of the [CEQA Guide to Air Quality Assessment](#) discusses analysis expectations in more detail.

<sup>2</sup> Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, SMAQMD, March 26, 2009. Page 14-3 & 14-4.

to the mobile NO<sub>x</sub>. This is a project's mobile NO<sub>x</sub>e in lbs/day. Your reduction target will be a fixed percentage of this number (usually 15% or 35%, depending on the project's consideration in the SIP). Multiply the project's mobile NO<sub>x</sub>e by your target percent to establish the pounds per day the project must mitigate. This is your reduction target. For example, a land development project considered in the SIP has unmitigated mobile sector emissions of 76 lbs/day of NO<sub>x</sub> and 72 lbs/day of ROG. The ozone creation potential of the unmitigated project's mobile sector would be 100 lbs/day of NO<sub>x</sub>e. As such, the project's mitigation target would be 15 lbs/day of NO<sub>x</sub>e.

**Meeting the reduction target**

The proponent should now apply the project mitigation and recalculate the daily summer or winter emissions (whichever was highest) and, using the methodology above, report the mitigated project's mass ozone precursors in NO<sub>x</sub>e. Please note that while the reduction target is based on mobile sector emissions, the project may utilize mitigation from *any* sector to meet the target. As such, subtract the project's total mitigated NO<sub>x</sub>e from the project's total unmitigated NO<sub>x</sub>e. The District *strongly* recommends that projects with traffic studies use prerequisite TS, but may also use all other available measures as needed.

A plan is considered to meet the target if the following equation is true:

$$Reduction\ Target \leq Unmitigated\ Project\ NO_{x,e} - Mitigated\ Project\ NO_{x,e}$$

For example, if the reduction target is 15 lbs/day of NO<sub>x</sub>e, the unmitigated project's total ozone precursor emissions are 120 lbs/day of NO<sub>x</sub>e, and the mitigated project's total ozone precursor emissions are 100 lbs/day of NO<sub>x</sub>e, the calculations would be as follows:

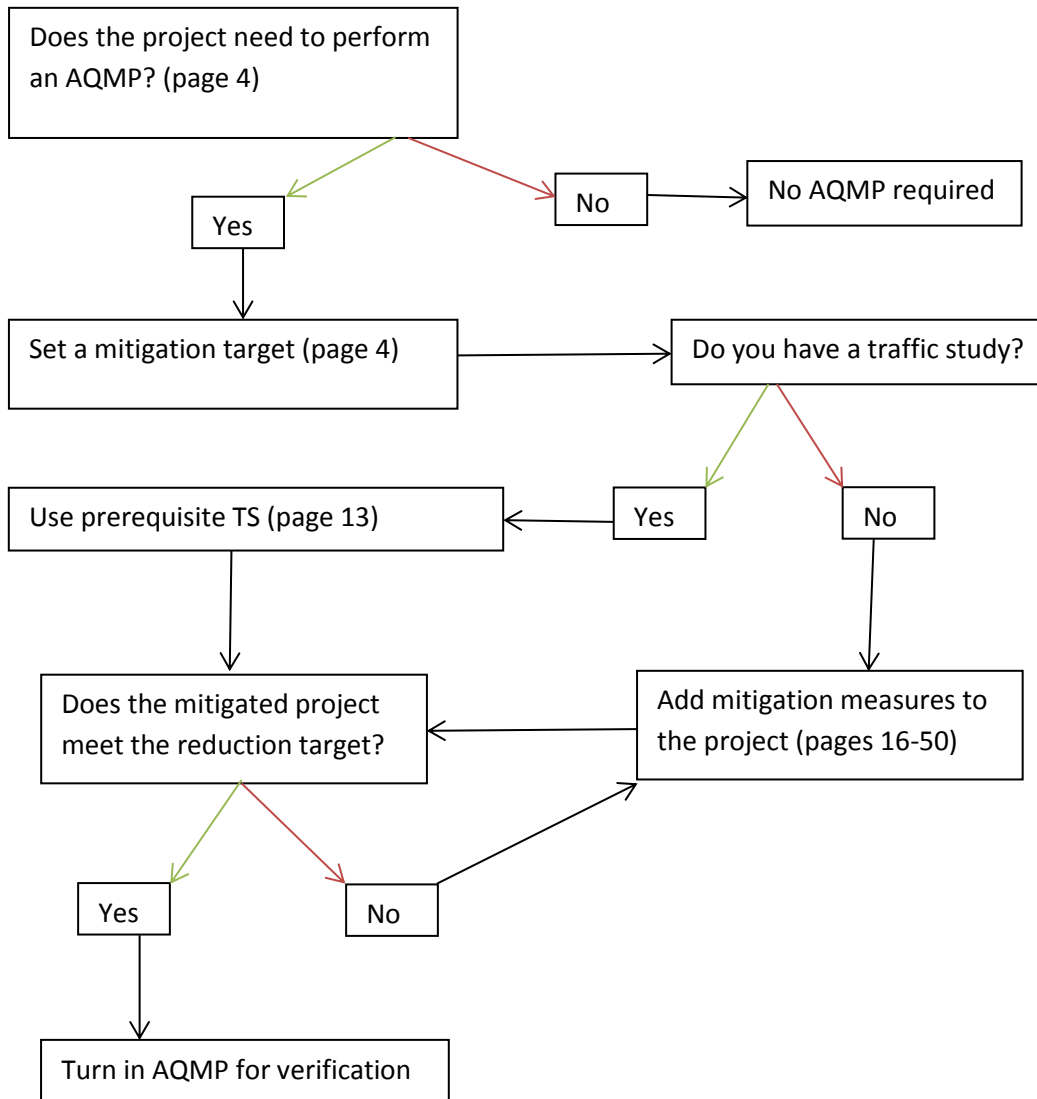
$$15 \frac{lbs}{day} NO_{x,e} \leq 120 \frac{lbs}{day} NO_{x,e} - 100 \frac{lbs}{day} NO_{x,e}$$

$$15 \frac{lbs}{day} NO_{x,e} \leq 20 \frac{lbs}{day} NO_{x,e}$$

The above statement is true; the mitigated project meets the reduction target.

NOTE: A project must still disclose ALL ozone precursors for the unmitigated and mitigated project, and base the initial significance determination on all sectors, not just the mobile sector.

**Quick Reference Flow-Chart**



# Protocol for Greenhouse Gases

The analysis of project level GHG is specifically covered in [Chapter 6](#) of the District's [CEQA Guide to Air Quality Assessment](#), while [Chapter 9](#) provides information on larger plan areas such as specific, community, and general plans.

## ***Jurisdictions with Existing GHG Strategies***

Each jurisdiction determines GHG significance for proposed development projects independently. There are a few strategies in use to address GHG emissions within the boundaries of the District. Proponents with projects in these jurisdictions should utilize the following strategies when analyzing GHG emissions and determining significance.

- City of Citrus Heights – Climate Action Plan with reduction targets and measures.<sup>3</sup>
- City of Elk Grove – Climate Action Plan with reduction targets and measures<sup>4</sup>.
- City of Sacramento - Climate Action Plan with reduction targets and measures<sup>5</sup>.
- County of Sacramento - GHG thresholds for transportation and energy usage adopted in the General Plan Update Environmental Impact Report<sup>6</sup>.

If a jurisdiction has a numerical threshold, the mitigated project GHG emissions should be reviewed to determine if the project emissions have met the established threshold. If a jurisdiction has an adopted Climate Action Plan, the project environmental document must describe all the reduction measures in the Climate Action Plan that apply to the project and demonstrate how the project will incorporate those reduction measures to show consistency with the Climate Action Plan. If a project cannot tier from or is not consistent with an applicable Climate Action Plan, consult with the jurisdiction to determine if the District's GHG thresholds would be an appropriate alternative to evaluate project significance.

## ***Air District GHG Thresholds of Significance***

To assist with projects in jurisdictions without GHG thresholds and/or Climate Action Plans, the District's Board of Directors adopted the following recommended GHG thresholds<sup>7</sup>.

- Operational phase of land development projects – 1,100 metric tons CO<sub>2</sub>e per year.
- Construction phase of a project – 1,100 metric tons CO<sub>2</sub>e per year.
- Stationary source project – 10,000 metric tons CO<sub>2</sub>e per year direct emissions.

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<sup>3</sup> Adopted by the City of Citrus Heights on August 11, 2011. Accessible [here](#).

<sup>4</sup> Adopted by the City of Elk Grove on March 27, 2013. Accessible [here](#).

<sup>5</sup> Adopted by the City of Sacramento on February 14, 2012. Accessible [here](#).

<sup>6</sup> Adopted by the County of Sacramento November 9, 2011. Accessible [here](#). The Climate Change section of the EIR is accessible [here](#).

<sup>7</sup> Adopted on October 23, 2014. SMAQMD's Board Resolution highlighting the rationale for adoption of the thresholds. Accessible [here](#).

The following guidance only applies to operational emissions and the development of a GHGRP, not construction and stationary source emissions.

### ***Analysis Expectations***

For land use jurisdictions without GHG analysis guidance, the District recommends disclosing the project's total annual GHG emissions per the recommendations contained in [Chapter 6](#) of the District's [CEQA Guide to Air Quality Assessment](#). Chapter 6 recommends reporting the GHG emissions of both the unmitigated project and the mitigated project in metric tons of CO<sub>2</sub>e during the full build-out year of the project. GHG emissions can then be compared to the operational significance threshold to determine if a GHGRP should be developed.

For projects with operational GHG emissions exceeding 1,100 metric tons CO<sub>2</sub>e per year, a GHGRP should be prepared. The District recommends the analysis compare project GHG emissions for two scenarios and determine if the project meets a 21.7% reduction. The two scenarios include the following:

1. Proposed project in 2020 with project specific mitigation measures including state GHG reduction measures for transportation and energy.
2. No Action Taken project in 2020 without project specific mitigation measures and without state GHG reduction measures for transportation and energy.

The basis for the recommended 21.7% reduction is described in the District's [Justification for Greenhouse Gas Emissions Thresholds of Significant](#) document. The District provides quantification guidance for [transportation](#) and [non-transportation](#) GHG emissions for the project and no action taken scenarios. A description of the measures used to demonstrate the 21.7% reduction should be documented in the GHGRP.

Projects building after 2020 should disclose emissions in the build out year and consider demonstrating a continued downward trajectory of emissions supportive of California's climate change goals<sup>8</sup>.

### ***Reviewing Larger Plan Areas***

General plans, community plans and specific plans cover large areas of land with development occurring over a longer period of time (i.e., 20 years) than a single development project. Sometimes the information available for a large plan doesn't exist in enough detail for the plan to utilize the mitigation measures described in this guidance document directly. [Chapter 9](#) of the District's [CEQA Guide to Air Quality Assessment](#) provides a discussion on how to handle large plan areas and include all feasible mitigation measures into those planning documents. A Climate Action Plan is often the preferred mechanism for a General Plan to identify and mitigate GHG emissions.

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<sup>8</sup> [Executive Order S-3-05](#) sets forth the ultimate climate change goal of reducing emissions by 80% below 1990 levels by 2050. State law does not yet require reductions beyond the AB32 2020 target.



# Table of Prerequisites and Measures

The following table summarizes the mitigation measures available to reduce ozone precursor and GHG emissions from a project, as well as the supporting information CalEEMod needs to calculate the reductions associated with these measures. Complete all prerequisites *before* selecting mitigation measures.

<b>Prerequisites:</b> The proponent must provide the following information to CalEEMod and the SMAQMD. (Designated by name)			Page
PS	Project Setting (Required)	Determination of project category	13
TS	Traffic Study (If Available)	Incorporating results of a traffic study into CalEEMod	14

A note is provided in the Ozone Precursors and GHG columns to identify if the measure applies to the pollutant (Yes), does not apply to the pollutant (No), the District does not recommend use of the measure to reduce the pollutant (N/A), or project specific information needs to be provided to demonstrate a reduction in the pollutant (Maybe).

<b>On-Model Measures:</b> CalEEMod's mitigation measures are based on the CAPCOA Measures. Further clarification on these measures can be found in <a href="#">CalEEMod's User Guide</a> and the <a href="#">CAPCOA Measures document</a> .					
CalEEMod Traffic Tab: Land Use & Site Enhancement Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
LUT-1	Increase Density	Project more dense than typical developments	Yes	Yes	16
LUT-3	Increase Diversity	Different types of land uses are near each other	Yes	Yes	17
LUT-9	Improve Walkability Design	Walkable street network	Yes	Yes	18
LUT-4	Improve Destination Accessibility	Project close to regional employment or destination center	Yes	Yes	19
LUT-5	Increase Transit Accessibility	Project near high-quality transit	Yes	Yes	19
LUT-6	Integrate Below Market Rate Housing	Incorporates affordable housing	Yes	Yes	20
CalEEMod Traffic Tab: Neighborhood Enhancement Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
SDT-1	Improve Pedestrian Network	On-site pedestrian access network links all of project internally and externally	Yes	Yes	21
SDT-2	Provide Traffic Calming Measures	Projects streets and intersections feature traffic calming features	Yes	Yes	22
SDT-3	Implement NEV Network	Project provides a viable NEV network	Yes	Yes	23

CalEEMod Traffic Tab: Parking Policy/Pricing Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
PDT-1	Limit Parking Supply	Parking supply below ITE rates	Yes	Yes	24
PDT-2	Unbundle Parking Costs	Parking cost separate from property costs	Yes	Yes	25
PDT-3 <sup>9</sup>	On-Street Parking Market Pricing	On-street parking utilizes market-rate pricing (such as meters)	N/A	N/A	25
CalEEMod Traffic Tab: Transit Improvement Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
TST-1	Provide BRT System	Establish a Bus Rapid Transit line with permanent operational funding stream	Yes	Yes	26
TST-3	Expand Transit Network	Establishes or enhances bus line with permanent operational funding stream	Yes	Yes	27
TST-4	Increase Transit Frequency	Reduces headways of existing transit	Yes	Yes	27
CalEEMod Traffic Tab: Commute Trip Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
TRT-1&2	Implement Trip Reduction Program	TMA membership or other comprehensive services	Yes	Yes	28
TRT-4 <sup>10</sup>	Transit Subsidy	Proponent subsidizes sustainable modes of transportation	N/A	N/A	29
TRT-15	Implement Employee Parking "Cash-Out"	Employer provides cash-value of a parking space to employees who do not use one	N/A	N/A	29
TRT-14	Workplace Parking Charge	Charge employees for their parking	N/A	N/A	29
TRT-6	Encourage Telecommuting and Alternative Work Schedules	Allow/require 9/80s, 4/10, and telecommuting	N/A	N/A	29
TRT-7	Market Commute Trip Reduction Option	Market sustainable travel options	N/A	N/A	29
TRT-11	Employee Vanpool/Shuttle	Provide employer-sponsored vanpool or shuttle program	N/A	N/A	29
TRT-3	Provide Ride Sharing Program	Establish a carpooling program with associated infrastructure	N/A	N/A	30
CalEEMod Traffic Tab: School Trip Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
TRT-13	Implement School Bus Program	Restore or expand school bus program or provide safe routes to school	N/A	N/A	30
CalEEMod Area Tab: Hearth Measures (No associated CAPCOA measure, designated sequentially)			Ozone Precursors	GHG	Page
H-a	Only Natural Gas Hearth	Project restricts hearths to Natural Gas Only	N/A	N/A	31
H-b	No Hearth	Project contains no hearths	N/A	N/A	31

<sup>9</sup> PDT-3: The District does not recommend utilizing this measure in the model, use T-c instead.

<sup>10</sup> TRT-4: The District does not recommend utilizing this measure in the model, use M-z instead.

CalEEMod Area Tab: Consumer Products (No associated CAPCOA measure, designated sequentially)			Ozone Precursors	GHG	Page
V-a	Use Low VOC Cleaning Supplies	Project utilizes only low VOC Cleaning supplies in perpetuity	N/A	N/A	32
CalEEMod Area Tab: Architectural Coatings (No associated CAPCOA measure, designated sequentially)			Ozone Precursors	GHG	Page
V-b	Use low VOC Paint	Project utilizes only low VOC Paint in perpetuity	N/A	N/A	33
CalEEMod Area Tab: Landscape Equipment Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
A-1,2&3	% Electric Lawnmower	Landscaping equipment and outdoor electrical plugs provided to project users	N/A	N/A	34
	% Electric Leaf blower		N/A	N/A	34
	% Electric Chainsaw		N/A	N/A	34
CalEEMod Energy Tab: Building Energy Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
BE-1	Exceed Title 24	Use less energy than allowed by Title 24	Yes	Yes	35
LE-1	Install High Efficiency Lighting	Make use of high-efficient outdoor and public lighting	No	Yes	36
BE-4	Energy Efficient Appliances	Use appliances more energy efficient than standard models	No	Yes	37
CalEEMod Energy Tab: Alternative Energy Measures (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
AE-1	On-site Renewable Energy	Establish on-site renewable energy. (No Ozone Precursor reductions if NO <sub>x</sub> intensity is higher than electric utility.)	Maybe	Yes	38
CalEEMod Water Tab: Water Conservation Strategy (No CAPCOA measure, designated sequentially)			Ozone Precursors	GHG	Page
WUW-2	Apply Water Conservation Strategy	Reduce indoor and outdoor water use	No	Yes	39
CalEEMod Water Tab: Water Supply (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
WSW-1	Use Reclaimed Water	Project utilizes non-potable water	No	Yes	41
WSW-2	Use Grey Water	Project reuses onsite water	No	Yes	41
CalEEMod Water Tab: Indoor Water Use (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
WUW-1	Install Low-Flow Bathroom Faucet	Reduce Indoor water use with low-flow fixtures	No	Yes	43
	Install Low-Flow Kitchen Faucet		No	Yes	43
	Install Low-flow Toilet		No	Yes	43
	Install Low-flow Shower		No	Yes	43

CalEEMod Water Tab: Outdoor Water Use (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
WUW-5	Reduce Turf in Landscapes and Lawns	Use less turf than normal projects	No	Yes	44
WUW-4	Use Water-Efficient Irrigation Systems	Install a smart irrigation control system	No	Yes	45
WUW-3	Water Efficient Landscape	Plant native or drought-resistant trees and Vegetation	No	Yes	45
CalEEMod Solid Waste Tab (Designated by associated CAPCOA measure)			Ozone Precursors	GHG	Page
SW-1	Institute Recycling and Composting Services	Project Recycles, Reduces, and Reuses	No	Yes	47

**Off-Model Measures:** These measures are available to proponents but not incorporated into CalEEMod. If a project has multiple land use types, measures must be scaled, so that if measures are limited in application to one type of land use it will only be counted as mitigation for the emissions associated with that land use type.

CAPCOA Measures not included in CalEEMod (Designated by CAPCOA measure)			Ozone Precursors	GHG	Page
#	Non-CalEEMod CAPCOA Measures	Use any CAPCOA measure not included in the CalEEMod Model	Maybe	Yes	47
Transportation Measures (No CAPCOA measure, designated by name)			Ozone Precursors	GHG	Page
T-a	Anti-Idling/Congestion Strategies	Installation of roundabouts, removal of four-way stop signs, diverging diamond intersections, permissive-protective left-turns, etc.	Yes	Yes	48
T-c	Cruising Reductions	Reduce cruising for parking	Yes	Yes	49
Miscellaneous Measures (No CAPCOA measure, designated by name)			Ozone Precursors	GHG	Page
M-n	NO <sub>x</sub> reduction technology	Technologies that reduce ambient NO <sub>x</sub> available for Ozone creation	Yes	No	50
M-z	Other	Other proposed strategies, in consultation with project lead agency and SMAQMD	Maybe	Maybe	50

# Prerequisites

These protocols are needed for CalEEMod to accurately estimate the anticipated emission reductions associated with the various mitigation measures. While all projects must complete PS: Project Setting, only projects with a traffic study required of them by the Lead Agency need to complete TS: Traffic Study.

## PS: Project Setting (Required)

The screenshot shows the 'Mitigation' software interface. At the top, there are tabs for 'Construction', 'Traffic', 'Area', 'Energy', 'Water', and 'Solid Waste'. Below these are sub-tabs for 'Land Use & Site Enhancement' and 'Commute'. The 'Project Setting' dropdown menu is highlighted with a red box, showing options: 'Low Density Suburban', 'Low Density Suburban', 'Suburban Center', 'Urban', and 'Urban Center'. The interface includes sections for 'Land Use', 'Neighborhood Enhancements', 'Parking Policy/Pricing', and 'Transit Improvement', each with various checkboxes and input fields. A 'Remarks' box is at the bottom, and navigation buttons '<< Previous' and 'Next >>' are on the right.

*Protocol:* All projects have a project setting, which helps predict the efficacy of traffic tab measures. While the CAPCOA Measures document provides definitions of the location setting on pages 59 and 60, the CalEEMod labels for project setting do not match the CAPCOA definitions for location setting. Use the following table to match the CalEEMod project setting with the CAPCOA location setting:

CalEEMod Project Setting	CAPCOA Location Setting
Low Density Suburban	Suburban
Suburban Center	Suburban Center
Urban	Urban
Urban Center	Compact Infill

Within the narrative of this measure, the proponent must provide evidence that their project meets the location setting requirements as put forth by the CAPCOA guidance.

*Applicability:* All projects utilizing traffic tab measures must complete this measure.

*Example:* A four-story mixed-use development adjacent to a light-rail station within the River District of Sacramento would qualify for the “Compact Infill” definition in the CAPCOA Measures document. The proponent would select the “Urban Center” setting in the drop-down menu marked “Project Setting.”

*Reference:* See the location setting definitions as shown on pages 59 and 60 of the CAPCOA guidance.

### **TS: Traffic Study (If Available)**

*Protocol:* Recognizing that site-specific information is better than information generated from a statewide model, proponents that prepare a traffic study should use the results of that traffic study instead of the model defaults. Traffic studies typically include calculations of internal trip capture, mix of uses, distance to job centers, and sometimes walking and cycling information. In lieu of using CalEEMod to estimate the impact of these features on a project, the proponent will use the results of the traffic study. As incorporating a traffic study into CalEEMod involves changing defaults and multiple model runs, special instructions must be followed to use this measure.

- 1) Disclose what air quality elements are included in the traffic study: Traffic studies may include some measures (such as diversity of uses and density) but not include others (such as Transportation Management Association (TMA) membership or cycling). The proponent must disclose and describe the emissive reducing elements of the project that are incorporated into the assumptions of the traffic model, and the guarantees they will be implemented (such as inclusion as a condition of approval or mitigation monitoring and reporting plan).
- 2) Establish the unmitigated project baseline: The proponent will run CalEEMod using the proposed land uses in default mode to establish the unmitigated project baseline, per this document’s Protocol for Ozone Precursors
- 3) Create mitigated project: The proponent will then have to create a second CalEEMod run, altering the defaults and adding mitigation not included in the traffic study. The mitigated project’s emissions can be estimated using the following protocol:

- a. Alter CalEEMod defaults with Traffic Study Information: On the Vehicle Trips tab, change the CalEEMod defaults to reflect the results of the traffic study. Check that VMT and total trips match the results of your study.

Home Project Characteristics Land Use Construction Operational Vegetation Mitigation Reporting Help  Cascade Defaults

**Operational - Mobile**

Vehicle Trips Vehicle Emissions Road Dust

Import csv Default Undo

Land Use SubType	Size Metric	WkDy Trip Rate (/size /day)	Sat Trip Rate (/size /day)	Sun Trip Rate (/size /day)	Res H-W Trip Length (miles)	Res H-S Trip Length (miles)	Res H-O Trip Length (miles)	Non Res C-C Trip Length (miles)	Non Res C-W Trip Length (miles)	Non Res C-NW Trip Length (miles)	Primar Trip (%)	Divert Trip (%)	Pass-B Trip (%)	Res H-W Trip (%)	Res H-S Trip (%)	Res H-O Trip (%)	Non Res C-C Trip (%)	Non Res C-W Trip (%)	Non Res C-NW Trip (%)
Apartments Mid Rise	Dwelling Unit	6.59	8	4	6	7.3	7.5	0	0	0	86	11	3	42.6	21	36.4	0	0	0
Elementary School	Student	1.4	0	0	0	0	0	10	9.5	7.3	63	25	12	0	0	0	30	65	5
Single Family Housing	Dwelling Unit	8	7	8	8.1	7.3	7.5	0	0	0	86	11	3	42.6	21	36.4	0	0	0
Strip Mall	1000sqft	42	42	10	0	0	0	6	9.5	7.3	45	40	15	0	0	0	64.4	16.6	19
Supermarket	1000sqft	100	160	160	0	0	0	6	9.5	7.3	34	30	36	0	0	0	74.5	6.5	19

<< Previous Next >>

Remarks  
Defaults altered to reflect traffic study

- b. Add non-traffic-study measures: After changing the default, the proponents may now select any and all applicable measures that were not included in the traffic study. However, to avoid double-counting, any measure considered in the traffic study may not be selected again. In addition, CalEEMod includes sectorial and global caps on transportation measures (see page 55 of the CAPCOA guidance). The proponent must demonstrate that the measure is in addition to the traffic study measures and would not violate sectorial and global caps on emission reductions.

- 4) Compare unmitigated project to mitigated project: Establish the effectiveness of the AQMP and GHGRP using the Protocol for Ozone Precursors and Protocol for Greenhouse Gases located in this document.

# On-Model Measures

**On-Model Measures:** The CalEEMod mitigation measures are based on [CAPCOA Measures](#). The model applies the sectorial and global maximum reduction values (or caps) based on the project setting and combination of mitigation measures selected for the project, therefore the usual reductions listed for each measure cannot simply be summed to determine total project emission reductions. Further clarification on these measures and reduction caps can be found in [CalEEMod's User Guide](#) and the [CAPCOA Measures](#) document.

## CalEEMod Land Use & Site Enhancement Tab: Land Use Measures

The screenshot shows the 'Mitigation' interface for the 'Land Use & Site Enhancement' tab. The 'Project Setting' is 'Low Density Suburban'. The 'Land Use' section is highlighted with a red box and includes the following measures:

- Increase Density (Dwelling Units/acre, Jobs/Job acre)
- Increase Diversity
- Improve Walkability Design (Intersections/Square Miles)
- Improve Destination Accessibility (Distance to Dwtwn/Job Ctr (Miles))
- Increase Transit Accessibility (Distance to Transit Station (Miles))
- Integrate Below Market Rate Housing (#Dwelling Units Below Market Rate)

Other sections include 'Parking Policy/Pricing' and 'Transit Improvement'. A red warning message states: '\*The mitigation should be applicable to land use project evaluated. \*Remarks\* box should contain percent reduction justification.' Navigation buttons '<< Previous' and 'Next >>' are visible at the bottom right.

### **LUT -1 Increase Density (usual reduction 0.8 – 30.0% VMT)**

*Measure:* The project is designed in a way that increases density without increasing the amount of land utilized. The reductions in emissions are quantified based on reduced VMT associated with communities that feature higher densities, which normally would also include a mixed use component (on or off-site) and access or proximity to alternate modes of transportation. The proponent calculates density by



stating the dwelling units per net acre and/or jobs per net acre. If the user utilizes a non-standard method of calculating density (for example, excluding a particular land use type from the calculation) this deviation shall be noted in the remarks section at the bottom of the screen.

*Applicability:* This is applicable to all land uses in urban and suburban contexts (proponent must complete project setting measure). It is not applicable in rural contexts. It is appropriate for residential, retail, office, industrial and mixed-use projects. The project must be a minimum of 8 dwelling units per acre to qualify for this measure, and an error will return if the proponent inputs less than 8 dwelling units per acre. This measure is only applicable to projects within SACOG transit priority areas unless approved by SMAQMD.

*Example:* A subdivision has an average density of 10 dwelling units per acre. The proponent will select the box marked "Increase Density" and type "10" into the field marked "Dwelling Units/acre"

*Reference:* See measure LUT-1 on page 155 of the CAPCOA guidance.

### **LUT-3 Increase Diversity (Usual reduction: 9-30% VMT)**

*Measure:* The project is designed or located in an area with variety of land use types in close proximity (mixed use). SMAQMD recognizes that having different types of land uses near one another can decrease VMT since trips between land use types are shorter and may be accommodated by non-auto modes of transport. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.

*Applicability:* This is applicable to all land uses in urban and suburban contexts (proponent must complete project setting measure). It is not applicable in rural contexts. It is appropriate for mixed-use projects.

To apply this measure in urban areas the project must be predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential, are combined in a single building or on a single site in an integrated development project with functional interrelationships and a coherent physical design. The residential units should be within ¼-mile of parks, schools, or other civic uses. The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.

To apply this measure in suburban areas the project must have at least three of the following on site and/or offsite within ¼-mile: Residential Development, Retail Development, Park/Open Space, or Office.

*Example:* In an urban area, a multi-floor residential condominium tower includes retail space on the ground floor with retail units designed to accommodate an eatery, an ATM, and general retail or

commercial uses. A user may gain credit for this measure by clicking on the box adjacent to the words “increase diversity” in the Land Use and Site Enhancement mitigation screen.

*Reference:* See measure LUT-3 on page 162 of the CAPCOA guidance.

### **LUT-9 Improve Walkability Design (Usual reduction: 3.0 – 21.3% VMT)**

*Measure:* The project will include improved design elements to enhance walkability and connectivity. Improved street network characteristics within a neighborhood include street accessibility, measured in terms of number of intersections per square mile.

Cul-de-sacs with bicycle/pedestrian through access to another roadway or bicycle/pedestrian facility may be considered a “complete intersection” when calculating the project’s internal connectivity factor.

Streets internal to the project should connect to streets external to the project whenever possible. External connections of the project must occur, on average, a minimum of every quarter-mile along the project perimeter.

For projects with large amounts of undisturbed open space non-accessible to the public (such as wetland preserves), the land set-aside for such areas may be excluded from the denominator of intersections per square mile. However, each developable “island” would be considered its own project and must meet the external connectivity requirements.

The project must also implement LUT-9’s associated group measures when applicable and feasible. These measures are SDT-5: Incorporate Bike Lane Street Design (on-site), SDT-6: Provide Bike Parking in Non-Residential Projects, SDT-7: Provide Bike Parking in Multi-Unit Residential Projects and SDT-9: Dedicate Land for Bike Trails. Bicycle parking must be consistent with the most recent edition of the [Bicycle Parking Guidelines](#) as issued by the [Association of Pedestrian and Bicycle Professionals](#). A project must demonstrate compliance with these measures or state why compliance is not applicable or feasible.

*Applicability:* This is applicable to all land uses in urban and suburban contexts (proponent must complete project setting measure). This measure is appropriate for residential, retail, office, industrial and mixed-use projects and must have a minimum of 36 intersections per square mile to qualify for this measure. This measure is unavailable in rural settings without SMAQMD consent.

*Example:* A new subdivision includes a street network built in a traditional grid pattern with small blocks. The project includes connections to all roadways, bicycle paths, and pedestrian facilities touching the projects boundaries. User calculates the average number of intersections per mile for the developable area of the entire project. A user may gain credit for this measure by clicking on the box to the left of the words “Improve Walkability” and entering in the number of intersections per square mile into the field marked “Intersections/Square Miles.”

Since the example project does not contain multifamily or non-residential uses, SDT-6 and SDT-7 are not applicable.

*Reference:* See measure LUT-9 (3.1.9 Improve Design of Development) on page 181 of the CAPCOA guidance.

#### **LUT-4 Improve Destination Accessibility (Usual reduction: 6.7 – 20% VMT)**

*Measure:* The project will be located in an area with high accessibility to destinations. Destination accessibility is measured in terms of the number of jobs or other attractions reachable within a given travel time, which tends to be highest at regional centers and lowest at peripheral locations. The location of the project also increases the potential for pedestrians to walk and bike to these destinations and therefore reduces the VMT.

Destination accessibility is measured by the distance, in miles, from the project site to the regional center, as calculated using the street and highway network. For the purposes of this measure, SMAQMD considers the intersection of 10<sup>th</sup> Street and K Street in Sacramento to be the regional center.

*Applicability:* This is applicable to all land uses in urban and suburban contexts (proponent must complete project setting measure). This measure may not be utilized in a rural context without SMAQMD consent. This measure is appropriate for residential, retail, office, industrial and mixed-use projects.

*Example:* A new multi-family residential project at Howe Avenue and Hurley Way in Arden-Arcade. Using mapping software, the user calculates the distance between the geographic center of the project site and the Sacramento Regional Center. The project is 6 miles by car from 10<sup>th</sup> and K Streets. The proponent would then click on the box to the left of the words “Improve Destination Accessibility” and type “6” in the field marked “Distance to Dwntwn/Job Ctr (Miles).”

*Reference:* See measure LUT-4 on page 167 of the CAPCOA guidance.

#### **LUT-5 Increase Transit Accessibility (Usual reduction: 0.5 – 24.6% VMT)**

*Measure:* Locating a project with high density near transit will facilitate the use of transit by people traveling to or from the project site. The use of transit results in a mode shift and therefore reduced VMT. A project with a residential/commercial center designed around a rail or bus station is called a transit-oriented development (TOD). The project description should include, at a minimum, the following design features:

- A transit station/stop with high-quality, high-frequency bus service located within a 5-10 minute walk (or roughly ¼ mile from majority of development), and/or
- A rail station located within a 20 minute walk (or roughly ½ mile from station majority of development)

- Fast, frequent, and reliable transit service connecting to a high percentage of regional destinations
- Neighborhood designed for walking and cycling with a safe and convenient path of travel to the transit or rail stop/station

*Applicability:* This is applicable to all land uses in urban and suburban contexts (proponent must complete project setting measure). This measure is only applicable to projects within a SACOG designated transit priority areas unless approved by SMAQMD. This measure may be appropriate in a rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center. This measure is appropriate for residential, retail, office, industrial and mixed-use projects.

Auto-oriented uses (such as a drive-thru coffee-kiosk) are not allowed to utilize this measure without SMAQMD consent.

*Example:* A new project is built within a transit priority area. A user may gain credit for this measure by clicking on the box to the left of the words “Increase Transit Accessibility” and entering the distance between the geographic center of the nearest transit station and the edge of the project site into the box to right of these words in the Land Use and Site Enhancement mitigation screen. The user is encouraged to include references to maps or graphics from project’s environmental document that demonstrate the accuracy of the calculation of the distance between the transit station and the project site.

Reference: See measure LUT-5 on page 171 of the CAPCOA guidance.

### **LUT-6 Increase Below Market Rate Housing (Usual reduction: 6.7 – 20% VMT)**

*Measure:* Residential development projects of five or more dwelling units will provide a deed restricted low-income housing (below market rate – BMR) component on-site. Income has a statistically significant effect on the probability that a commuter will take transit or walk to work. BMR housing provides greater opportunity for lower income families to live closer to jobs centers and achieve jobs/housing match near transit.

*Applicability:* This is applicable to land uses in urban and suburban contexts (proponent must complete project setting measure). This measure is only applicable to projects within SACOG transit priority areas unless approved by SMAQMD. It is not applicable in rural contexts. It is appropriate for mixed-use projects. Proponents who pay into In-Lieu Fee programs are not eligible for this measure.

*Example:* A residential project includes BMR housing on site. A user may gain credit for this measure by clicking on the box to the left of the words “Increase Below Market Rate Housing” and entering the number BMR housing units into the box to right of these words in the Land Use and Site Enhancement mitigation screen.

Reference: See measure LUT-6 on page 176 of the CAPCOA guidance.

## CalEEMod Land Use & Site Enhancement Tab: Neighborhood Enhancement Measures

**Mitigation**

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

Project Setting: Low Density Suburban

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Land Use**

- Increase Density: Dwelling Units/acre, Jobs/Job acre
- Increase Diversity
- Improve Walkability Design: Intersections/Square Miles
- Improve Destination Accessibility: Distance to Dwtwn/Job Ctr (Miles)
- Increase Transit Accessibility: Distance to Transit Station (Miles)
- Integrate Below Market Rate Housing: #Dwelling Units Below Market Rate

**Neighborhood Enhancements**

- Improve Pedestrian Network: Project Site
- Provide Traffic Calming Measures: % Streets with Improvement, % Intersections with Improvement
- Implement NEV Network

**Parking Policy/Pricing**

- Limit Parking Supply: % Reduction in Spaces
- Unbundle Parking Costs: Monthly Parking Cost (\$)
- On-Street Market Pricing: % Increase in Price

**Transit Improvement**

- Provide BRT System: % Lines BRT
- Expand Transit Network: % Increase Transit Coverage
- Increase Transit Frequency: Level of Implementation, % Reduction in Headways

Remarks

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### **SDT-1 Improve Pedestrian Network (Usual reduction 0 - 2% VMT)**

*Measure:* The project will provide a pedestrian access network that internally links all uses and connects to all existing or planned external streets and pedestrian facilities contiguous with the project site. Emission reductions are awarded based on the project location, which are selected from the drop-down menu in CalEEMod.

- To qualify for the “project” setting the project must minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, landscaping, and slopes that impede pedestrian circulation are eliminated. Project design includes a designated pedestrian route interconnecting all site entrances, primary building entrances, public facilities, and adjacent uses to existing external pedestrian facilities and streets. Route has minimal conflict with parking and automobile circulation facilities. Streets (with the exception of alleys) within the project have sidewalks. All sidewalks internal and adjacent to project site are minimum of five feet wide. All sidewalks feature vertical curbs or planting strip separating the sidewalk from the parking or

travel lane. Pedestrian facilities and improvements such as grade separation, wider sidewalks, and traffic calming are implemented wherever feasible to minimize pedestrian barriers.

- To qualify for the “project and off site” setting the project must qualify for all the requirements of the “project” setting and implement improvements to off-site pedestrian network, or connect with a substantial and existing off-site pedestrian connections similar to those described as the “project” setting.
- If the project is located in a rural location, check the rural setting.

*Applicability:* This is applicable to all land uses in urban, suburban, and rural contexts (proponent must complete project setting measure). It is appropriate for residential, retail, office, industrial and mixed-use projects. Reduction benefits are provided if the project has both pedestrian network improvements on site and connections to the larger off-site network, and a lesser benefit if the project has only network improvements on site.

*Example:* A user may gain credit for this measure by clicking on the box to the left of the words “Improve Pedestrian Network” and selecting one of the 3 following settings from the drop down menu to the right: project, project & connecting off site, and rural.

*Reference:* See measure SDT-1 on page 187 of the CAPCOA guidance.

## **SDT-2 Provide traffic calming measures (Usual reduction: 0.25 – 1.00% VMT)**

*Measure:* The project provides traffic calming measures to encourage people to walk or bike instead of using a vehicle. Project design includes pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements. Roadways are designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips with traffic calming features. Street traffic calming features may include: on street parking, planter strips with street trees, chicanes, horizontal shifts (lane centerline that curves or shifts), bollards, rumble strips, woonerfs, and others. Intersection traffic calming measures may include: marked crosswalks, count-down signal timers, curb extensions, channelization islands, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, traffic circles or mini-circles, and others.

*Applicability:* This is applicable to all land uses in urban, suburban, and rural contexts (proponent must complete project setting measure). It is appropriate for residential, retail, office, industrial and mixed-use projects.

*Example:* A new project utilizes traffic circles at key intersections with chicanes and on-street parking to narrow the roadway. A user may gain credit for this measure by clicking on the box to the left of the words “Provide traffic calming measures” and entering the percentages of streets and intersections that have traffic calming improvements in the boxes to the right. The percentage of streets with improvements shall be calculated by dividing the number of streets with improvements by the total

number of streets in the project. The percentage of intersections with improvements shall be calculated by dividing the number of improved intersections by the total number of intersections.

*Reference:* See measure SDT-2 on page 190 of the CAPCOA guidance.

### **SDT-3 Implement NEV Network (Usual reduction: 0.5-12.7% VMT)**

*Measure:* The project will create local "light" vehicle networks, such as neighborhood electric vehicle (NEV) networks. To create a NEV network, the project will implement the necessary infrastructure, including NEV parking, charging facilities, striping, signage, and educational tools. NEV routes will be implemented throughout the project. The proponent must also implement measure SDT-8: Provide EV Parking.

*Applicability:* This is applicable to all land uses in urban, suburban, and rural contexts (proponent must complete project setting measure). It is appropriate for residential, retail, office, industrial and mixed-use projects. This measure is limited to programmatic level plans or communities with existing NEV infrastructure unless approved by the SMAQMD. CalEEMod assumes a low-level penetration rate in the project for NEVs, for more information on penetration rate see the CAPCOA guidance.

*Example:* A new master planned community of residential housing, retail, and a regional university includes extensive NEV infrastructure linking all major internal uses. A user may gain credit for this measure by clicking on the box adjacent to the words "Implement NEV Network" in the Land Use and Site Enhancement mitigation screen. The user is encouraged to include references to map's, graphics, and narratives depicting the NEV infrastructure from relevant planning and environmental documents in the remarks box at the bottom of the screen.

*Reference:* See measure SDT-3 on page 194 of the CAPCOA guidance.

## CalEEMod Land Use & Site Enhancement Tab: Parking Policy/Pricing Measures

**Mitigation**

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

Project Setting: Low Density Suburban

**Land Use**

- Increase Density: Dwelling Units/acre
- Increase Diversity: Jobs/Job acre
- Improve Walkability Design: Intersections/Square Miles
- Improve Destination Accessibility: Distance to Dwtwn/Job Ctr (Miles)
- Increase Transit Accessibility: Distance to Transit Station (Miles)
- Integrate Below Market Rate Housing: #Dwelling Units Below Market Rate

**Neighborhood Enhancements**

- Improve Pedestrian Network: Project Site
- Provide Traffic Calming Measures: % Streets with Improvement
- % Intersections with Improvement
- Implement NEV Network

**Parking Policy/Pricing**

- Limit Parking Supply: % Reduction in Spaces
- Unbundle Parking Costs: Monthly Parking Cost (\$)
- On-Street Market Pricing: % Increase in Price

**Transit Improvement**

- Provide BRT System: % Lines BRT
- Expand Transit Network: % Increase Transit Coverage
- Increase Transit Frequency: Level of Implementation
- % Reduction in Headways

Remarks

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### **PDT-1 Limit Parking Supply (Usual reduction: 5 – 12.5% VMT)**

**Measure:** The project must demonstrate that provided parking is below the average generation rate as estimated by the most recent edition of the Institute of Transportation Engineers *Parking Generation* handbook. Trip reduction will be credited only if measures are implemented to control for spillover parking in and around the project, such as residential parking permits, metered parking, or time-limited parking. Parking provided off-site, such as through long-term leases, counts toward a project's provided parking supply.

**Applicability:** This is applicable to all land uses in urban and suburban settings (proponent must complete project setting measure). This measure is unavailable in rural settings without SMAQMD consent.

**Example:** If the ITE parking generation rate for a project is 100 spaces and the project provides 95 spaces, the a user may gain credit for this measure by selecting the "Limit Parking Supply" checkbox and typing "5" in the field titled "% reduction in Spaces."



*Reference:* See measure PDT-1 on page 207 of the CAPCOA guidance.

### **PDT-2 Unbundle Parking Costs (usual reduction: 2.6 – 13% VMT)**

*Measure:* The project demonstrates that the cost of parking is separate from the property costs. For multi-family projects, each parking space is leased/sold separately from the unit and the tenant/owner has the option of not purchasing/owning a space. For office and industrial uses, employees are charged for parking. For retail uses, credit is given for charging employees; additional credit is given if retail customers are charged for parking. Trip reduction will be credited only if measures are implemented to control for spillover parking in and around the project, such as residential parking permits, metered parking, or time-limited parking.

*Applicability:* This is applicable to multi-family residential, retail, office, industrial and mixed-use projects in urban and suburban settings (proponent must complete project setting measure). This measure is unavailable in rural settings without SMAQMD consent.

*Example:* A multifamily condominium project is selling parking spaces at \$20,000 per space. Prospective condo buyers may purchase as many or as few spaces as they would like. Homeowner Association (HOA) dues for maintenance of the spaces are anticipated to be \$25 per month per space. If a thirty-year fixed-rate mortgage with good credit can be obtained at 5% at the time of AQMP submittal and property taxes are anticipated to be 1.25%, payments for the parking space would be \$124.03 per month for 30 years. Proponent would add the HOA fee to the monthly cost of the space over a 30-year fixed-term loan and type "149.03" into the field marked "Monthly Parking Cost (\$)," along with selecting the box marked "Unbundle Parking Costs."

*Reference:* See measure PDT-2 on page 210 of the CAPCOA guidance.

### **PDT-3: On-Street Parking Market Pricing (N/A)**

This measure is not utilized by SMAQMD as an on-model measure. Innovative parking strategies and systems may apply for credit as a T-c measure.

## CalEEMod Land Use & Site Enhancement Tab: Transit Improvement Measures

**Mitigation**

Construction | Traffic | Area | Energy | Water | Solid Waste

Land Use & Site Enhancement | Commute

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

Project Setting: Low Density Suburban

**Land Use**

- Increase Density: Dwelling Units/acre, Jobs/Job acre
- Increase Diversity
- Improve Walkability Design: Intersections/Square Miles
- Improve Destination Accessibility: Distance to Dwtwn/Job Ctr (Miles)
- Increase Transit Accessibility: Distance to Transit Station (Miles)
- Integrate Below Market Rate Housing: #Dwelling Units Below Market Rate

**Neighborhood Enhancements**

- Improve Pedestrian Network: Project Site
- Provide Traffic Calming Measures: % Streets with Improvement, % Intersections with Improvement
- Implement NEV Network

**Parking Policy/Pricing**

- Limit Parking Supply: % Reduction in Spaces
- Unbundle Parking Costs: Monthly Parking Cost (\$)
- On-Street Market Pricing: % Increase in Price

**Transit Improvement**

- Provide BRT System: % Lines BRT
- Expand Transit Network: % Increase Transit Coverage
- Increase Transit Frequency: Level of Implementation, % Reduction in Headways

Remarks

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### **TST-1 Provide BRT System (Usual reduction: 0.02 – 3.2% VMT)**

**Measure:** The project will provide a Bus Rapid Transit (BRT) system with design features for high quality and cost-effective transit service. These include:

- Grade-separated right-of-way, including bus only lanes (for buses, emergency vehicles, and sometimes taxis), and other transit priority measures.
- Frequent, high-capacity service
- High-quality vehicles that are easy to board, quiet, clean, and comfortable to ride.
- Pre-paid fare collection to minimize boarding delays.
- Integrated fare systems, allowing free or discounted transfers between routes and modes.
- Convenient user information and marketing programs.
- High quality bus stations with Transit Oriented Development in nearby areas.
- Modal integration, with BRT service coordinated with walking and cycling facilities, taxi services, intercity bus, rail transit, and other transportation services.

**Applicability:** This measure only applies to programmatic level documents such as a municipal General Plan or specific plan (proponent must complete project setting measure).

*Example:* A component of a municipality’s General Plan update is to upgrade 5 of its 20 bus lines to BRT. A user may gain credit for this measure by clicking on the checkbox to the left of the words “Provide BRT System” and entering the percentages of the system that is converting to BRT in the box to right. This figure shall be calculated by dividing the number of bus lines with BRT improvements by the total number of bus lines in the jurisdiction.

*Reference:* See measure TST-1 on page 270 of the CAPCOA guidance.

### **TST-3 Expand Transit Network (Usual reduction: 0.1 – 8.2% VMT)**

*Measure:* The project will expand the local transit network by adding or modifying existing transit service to enhance the service near the project site. This will encourage the use of transit and therefore reduce VMT.

*Applicability:* This is applicable to multi-family residential, retail, office, industrial and mixed-use projects in urban and suburban settings (proponent must complete project setting measure). This measure is unavailable in rural settings without SMAQMD consent.

*Example:* A new mixed use subdivision includes a mello-roos assessment to fund the expansion of public transportation services to the project site. The funding is sufficient to add 2 additional bus lines. The area already has 2 existing bus lines, so the new bus service will increase transit coverage by 100%. A user may gain credit for this measure by clicking on the checkbox to the left of the words “Expand Transit Network” and entering the percentage increase in the box to right.

*Reference:* See measure TST-3 on page 276 of the CAPCOA guidance.

### **TST-4 Increase Transit Frequency (Usual reductions: 0.02 – 2.5% VMT)**

*Measure:* This project will reduce transit-passenger travel time through more reduced headways and increased speed and reliability. This makes transit service more attractive and may result in a mode shift from auto to transit which reduces VMT.

*Applicability:* This is applicable to multi-family residential, retail, office, industrial and mixed-use projects in urban and suburban settings (proponent must complete project setting measure). This measure is unavailable in rural settings without SMAQMD consent.

*Example:* A new residential subdivision includes a mello-roos assessment to fund the expansion of public transportation services to the project site. There are 3 bus lines with hourly headways serving the project site. The funding is sufficient to double the headways on 2 of the lines. A user may gain credit for this measure by clicking on the checkbox to the left of the words “Increase Transit Frequency” and entering the percentage increase in the box to right (since the headways doubled, the speed increase is 50%). The box below allows you to select between two levels of implementation; less than or greater

than 50%. Since the funding increased headways on 2 of the 3 bus lines connecting, in this example you would select ">=50%".

*Reference:* See measure TST-4 on page 280 of the CAPCOA guidance.

## CalEEMod Traffic Tab: Commute Trip Measures

**Mitigation**

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

Commute Trip

Implement Trip Reduction Program

% employee eligible

Program Type

Encourage Telecommuting and Alternative Work schedules

% employee work 9/80

% employee work 4/40

% employee telecommute 1.5 days

Transit Subsidy

% employee eligible

Daily Transit Subsidy Amount (\$)

Market Commute Trip Reduction Option

% employee eligible

Implement Employee Parking "Cash-Out"

% employee eligible

Employee Vanpool/Shuttle

% employee eligible

% vanpool mode share

Workplace Parking Charge

% employee eligible

Daily Parking Charge (\$)

Provide Ride Sharing Program

% employee eligible

School Trip

Implement School Bus Program

% family using

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

Remarks

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### **TRT-1&2: Implement Trip Reduction Program (usual reduction: VMT 5%)**

*Measure:* Research and SMAQMD experience suggest that providing commute trip reduction programs increases sustainable mode share for the commute and results in about a five percent decrease in vehicle miles traveled. SMAQMD determines compliance if a project permanently joins a TMA to be funded through a Community Facilities District, County Service Area, or other non-revocable funding mechanism.

*Applicability:* This is applicable to all land uses in urban and suburban settings (proponent must complete project setting measure). This measure is unavailable in rural settings without SMAQMD consent.

*Example:* A master-planned community joins their local TMA and funds membership through joining a County Service Area paid by every household and commercial property owner. A user may gain credit for this measure by clicking the checkbox titled “Implement Trip Reduction Program,” provide the percentage of employees eligible for the program by typing 100 in the “% employee eligible” box and select “voluntary” from the drop down list of “program type.”

*Reference:* See measure TRT-1 and TRT-2 on pages 218 and 223 of the CAPCOA guidance.

#### **TRT-4: Transit Subsidy (usual reduction: Commute VMT 1 – 20%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

#### **TRT-15: Implement Employee Parking “Cash-Out” (usual reduction: Commute VMT 0.6 – 7.7%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

#### **TRT-14: Workplace Parking Charge (usual reduction: Commute VMT 0.1 – 20%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

#### **TRT-6: Encourage Telecommuting and Alternate Work Schedules**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

#### **TRT-7: Market Commute Trip Reduction Option**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

#### **TRT-11: Employee Vanpool/Shuttle (usual reduction: Commute VMT 2 – 20%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

**TRT-3: Promote Ride Sharing Program (usual reduction: Commute VMT 1 – 15%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

**CalEEMod Traffic Tab: School Trip Measures**

**Mitigation**

Construction Traffic Area Energy Water Solid Waste

Land Use & Site Enhancement Commute

Commute Trip

- Implement Trip Reduction Program
  - % employee eligible: 0
  - Program Type: [dropdown]
- Encourage Telecommuting and Alternative Work schedules
  - % employee work 9/80: [dropdown]
  - % employee work 4/40: [dropdown]
  - % employee telecommute 1.5 days: [dropdown]
- Transit Subsidy
  - % employee eligible: 0
  - Daily Transit Subsidy Amount (\$): [dropdown]
- Implement Employee Parking "Cash-Out"
  - % employee eligible: 0
- Workplace Parking Charge
  - % employee eligible: 0
  - Daily Parking Charge (\$): [dropdown]
- Market Commute Trip Reduction Option
  - % employee eligible: 0
- Employee Vanpool/Shuttle
  - % employee eligible: 0
  - % vanpool mode share: 2
- Provide Ride Sharing Program
  - % employee eligible: 0

School Trip

- Implement School Bus Program
  - % family using: 0

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

Remarks

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**TRT-13: Implement School Bus Program (usual reduction: School VMT 38 – 63%)**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

## CalEEMod Area Tab: Hearth Measures

**Mitigation**

Construction Traffic **Area** Energy Water Solid Waste

**Hearth**

Only Natural Gas Hearth

No Hearth

**Consumer Products**

Use Low VOC Cleaning Supplies

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

**Architectural Coatings**

	EF (g/L)
<input type="checkbox"/> Use low VOC Paint (Residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Residential Exterior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Exterior)	250

**Landscape Equipment**

% Electric Lawnmower

% Electric Leafblower

% Electric Chainsaw

Remarks

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### **H-a: Only Natural Gas Hearth**

This measure is not utilized by SMAQMD since it is assumed all projects have no hearths. Projects including hearths must incorporate them using the methodology in [SMAQMD's Tips for Using CalEEMod](#).

### **H-b: No Hearth**

This measure is not utilized by SMAQMD since it is assumed all projects have no hearths. Projects including hearths must incorporate them using the methodology in [SMAQMD's Tips for Using CalEEMod](#).

## CalEEMod Area Tab: Consumer Products Measures

**Mitigation**

Construction Traffic Area Energy Water Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Hearth**

Only Natural Gas Hearth

No Hearth

**Consumer Products**

Use Low VOC Cleaning Supplies

**Architectural Coatings**

	EF (g/L)
<input type="checkbox"/> Use low VOC Paint (Residential Interior)	<input type="text" value="250"/>
<input type="checkbox"/> Use low VOC Paint (Residential Exterior)	<input type="text" value="250"/>
<input type="checkbox"/> Use low VOC Paint (Non-residential Interior)	<input type="text" value="250"/>
<input type="checkbox"/> Use low VOC Paint (Non-residential Exterior)	<input type="text" value="250"/>

**Landscape Equipment**

% Electric Lawnmower

% Electric Leafblower

% Electric Chainsaw

Remarks

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### V-a: Use Low VOC Cleaning Supplies

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.



## CalEEMod Area Tab: Architectural Coatings Measures

**Mitigation**

Construction | Traffic | Area | Energy | Water | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

**Hearth**

Only Natural Gas Hearth

No Hearth

**Consumer Products**

Use Low VOC Cleaning Supplies

**Architectural Coatings**

	EF (g/L)
<input type="checkbox"/> Use low VOC Paint (Residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Residential Exterior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Exterior)	250

**Landscape Equipment**

% Electric Lawnmower

% Electric Leafblower

% Electric Chainsaw

Remarks

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### **V-b: Use Low VOC Paint**

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

## CalEEMod Area Tab: Landscape Equipment Measures

**Mitigation**

Construction | Traffic | Area | Energy | Water | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
"Remarks" box should contain percent reduction justification.

**Hearth**

Only Natural Gas Hearth  
 No Hearth

**Consumer Products**

Use Low VOC Cleaning Supplies

**Architectural Coatings**

	EF (g/L)
<input type="checkbox"/> Use low VOC Paint (Residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Residential Exterior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Interior)	250
<input type="checkbox"/> Use low VOC Paint (Non-residential Exterior)	250

**Landscape Equipment**

<input type="checkbox"/> % Electric Lawnmower	0
<input type="checkbox"/> % Electric Leafblower	0
<input type="checkbox"/> % Electric Chainsaw	0

Remarks

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### A-1, 2&3: Landscape Equipment Measures

As compliance into perpetuity cannot be guaranteed by proponent, this measure is not utilized by SMAQMD.

## CalEEMod Energy Tab: Building Energy Measures

**Mitigation**

Construction | Traffic | Area | **Energy** | Water | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Building Energy**

Exceed Title 24  
% Improvement

Install High Efficiency Lighting  
% Lighting Energy Reduction

**Alternative Energy**

On-site Renewable Energy

kWh Generated

% of Electricity Use Generated

**Energy Efficient Appliances**

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30
DishWasher		15
Fan		50
Refrigerator		15
*		

Remarks

### **BE-1: Exceed Title 24 (usual reduction: 5% electricity use, 10% natural gas use)**

*Measure:* The project will reduce building envelope energy efficiency standards beyond California's Title 24. This reduces building electricity use and building natural gas use and associated emissions. To qualify for this measure, the proponent must agree to exceed the Title 24 standard at the time of project approval by a certain percentage. CalEEMod calculates the carbon intensity of electricity use as well as natural gas use, but only calculates the NO<sub>x</sub> intensity of natural gas.<sup>11</sup>

*Applicability for Ozone Precursors:* Any project that utilizes natural gas.

*Applicability for GHG:* Any project that utilizes electricity or natural gas.

<sup>11</sup> To achieve credit from the NO<sub>x</sub> reductions associated with electricity, proponents must show off-model calculations, as described on page xxx.

*Example:* A proponent of office building project commits to exceeding the 2013 Title 24 Standards by 10 percent. Since CalEEMod version 2013.2.2 includes only 2008 Title 24 Standards, the proponent must account for both the percent improvements from 2008 to 2013 and the additional 10 percent commitment. The 2013 Title 24 Standards are estimated to be 25 percent more efficient than the 2008 Title 24 Standards<sup>12</sup>. The proponent may select the “Exceed Title 24” box and enter “35” into the field labeled “% Improvement.” This accounts for the 25 percent improvement in the efficiency of Title 24 Standards from 2008 to 2013 and the additional 10 percent commitment.

*Reference:* See measure BE-1 on page 85 of the CAPCOA guidance.

### **LE-1: Install High Efficiency Lighting (usual reduction: 16 – 40% of outdoor lighting)**

*Measure:* The proponent installs higher efficiency lighting in public areas, such as street lights, outdoor stairwells, pedestrian pathways, parks, parking lots, other exterior lighting and around public buildings. Scaled by lumens, proponent may take the following credit for efficiency:

- 16% for metal halide post top lights
- 35% for metal halide cobrahead or cutoff lights
- 40% for high pressure sodium cutoff lights

Other lighting, such as light emitting diodes (LED), also qualifies for this measure. Use mercury cobrahead lights as baseline when determining percent improvement.

*Applicability for Ozone Precursors:* This measure does not qualify for Ozone Precursor emissions.

*Applicability for GHG:* Any project that utilizes outdoor lighting.

*Example:* A suburban grocery store will utilize metal halide post top lights for its parking lot and pedestrian area illumination while utilizing metal halide cobrahead for its loading dock area illumination. The loading dock represents one-tenth of the total lumens of the project, while the other areas provide nine-tenths of the total lumens.  $35 \times 0.1 + 16 \times 0.9 = 3.5 + 14.4 = 17.9$  percent. The proponent may then select the box “Install High Efficiency Lighting” and enter “17.9” into the field labeled “% Lighting Energy Reduction.”

*Reference:* See measure LE-1 on page 115 of the CAPCOA guidance.

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<sup>12</sup> CA Energy Commission, 2013 Building Energy Efficiency Standards FAQ, [http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2013\\_Building\\_Energy\\_Efficiency\\_Standards\\_FAQ.pdf](http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2013_Building_Energy_Efficiency_Standards_FAQ.pdf)

## **BE-4: Energy Efficient Appliances (usual reduction: 2 – 22% of electricity use)**

*Measure:* The project installs appliances that are more efficient than current efficiency standards. Typical Energy Star appliances would rate as follows: Cloth Washer – 30%, Dish Washer – 15%, Fan – 50%, Refrigerator – 15%. Land uses with more intensive use of appliances (such as grocery stores) would have a higher overall reduction than less intensive uses (residential). CalEEMod calculates the carbon intensity of the energy used.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor emissions.

*Applicability for GHG:* Any project that utilizes natural gas or electrical appliances.

*Example:* A high-rise project will install high efficiency clothes washers in their units that are 30 percent more efficient than standard clothes washers. Proponent would then select the land use Condo/Townhouse High Rise and note the 30 percent improvement in clothes washers.

*Reference:* See measure BE-4 on page 103 of the CAPCOA guidance.

### **CalEEMod Energy Tab: Alternative Energy Measures**

**Mitigation**

Construction Traffic Area **Energy** Water Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Building Energy**

Exceed Title 24

% Improvement

Install High Efficiency Lighting

% Lighting Energy Reduction

**Alternative Energy**

On-site Renewable Energy

kWh Generated

% of Electricity Use Generated

**Energy Efficient Appliances**

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30
DishWasher		15
Fan		50
Refrigerator		15
*		

Remarks

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## **AE-1: On-site Renewable Energy (usual reduction: 0 – 100% electricity use)**

*Measure:* The project will generate electricity on-site using renewable or carbon-neutral power systems which displaces electricity demand normally supplied by the local utility. The project could alternatively enter into a contract with the electric service provider for the supply of renewable energy (such as SMUD's Greenenergy or Solar shares). Life of an on-site project is assumed to be 20 years, while purchasing off-site credits may be done either through a 20 year contract or an up-front payment with greenhouse gas reductions amortized over 20 years.

*Applicability for Ozone Precursors:* This measure does not give ozone precursor emission credits. Renewable energy measures that involve the creation of NO<sub>x</sub> (such as biomass) which are more NO<sub>x</sub> intense than SMUD have a negative effect on ozone precursor pollutants and the project would be assigned negative credit for this measure.

*Applicability for GHG:* The proponent must control the greenhouse gas credits associated with the project; they may not be sold or surrendered to a third party.

*Example:* A warehouse project is proposing to enter into a contract to purchase Greenenergy. The warehouse which will use the equivalent of 10,000 kWh per year is proposing to offset 10% of their usage for 20 years (that is 10% of estimated usage x 10,000 kWh x 20 years = 20,000 kWh). The project would select the box "on-site renewable energy" as well as the box "kWh generated and type "20,000" into the associated field.

*Example:* A master-planned community has proposed to generate 20% of its electricity needs through an undetermined mix of renewable energy on-site. The proponent would select the box "On-site renewable energy" as well as "% of Electricity Use Generated" and type "20" into the associated field.

*Reference:* See measure AE-1 on page 125 of the CAPCOA guidance.

## CalEEMod Water Tab: Water Conservation Strategy Measures

**Mitigation**

Construction | Traffic | Area | Energy | Water | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks box should contain percent reduction justification.

**Water Conservation Strategy**

Cannot be used with other water mitigation strategies

Apply Water Conservation Strategy

% Reduction Indoor:

% Reduction Outdoor:

**Water Supply**

Use Reclaimed Water

% Indoor Water Use:

% Outdoor Water Use:

Use Grey Water

% Indoor Water Use:

% Outdoor Water Use:

**Indoor Water Use**

Install Low-flow Bathroom Faucet

% Reduction in flow:

Install Low-flow Kitchen Faucet

% Reduction in flow:

Install Low-flow Toilet

% Reduction in flow:

Install Low-flow Shower

% Reduction in flow:

**Outdoor Water Use**

Turf Reduction

Turf Reduction Area (acres):

% Reduction turf:

Use Water-Efficient Irrigation Systems

% Reduction:

Water Efficient Landscape

MAWA (gal/yr):

ETWU (gal/yr):

Remarks:

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### **WUW-2: Apply Water Conservation Strategy – (usual reduction: 0-100% of GHG from water use)**

*Measure:* The project must justify the percent reduction of water usage being claimed through implementation of a water conservation program. The proponent will provide evidence of strategies that will be implemented by the project, the effectiveness of each strategy in reducing water usage, and overall water usage reduction. Indoor and outdoor water usage and strategies must be documented for use of this measure in CalEEMod. Project water demand (indoor and outdoor) calculated for the project in CalEEMod's Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations. Water demand should be calculated prior to calculating water supply mitigation.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

**Applicability for GHG:** This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.). **NOTE:** If this measure is selected in CalEEMod all other mitigation measures for water supply and water use cannot be used.

**Example:** If the project will reduce overall water usage by 25%, 15% from indoor strategies and 10% from outdoor strategies, the proponent may select the “Apply Water Conservation Strategy” checkbox and may type “15” in the field titled “% Reduction Indoor” and may type “10” in the field titled “% Reduction Outdoor”.

**Reference:** See measure WUW-2 on page 362 of the CAPCOA guidance.

## CalEEMod Water Tab: Water Supply Measures

**Mitigation**

Construction | Traffic | Area | Energy | **Water** | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Water Conservation Strategy**

\* Cannot be used with other water mitigation strategies

Apply Water Conservation Strategy

% Reduction Indoor:

% Reduction Outdoor:

**Water Supply**

Use Reclaimed Water

% Indoor Water Use:

% Outdoor Water Use:

Use Grey Water

% Indoor Water Use:

% Outdoor Water Use:

**Indoor Water Use**

Install Low-flow Bathroom Faucet

% Reduction in flow:

Install Low-flow Kitchen Faucet

% Reduction in flow:

Install Low-flow Toilet

% Reduction in flow:

Install Low-flow Shower

% Reduction in flow:

**Outdoor Water Use**

Turf Reduction

Turf Reduction Area (acres):

% Reduction turf:

Use Water-Efficient Irrigation Systems

% Reduction:

Water Efficient Landscape

MAWA (gal/yr):

ETWU (gal/yr):

Remarks



## **WSW-1: Use Reclaimed Water – (usual reduction: 0-40% of GHG from outdoor or non-potable water uses)**

*Measure:* The project must calculate the amount of reclaimed water used instead of new potable water supplies for outdoor water uses or other non-potable water uses. Less energy is needed to collect, treat, and redistribute reclaimed water compared to new potable water supplies. The proponent must commit to using a percentage of reclaimed water and provide the total amount of reclaimed and non-potable water to be used by the project. If indoor reclaimed water uses are anticipated, indoor and outdoor usage for the project must be documented separately for use of this measure in CalEEMod. Water demand should be calculated prior to calculating water supply mitigation. Project water demand (indoor and outdoor) calculated for the project in CalEEMod's Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

*Applicability for GHG:* This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.). Outdoor water use mainly is expected to benefit from this measure. If the project is considering replacing indoor water use with reclaimed water, consult with SMAQMD prior to utilizing the "% Indoor Water Use" field in CalEEMod. This measure could overlap with WSW-2, so the project should not "double count" reductions of new potable water from this measure and WSW-2.

*Example:* If the project will use 50 million gallons of water a year for outdoor use and commits to using 25 million gallons of reclaimed water for outdoor use as mitigation, the proponent may select the "Use Reclaimed Water" checkbox and may type "50" in the field titled "% Outdoor Water Use."

*Reference:* See measure WSW-1 on page 332 of the CAPCOA guidance.

## **WSW-2: Use Grey Water – (usual reduction: 0-100% of GHG from outdoor water use)**

*Measure:* The project must calculate the amount of grey water used instead of new potable water supplies for landscape irrigation and other outdoor water uses. Negligible energy is needed to collect and distribute grey water compared to new potable water supplies. The proponent must commit to using a percentage of grey water and provide the total amount of grey water and outdoor water to be used by the project. Water demand should be calculated prior to calculating water supply mitigation. Project water demand (indoor and outdoor) calculated for the project in CalEEMod's Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

**Applicability for GHG:** This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.). The amount of grey water generated by a project may be larger than the amount of grey water needed for outdoor water use. Credit is only allowed for the amount of grey water that can be used by the project. If the project is considering replacing indoor water use with grey water, consult with SMAQMD prior to utilizing the “% Indoor Water Use” field in CalEEMod. This measure could overlap with WSW-1, so the project should not “double count” reductions of new potable water from this measure and WSW-1.

**Example:** The project will use 50 million gallons of water a year for landscape irrigation and other outdoor uses and commits to providing a system that will supply 5 million gallons of grey water per year for mitigation, the proponent may select the “Use Grey Water” checkbox and may type “10” in the field titled “% Outdoor Water Use.”

**Reference:** See measure WSW-2 on page 336 of the CAPCOA guidance.

## CalEEMod Water Tab: Indoor Water Use Measures

**Mitigation**

Construction | Traffic | Area | Energy | **Water** | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

**Water Conservation Strategy**

\* Cannot be used with other water mitigation strategies

Apply Water Conservation Strategy

% Reduction Indoor:

% Reduction Outdoor:

**Water Supply**

Use Reclaimed Water

% Indoor Water Use:

% Outdoor Water Use:

Use Grey Water

% Indoor Water Use:

% Outdoor Water Use:

**Indoor Water Use**

Install Low-flow Bathroom Faucet

% Reduction in flow:

Install Low-flow Kitchen Faucet

% Reduction in flow:

Install Low-flow Toilet

% Reduction in flow:

Install Low-flow Shower

% Reduction in flow:

**Outdoor Water Use**

Turf Reduction

Turf Reduction Area (acres):

% Reduction turf:

Use Water-Efficient Irrigation Systems

% Reduction:

Water Efficient Landscape

MAWA (gal/yr):

ETWU (gal/yr):

Remarks

**WUW-1: Install Low-Flow Bathroom Faucet, Low-Flow Kitchen Faucet, Low-Flow Toilet and Low-Flow Shower – (usual reduction: 0-20% of GHG from indoor residential water use; 17-31% of GHG from indoor non-residential water use)**

*Measure:* The project must calculate the total expected indoor water demand before and after installation of low-flow or high-efficiency water fixtures. The project proponent must commit to the installation of low-flow fixtures. Installing low-flow or high-efficiency water fixtures reduces water demand and therefore energy demand and GHG emissions. Since CalEEMod focuses on reductions of flow from four fixtures: bathroom faucet, kitchen faucet, toilet and shower, information regarding reduced flow from each must be provided. Project water demand (indoor and outdoor) calculated for the project in CalEEMod's Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations. Water demand should be calculated prior to calculating water supply mitigation.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

*Applicability for GHG:* This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.). CalEEMod doesn't take into account dishwashers and clothes washers which are included in CAPCOA Measure WUW-1, therefore if reductions from these appliances are expected, the project should consider using WUW-2 rather than this measure to mitigate water use reductions.

*Example:* The project will use 30 million gallons of water per year for indoor water use. The proponent commits to using low flow toilets that have a rate of 1.12 gallons/flush compared to the 2010 CA Green Building Standards Code requirement of 1.28 gallons/flush. The difference in flow is a 12.5% reduction. The proponent may select the "Install Low-flow Toilet" checkbox and may type "12.5" in the field titled "% Reduction in flow." If toilets account for 33% of indoor water use, 9.9 million gallons of water would be used by the project toilets. The low-flow toilet mitigation would reduce water use by 1.2375 million gallons, a 4% reduction overall.

*Reference:* See measure WUW-1 on page 347 of the CAPCOA guidance.

## CalEEMod Water Tab: Outdoor Water Use Measures

**Mitigation**

Construction | Traffic | Area | Energy | Water | Solid Waste

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks" box should contain percent reduction justification.

**Water Conservation Strategy**

\* Cannot be used with other water mitigation strategies

Apply Water Conservation Strategy

% Reduction Indoor:

% Reduction Outdoor:

**Water Supply**

Use Reclaimed Water

% Indoor Water Use:

% Outdoor Water Use:

Use Grey Water

% Indoor Water Use:

% Outdoor Water Use:

**Indoor Water Use**

Install Low-flow Bathroom Faucet

% Reduction in flow:

Install Low-flow Kitchen Faucet

% Reduction in flow:

Install Low-flow Toilet

% Reduction in flow:

Install Low-flow Shower

% Reduction in flow:

**Outdoor Water Use**

Turf Reduction

Turf Reduction Area (acres):

% Reduction turf:

Use Water-Efficient Irrigation Systems

% Reduction:

Water Efficient Landscape

MAWA (gal/yr):

ETWU (gal/yr):

Remarks

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### **WUW-5: Reduce Turf in Landscapes and Lawns – (usual reduction: 0-100% of outdoor water use)**

*Measure:* The project must calculate the total area of turf (lawn) for a standard project (if square feet convert to acres) and provide a commitment to reduce the amount of turf being used on the project (use square feet or acres to determine a percentage). Reducing the amount of turf reduces water demand and therefore energy demand and GHG emissions. Project water demand (indoor and outdoor) calculated for the project in CalEEMod's Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations. Water demand should be calculated prior to calculating water supply mitigation.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

*Applicability for GHG:* This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.).

*Example:* The project proponent estimates 10 acres of turf for the project and commits to reducing turf by 25%, which is a reduction of 2.5 acres. The proponent may select the “Turf Reduction” checkbox, enter “2.5” in the “Turf Reduction Area (acres)” field, and enter “2.5” in the “% Reduction turf” field.

*Reference:* See measure WUW-5 on page 376 of the CAPCOA guidance.

#### **WUW-4: Use Water-Efficient Irrigation Systems – (usual reduction: 6.1% of GHG from outdoor water use)**

*Measure:* The project must calculate the percent reduction of water use from the installation of a water-efficient irrigation system, by providing outdoor water use before installation and water use after system installation. Installing a water-efficient irrigation system reduces water demand and therefore energy demand and GHG emissions. The default reduction from systems surveyed is 6.1%. At this time, reductions greater than 6.1% are not being accepted. Project water demand (indoor and outdoor) calculated for the project in CalEEMod’s Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod may be modified to reflect project specific water demand calculations rather than using the default calculations. Water demand should be calculated prior to calculating water supply mitigation.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor reductions.

*Applicability for GHG:* This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.).

*Example:* The project estimates using 25 million gallons of water for irrigation. A water-efficient irrigation system will be installed to mitigate water usage. The proponent uses the default value of 6.1% reduction in water and GHG emissions. The proponent may select the “Use Water-Efficient Irrigation Systems” checkbox and may enter “6.1” in the “% Reduction” field.

*Reference:* See measure WUW-4 on page 372 of the CAPCOA guidance.

#### **WUW-3: Water Efficient Landscape – (usual reduction: 0-70% of GHG from outdoor water use)**

*Measure:* The project must provide the baseline outdoor water usage in gallons per year (the Maximum Applied Water Allowance (MAWA)) and mitigated outdoor water use in gallons per year (the Estimated Total Water Use (ETWU)) using calculations consistent with a locally adopted or state Model Water Efficient Landscape Ordinance to show decreased water usage demand in residential and commercial landscape plantings compared to standard California landscape plantings. Reduced water usage for landscape plantings reduces water demand and therefore energy demand and GHG emissions. Project water demand (indoor and outdoor) calculated for the project in CalEEMod’s Operational Water and Wastewater tab should be compared to project proponent calculations for water demand. CalEEMod

may be modified to reflect project specific water demand calculations rather than using the default calculations. Water demand should be calculated prior to calculating water supply mitigation.

*Applicability for Ozone Precursors:* This measure does not qualify for ozone precursor emissions reductions.

*Applicability for GHG:* This measure is applicable to all land use types across all project settings (urban, suburban, rural, etc.).

*Example:* The project estimates 10 million gallons of water a year (MAWA) unmitigated for landscape plantings and provides a plan for landscape plantings that will reduce the water usage to 6 million gallons a year (ETWU) as mitigation. The proponent may select the “Water Efficient Landscape” checkbox and may type “10,000,000” in the field titled “MAWA (gal/yr)” and may type “6,000,000” in the field titled “ETWU (gal/yr).”

*Reference:* See measure WUW-3 on page 365 of the CAPCOA guidance.

## CalEEMod Solid Waste Tab

**Mitigation**

Construction Traffic Area Energy Water **Solid Waste**

\*The mitigation should be applicable to land use project evaluated.  
\*Remarks\* box should contain percent reduction justification.

Institute Recycling and Composting Services

% Reduction in waste disposed

Remarks

## **SW-1: Institute Recycling and Composting Services (usual reduction: Emissions from waste 0-50%)**

*Measure:* The project reduces the amount of waste landfilled by the project through reducing the amount of waste generated, composting waste, or recycling waste. CalEEMod only calculates indirect GHG from landfill gases, so GHG credit is only possible.

*Applicability for Ozone Precursors:* This measure does not give ozone precursor emissions credit. An M-z measure for criteria pollutants is possible if the proponent's efforts would reduce hauling emissions from garbage/recycling/green waste trucks.

*Applicability for GHG:* This is applicable to all projects that generate solid waste.

*Example:* A local university builds a zero-waste football stadium. All items sold in the stadium are compostable or recyclable, and bins are placed around the stadium for staff and spectator usage. No "landfill" trash cans are present there. The proponent may select the box "Institute Recycling and Composting Services" and type "100" in the field labeled "% Reduction in waste disposed."

*Reference:* See measure SW-1 on page 401 of the CAPCOA guidance.

## **Off-Model Measures**

These measures are available to proponents but not incorporated into CalEEMod. If a project has multiple land use types, measures must be scaled, so that if measures are limited in application to one type of land use it will only be counted as mitigation for the emissions associated with that land use type.

## **CAPCOA Measures not included in CalEEMod**

### **BE-1: Exceed Title 24 (Ozone Precursor's from reduction in electricity use)**

*Measure:* The project will reduce building envelope energy efficiency standards beyond California's Title 24. This reduces building electricity use and associated emissions. To qualify for this measure, the proponent must agree to exceed the Title 24 standard at the time of project approval by a certain percentage. CalEEMod calculates the carbon intensity of electricity use as well as natural gas use, but only calculates the NO<sub>x</sub> intensity of natural gas. To achieve credit from the NO<sub>x</sub> reductions from reduced electricity use, proponents must show off-model calculations.

The SMAQMD is currently working with SMUD to develop a NO<sub>x</sub> intensity factor for electricity. Please contact SMAQMD staff if you wish to take NO<sub>x</sub> credit for electricity reductions.

*Applicability for Ozone Precursors:* Any project that utilizes electricity.

*Applicability for GHG:* N/A (calculated with on-model measure BE-1)

*Reference:* See measure BE-1 on page 85 of the CAPCOA guidance.

## **#: Non-CalEEMod CAPCOA Measures**

*Measure:* CalEEMod does not contain all measures listed in the CAPCOA guidance document, and the proponent may, with the consent of the SMAQMD, utilize a quantified measure listed in the CAPCOA guidance document. If the measure comes from a category with a total reduction cap (such as transportation) the proponent must demonstrate that measures already taken have not reached the cap.

*Applicability for Ozone Precursors and GHG:* Any measure available in the CAPCOA guidance that has quantifiable emission reductions. The measures utilized may not claim credit for exceeded categorical caps.

*Example:* A proposed subdivision would require the installation of four traffic signals. The proponent elects to pursue measure LE-3 and install only LED traffic lights in the proposed subdivision. In the AQMP, the proponent would indicate that they were pursuing LE-3, estimate energy reductions from using LED traffic lights, and calculate reduced GHG. As the measure does not have quantifiable ozone precursor benefits, the proponent would only receive GHG credit.

*Reference:* Entire CAPCOA guidance document.

## **Transportation Measures**

### **T-a: Anti-Idling/Congestion Strategies for roadways (usual reduction – Mobile NO<sub>x</sub> and CO<sub>2</sub> ~1%)**

*Measure:* The project reduces vehicle idling by implementing strategies that reduce or remove impediments to the free flow of motor vehicles. The idling reductions are quantified by determining the emissions reduction associated with the reduction in idling time compared to a base case scenario where the strategy was not implemented. The reduced/eliminated emissions are then compared to the total emissions associated with the project to determine the percentage of emissions reduced. The reduction may be determined by utilizing traffic model runs comparing the project with and without the emission reduction strategy. If this data is unavailable the user may propose to estimate the emission reductions based on assumptions of the likely reductions associated with measure, as derived from



national averages or existing research and literature; all approaches are subject to review by SMAQMD staff.

*Applicability for Ozone Precursor and GHG:* This measure is applicable to all land uses in urban, suburban, and rural contexts that include roadways or intersections within the project scope. It is appropriate for roadway and intersection projects, and may be appropriate for residential, retail, office, industrial and mixed-use projects that include roadways and intersections.

*Example:* A specific plan for a new residential, commercial and mixed use community features roundabouts and modern traffic circles in place of four-way stop signs at key intersections. Using data from a traffic model or traffic study, the user determines the emission benefit of utilizing of reduced idling and divides it by the total transportation emissions associated with the project to determine the percentage reduction.

*Reference:* For more information on existing studies of the Air Quality impacts of modern roundabouts please see:

Impact of Modern Roundabouts on Vehicular Emissions:

<http://www.ctre.iastate.edu/pubs/midcon2003/MandavilliRoundabouts.pdf>

Modern Roundabouts, Global Warming, and Emissions Reductions: Status of Research and Opportunities:

<http://www.nh.gov/oep/resourcelibrary/referencelibrary/r/roundabouts/documents/vermontctrfpaper.pdf>

### **T-c: Cruising Reductions through Parking Management (usual reduction – Mobile NO<sub>x</sub> and CO<sub>2</sub> ~2%)**

*Measure:* The project reduces cruising for parking, associated congestion, and byproduct emissions by implementing measures that aid motorists in quickly locating and occupying vacant parking spaces. The cruising reductions are quantified by determining the emissions reduction associated with the reduction in cruising time compared to a base case scenario where the strategy was not implemented. The reduced/eliminated emissions are then compared to the total emissions associated with the project to determine the percentage of emissions reduced. The reduction may be determined by utilizing traffic model runs comparing the project with and without the emission reduction strategy. If this data is unavailable the user may propose to estimate the emission reductions based on assumptions of the likely reductions associated with measure, as derived from national averages or existing research and literature; all approaches are subject to review by SMAQMD staff.

*Applicability for Ozone Precursor and GHG:* This measure is applicable to all land uses in urban and suburban contexts where cruising for parking could be anticipated. It is appropriate for roadway and intersection projects with on-street parking as well as large campus projects which have convenient and inconvenient parking spaces.

*Example:* A project implements performance-based prices for on-street parking and incorporates wayfinding signage to off-street lots that indicate the number of spaces available. Using data from a traffic model or traffic study, the user determines the emission benefit of utilizing the measures and divides it by the total transportation emissions associated with the project to determine the percentage reduction.

*Reference:* For more information on existing studies of the Air Quality impacts of parking management please see:

Donald Shoup, *The High Cost of Free Parking*. APA Planners Press, 2005

## Miscellaneous Measures

### **M-n: NO<sub>x</sub> reduction technology**

*Measure:* The project improves air quality by employing technologies that reduce existing Nitrous Oxide pollution.

*Applicability:* This measure is applicable to all land uses in urban, suburban, and rural contexts. It is appropriate for residential, retail, office, industrial and mixed-use projects.

*Example:* A new residential project commits to use certified roofing materials containing a photo-catalytic material, such as titanium dioxide, that will remove NO<sub>x</sub> from the air. Using a certified rate of removal based on the level of implementation (adapted to the Sacramento Climate) a user can compare the total emission reduction associated with implementing the measure against the total emissions associated with the project to determine the percent emission benefit of implementing the measure.

*Reference:* The proponent provides all necessary references.

### **M-z: Other**

*Measure:* Applicant proposes a mitigation reduction measure not covered elsewhere in the document. Applicant must provide methodology for quantification of credit and plan for implementation of the measure.

*Applicability:* This measure is unavailable without SMAQMD consent.

## Glossary

Bus Rapid	A public transportation system using buses to provide faster, more efficient service than an ordinary bus line by implementing specialized infrastructure
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Transit	and operations such as exclusive right of way, off-bus fare collection, etc.
BMR Housing	Below Market Rate Housing are dwelling units with deed-restrictions limiting their use to moderate-, low-, or very-low-income households. It is also known as affordable housing.
Capital Improvements	Addition or structure that enhances the value of a property, or a replacement or upgrade that extends the useful life of an asset.
CEQA	The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
Energy Star	A joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy which sets national standards for energy efficient consumer products. ENERGY STAR certified products are guaranteed to meet the efficiency standards specified by the program.
GHG	Greenhouse Gases. GHG are the six gases identified in the Kyoto Protocol and referenced in the Global Warming Solutions Act (AB32): carbon dioxide (CO <sub>2</sub> ), nitrous oxide (N <sub>2</sub> O), methane (CH <sub>4</sub> ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF <sub>6</sub> ). Although additional GHG exist, these six are the most commonly analyzed for development projects.
Grey Water	Untreated wastewater generated from bathtubs, showers, bathroom wash basins, and clothes washing machines which is collected and redistributed onsite for irrigation.
Headway	The amount of time in minutes that elapses between two public transit vehicles on a given route and given line.
Intensity (as in NO <sub>x</sub> or GHG intensity)	The average emission rate of a given pollutant from a given source relative to the intensity of a specific activity; for example, grams of carbon dioxide released per megajoule of energy produced, or the ratio of greenhouse gas emissions produced to Gross Domestic Product.
Intersection	A road junction where two or more roads either meet or cross at grade.

ITE	The Institute of Transportation Engineers is an international educational and scientific association of transportation professionals that publish a variety of technical documents containing data used by CALEEMOD and CAPCOA mitigation measures. Specific documents include the Trip Generation and Parking Generation Manuals, which are collections of survey data on the average trip and parking generation rates associated with various land use types.
Mello-Roos	A special property tax on real estate, in addition to the normal property tax, which is imposed on those property owners within a Community Facilities District.
Mini Circle	Raised circular islands constructed in the center of residential or local street intersections for traffic calming that employ yield control. They may also be used at uncontrolled junctions.
NEV	Neighborhood Electric Vehicles: Battery electric vehicles that are legally limited to roads with posted speed limits 35 miles per hour or less. NEV lanes may be installed on faster roads to allow NEV access.
NO <sub>x</sub>	Highly reactive gases known as "oxides of nitrogen," or "nitrogen oxides (NO <sub>x</sub> )." Forms from emissions from cars, trucks and buses, power plants, and off-road equipment and contributes to the formation of ground-level ozone and fine particle pollution.
Ozone Precursor	The precursor components of Ground Level Ozone for which National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) have been established. For the purpose of this guidance, Ozone Precursors are Nitrous Oxides (NO <sub>x</sub> ) and Reactive Organic Gasses/Volatile Organic Compounds (ROG/VOC).
Reclaimed Water	Reclaimed water or recycled water is former wastewater (sewage) that is treated to remove solids and certain impurities, and used in sustainable landscaping irrigation, non-potable uses in double-piped buildings, and other uses.
Renewable Energy	Energy sources such as solar energy, hydropower, and wind, and carbon-neutral technologies such as biomass.
ROG	Reactive Organic Gases (or ROG) is emitted during fuel combustion (e.g., gasoline, natural gas, wood, oil); and by emissions of solvents; petroleum processing and storage; and pesticides. Mixes with NO <sub>x</sub> to create ground level ozone. Does not include methane. For the purposes of this document, ROG is interchangeable with VOC.
Roundabout	A road junction in which traffic moves in one direction around a central island. Entering traffic must always yield to traffic already in the circle, whereas in a traffic circle, entering traffic is controlled by stop signs, or is not formally controlled.

State Implementation Plan	A Plan that demonstrates how existing and new control strategies will provide the necessary future emission reductions to meet the federal Clean Air Act requirements for reasonable further progress and attainment of the 1997 8-hour ozone NAAQS for the Sacramento region. The plan assumes the land uses projected in the 2035 MTP as adopted in March 2008.
Title 24	Title 24 Part 6 is also known as the California Building Energy Efficiency Standard, which regulates building energy efficiency standards. Regulated energy uses include space heating and cooling, ventilation, domestic hot water heating, and some hard-wired lighting.
TOD	A Transportation Oriented Development (TOD) is a development located near and specifically designed around a rail or bus station. Proximity alone does not characterize a development as transit-oriented. The development and surrounding neighborhood should be designed for walking and bicycling and parking management strategies should be implemented. The development should be located within a short walking distance to a high-quality, high frequency, and reliable bus or rail service.
Transit Priority Area (TPA)	A Transit Priority Area is an area within a ½-mile of a rail stop or a bus corridor that provides or will provide at least 15-minute frequency service during peak hours by the year 2035. Transit Priority Areas are defined in California's Senate Bill 375 (SB 375) aligning regional transportation, land use, housing and greenhouse gas emissions planning through a new element to our region's Metropolitan Transportation Plan or MTP.
Traffic Circle	A type of circular intersection in which traffic must travel in one direction around a central island, usually on arterial streets. Entering traffic is controlled by stop signs, or is not formally controlled.
Unbundled Parking	Parking spaces are rented or sold separately from building space, instead of included in the cost/rent of the building, as a disincentive for driving.
VOC	Volatile organic compounds (VOC) are emitted as gases from a variety of chemicals, some of which may have short- and long-term adverse health effects. Sources include paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, etc. For the purposes of this document, VOC and ROG are interchangeable.
Woonerf	A low speed street where pedestrians, motorists, and cyclists share the same right of way.

# Summary of Changes to Guidance

Changes made from Version 3.1 to Version 3.2 include the following items:

- Clarification was made to set the reduction target from the mobile sector emission.
- AE-1 amended to allow for participation in renewable energy programs.
- BE-1 added as off-model measure.
- Added Prerequisites, removed meta-measures.
- The District's GHG Thresholds and the City of Citrus Height's Climate Action Plan were added.

Changes made from Version 3.0 to Version 3.1 include the following items:

- Revised the Protocol for Greenhouse Gases section to reflect the most current thresholds available and adopted climate action plans in the District.
- Altered off-model measure numbering.
- Added TS - Traffic Study meta-measure.
- Updated title page, table of contents and footers to reflect the new version and date.
- Created the Summary of Changes section to document changes made in the Guidance from one version to the next.