Attachment 3

Proposed Addendum to 2007 Regional Transportation Plan Guidelines

Addressing Climate Change and Greenhouse Gas Emissions During the RTP Process

To be Considered for Adoption at the May 28-29, 2008 CTC Meeting

SMART GROWTH/LAND USE

RTP Policy Element

1. Develop investments and programs that support local jurisdictions that make land use decisions that implement regional blueprints and other smart growth strategies, including rural sustainability strategies.

2. Emphasize transportation investments in areas where desired land uses as indicated in a city or county general plan may result in vehicle miles traveled (VMT) reduction or other lower impact use.

Transportation Planning and Investment Strategies

1. Consider shifting transportation investments towards improving and expanding urban and suburban core transit, programs for walkability, bicycling and other alternative modes, transit access, housing near transit, and local blueprint plans that coincide with the regional blueprint.

2. Provide funds and technical assistance to local agencies to develop and implement blueprint strategies.

3. Implement operational efficiencies that reduce congestion in vehicle throughput on roadways or improve transit access or other alternative access without physical expansion of the roadways.

4. For the purposes of allocating transportation investments, recognize the rural contribution towards GHG reduction for counties that have policies that support development within their cities, and protect agricultural and resource lands. Consideration should be given to jurisdictions that contribute towards these goals for projects that reduce GHG or are GHG neutral, such as safety, rehabilitation, connectivity and for alternative modes.

5. In setting priorities, consider transportation projects that increase connectivity or provide other means to reduce Vehicle Miles Traveled (VMT).

Pricing Strategies

1. Consider the use of alternative mode programs, congestion pricing, toll roads, and parking strategies. Examples include, but are not limited to the following:
   i. Road pricing and High Occupancy Toll (HOT) lanes. To reduce VMT, MPOs should model adding pricing to existing lanes, not just as a means for additional expansion. Variable/congestion pricing should be considered.
   ii. User fees such as fuel taxes and parking charges.
   iii. Free or reduced fare transit fares.
   iv. Expansion of Parking Cash-Out Programs
   v. Strategies to reduce the impacts of pricing strategies on low-income individuals.

2. Consider utilizing revenues from these pricing strategies for projects, such as mass transit, that improve mobility without increasing VMT or GHG emissions.

Road pricing strategies examples can be found at:

- "Opportunities to Improve Air Quality through Transportation Pricing Programs", U.S. Environmental Protection Agency, September 1997. http://www.epa.gov/oms/market/pricing.pdf
- "Sacramento Transportation & Air Quality Collaborative Final Report, Volume III: Supplemental Text for Agreements", December 2005. http://www.sacta.org/pdf/STAQC/FinalReportIII.pdf

Land Use Strategies

Regional land use projections that underlie RTPs have typically assumed existing growth trends will continue into the future, based on general plans. Over the last five years several MPOs have undertaken regional visioning or "blueprint" processes to look at how regions can grow more efficiently and meet more environmental and social goals.

1. Encourage twenty-year or longer regional housing forecasts by region, consistent with the RTP; housing need allocations that are consistent with the blueprint, and general plans to project twenty years forward in conjunction with the blueprint.

2. Encourage that the county or city general plan considers the blueprint plan for the region and links the general plan to reflect the best-case scenario.

3. Encourage that there is a reasonable basis for the projected land uses included in the RTP.

4. Encourage that land use changes contained within city and county general plans are built into land use pattern projections in the base case for modeling purposes.

5. Encourage that where there is a blueprint, the planned land use base for the regional transportation plan is consistent with that regional agency's blueprint.

6. Encourage that the land use base for the blueprint is consistent with federal regulations and current or projected local general plans.

7. MPOs should perform land use sensitivity analyses to determine whether more compact and efficient growth patterns (than the base case) would further reduce VMT.

Performance Measures

1. Include a VMT measurement as part of the environmental reporting requirements, taking into account growth projections for the area.

2. Compare projected blueprint development to actual development in applicable locations and provide an explanation for variances as updated.

3. Report the progress relative to whether the project(s) identified in the local RTP are consistent with city and county general plans or the blueprint strategy for the region.

TRANSPORTATION MODELING

The goal of applying transportation models and analytical techniques, as part of the RTP process, is to enhance the quality of information and analysis presented to educate public decision makers and the public at large

regarding the implications of various policy options, while recognizing that the final decisions on policy choices are their responsibility.

1. For preparation of the RTP required under Sections 65080 et seq. of the Government Code, by July 1, 2008 each MPO or RTPA over 200,000 in population is urged to establish transportation modeling and analytical techniques that facilitate its evaluation of one or more alternative planning scenarios under the provisions of Section 65080.3.
2. As part of the four-year RTP process each MPO or RTPA should strive to enhance, to the extent that data and resources permit, it's modeling and analytical techniques in order to improve its assessment of the likely implications of key policy options. Such improvements should educate decision-makers and the public regarding how such options would potentially affect trip making, choice of travel modes, VMT, major land use development decisions, and quality of life issues.

3. The transport sector produces almost half of GHG in California. To evaluate the effectiveness of policies to reduce GHG, the California Air Resources Board (ARB) and others need to compare modeling outputs across all regions in the State. To be able to compare travel projections across regions in California, some basic recommended modeling protocols should be adopted. These should be specific to groups of regions, according to policy problems encountered. California Department of Transportation (Caltrans) District Offices should follow the same practices as used by the MPOs, RTPAs, Congestion Management Agencies (CMA) and Councils of Government (COG).

   MPOs, RTPAs, CMAs, and COGs may be grouped according to modeling needs. For each group, we define: Model features and data, Possible applications of the model, and Policy analysis capabilities. These recommendations are cumulative, with each set of model guidelines including the earlier ones on the list.

   A. Counties with very slow growth in population and jobs, little or no congestion, and no significant new road or transit construction plans (i.e., Modoc, Inyo, Siskiyou, which have 1990-2000 population growth rates below 3%)

   Features and data: These counties do not need to run a network travel model.
   Possible applications of the model: No model.
   Policy analysis capabilities: Road congestion is not increasing rapidly. Emission changes from higher-MPG vehicles can be factored or derived from the ARB inventory.

   B. Regions with attainment Air Quality (AQ), slow growth, or virtually no transit, plus the rural, isolated non-attainment areas.

   Features and data: These RTPAs and CMAs can run 3-step models, at least for the next few years. These models should be run to equilibrium. They should implement 4-Ds add-on models, to account for the effects of land use characteristics on travel, in the short term. See the recent *Assessment of Local Models and Tools For Analyzing Smart-Growth Strategies* Final Report developed by DKS Associates for Caltrans, which can be found at:
   http://www.dot.ca.gov/hq/research/researchreports/reports/2007/local_models_tools.pdf

   The travel model should be documented, including all statistical goodness-of-fit measures derived from sub-model specification. The model should also be put through sensitivity tests and other validation tests, with these tests documented, and then formally peer-reviewed, also resulting in a written report. The models should address changes in regional demographic patterns. Geographic Information Systems (GIS) capabilities should be developed in these counties, leading to simple land use models in a few years. All natural resources data should be entered into the GIS. Parcel data should be developed within a few years and an existing land use data layer created.

Possible applications of the model: Agencies can define and evaluate Trend forecast, Combined General Plans, Preferred RTP, and Low-VMT scenarios. The Low-VMT scenario should achieve the regional VMT and GHG targets, if they are adopted by the ARB. Otherwise, the Low-VMT scenario can simply reduce VMT substantially and increasingly over time, compared to the Proposed RTP.

Policy analysis capabilities: These models can be used to evaluate increased density and mix, urban growth limits, and improved neighborhood walkability and bikeability. Performance measures can include on-road emissions of pollutants and GHG.

C. Regions with rapid growth, nonattainment AQ, or the potential for significant transit use.

Features and data: These regions should develop 4-step travel models as soon as is possible. In the near-term, 4-Ds add-on models should be used. Simple land use models should be used, such as GIS rule-based ones, in the short term. Economic, market-based land use models should be developed within a few years. A simple freight model should be used. Several employment types should be used, along with several trip purposes. Time periods should include peak and off-peak. The travel model set should be run to full equilibration across all model steps. All road capacities and speeds should be validated with surveys. The urban development footprint in GIS should be used to calculate environmental impacts on terrestrial and aquatic ecosystems. The travel model and land use model should be documented and tested, as above. Parcel data and an existing urban layer should be developed as soon as is possible. A digital general plan layer also needs to be developed in the short-term.

Possible applications of the model: More policy scenarios can be run. The same policies as in *B* could be run, plus one or more transit improvement proposals, as well as demand management and pricing strategies.

Policy analysis capabilities: In addition to the policies and performance measures in *B*, these agencies can evaluate policies for their effects on lower-income households, as required by Federal and State law. This can be done by evaluating traveler welfare measures based on the mode choice log sums for each household income class, or based on travel costs for them. In addition, these agencies can evaluate simple road pricing, parking charges, and higher fuel taxes or carbon taxes in the Plan, or in the Government Code Section 65080.3 alternative.

D. Regions with serious or worse ozone or CO non-attainment.

Features and data: These agencies should achieve the requirements of the Federal AQ Conformity Rule, meaning 4-step models with full feedback across travel model steps and some sort of land use modeling. In addition to the Conformity requirements, they should also add an auto ownership step and make this step and the mode choice equations for transit and walk and bike and the trip generation step sensitive to land use variables. Walk and bike modes should be explicitly represented. They should implement simple land use models for the next RTP and develop formal, economic land use models in the next few years. Freight models should be implemented in the short term and commodity flows models within a few years. Simple Environmental Justice analyses should be done using travel costs or mode choice log sums, as in *C.* Four or five time periods should be modeled. Agencies should develop and test joint mode-destination choice models. Small Traffic Analysis Zones (TAZ) should be used, to increase sensitivity to densification near to rail stations and in Bus Rapid Transit (BRT) corridors. These regions should monitor the large RTPAs and MPOs, in *E* below, as they develop tour-based travel models and activity-based travel models. The next household travel survey should include activities and tours. Floor space rent data should be collected. Parking quantity and cost should be represented in the travel model. The carpool mode should be included, along with access-to-transit sub

modes. Speed post-processing should be used and take into account the effects of corridor capacity continuity and bottlenecks on congested speeds and emissions.

Possible applications of the model: Five-step models permit the agencies to design and evaluate more land use policies, such as in *D*, plus complex combinations of transit, land use, and pricing policies.

Policy analysis capabilities: A full range in performance and impact measures could be developed, for economic, environmental, and equity effects, as required by SAFETEA-LU, National Environmental Policy Act, CEQA, and other laws. Traveler welfare could be measured and, if possible, locator welfare. Various measures of economic development could also be created, such as wages, jobs, production, and exports.

E. The largest four MPOs and other COGs and RTPAs with rapid growth and established transit systems.

Features and data: These regions should develop tour-based travel models in the short term and activity-based travel models within a few years. They should also build formal microeconomic land use models, as soon as is practical, so that they can be used to evaluate economic welfare (utility) and economic development (wages, jobs, exports). Commodity flows models should be developed, with truck and van tours, in a few years. The next household travel survey should include activities and tours. Geocoded employment data with occupational code should be purchased for two or more past years. Floor space quantity and rent data should be gathered. Freight data also should be collected. Full sample enumeration of households in the travel model and land use model should be studied and implemented in a few years, if feasible. Households should be geocoded to location. Stated preference surveys of households and firms should be performed, as necessary, for use in location choice models. Microsimulation of households and firms should be investigated and developed, if feasible.

Possible applications of the model: The effects of transportation policies and land use policies interact with feedbacks in an integrated model set and so projections will be more accurate. With a market-based land use model, the agency can evaluate land-pricing policies, such as infill subsidies.

Policy analysis capabilities: Economic measures from the land use model could be implemented. These measures are more complete than those from the travel model and include locator welfare, wages, and exports. Equity analysis could include change in welfare by household income class. Water quality, housing affordability, and fire hazard analysis are examples of the measures that such model sets can also produce. These microsimulation land use models can evaluate the energy use and GHGs produced by households and workers in building space. Economic development impacts may be comprehensively evaluated with this model set. Time-of-day road tolls can be evaluated.

The following recommendations for quality control through model consistency and peer review are essential in creating confidence in modeling results. These process recommendations should be implemented by all agencies as soon as is possible.

Consistency of RTP Modeling

For modeling groups *C*, *D*, and *E*, the No Action alternative and the Proposed Plan alternative in an RTP should be modeled consistently. This means both should be done using the same land use model and the same travel model. The inputs for the models, including alternative land use policies; will be different, of course. This practice will reduce the arbitrariness of zonal projections for households and employment in travel models. This practice also should apply to Environmental Impact Reports (EIR)/Environmental Impact Statements (EIS) studies. The same land use model used in the RTP modeling should be used in the impact assessment for the No Action alternative, the Proposed Plan alternative, and the Environmentally Preferable Alternative. Only in this way, will all of the outputs in the RTP and EIR be comparable. An alternative-planning scenario under Government Code Section

65080.3 should also be evaluated with the same models. County and corridor studies performed by Caltrans districts and by county agencies may use more-detailed networks and zones than the MPO uses, but the models should be otherwise consistent, structurally and in operation, with the MPO model.

Peer Review and Model Testing

All travel and land use models should be fully documented, with the documents on the web. They should also be validated and tested for sensitivity to changes in inputs, parameter values, and policies. Agencies should have an on-going model improvement program to increase model accuracy and policy sensitivity. All substantial model changes should be subjected to peer review and written up. The four largest MPOs should use the Travel Model Improvement Program (TMIP) national peer review process, but include two California modelers, for their understanding of California laws. Other agencies should set up reviews using California modelers. The California Inter-Agency (CIA) Forum or other body of California modelers may develop validation guidelines. Also, these bodies could develop guidelines for which types of VMT should be reduced in GHG-reduction scenarios and alternatives.

4. The RTP analyses should provide to decision-makers and the public:
   a. A clear explanation of the modeling and analytical techniques applied in assessing the implications of the "likely" land use scenario, and any land use and other alternatives studied;
   b. Reasonable transparency to that modeling and analytical process;
   c. An understanding of the sensitivity of the forecast results to various policy assumptions; for example, where feasible offering estimates of the elasticity's and cross elasticity's of demand for various modes of travel with respect to critical variables such as access time, travel time, reliability, safety, privacy, and cost;
   d. The degree to which analytical results can be expected to:
      i. Be more indicative of a general expected trend or order of magnitude change rather than a quantifiably valid forecast;
      ii. Provide the degree of certainty needed for the quantifiable forecasts; and
   e. Any insights gained through market-based research into the variables that most influence consumer choices with respect to housing in transit oriented and mixed-use developments, the use of transit services, and decision to use single occupant vehicles.

The following are suggested references:

- "Assessment of Integrated Transportation/ Land Use Models", Robert Johnston and Mike McCoy, UC Davis for Caltrans, May 2006: http://www.ice.ucdavis.edu/um/
- "Assessment of Local Models and Tools for Analyzing Smart-Growth Strategies," DKS Associates, with UC Irvine and UC Santa Barbara, for Caltrans, July 2007. http://www.dot.ca.gov/newtech/researchreports/reports/2007/local_models_tools.pdf
- "Traveler Response to Transportation System Changes, Interim Handbook," TCRP Web Document 12 (Project B-12), March 2000.
- "Metropolitan Travel Forecasting: Current Practice and Future Direction" Transportation Research Board, Special Report 288.
- Robert A. Johnston, "Review of U.S. and European Regional Modeling Studies of Policies Intended to Reduce Transportation Greenhouse Gas Emissions" July 30, 2007. On the VTPI web site and available from the author at UC Davis.