U.S. Department
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SUMMARY OF COMMENTS PREPARED BY TRAVEL FORECASTING PEER REVIEW PANELS

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PEER REVIEW PANEL FUNCTIONS

The procedures used by transportation planning agencies to forecast future travel demand and the split of demand among drive alone, ridesharing and public transit are quite complex. Over the past thirty years, a basic process has been developed that involves four major elements.

1. How many trips will be made? (Trip generation)

2. What destinations will be selected by people living in specific areas? (Trip distribution)

3. How will travel be divided between driving alone, ridesharing and public transit? (Mode choice)

4. How many vehicles or people will want to use specific roadways or transit services? (Assignment)

Initially, the methods used to address each of these questions were relatively simple. Over time, as more research has been reported on personal travel behavior, new procedures were recommended. Advances in personal computer technology and reduced costs for computers has made it possible to implement many of the methods recommended by the research. As this has happened, the methodologies used to consider each of the questions have become more complex.

When an agency undertakes development of new travel forecasting methods, it must consider many questions related to the details of the methodology. The questions might include:

- How should the population be stratified for estimating travel demand?

- What factors are important in determining the number of trips to be made?

- What factors affect an individual's choice of the destination for a trip? If both highway and transit are available, does this affect the choice of destination? If so, how are these travel opportunities represented?

- When allocating travel to the available modes, what modes must be considered? Should different types of transit service be treated as different modes? Does the methodology need to differentiate between people who walk to transit and those who drive to transit?

- What factors determine a traveler's choice of mode? How important is each factor?

Each of the questions listed above implies further questions relating to details of the computer programs and the techniques used to represent transportation facilities in the computer models. There are many possible pitfalls. Seemingly simple decisions made at the beginning of work to develop travel forecasting methods can make it difficult or impossible to answer questions that arise when specific investment actions are being considered.

Few individuals have had the opportunity to develop and apply more than one travel demand forecasting procedure. No individual can foresee all the issues that may arise in developing or applying a new model set. One approach to improving travel forecasting procedures has been the use of Peer Review Panels. These Panels, composed of individuals who have "hands-on" experience with both developing and applying travel forecasting models, assist local agency staff in both identifying possible problems and in developing workable solutions.

For a project involving development of new models, a Panel will typically schedule a two or three day meeting that functions much like a seminar. Documentation of existing travel forecasting procedures and of available data sources are distributed to the Panel In advance of the meeting, permitting the Panel to read the items and become familiar with the methods. At the meeting, each aspect of the travel forecasting procedures is discussed in detail. Deficiencies, if any, in existing procedures are noted and suggestions for improving the methods are made. The objective is to assure that travel forecasting methods will be able to answer important questions and that the methods are consistent with the general "state-of-the-art." At the end of the Panel meeting, documentation is prepared of specific recommended and desirable actions.

For a project involving the application of travel forecasting models to analysis of a proposed transportation investment, the role of the Panel is slightly different. In these situations, the Panel will provide comments on the application of the existing models to the issues under study, suggest areas in which additional analyses are required, provide review of basic assumptions (e.g. demographic forecasts, parking costs) and design of alternatives to be tested, and comment on the interim and final results.

In the past few years, Panels have been formed in at least a dozen metropolitan areas. Some Panels have been established as part of FTA's review of Alternatives Analysis studies; others have been assembled by the local transit agency or Metropolitan Planning Organization. As there are many similarities in the travel forecasting procedures used by planning agencies, it is likely that comments made by these Panels would have application in other areas and might provide guidance to the travel forecasting profession on topics where there appears to be concerns on the need for improvements. A synthesis of the comments from the recently convened Panels might assist in this process.

The following materials are a terse summary listing of relevant comments from a number of recent Panels. The factors leading to the cited recommendations reflect both the issues under study in specific projects and the existing model structure used by each of the agencies. Full understanding of specific comments would require knowledge of the detailed procedures in use by the agencies. The summary, however, does provide a useful overview of the topics in travel forecasting meriting attention.

Materials from a number of Peer Review Panels assembled to comment on travel forecasting methods have been obtained and reviewed. Data for panels convened in eight metropolitan areas involving sixteen separate meetings have been obtained. Thirteen of the meetings addressed methods being proposed or used for analysis as part of a specific transit investment study. Three of the meetings had a more general scope related to overall improvements to the demand forecasting procedures being used in or developed for a metropolitan area.

PEER GROUP COMMENTS INCLUDED IN SUMMARY ANALYSIS

City	Meeting Number	Date	Project
Atlanta	1	April 1994	Model Development
Cincinnati	1	July 1994	Model Review Prior to Corridor Study
Cleveland	1	January 1994	Dual-Hub Corridor
Hartford	?	November 1993	Griffin Line
Honolulu	1	April 1991	Ewa-University of Hawaii
	2	November 1991	Ewa-University of Hawaii
	3	February 1992	Ewa-University of Hawaii
	Models	April 1993	Model development
Los Angeles	1	February 1992	East Side
	2	September 1992	East Side
	3	February 1993	East Side
Sacramento	1	October 1992	South Corridor
	2	February 1993	South Corridor
	3	July 1993	South Corridor
San Diego	1	September 1993	Mission Valley East
	2	January 1994	Mission Valley East

PANEL COMMENTS

Panel comments are grouped under nine broad topics:

- o Observed Data
- o Demographic and Economic Forecasts
- o System Design
- o General Forecasting Model Issues
- o Trip Generation
- o Trip Distribution
- o Mode Share
- o Assignment
- o Details

There is some overlap and duplication among these topic areas. The comments of panels assembled in specific areas reflect the nature of the project being considered, the status and sophistication of the existing model set and the membership of the panel.

In broad terms, the recommendations that appear to be made most frequently relate to:

1. Obtaining current data on travel behavior, system use or system performance.

2. Validating models against observed data.

3. Assuring consistency of travel times through all steps of modeling and evaluation.

4. Developing new models, especially mode choice models, that adequately treat mode-of-access. A need for a two phase development effort is seen, with near-term efforts focusing on the four-step process and long-term efforts based on processes yet to be defined.

5. Fully documenting procedures and assumptions.

OBSERVED DATA

Develop a regional travel database	Honolulu 1
New travel data are needed. The current base-data are too old. Home-interview On-board transit survey Highway travel speed and travel time	Cincinnati
Conduct household survey (3,000-7,000) (activity based)	Atlanta
Conduct panel survey (1,500-2,000)	Atlanta
Obtain actual highway speed data for current year	Atlanta
CBD Parking Costs should be analyzed -- Under/Overstated -- Better data needed	Honolulu 1, Los Angeles 1 San Diego 1, Honolulu 2
Obtain better data on transit fares and parking costs	Atlanta
Conduct surveys at trip destinations	Atlanta
Develop a consistent traffic count database	Atlanta
Obtain data on pedestrian and bicycle facilities	Atlanta
Conduct survey of taxis	Atlanta

DEMOGRAPHIC AND ECONOMIC FORECASTS

Sensitivity tests of model elements/inputs should be conducted	Honolulu 3
Conduct Sensitivity Testing of CBD Growth Forecasts	Honolulu 1, Sacramento 1
Check consistency of population and employment forecast	Cleveland, Hartford, Sacramento 1
Analyze apparent lack of consistency between employed resident forecasts and auto ownership forecasts in corridor	Los Angeles 3
Demonstrate financial ability to construct and operate no-build	Los Angeles 1
Document availability of funding for feeder bus services	Honolulu 1
Analyze effect of aging population on system average fares	Honolulu 1
Document, with tabulations and maps, base year, future year and growth in population and parking costs by zone.	Sacramento 1
Reflect transit availability in auto ownership, trip generation, trip distribution, etc.	Atlanta
Review auto ownership forecasts	Hartford

SYSTEM DESIGN

The TSM Alternative requires:

-- Better definition -- Community involvement in defining services	Los Angeles 1
Prepare full documentation of alternatives, including rail operating plans	San Diego 1, San Diego 2
Do "winners and losers" analyses to refine networks	Los Angeles 3, San Diego 1, Cleveland 1
Compare bus operating speeds developed from highway network to scheduled times	San Diego 1
Document the equilibration of transit service supply and demand procedure	Los Angeles 1
Check to assure that all alternatives, including TSM, offer comparable service and have comparable service areas	Sacramento 3, Los Angeles 1
Document current and future peak-to-base service ratios	Sacramento 3
Document and justify annualization factors	Sacramento 3

GENERAL FORECASTING MODEL ISSUES

A two level approach to model development is needed. -- Short-term -- Long-term Prepare to spend 2-3 years to develop new models	Honolulu Models, Cincinnati
Layout basic model design before data collection	Honolulu Models, Cincinnati
Make models state-of-the-practice not state-of-the-art	Cincinnati
Must regularly update models	Honolulu Models
Focus on activities not trips	Cincinnati, Atlanta
Develop methods to analyze Land Use-Transportation linkage	Atlanta
Analyze impact of land use assumptions on forecast transit ridership	Hartford
Need Airport models: distribution, mode share and special generator	Cincinnati, Hartford, Atlanta, Honolulu Models
Supply representation and travel forecasts should treat peak and off-peak periods separately	Honolulu Models, Hartford
Need capability in models to address management type actions, including TDM and pricing	Atlanta, Cincinnati
Develop and document methods for modeling the effects of programs established to meet emission reduction goals that require employers to develop programs to promote reduced use of single-occupant autos for commuting	San Diego 1
There is a need for "Special Generator" analyses	Cincinnati, Hartford
Complete analysis and documentation of model set prior to start of corridor investment studies	San Diego 1, Cincinnati
Feedback congested speeds to distribution, mode choice	Cincinnati, Atlanta, Hartford

GENERAL FORECASTING MODEL ISSUES (Continued)

Highway congestion effects should be reflected in transit patronage forecast	Honolulu 1, Hartford
Check the forecasts of future bus operating speeds	Honolulu 1
Check bus speeds, as developed	Hartford
Develop regional model with flexibility to permit analyses at or below corridor level	Atlanta
Extend study area boundary	Atlanta
Support linking GIS/Transportation Analysis	San Diego 1
Use focus groups or stated preference surveys to identify trade-offs	Atlanta, Cincinnati
Validate base year model simulations	Sacramento 1
-- against on-board survey and household survey -- against screenline crossings	
Compare trip length distribution of person trips and transit trips, as simulated, against on-board and home interview surveys	Sacramento 1
Include an incremental build-up analysis in Results Report. This would include a step-by-step analysis of the impacts of demographic/economic change, and system changes so the effects of each on the resulting forecasts can be identified.	Los Angeles 3, San Diego 1 Sacramento 2
Concern about use of FRATAR to expand transit trip table for incremental analysis	Honolulu 1
Project schedule too short	Los Angeles 1, San Diego 2
Do not "hand adjust" forecasts upon completion of model application	Hartford
Commercial trip data and analysis are needed.	Honolulu Models

TRIP GENERATION

Trip generation	
-- include walk trips	Honolulu Models
-- should include a measure of level of service available	Honolulu Models
-- stratify by income (or similar measure)	Honolulu Models
-- The dwelling unit is the decision unit	Honolulu Models
Include household size in work trip generation model	Hartford
Life-cycle analysis of households is needed	Honolulu Models
Non-Home Based	Cincinnati
-- Divide into work-based and others	
-- Generate based on household data then allocation to Origin and Destination Zones	
Review reasonableness of future year trip generation results	San Diego 2
Develop cross-classification trip generation model	Atlanta
The assumption of auto ownership rates and income constant over time at the zone level may be incorrect for zones that will have substantial change (e.g. from rural to suburban).	Sacramento 1, Cincinnati

TRIP DISTRIBUTION

Check work trip distribution against Census	Los Angeles 3, San Diego 1 Los Angeles 1, Cleveland 1, Sacramento 2
Need validation of geographic trip patterns	San Diego 1, Sacramento 2
Check model estimates of CBD travel -- Number -- Orientation -- CBD Cordon	Cleveland 1
Use composite impedance at least for work trips	Honolulu Models
Use congested speeds for work trip distribution	Hartford
Do "time-of-day" analysis	Hartford
Use a single set of friction factors by purpose, not peak and off-peak	San Diego 2
Examine need for K-factors	Sacramento 1

MODE SHARE

Develop/borrow non-work mode choice model	San Diego 1, Sacramento 2
Develop procedure for transit mode of access modeling (including Kiss-and-Ride) Develop better Park-Ride access coding	Honolulu 1, Cincinnati, Sacramento 1
Use nested logit for work mode choice	Honolulu Models
Transit Mode of Access	
-- Consider weight on auto connector time -- There may be a need to represent access to several park-ride opportunities (different services)	Los Angeles 1
Broadly define park-and-ride catchment area	Hartford
Broadly define walk access area	Hartford
Consider walk networks around stations	Sacramento 1
Revise zone structure for corridor investment study to assure small zones near stations and correct mode of access representation	Cincinnati, Cleveland 1, Los Angeles 1, Sacramento 1
Use mode choice model segmented by income group	Atlanta
Use congested highway speeds	Hartford
Do/portray sample mode choice computation	Cleveland 1, Sacramento 1
Tie transit network coding to highway network	Cincinnati, Atlanta
Use same maximum walk distances for bus and rail	Sacramento 1
Estimate college/university mode choice using work trip model	Los Angeles 1, San Diego 1, Cleveland, Sacramento 1
Document parking costs	Hartford
Is factoring method (as used in Washington and Atlanta) adequate for non-work mode choice (as opposed to separate model)?	Hartford
Need analysis to determine if "CBD Flag" variable and parking cost variable duplicate each other	Hartford, Cleveland

MODE SHARE (Continued)

Need a methodology to eliminate "long drive access/short transit" trips with non-CBD origin and destination	Hartford
Need to carefully check transit assignments for short (one station) trips	Los Angeles 1
Conduct sensitivity analysis of timed-transfer operations	Sacramento 3
Analyze drive-access demand relative to Park-Ride lot capacity	Sacramento 3
Prepare District-to-District trip tables for alternatives to analyze differences	San Diego 1
Identify "new" trips using "build project"	San Diego 1, Los Angeles 3 Sacramento 1

ASSIGNMENT

Highway Assignment	Honolulu Models
-- Use multipath	Honolulu Models
-- Use generalized costs	Honolulu Models
-- Do by time of day	Honolulu Models
-- Use more iterations in equilibrium assignment	San Diego 1
Use equilibrium highway assignment	Cincinnati
Use generalized cost for highway path building	Cincinnati
Compare uncongested and congested highway speeds (travel times)	Hartford, Cincinnati
A time-of-day analysis by trip purpose is required for transit assignment.	Hartford
Assign on-board survey and check against load counts and transfer rates	Sacramento 1, Cleveland 1