

STAFF REPORT

SUBJECT: Regional Travel Model

MEETING DATE: October 21, 2004

AGENDA ITEM: 7D

RECOMMENDATION:

Approve contract amendment with Caliper Corporation in the amount of \$68,400 for extra services to upgrade the regional travel model.

SUMMARY:

SBCAG contracted with Caliper Corporation for development of a new regional travel model. Last month the board authorized the use of the model for the 101 in Motion project, Regional Transportation Plan update and other planning applications. This contract amendment will allow the model to be expanded to include the capability to analyze alternative highway lane configurations, such as High Occupancy Vehicle lanes and reversible lanes as part of the 101 IM project.

DISCUSSION:

In July 2001, the SBCAG Board authorized a contract with Caliper Corporation for the SBCAG Model Replacement and Update for a cost of \$165,000. The purpose of the model update is four-fold: replacement of SBCAG's existing model with new travel model software, upgrading our agency's modeling capability with a Transit Mode Choice Model, enhancing the in-house GIS capability, and updating the model database from 1994 to 2000. In January, of this year the board approved a contract amendment of \$20,300 to compensate the contractor for extra work performed to overcome a number of unforeseen challenges during the model data and model development phases such as redoing travel estimates due to changes in state travel survey base data and an additional presentation to the model Technical Advisory Committee (TAC).

Last month the board authorized use of the model in the 101 in Motion project and other planning applications. The model will be used to forecast travel demand under different transportation network improvement alternatives. In its presentation last month on the 101 in Motion project, the consulting team presented the alternative improvement packages that were developed jointly by the Stakeholder Advisory Committee and the Technical Advisory Committee. These packages include alternatives such as widening 101 with mixed flow, High Occupancy Vehicle or reversible High Occupancy Vehicle, Toll lanes, expanded express bus

Member Agencies

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service and commuter rail as their key congestion relief elements. The travel model must be expanded in order to use it to forecast travel demand for the HOV and reversible HOV and express transit lane alternatives. Staff is recommending that this work be completed by Caliper through a contract amendment. The attached scope of work outlines the additional tasks that will be required to upgrade the model. The extra work required to complete these tasks will require approximately 400 hours. Staff recommends approval of the contract amendment at a cost not to exceed \$68,400.

Sufficient funds have been included in the Professional and Special Services account of the SBCAG FY 03-04 budget, therefore, no budget appropriation increase is required.

COMMITTEE REVIEW:

None

STAFF CONTACT: Michael Powers, Bill Yim

ATTACHMENT A

SUMMARY OF ADDITIONAL COSTS BY CATEGORY

Description	Additional Cost
1. Labor	\$55,900
2. Subcontractor for mode Choice Model Improvements	\$7,500
3. Other Direct costs	\$5,000
Total:	\$68,400

ATTACHMENT B

AN AMENDMENT TO THE SCOPE OF WORK

TO THE AGREEMENT BETWEEN

THE SANTA BARBARA COUNTY ASSOCIATION OF GOVERNMENTS AND CALIPER CORPORATION FOR PROFESSIONAL AND TECHNICAL SERVICES

It is mutually agreed that the following tasks are either to be added or amended to the Scope of Services Agreement approved on July 19, 2001 and revised on January 20, 2004 between the Santa Barbara County Association of Governments (SBCAG) and Caliper Corporation (Caliper) as part of the SBCAG Model Replacement and Update project.

1.0 Work Tasks

1. 1 HOV Lane Network- Related Extensions

- **Define appropriate network parameters and coding conventions to include HOV lanes in the highway system definitions:**

In general, HOV lanes are represented as independent line segments in the network database. Caliper will define new network parameters and coding conventions on the highway network layer to help analyze the performance of HOV lanes whereby the HOV, i.e., HOV-2, HOV -3, etc., and non-HOV traffic are to be separately assigned. New network attribute fields in the line layer will be added to easily identify HOV links from non-HOV links. These HOV and non-HOV sets will serve as an input to the skimming procedure and the assignment procedure that can assign the HOV trips separately from the non-HOV trips.

The incorporation of "reversible HOV" lanes into the network and model script will be added. The current model structure assumes that the available network links are the same for the daily, AM, PM and Offpeak time periods. When reversible HOV lanes are added to the network, it is possible that the network links might differ between the various time periods. This requires that separate networks be built for each time period and that separate highway skims be performed for each time period. This would also require the appropriate changes in the model script.

- **Modify appropriate scripts and process setups to create level-of-service matrices for HOV lane (2+ only):**

The model script will be modified to independently model HOV trips from the highway network. A new HOV highway skim matrix will be generated as an additional input into the mode split FORTRAN program. This skim will be separate from the original highway skim matrix, which will be modified so that it will be produced from only non-HOV links.

- **Modify appropriate scripts and process setups to assign HOV lane matrices to highway network:**

In the current model, auto vehicle trips are assigned as one mode onto the highway network using TransCAD's standard User Equilibrium assignment procedure. With the addition of HOV trips, the mode split fortran program will output HOV trips in addition to the single-occupancy vehicle (SOV) trips. The model script will be modified to treat the two outputs as separate

matrices in the PA to OD and Time of Day steps, resulting in separate HOV and non-HOV vehicle trip matrices. These two matrices will be assigned simultaneously using TransCAD's Multi-Modal Multi-Class (MMA) assignment procedure. In this assignment, the HOV specific links will be available for use for the HOV trips and disabled for the SOV trips. The model will also allow bus use on the HOV links. The MMA method is recommended because it allows for the simultaneous assignment of multiple modes and the disabling of links for specific mode. In addition, it can support future HOT analysis, as this model can support tolls, and each mode can have a different value of time.

- **Identify changes in network processing sequence (as appropriate):**

The proposal should identify the sequence of the modeling modifications necessary in the expanded work scope in order to differentiate the difference with the current model. This includes the network attributes, script changes, new processing procedures, and model process sequence, etc.

1. 2. Mode Choice Model Improvements

- **Expand lower level nesting structure to consider HOV lane choice**

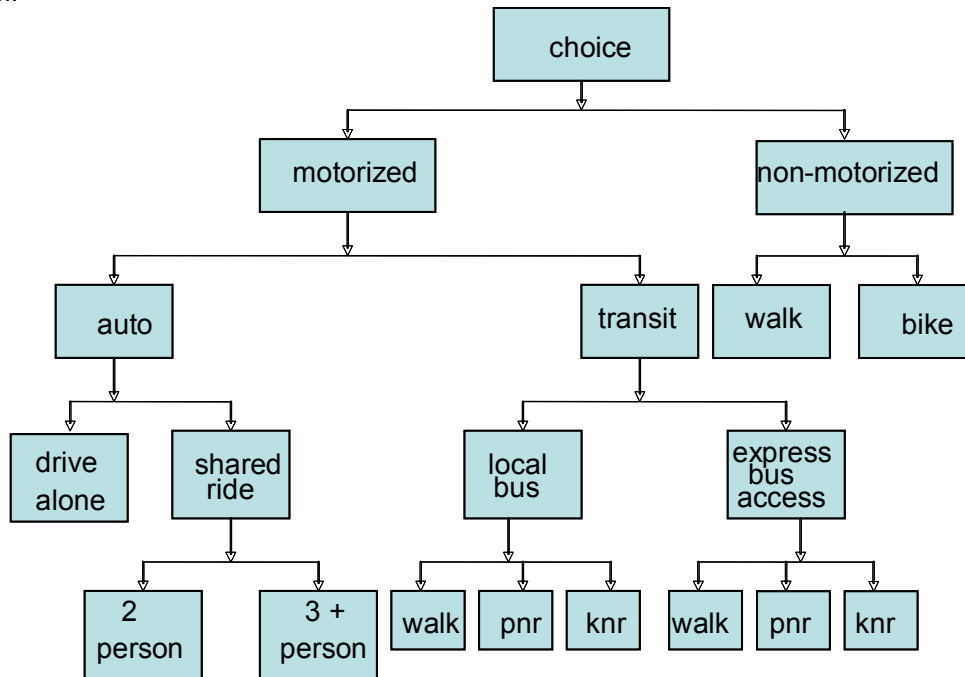
The mode choice nesting structure will be expanded to incorporate the HOV mode.

- **Define utility expressions and variable coefficients for both new mode alternatives**

The newly expanded HOV modes will have new defined utility equations and new choice mode coefficient values. The new mode coefficients will come from other similar models that have developed that incorporates HOV, or Caliper will choose coefficients that reflect the best default choice. Model constants for these modes will be calibrated for the future year forecasts to generate reasonable results.

- **Identify changes in new nested mode choice structure when comparing with existing structure**

The following graphic illustrates the mode choice structure existing in the current model:



In the above graphic, the “HOV” mode is incorporated into the 2 person and 3+ person “modes” that currently exist. The nested structure of the model will not change. However, the HOV modes will be evaluated with the added information of separate HOV and SOV highway skim matrices. In the current model, only SOV skim matrices are used to evaluate these modes. A separate technical memorandum document on the new mode choice model will be created and be part of the deliverable. pbConsult will be assisting as necessary with all tasks in this section of the scope of work.

1. 3. Model Calibration and Future Forecasts

Part of the mode choice expansion effort will include the following calibrations and forecasts:

- A recalibration of the base year 2000 model. The introduction of the HOV lanes will probably affect model results for the base year.
- A 2030 and an interim year (2010) network, incorporating the HOV Lane(s).
- Calibration of forecasts and model output to ensure reasonableness for review by SBCAG and PB
- An update of the 2030 and an interim year (2010) forecasts for input to the 101IM project.

1. 4. Documentation / User’s Manual

The original model development contract includes five copies of full model report. For this mode choice expansion effort, Caliper will provide “an addendum” to the original model report documenting the mode choice module expansion and all other related changes.

2.0 Project Management and Subcontractor

Mr. Jim Lam will be the Project Manager for this expansion work. pbConsult will serve as a subcontractor for the work, and will report to Mr. Jim Lam.

3.0 Product, Deliverables, Schedules

The products, deliverables, and schedules are summarized as follows:

- An expanded and workable nested logit mode choice model incorporating the HOV mode replacing the existing mode choice model. The new mode choice model will allow “place holders” for further mode choice expansion, such as HOT, should this become necessary.
- 5 copies of the new mode choice users manual, which will be a separate addendum to the SBCAG final model report. The User’s Manual will include full description of the components of the new mode choice model, application, and evaluation functions.
- Revised 2030 and 2010 models in CD-ROM (separate from the original SBCAG Model CD-ROM)

4.0 Staff Training and Technical Support

SBCAG staff training or re-training needs should be minimal for this expansion project. Most likely, the model interface will remain the same with the only additional output skim and trip matrices for the new HOV modes. Thus, training and support would only be necessary for SBCAG staff to be knowledgeable about changed highway and transit network input requirements and the changed output files. An additional two-day training session has been included in the cost summary.

The outlined work scope is hereby made a part of the SBCAG Model Replacement and Update Project work scope.

IN WITNESS WHEREOF, the parties hereto have executed this agreement to the SBCAG Model Replacement and Update project agreement on the day and year below written, but effective as of the day and year first set forth above.

CALIPER CORPORATION

SBCAG

By: _____
Names: Howard Slavin, Ph.D.
President

By: _____
Name: Supervisor Naomi Schwartz
Chair, SBCAG

Date: _____

Attest

By: _____
Name: James M. Kemp
Executive Director

Date: _____

Approved as to form and procedure:

Stephen Shane Stark
County Counsel

By: _____
Deputy County Counsel
Counsel for SBCAG